Ancient Monuments Laboratory
Report 18/92

ANGLO-SAXON HUMAN REMAINS FROM MUCKING, ESSEX

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Summary

80 inhumations and 403 cremations were studied by the present writer and demographic data from a further 57 inhumations studied by Powers (nd) have been incorporated in the present report. Due to the aggressive nature of the soil conditions at Mucking the remains from both types of burial consist of small quantities of bone fragments and both are recorded in similar fashion. Survival of inhumed and cremated bone is compared as is the quantity and reliability of the data which can be obtained from them.

Author's address :-

S A Mays

Ancient Monuments Laboratory
English Heritage
23 Savile Row
London
W1X 2HE

ANGLO-SAXON HUMAN BONE FROM MUCKING, ESSEX

Introduction to the site

Two early Anglo-Saxon (5th-7th century) cemeteries on a gravel terrace by the Thames at Mucking, Essex were excavated between 1967 and 1975. About 50-60 graves were excavated from Cemetery 1. Here graves were laid out in distinct rows and nearly all were inhumations. Cemetery 2, which lay about 300m to the north-west contained more than 800 graves of which more than half were cremations; unlike Cemetery 1 the graves here were not arranged in any regular pattern. Cemetery 2 was completely excavated, Cemetery 1 was not. The two cemeteries appear to be contemporary.

The Human Remains

Unfortunately most of the teeth were separated from the bone during post-excavation processing and have since been lost. However some notes on the teeth were prepared by Rosemary Powers (Powers nd); these consist primarily of age estimations and are incorporated into the present report where specifically stated, otherwise all results refer only to those remains studied by the present writer.

1. Recovery methods

The fills containing the cremated bone fragments were wet sieved through a 1.7mm mesh and the bone hand-recovered from the residue. The inhumed bone was hand-recovered on site.

2. Bone preservation

Bone survival at Mucking was very poor; the very free draining, somewhat acid soil (the mean pH was about 5.7 - Keeley et al. 1977) is probably largely responsible for this. Most of the inhumations were present only as soil silhouettes with minimal survival of bone. The chemical nature of these soil silhouettes at Mucking has been the subject of several studies (Barker 1975; Keeley et al. 1977 & refs therein).

Bone was received for study from 80 inhumations (4 from Cemetery 1, 76 from Cemetery 2) and 403 cremations (all but 1 from Cemetery 2); in addition there was also a deposit of cremated animal bone (from cemetery 2). An additional 77 inhumations (7 from Cemetery 1, 70 from Cemetery 2), for which only tooth fragments survived, were studied by Powers (nd); of these demographic data is available from 61.

The inhumed bone which does survive at Mucking mainly consists of small fragments; it was thus decided to treat it in a similar way to the cremated bone and describe the burials in terms of weight of remains and estimated mean fragment size. The results for weights (in grams) and estimated mean fragment sizes (in millimetres), are shown in Tables 1 and 2 and Figs. 1-6.

Table 1: Summary statistics of weights of bone from inhumations and cremations

	All burials				Adults only			
	N	Mean	sd	Range	N	Mean	sd	Range
Inhumations	40	53.2	65.2	0.1-274.4	26	79.7	67.3	0.1-274.4
Cremations	402	147.4	199.0	0.1-1164.5	189	264.1	230.3	3.7-1164.5

Note: one cremation could not be weighed owing to the bone being received mixed with a large amount of extraneous material; 40 inhumations could not be weighed as the bone could not be separated from firmly adhering soil. Adults are considered, for the present purposes, to be those thought to be aged over about 18 years at death.

Fig. 1: Histogram of weights of bone from inhumations (50g intervals)

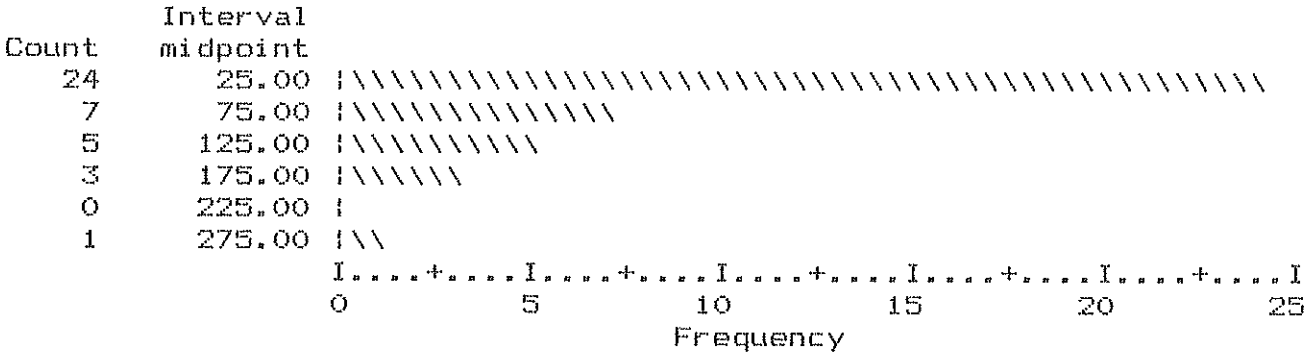


Fig. 2: Histogram of weights of bone from cremations (50g intervals)

