
5 Cremation Report by *K McSweeney*

5.1 Introduction and methodology

The cremated remains were divided between those still *in situ* in the broken cremation urn and the remainder, thought originally to be spill from the urn within a matrix of soil and plant fibre. These remains had been collected as a bulk sample, together with the surrounding soil matrix and air-dried at room temperature. No bone was retrieved from the urn.

It was very difficult to separate all of the bone from the soil matrix. The bone fragments were in exceptionally poor condition, many were extremely tiny and some crumbled away when touched. The contents of the box were sieved in a 4.5 mm sieve but the remaining soil matrix still contained numerous tiny flakes of bone. This residue was further examined for identifiable fragments but, because it was clear that the remaining material would provide no meaningful contribution to this report, further, time-consuming extraction of these fragments was not undertaken.

The extracted bone fragments were very dirty and their poor condition meant that they could not be washed or brushed. Occasionally, where absolutely essential, the surfaces of fragments were very carefully cleared of soil.

Each extracted fragment was examined and sorted into anatomical area although in some instances only a general area of origin could be established. For example, some fragments, which, on the evidence of their size, shape and fracture pattern, were clearly from one of the six major longbones of the body but were too incomplete to be more positively identified, have been classified simply as 'longbone'. Because of size or distortion, even a general anatomical provenance could not be established for some fragments which have been classified as 'unidentified'.

The bone remains were weighed using scales accurate to 1 g. General methods of ageing and sexing have been outlined previously ([Breathnach 1965](#); [Brothwell 1981](#); [Bass 1987](#)). The identification and assessment of age of the dental remains is based on *Dental Morphology: An Illustrated Guide* ([van Beek 1983](#)).

5.2 Description of the remains

5.2.1 Skull

Fragment of external auditory meatus of temporal bone.

Two fragments of cranial wall with both tables intact and with sutural edges. The sutures have not yet closed, possibly indicating a younger rather than older individual. (Generally speaking, cranial sutures

gradually close and become obliterated with age although this varies considerably among individuals and some old individuals can retain open sutures.) Two fragments of cranial wall with only the outer table remaining and open sutural edges.

Seven fragments of cranial wall with both tables intact. Cranial wall thickness approximately 3 mm.

Six fragments of cranium with only a single table remaining.

5.2.2 Mandible

Fragment of the external surface of mandible. Traces of a tooth socket are visible, probably for permanent M1 or M2.

5.2.3 Dentition

Roots, part of crown and pulp chamber (no enamel) of probably a lower third molar. The roots are fused together and the apex of the roots are fully closed. As fusion of the roots of third molars is normally complete by 18–25 years, this tooth is probably from an individual aged over 18. There is also a possibility that this is a lower second molar. Although the roots of this tooth are not normally found fully fused together, in some individuals the roots can be partly fused.

Part of the crown of a tooth, enamel missing, showing part of the pulp chamber. Morphology suggests that this is part of a molar, probably lower. The inferior edge of the fragment is not broken but tapered, suggesting that it is a developing permanent tooth with the roots just starting to form. Age would depend on which tooth this is but it would be in the region of 3–5, 8–10, or 14–16 years depending on whether this was a first, second or third molar.

Fragment of tooth root?

5.2.4 Ribs

Seven fragments of body of ribs.

5.2.5 Innominate

Fragment of ilium?

5.2.6 Humerus

Three fragments of shaft of humerus.

5.2.7 *Radius/ulna*

Three fragments of shafts of radius or ulna.

5.2.8 *Femur*

Fragment of condyle, too small to indicate whether epiphyseal fusion had taken place.

Two fragments of shaft of femur.

5.2.9 *Tibia*

Fragment of condyle? Too small to indicate whether epiphyseal fusion had taken place.

Two adjoining fragments of shaft of tibia.

Fragment of shaft of tibia.

5.2.10 *General longbone*

Twenty-seven fragments of shafts of various longbones.

5.2.11 *Hands*

Fragment of carpal bone – lunate?

Fragment of carpal bone – hamate?

Detached head of metacarpal. Epiphyseal fusion had taken place.