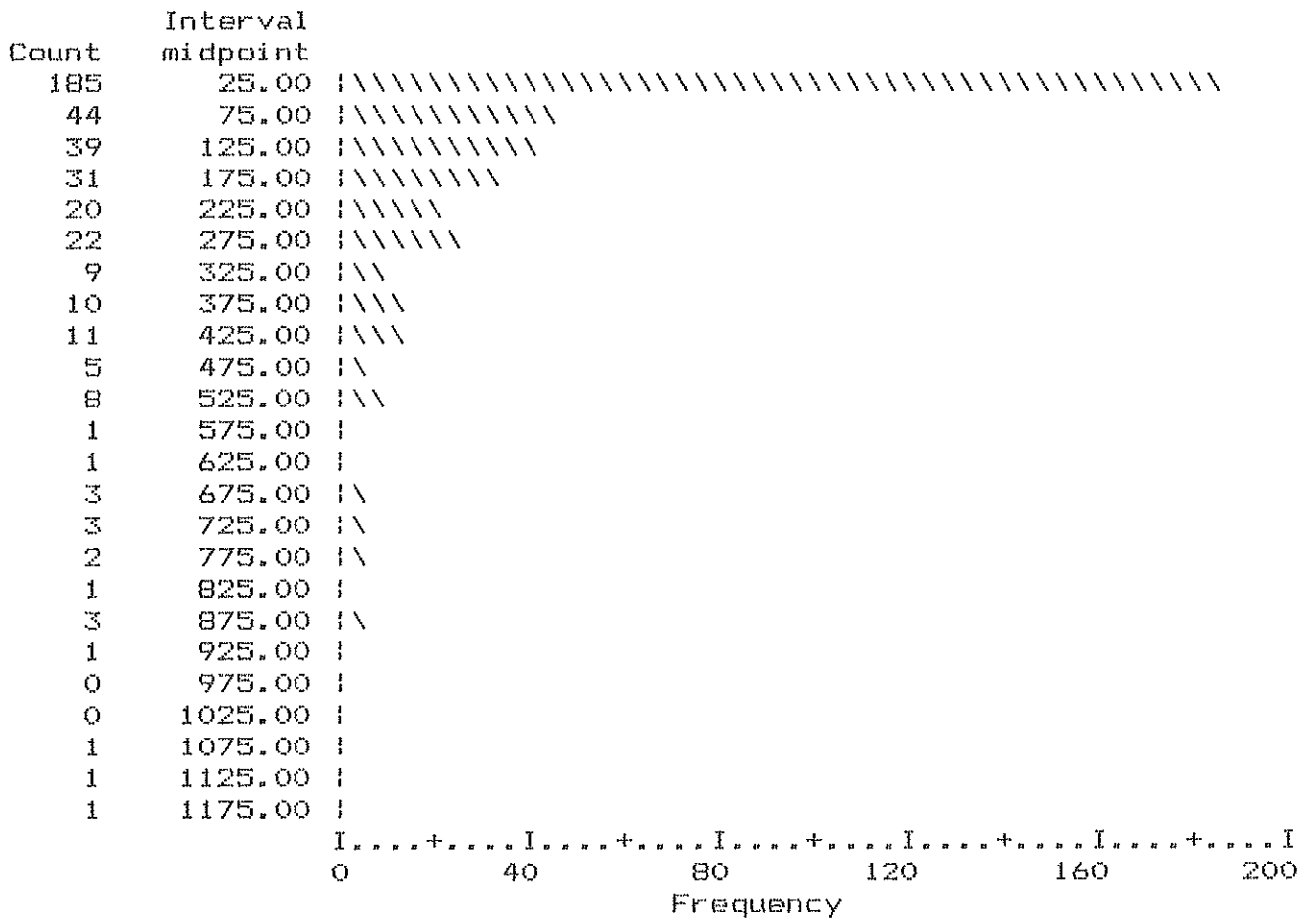


Fig. 3: Histogram of weights of bone from adult inhumations (50g intervals).

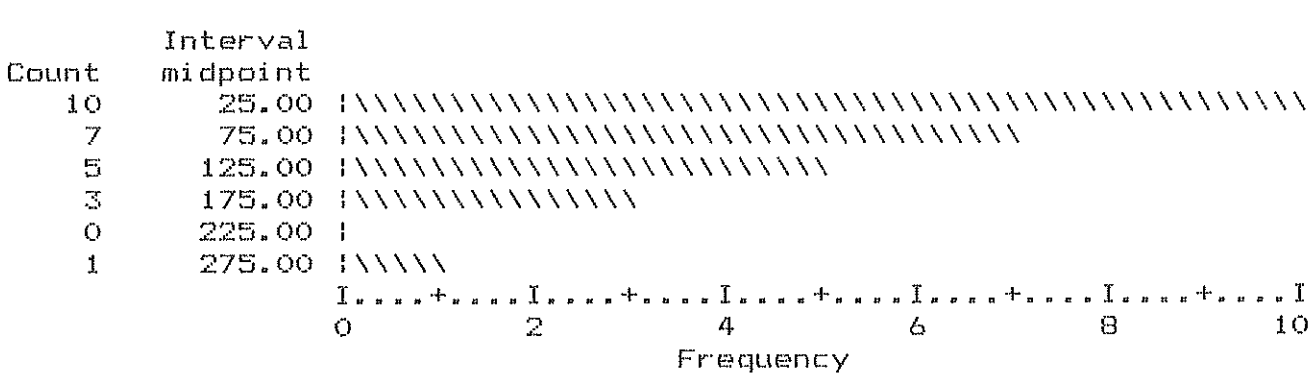
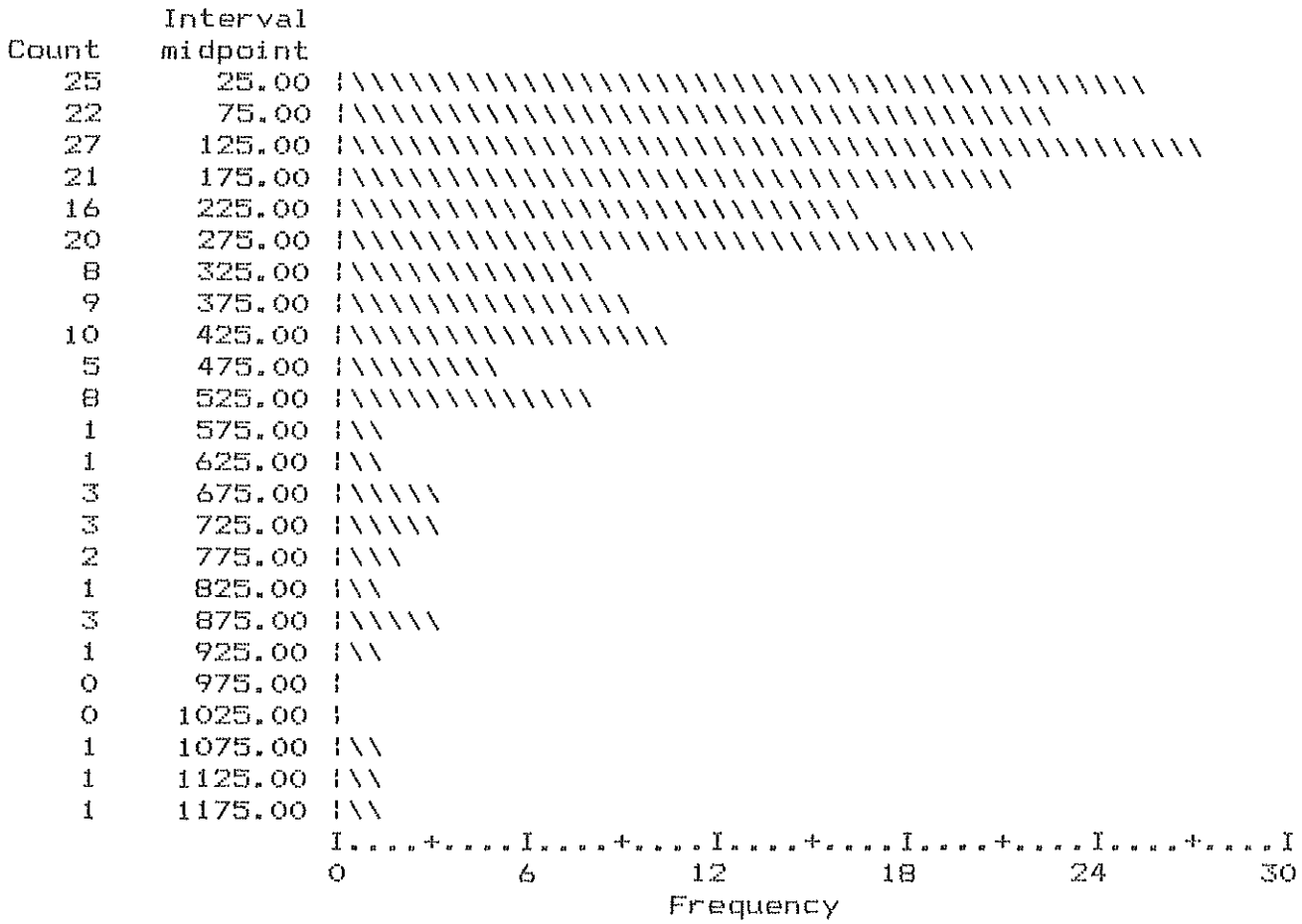


Fig. 4: Histogram of weights of bone from adult cremations (50g intervals).



Cremation of an adult corpse yields about 2-3kg of bone (studies discussed in Wahl 1982). Thus the average weight of adult cremations for which bone survived at Mucking of 264.1g represents about one tenth of a skeleton. Figs. 2 and 4 show that the distribution of the weights of the cremations is highly skewed towards the lower weights, with nearly half of all cremations consisting of less than 50g of bone.

The dry weight of the mineral part of an adult skeleton is also about 2-3kg, so the inhumations are generally even less complete than the cremations. On heating to temperatures attained by most cremations, bones fragment and undergo dehydration, loss of the organic component, and the mineral component undergoes changes in crystal structure (Shipman et al. 1984). When still hot the cremated bone fragments are highly friable but they gain strength when they cool, apparently through absorbtion of moisture. The end result is fragments which have greater mechanical strength than unburnt bone and greater resistance to destruction in the soil by chemical and biological factors (discussion in Wahl 1982). Thus the greater mean weight of remains from the cremation burials might be anticipated from the nature of the bone, however half the inhumations could not be weighed due to

firmly adhering soil; these tended to be those with rather larger bone fragments, hence the exclusion of these will have had the effect of somewhat reducing the mean weight figure for the inhumations. The bone from the inhumations was hand recovered, whereas that from the cremations was recovered by seiving - this more thorough recovery of cremated bone may also have biassed the results slightly.

An important factor in the loss of bone from the Mucking burials is damage to the graves by mechanical excavators prior to the archaeological excavation and, in addition, there was some damage to the site by deep ploughing. Besides the destructive effect of the soil conditions at the site, in the case of cremations some loss of bone in antiquity during transfer of the bony remains from the funeral pyre to their place of burial must have occurred.

Table 2: Summary statistics for estimated mean fragment sizes of cremated and inhumed bone

	N	Mean	sd	Range
Inhumations	79	23.0	16.6	3-80
Cremations	403	10.8	3.9	2-23

Note: the mean fragment size of one inhumation could not be estimated due to large quantities of firmly adhering soil.

Fig. 5: Histogram of estimated mean fragment sizes for inhumations

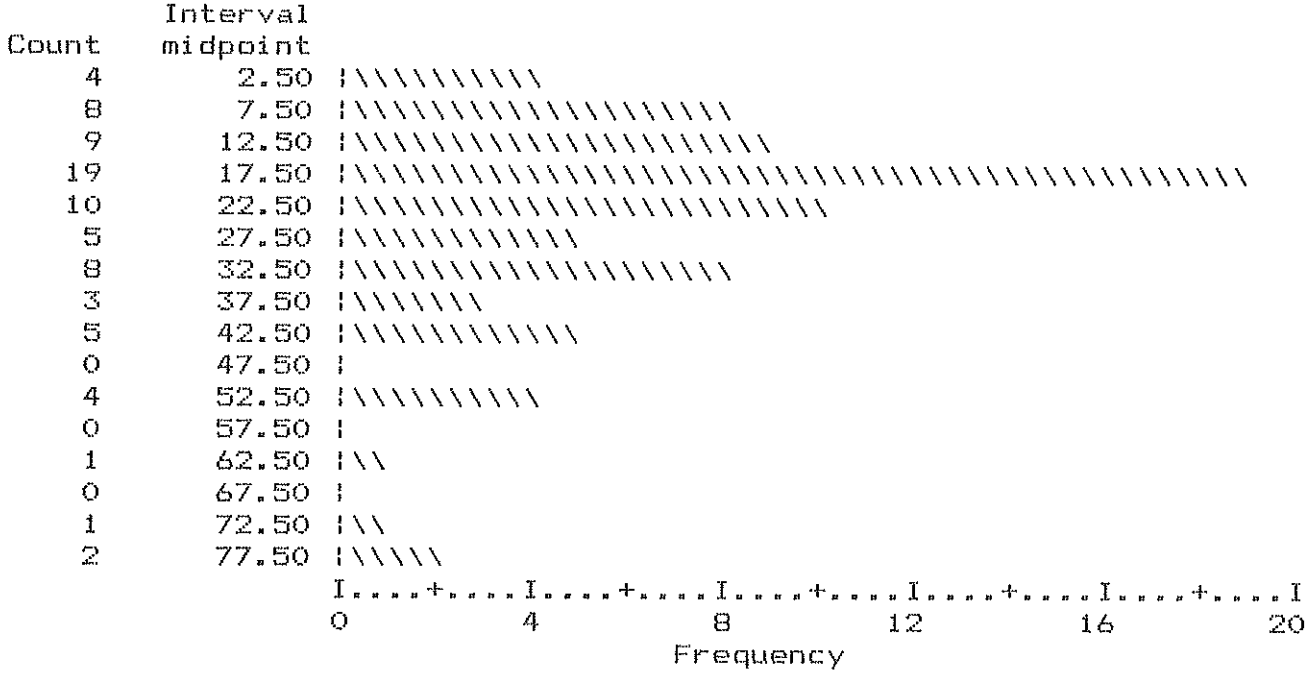
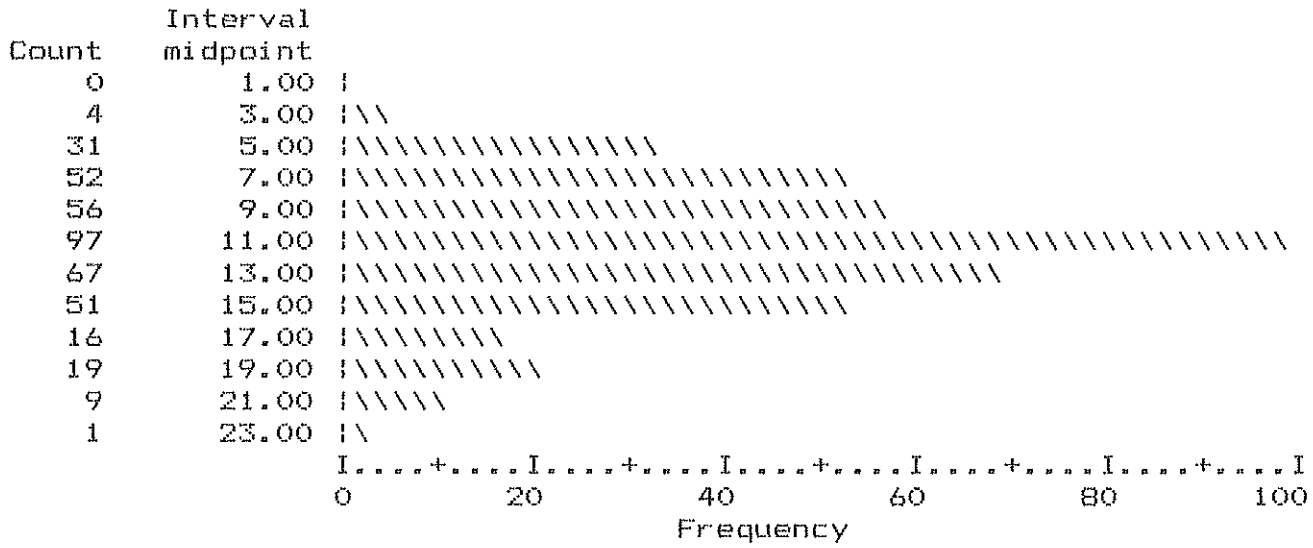


Fig. 6: Histogram of estimated mean fragment sizes for cremations.



The small size of the bone fragments in both the inhumed and cremated burials, together with the generally small quantities of material surviving, is largely responsible for the paucity of the anthropological data (see below) which could be gleaned from the remains.

The estimated mean fragment size for the cremations varies less between burials than does that for the inhumations (the coefficient of variation for the cremations is 36.1% compared with 72.2% for the inhumations). The appearance of the cremated bone suggests that the burials underwent a fairly similar degree of firing and this, together with presumably similar treatment of the remains during retrieval of the fragments from the pyre and their subsequent burial, seems to have resulted in a fairly similar degree of fragmentation for all cremation burials. By contrast the fragmentation of the more friable bone in an inhumation depends on the vicissitudes of the precise soil conditions in the spot where the individual was interred and on the care taken by the individual excavator in retrieving the remains, hence it is more variable.

3. Demographic aspects

An impression of the sex of an individual was gained from the dimorphic aspects of the pelvis and skull (Workshop of European Anthropologists 1980), or failing this, from the general size and robusticity of the remains. Note that it is not generally feasible to determine the sex of juveniles from their bones.

Approximate age at death was estimated in juveniles from epiphysial fusion (Workshop of European Anthropologists 1980: Fig. 6) or, failing this, using the general size and robusticity of the remains. In adults cranial suture closure (Perizonius 1984) was used to give a very approximate indication of age; in a few of the inhumations sufficient dentition was available to give a more precise age determination using dental wear (Brothwell

1981: Fig. 3.9).

The demographic data for the Mucking inhumations and cremations are presented below:

Table 3: Age at death for the juvenile inhumations and cremations

	Infant	Infant/child	Child	Adolescent	TOTAL
Inhumations*	0	0	5	0	5
Cremations	32	10	51	5	98
TOTAL	32	10	52	5	99

Note: the age categories in Table 3 correspond to approximate ages in years as follows: infant, 0-2 years; child, 2-18 years; adolescent 12-18 years. *=includes data on 4 individuals from Powers (nd).

Table 4: Age at death and sex of the adult inhumations and cremations.

		Young adult	Young/middle adult	Middle adult	Middle/older adult	Old adult	Indeterminate adult	TOTAL	
*Inhumations	Male	0	0	1	0	3	0	4	
	Probably male	2	0	2	5	1	2	12	20
	Possibly male	0	1	0	1	0	2	4	
	Female	1	0	0	0	0	1	2	
	Probably female	0	0	0	0	0	3	3	5
	Possibly female	0	0	0	0	0	0	0	
	Unsexed	12	1	9	7	1	63	93	
Cremations	Male	1	1	0	0	0	2	4	
	Probably male	0	0	0	3	0	6	9	24
	Possibly male	0	1	0	2	0	8	11	
	Female	1	0	0	0	0	0	1	
	Probably female	0	0	0	0	0	1	1	16
	Possibly female	2	0	0	1	0	11	14	
	Unsexed	8	5	4	10	0	123	150	
TOTAL		27	9	16	29	5	222	308	

Key: the age categories in Table 4 correspond to approximate ages in years as follows: young adult, 18-35 years; middle adult, 35-50 years; old adult, 50+ years. *=includes data on 57 individuals from Powers (nd).

In no cremation or inhumation is there any evidence for the remains of more than one individual.

In 18 cases out of the 80 inhumations studied by the present writer no estimate of age or sex could be made; the same is true for 115 out of the 403 cremations. The main factor responsible was the small amount of bone present in these cases. Also few individuals could be aged or sexed with any certainty - the great majority of adult inhumations and cremations are of unknown sex and could not be aged more precisely than that they were adult rather than juvenile.

In 39.3% of adult inhumations studied by the present writer some estimate of sex could be made, and for 36.7% age could be

estimated more precisely than "indeterminate adult". The corresponding figures for the adult cremations are 21.1% and 20.5% respectively. Thus, despite the lesser mean quantity of remains the inhumed adults were easier to age and sex. This is probably mainly due to their somewhat larger mean fragment size (26.3mm, compared with 12.8mm for cremations) and because in many inhumations the fragments which survived best are pieces of skull vault - the cranial vault bears many sexually dimorphic traits and cranial suture closure was the principal ageing method for the Mucking adults. Furthermore the inhumed bone fragments clearly did not suffer from the shrinkage and distortion that the heat of the pyre induced in the cremated remains.

Only 11 adults (5 cremations, 6 inhumations (including one sexed by Powers nd)) could be sexed with any certainty; this is because the secondary sex characters of the pelvic bones, which are the most reliable indicators of gender, rarely survive at Mucking. In most instances the general size and robusticity of the skeleton was used to determine sex, hence the uncertainty in the sexing of most adults.

Including those for whom the assignment of sex was less than certain in the totals for males and females, there are 44 male and 21 female adults. Although chi-square indicates that this sex imbalance is statistically significant (at the 1% level) little emphasis should be placed on it for two reasons; firstly the low proportion of individuals who could be sexed at all, let alone with any certainty, and secondly, the possibility of bias in the results. As stated above most individuals were sexed on the basis of the robusticity of their bones - those of markedly heavy build were classed as possible or probable males, those of markedly light build as possible or probable females, the majority of individuals who lay between these two extremes could not be sexed. If the group as a whole (both males and females) tended to be of rather heavy build then this would lead to more of the males being identified than females, the converse would be the case if the group as a whole was of light build. Hence the sex imbalance at Mucking may be illusory.

Turning now to the juvenile part of the assemblage it is apparent that although 98 cremations are juveniles there are only 5 juvenile inhumations (including 4 from Powers (nd)). Differential survival of remains is probably an important factor in the low numbers of juvenile inhumations - doubtless fewer of the more fragile juvenile bones survived among the inhumations (the generally greater resistance of cremated bone to destruction in the soil means that differential preservation should be very much less marked among the cremations).

Of the cremations approximately 34% are juveniles, and of these between one third and one half are infants. In the absence of modern medical care mortality among infants and young children is high - more than 40% of deaths may occur in the under 15 age group with most of these occurring in infancy (discussion in Brothwell 1987). It seems likely that, although the figures for the Mucking cremations approach these levels, infants are somewhat under-represented, as they are at other Anglo Saxon cremation cemeteries (e.g. Elsham, Humberside; Illington, Norfolk; Loveden Hill, Lincolnshire; Newark Millgate, Lincolnshire; Sancton, Humberside (data reproduced in Richards

1987) and Spong Hill, Norfolk (McKinley 1989); this may to some extent be due to differential preservation and recovery, and difficulties in identifying infant remains if infants were cremated with adults and the bones buried mixed, but it seems likely that, as is suggested by the other cemetery studies, infants were often buried outside recognised cemetery areas in the Pagan Saxon period.

4. The firing of the cremated remains

It has been demonstrated (Shipman et al. (1984) that the colour of burnt bone may be used as a very approximate guide to firing temperature. The main colour of the Mucking cremated bone is almost invariably neutral white, which suggests exposure to a temperature of in excess of about 940° C. Bone fragments from some of the cremation burials had fused glass or copper/bronze adhering to them, presumably from grave goods cremated with the corpse. Early Anglo-Saxon glass beads from Illington, Norfolk were found to become completely molten at approximately 920-940°C (Wells 1960). The melting point of copper is 1084 °C; that of a bronze would be somewhat lower than this, the precise figure depending upon the composition of the alloy. Thus the evidence from both the bone and the artifacts is consistent with cremation temperatures in excess of about 940°C. The temperature attained by the Mucking cremations is similar to (or perhaps a little greater than) that for the cremations from Springfield Lyons, Essex (Mays nd) and Illington, Norfolk (Wells 1960), and also, incidentally, to temperatures attained in modern British (Wells 1960) crematoria. The uniformity of the colour of the fragments in most of the cremations suggests even firing of the remains.

Ten cremations were found to contain small quantities of "clinker". This is a pale yellow/greenish coloured material with an irregular, glistening surface showing numerous small cavities. This seems to be the same material which was first described in archaeological cremations by Wells (1960) who suggested that it was derived from burnt hair. However later workers (Henderson et al. 1987) showed that this explanation is unlikely - they demonstrate that it is probably produced as a result of fusion of material from the pyre with the soil which underlay it.

5. Animal bone fragments retrieved from the cremations

Fragments identifiable as animal bone were retrieved from 6 cremations at Mucking.

Table 5: Animal bones from Mucking cremations

Cremation	Species present	Burnt/unburnt
499	Unidentified	Burnt
606	Sheep/goat	Unburnt
675	Cattle	Uncertain
696	Cattle & sheep/goat or pig	Poorly burnt
797	Cattle	Burnt
809	Sheep	Burnt

Animal bones are often reported in Anglo-Saxon cremations (Richards 1987).

One deposit of cremated bone at Mucking (cremation 490) seems

to consist solely of animal bone - there is 300.2g of burnt bone, amongst which fragments from cattle, sheep/goat and possibly pig were identified. Cremation deposits consisting solely of animal bone have been reported from other Anglo-Saxon cemeteries (e.g. Sancton, Humberside - discussion in Richards 1987).

6. Summary

Bone from 403 cremations and 80 inhumations was studied by the writer; both the inhumations and the cremations consisted of small quantities of highly fragmentary bone and both types of burial were recorded in a similar fashion. Dental remains from a further 77 inhumations were studied by Powers (nd), and 57 of these produced demographic data, which were incorporated in the present report.

It was found that more bone generally survived from the cremations (reflecting cremated bone's greater resistance to destruction in the soil) but that the demographic data which could be gained from it was less, probably due to the generally smaller size and distorted nature of the cremated bone fragments and to the fact that in many inhumations the fragments which survived best were pieces of skull which are useful for determining age and sex.

About one third of the cremations were juveniles, however there were fewer infants in this total than might be expected given the likely infant mortality. The major reason for this is probably that infants were often disposed of outside the cemetery areas, a practice which has been inferred from other Pagan Saxon inhumation and cremation cemeteries. Only 5 of the inhumations were juveniles; this probably, at least in part, reflects poorer survival in the soil of the more fragile juvenile inhumed bones.

The cremations were very evenly fired and temperatures in excess of about 940°C were probably attained.

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Acknowledgements

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APPENDIX: DATA FOR INDIVIDUAL BURIALS

CATALOGUE OF BURIALS

CEMETERY 1

129	c	f??	adult	white	13	427.6
100	i	u	adult		50	
113	i				15	
244	i				8	0.6
249	i				15	

CEMETERY 2

BURIAL	TYPE	SEX	AGE	MAIN COLOUR	SUBSIDIARY COLOUR	MEANSIZE	WEIGHT
149	c	u	adult	white		9	98.4
150	c	u	adult	white		12	61.3
151	c	u	adult	white		6	296.6
152	c	m?	middle/older adult	white		12	176.5
153	c	f??	adult	white		10	330.2
184	c	j	infant	white		4	2.0
188	c	u	adult	white	blue	16	173.5
189	c			white		8	59.3
190	c	u	young adult	yellow, white	grey, blue	23	382.5
191	c	j	infant/child	white		7	19.2
192	c	u	adult	white		16	117.4
193	c	m??	adult	white		10	182.2
194	c			white	grey	12	135.4
195	c	f??	adult	white	grey	15	462.7
196	c	j	infant	white		5	1.4
197	c	m?	adult	white	grey	15	891.5
198	c	f??	adult	white		13	419.0
199	c			white		12	64.4
200	c			white		7	60.9
201	c	j	child	white	grey	11	161.2
202	c	j	infant	white		5	12.2
205	c	u	middle/older adult	white		13	198.3
206	c	f??	young adult	white		10	143.3
208	c			white		8	47.0
209	c	u	adult	white		12	172.1
210	c	j	child	white		8	160.7
211	c			white		7	190.4
212	c	u	adult	white		7	51.3
213	c			white		10	7.2
214	c	j	child	white		10	167.7
215	c	j	infant	white		6	4.3
217	c	j	child	white		10	65.5
218	c	j	infant/child	white		10	46.0
219	c	u	adult	white		12	301.4
220	c	u	adult	white		10	137.4
221	c	j	child	white		8	6.4
222	c	u	adult	white		14	
223	c			white		4	0.6
224	c	u	adult	white		13	280.8
225	c	u	adult	white		16	444.7
226	c	u	adult	white		14	371.5
227	c	u	adult	white		10	371.2

BURIAL	TYPE	SEX	AGE	MAIN COLOUR	SUBSIDIARY COLOUR	MEANSIZE	WEIGHT
228	c	u	adult	white		8	100.3
229	c			white		11	6.4
230	c	j	infant	white		7	9.4
233	c			white		8	59.9
234	c			white		7	182.8
236	c	j	infant	white		6	35.4
237	c	u	adult	white		10	260.9
239	c	j	infant	white		7	8.0
262	c	j	child	white		7	21.6
263	c	j	child	white		6	16.1
267	c	j	child	white		7	14.9
268	c	j	infant	white		5	1.6
270	c			white		8	15.4
273	c	u	adult	white		10	119.3
274	c			white		10	0.9
275	c	u	adult	white	grey	10	174.1
279	c	u	adult	white		7	21.6
284	c	j	infant	white		5	0.2
289	c	j	child	white	grey	15	121.9
291	c	j	child	white		11	363.1
294	c	u	adult	white		11	276.7
295	c			white		10	35.7
296	c	j	child	white		18	8.6
301	c	u	adult	white	grey, blue	13	461.5
302	c	j	infant	white		8	1.9
303	c	u	adult	white		10	142.7
304	c	j	child	white	grey	6	32.7
307	c			white		10	11.8
310	c			white		10	10.7
311	c			white		9	5.9
312	c			white		5	181.6
313	c	j	infant	white		7	4.4
314	c	u	middle/older adult	white		17	313.6
316	c	m??	middle/older adult	white	blue	20	404.4
317	c	j	child	white		10	77.9
318	c	u	adult	white		14	355.0
319	c	j	infant	white		5	1.5
321	c			white		10	0.1
326	c			black, white		8	31.0
327	c	j	child	white	grey	7	70.6
328	c			white		6	0.1
330	c			white	grey, black	10	19.8
331	c	j	child	white		10	47.0
332	c			white		4	0.3
337	c	u	adult	white		10	217.2
342	c			white		10	15.6
344	c			white		10	52.9
345	c	j	infant	white		7	3.4
348	c			white		7	44.7
352	c			white	grey	7	11.9
353	c			white		4	0.1
358	c	u	adult	white		12	39.3
359	c			white		10	114.0
361	c			white		15	1.5
362	c			white		10	0.5

BURIAL	TYPE	SEX	AGE	MAIN COLOUR	SUBSIDIARY COLOUR	MEANSIZE	WEIGHT
363	c	u	young adult	white		13	410.5
364	c	j	child	white		18	27.9
365	c	j	infant	white		5	2.6
366	c	u	young/middle adult	white		19	186.6
367	c	m?	middle/older adult	white		15	421.8
368	c	u	middle adult	white	grey	16	172.8
369	c	u	adult	white		11	32.5
370	c	j	child	white		14	29.6
371	c	j	infant	white		7	11.9
372	c	j	child	white		8	137.6
373	c			white		8	18.4
375	c	j	infant/child	white		9	28.0
376	c	u	adult	white	grey	13	219.9
377	c			white		7	1.4
378	c			white		11	20.8
379	c	u	adult	white		11	100.7
380	c	j	infant	white		6	6.2
381	c	u	adult	white		11	261.0
382	c	u	adult	white		18	57.8
383	c	u	adult	white	grey	10	241.7
384	c	u	adult	white		7	83.0
385	c			white		7	25.5
386	c			white		8	18.1
387	c	u	adult	white		8	14.6
388	c	u	middle/older adult	white	grey	9	398.0
389	c	m?	middle/older adult	white		13	672.8
390	c	j	child	white		13	95.1
391	c			white		2	0.1
392	c			white	grey	6	0.1
393	c	u	adult	white		15	234.2
394	c			white		12	122.4
395	c	u	adult	white		11	48.2
398	c	j	child	white		13	48.6
399	c			white		8	19.1
400	c	u	middle/older adult	white		12	168.9
401	c	j	infant/child	white		10	2.1
402	c	f??	adult	white		15	361.0
403	c	u	adult	white		12	120.3
404	c	m?	adult	white, light grey		15	196.6
405	c	j	child	white		10	62.0
406	c	j	infant	white		6	5.5
408	c	u	adult	white		7	265.7
409	c			white		10	8.1
410	c	u	adult	white		15	43.1
411	c	j	child	white		11	36.0
413	c	j	child	white		12	230.2
414	c			white		6	2.5
415	c	u	adult	white		13	206.2
416	c	u	adult	white		18	777.9
417	c	j		white		5	7.8
418	c	j	infant	white		5	2.1
420	c	u	adult	white		20	35.5
421	c	j	child	white		8	7.8
422	c	u	adult	white		14	98.9
423	c	m??	adult	white		12	71.0

BURIAL	TYPE	SEX	AGE	MAIN COLOUR	SUBSIDIARY COLOUR	MEANSIZE	WEIGHT
424	c	j	child	white	blue	10	17.3
425	c	j	child	white		7	13.5
427	c	j	infant	white		8	15.3
428	c			white		10	44.6
429	c	j	child	white		14	20.5
430	c	j	child	white		10	26.0
433	c			white		10	96.1
434	c			white		8	1.1
435	c	u	adult	white		17	148.7
436	c			white	grey, blue	12	23.3
437	c	u	young/middle adult	white		15	141.5
438	c	j	child	white		8	116.8
440	c	m?	adult	white	blue, grey	20	529.8
442	c	j	infant/child	white		5	2.0
443	c	u	adult	white		15	132.9
444	c	u	adult	white		10	35.0
445	c	j	infant/child	white		4	3.8
446	c	u	adult	white		15	199.6
447	c	u	adult	white	blue, grey	18	288.3
449	c	u	adult	white		15	184.9
450	c	u	adult	white		9	87.6
452	c	u	adult	white		9	29.9
453	c			white		7	0.3
454	c	m??	adult	white		13	294.2
455	c			white		8	0.6
456	c	j	child	white		10	142.1
458	c	f??	adult	white	grey	13	874.0
459	c	u	adult	white		12	241.0
460	c	j	infant	white		7	8.3
461	c			white		5	0.5
462	c			white		10	8.5
463	c	u	adult	white		13	26.3
464	c	u	adult	white		9	79.6
465	c			white		12	194.3
466	c			white		5	1.0
467	c	u	adult	white		17	171.7
468	c	u	adult	white		12	251.6
469	c	j	infant	white		6	8.8
470	c			white		4	0.1
471	c	u	young/middle adult	white		18	104.6
472	c			white		3	0.1
473	c	j	child (adolescent)	white		10	83.7
474	c	u	adult	white	grey	10	332.0
475	c			white		5	2.9
476	c	u	adult	white		8	63.8
477	c	j	infant	white		7	0.3
478	c	u	adult	white		12	52.5
479	c	j	infant	white		8	4.0
480	c			white		3	0.4
481	c			white		7	0.7
482	c	j	child	white		5	12.0
483	c	j	child	white		15	32.6
484	c			white		7	1.2
485	c			white		12	35.0
486	c	u	adult	white		15	140.7

BURIAL	TYPE	SEX	AGE	MAIN COLOUR	SUBSIDIARY COLOUR	MEANSIZE	WEIGHT
488	c	j	infant/child	white		15	60.4
489	c	u	adult	white	grey	10	214.4
498	c	m??	adult	white		17	514.5
499	c	u	adult	white		18	288.7
500	c	j	child	white		10	16.5
501	c			white	blue	10	3.8
504	c			white		12	16.5
505	c	j	child	white		14	29.4
506	c	j	infant	white		8	5.2
507	c	u	adult	white		10	23.0
508	c	u	adult	white		14	40.0
509	c	u	adult	white		10	36.2
510	c			white		17	37.7
511	c			white		8	1.9
512	c	f	young adult	white		15	338.0
513	c	u	middle adult	white		10	293.2
515	c			white		8	201.8
516	c	m?	adult	white		12	48.7
517	c			white		7	0.1
518	c	u	adult	white		10	212.4
519	c	u	middle/older adult	white	light grey	15	417.2
520	c	j	child	white		5	229.2
522	c	u	adult	white		10	112.4
523	c			white		5	5.7
524	c	j	child	white		12	141.7
525	c	u	adult	white		8	20.7
539	c	u	adult	white		11	124.6
549	c			white		3	0.2
555	c	m??	adult	white		11	515.1
559	c			white		7	3.6
560	c	j	child	white		9	77.2
563	c			white		7	182.3
564	c			white		4	0.5
570	c	f??	adult	white		7	70.5
577	c			white		13	1.6
580	c			white		14	10.9
592	c	j	infant	white		7	19.6
594	c			white	grey	11	47.1
595	c	j	child (adolescent)	white		17	267.1
606	c			white		7	8.8
607	c	j	child	white		10	25.5
612	c	m	young adult	white		20	270.0
627	c			white		7	34.0
632	c	j	infant	white		8	1.6
635	c	j	child (adolescent)	white	blue, black	10	81.8
640	c	u	middle/older adult	white		8	115.2
641	c	u	adult	white	blue, black	13	108.3
642	c	j	child	white		7	63.6
644	c	u	adult	white	grey	12	110.6
645	c	u	middle/older adult	white		14	1080.9
663	c			white		12	0.5
669	c	f??	adult	white		15	19.7
670	c	u	adult	white		10	223.5
671	c			white		9	3.0
673	c	m??	adult	white	grey	15	466.0

BURIAL	TYPE	SEX	AGE	MAIN COLOUR	SUBSIDIARY COLOUR	MEANSIZE	WEIGHT
674	c	u	adult	white		16	503.3
675	c	u	adult	white		12	447.5
676	c	m??	adult	white	light grey	15	359.9
677	c	u	adult	white	grey	10	339.2
679	c			white		8	1.9
680	c	j	infant	white		10	59.9
681	c			white	grey	10	47.8
683	c	m	adult	white		17	615.8
684	c			white		10	1.1
685	c	f??	adult	white	light grey	15	183.4
686	c	u	adult	white	grey	10	525.6
687	c	u	adult	white		13	201.6
688	c	u	middle/older adult	white		9	5.5
693	c			white	grey	14	14.0
694	c			white		8	22.2
695	c	u	adult	white	blue	8	259.6
696	c	u	young adult	white	blue, grey, black	17	847.8
697	c			white		12	2.0
698	c	j	child	white		8	3.0
700	c			white		10	121.6
701	c			white		5	0.8
702	c	u	young adult	white		10	371.5
704	c	u	adult	white	blue	13	684.3
705	c	u	young adult	white		12	191.7
706	c	u	adult	white		14	100.3
707	c	u	adult	white	grey	10	288.5
708	c	u	adult	white		12	51.6
709	c	j	child	white		7	35.3
710	c	u	adult	white		12	92.0
711	c	j	infant/child	white		7	13.8
712	c	u	adult	white		10	76.3
713	c	m	adult	white		10	104.1
714	c	f??	young adult	white		15	721.7
715	c	u	adult	white		18	428.0
716	c	f??	adult	white	blue, grey	8	206.9
717	c	u	adult	white		9	249.7
718	c			white		10	61.6
719	c			white		12	15.0
720	c	m??	middle/older adult	white		20	662.3
721	c	u	adult	white	blue	8	207.0
722	c	j	infant	white		5	4.7
723	c	u	adult	white		10	244.8
724	c	f??	middle/older adult	white		20	246.6
726	c	u	adult	white		15	98.2
727	c	u	young/middle adult	white	blue, grey, black	20	503.8
728	c			white		20	13.2
729	c			white		5	0.1
732	c	u	adult	white		10	103.3
733	c	f?	adult	white		18	284.7
734	c	u	adult	white		5	429.2
735	c	f??	adult	white		8	144.1
736	c	j	child	white		8	36.5
738	c			white		10	13.7
739	c			white		5	0.1
740	c	u	middle adult	white		20	52.0

BURIAL	TYPE	SEX	AGE	MAIN COLOUR	SUBSIDIARY COLOUR	MEANSIZE	WEIGHT
741	c	m	young/middle adult	white		19	1164.5
742	c	j	infant	white		7	13.4
743	c	u	adult	white		13	115.8
744	c	u	adult	white		12	164.1
746	c	u	young adult	white	grey	17	744.7
747	c	j	infant/child	white		9	9.2
749	c			white	grey	10	323.4
750	c	u	adult	white		8	140.3
751	c			white		12	75.2
752	c	j	child	white		10	133.6
754	c	j	infant	white		11	18.2
755	c	u	adult	white		14	174.7
756	c	u	adult	white		13	261.0
757	c			white		17	24.5
758	c	u	adult	white		15	150.1
759	c	j	infant	white		5	1.3
760	c	j	child	white	grey	10	18.6
761	c	u	adult	white	grey	10	137.6
762	c	u	middle/older adult	white		12	282.4
763	c			white		6	0.3
764	c			white		10	3.9
768	c	u	adult	white	grey	13	290.9
787	c			white		16	212.7
788	c	j	child	white		10	85.0
793	c	u	young/middle adult	white, grey	blue	15	524.2
794	c	u	adult	white		6	36.6
795	c			white	grey	15	438.6
796	c	u	adult	white		12	324.0
797	c	u	adult	white	blue	13	722.1
798	c	u	adult	white		10	153.0
799	c	u	middle adult	white		8	87.8
800	c	j	child (adolescent)	white		11	294.4
801	c	m??	young/middle adult	white		12	462.9
802	c	m?	adult	white		18	572.6
803	c	u	adult	white	blue	18	254.8
804	c	u	adult	white, grey		12	911.8
805	c	m?	adult	white	blue	15	303.7
806	c	j	child	white		18	23.2
807	c	u	adult	white		10	396.3
808	c	u	adult	white	blue, grey	10	451.9
809	c	u	middle/older adult	white		14	751.9
810	c	j	child	white		10	59.2
811	c			black, grey		13	0.6
812	c	u	adult	white		15	36.3
813	c	j	child	white		12	115.7
815	c	u	adult	white	blue	10	92.5
816	c	u	young adult	white		18	875.7
817	c			white		15	129.3
818	c	u	young adult	white		15	1106.7
819	c	u	adult	white		13	151.6
820	c	u	adult	white	grey	10	283.9
821	c	u	adult	white		13	73.9
822	c	j	child	white		8	155.0
828	c			white		8	2.7
831	c	j	child (adolescent)	white		12	162.7

BURIAL	TYPE	SEX	AGE	MAIN COLOUR	SUBSIDIARY COLOUR	MEANSIZE	WEIGHT
832	c	m??	adult	white		12	119.8
833	c			white		14	42.9
835	c			white		8	8.9
836	c	u	adult	white		11	182.0
837	c	u	adult	white	black	7	24.4
838	c	u	adult	white, blue	black	18	543.4
839	c	u	adult	white		12	46.3
840	c			white		10	0.4
853	c	u	adult	white	grey	14	94.2
916	c	u	adult	white		19	68.2
917	c			white		13	3.8
920	c	j	child	white		8	28.5
929	c	u	adult	white		12	34.2
942	c	j	child	white	grey	6	19.9
945	c			white		18	98.6
946	c	j	infant	white		15	9.8
949	c	u	adult	white		10	34.3
966	c	u	adult	white	grey	10	103.1
984	c	u	adult	white	blue, grey	10	237.2
997	c			blue	grey, black	8	0.1
1102	c			white		15	2.6
1104	c			white		4	0.3
1113	c	u	adult	white		12	3.7
1114	c			white		15	2.3
1115	c	u	adult	white		18	49.5
1118	c			white	grey	8	3.9
1119	c			white		10	0.9
1121	c			white	black	8	0.9
1129	c			white		15	19.7
1130	c			white		5	0.9
260	i					17	5.0
281	i	m?	young adult			40	
287	i	u	adult			25	
288	i	m?	middle/older adult			30	184.8
322	i	m?	middle/older adult			79	77.9
323	i	u	adult			25	
333	i	m	older adult				
334	i	u	adult			35	
336	i	u	adult			20	16.6
343	i	u	middle/older adult			80	124.0
347	i	m??	middle/older adult			30	181.0
350	i	f?	adult			40	
351	i					20	22.3
397	i					3	2.4
534	i	u	adult			8	7.9
537	i	u	middle/older adult			12	
542	i	m	older adult			60	
550	i	f	young adult			30	
552	i	m??	adult			15	52.0
557	i					11	7.9
562	i	u	adult			9	23.8
568	i	m?	middle adult, 35-45 years			17	79.1
571	i	m?	adult			15	
572	i	u	adult			27	16.3
573	i	u	adult			15	25.3

BURIAL	TYPE	SEX	AGE	MAIN COLOUR	SUBSIDIARY COLOUR	MEANSIZE	WEIGHT
575	i	u	adult			15	274.4
578	i	j	child 8-11 years			10	
583	i	u	adult			15	
591	i	m?	middle/older adult			20	
603	i	u	middle/older adult			15	
604	i	u	young adult			15	105.8
608	i	f	adult			10	
617	i	m?	middle adult			25	155.4
623	i	u	adult			30	
631	i	m?	young adult			20	29.3
637	i					35	1.6
643	i					20	
655	i	m??	adult			24	53.5
664	i	u	middle/older adult			70	
665	i	u	adult			20	57.3
690	i					10	0.1
784	i					10	2.3
785	i					15	6.3
789	i	u	adult			30	
846	i					15	
847	i	u	adult			50	
870	i					15	1.0
875	i	u	adult			20	
877	i	u	adult			50	
881	i	u	adult			7	0.1
914	i	u	adult			5	7.5
921	i					4	1.9
922	i	m??	young/middle adult			12	124.9
924	i					3	0.1
925	i	u	adult			25	
931	i	u	adult			15	
933	i	m?	older adult			15	87.2
934	i	u	middle/older adult			35	
939	i	u	middle adult			20	120.5
940	i	m?	adult			40	88.6
943	i	u	adult			10	
950	i	u	adult			40	118.2
961	i	u	adult			30	
965	i	u	adult			15	
978	i	f?	adult			50	
979	i	u	adult			10	
980	i	u	adult			40	35.7
982	i					8	2.0
989	i	u	adult			4	
990	i	u	adult			5	
992	i					5	0.8
993	i	m?	middle/older adult			20	
995	i	f?	adult			15	
996	i	m?	middle/older adult			15	25.6
998	i	m	middle/older adult			30	
999	i	u	adult			30	

DEPOSIT OF CREMATED ANIMAL BONE

BURIAL	TYPE	SEX	AGE	MAIN COLOUR	SUBSIDIARY COLOUR	MEANSIZE	WEIGHT
#490	c			white	light green		300.2

Key: Type: c=cremation, i=inhumation Sex: m=male, f=female, u=unsexed adult, j=unsexed juvenile
Main & subsidiary colours: note these were recorded for the cremations only Meansize=mean size of bone fragments (in mm) Weight: weight of remains in grams.

DEMOGRAPHIC DATA FROM INHUMATION BURIALS STUDIED BY POWERS (ND)

Cemetery 1

Burial	Age	Burial	Age
108	Adult	127	Adult
116	Adult	128	-
119	Young adult	265	Adult
		266	Adult

Cemetery 2

Burial	Age	Burial	Age
282	Young adult	620	Adult
286	Adult	621	Young adult
335	Adult	622	Middle adult
356	Adult	629	Adult
448	Adult	630	Adult
451	Adult	633	Middle adult
492	Young adult	662	-
496	Adult	692	-
529	Adult	764	Adult
530	Middle adult	776	Adult
535	Adult	778	Adult
540	Juvenile?	824	-
541	Middle/older adult	826	-
544	-	843	-
547	Old adult	844	Adult
548	Juvenile	845	Adult
551	-	849	Middle adult
553	Juvenile	850	-
554	Young/middle adult	854	-
556	Adult	855	Adult
566	Young adult	874	-
567	Adult	886	Adult
569	Adult	913	Young adult
574	Adult	948a	Middle adult
576	Middle adult	948b	Old adult
579	Middle/older adult	954	Mature adult
581	-	956	Young adult
582	-	958	Young adult
589	Adult	959	Adult
597	-	962	Juvenile
598	Young adult	971	Adult
600	Young adult	975	Adult
610	-	988	Mature adult
611	-	997	Adult
617	Young adult		

BURIAL	NOTES
334	Adhering soil precludes weighing of the remains.
350	Adhering soil precludes weighing of the remains.
537	Adhering soil precludes weighing of the remains.
542	Adhering soil precludes weighing of the remains.
550	Adhering soil precludes weighing of the remains. Green staining on teeth.
571	Adhering soil precludes weighing of the remains.
578	Adhering soil precludes weighing of the remains.
583	Adhering soil precludes weighing of the remains.
591	Adhering soil precludes weighing of the remains.
603	Adhering soil precludes weighing the remains.
608	Adhering soil precludes weighing of the remains.
623	Adhering soil precludes weighing of the remains.
637	1 bone fragment only. Green staining on bone.
643	Adhering soil precludes weighing of the remains.
664	Adhering soil precludes weighing of the remains.
690	1 bone fragment only.
789	Adhering soil precludes weighing of the remains.
846	Adhering soil precludes weighing of the remains.
847	Adhering soil precludes weighing of the remains.
875	Adhering soil precludes weighing of the remains.
877	Adhering soil precludes weighing of the remains.
925	Adhering soil precludes weighing of the remains.
931	Adhering soil precludes weighing of the remains.
934	Adhering soil precludes weighing of the remains. There is also a bag containing some cremated bone in the same box as the inhumation; presumably this is stray material.
943	Adhering soil precludes weighing of the remains.
950	Metopic suture.

BURIAL	NOTES
961	Adhering soil precludes weighing of the remains.
965	Adhering soil precludes weighing of the remains.
978	Adhering soil precludes weighing the remains.
979	Adhering soil precludes weighing the remains.
989	Too much adhering soil to weigh the remains. Some fragments show green staining.
990	Adhering soil precludes weighing the remains. 1 bone fragment only
993	Adhering soil precludes weighing the remains.
995	Adhering soil precludes weighing the remains.
998	Adhering soil precludes weighing the remains. Green staining on facial bones and scapula. Preserved wood adhering to frontal bone.
999	Adhering soil precludes weighing the remains.

CREMATED ANIMAL BONE

BURIAL	NOTES
490	No human bone identified; fragments of sheep/goat, cow & ?pig bones present.