Middle phalanx, almost complete apart from slight damage to the proximal end. However, enough remained of the proximal end to establish that epiphyseal fusion had taken place, indicating an age at death of over 15 years.

Head and part shaft of proximal or middle phalanx of hand.

5.2.12 *Hands/Feet*

Head and part shaft of proximal or middle phalanx of hand or foot.

Ten fragments of shafts of metacarpals or metatarsals.

Eight fragments of shafts of phalanges of hands or feet.

5.3 **Condition of the remains**

The condition of the remains was extremely poor; fragments were very fragile and prone to further disintegration, even with careful handling.

With the exception of one almost complete hand phalanx, there were no complete bones. Fragment size was generally small. A few longbone fragments were about 55–60 mm in length but, in general, fragments were only about 20 mm or less. The largest pieces of cranium were about 20 mm. These measurements are

much smaller than those found by McKinley in her analysis of modern cremations where skull fragments of up to 95 mm and longbone fragments up to 195 mm were found (McKinley 1993, 284).

The Olcote cremated material displayed considerable splintering, distortion and splitting of layers of bone as a result of burning, and it is likely that the material had been subjected to post-depositional deterioration. Past experience has shown that cremated bone within an urn survives much better than cremation deposits from the same site that do not have the protection of a pottery container.

The poor condition of the remains meant that the identification rate was low, only 43% of the total weight (68 g from a total of 158 g).

5.4 **Completeness of the remains**

The total weight of the extracted remains was 158 g. In a study of 15 modern cremations, McKinley found that total weight ranged from 1227.4 g for an 83-year-old female, to 3001.3 g for a 90-year-old male (McKinley 1993, 284). She estimated that, in an archaeological setting, a realistic range would be 1001.5–2422 g. The Olcote remains clearly fell far short of this.

In general, compact bone, mostly fragments of longbone shaft, survived. Even this material was in poor condition and the total volume was much less than would normally be anticipated. Areas of soft, cancellous bone, such as that found in the pelvis, vertebrae and the ends of longbones, were virtually absent. The identified fragments were from the cranium, mandible, dentition, ribs, all six major longbones, hands and, possibly, feet.

The small quantity of cremated bone might have been intended as only a token gesture, or the total deposit may have been originally fuller and diminished as a result of post-depositional erosion. Alternatively, both factors could have been involved.

5.5 **Number of individuals and age at death**

With the exception of some possibly conflicting evidence from the dental remains, there was no clear evidence for the presence of more than one individual within this deposit. There were no duplicated bones and the robustness of the remains was consistent with derivation from the same person.

On the basis of full fusion of the roots and general morphology, the roots and part of the crown of a tooth appeared to be a lower third molar. Full development of the roots of a third molar would give an age at death of over 18. Also present was part of a crown of a developing molar from an individual aged either 3–5, 8–10 or 14–16 years, depending on whether the tooth was a first, second or third molar. However, clearly none of these ranges is compatible with an age of over 18. It is not entirely clear whether this evidence

indicates the presence of one or more individuals. The absence of enamel precludes categorical identification of the fully developed tooth and it could conceivably be a second molar. This develops before the third molar, suggesting that age at death could be as low as 14–15 years, which is compatible with the latest age range for the developing tooth (14–16 years).

The presence of a hand phalanx and a metatarsal with fused epiphyses provides an age at death of over 15. Thin cranial walls and unfused cranial sutures, while not in themselves accurate indicators of age, are suggestive of an individual who had not reached advanced adulthood. Although an age range of 14–16 would not be entirely consistent with this non-dental evidence of ageing, human variation should allow for such a combination.

Taking all of this evidence into account, it would appear that there are two possible options:

- 1 Both teeth (together with the rest of the remains) are from the same individual, who was aged about 14–16, the fully developed tooth being a second molar and the developing tooth was a third molar. This could just about fit with an age of 15+ from the fully developed hand bones although some evidence that the epiphyses had only recently fused might be expected, and there was none.
- 2 The teeth are from two different individuals, one probably aged over 18 years (this would sit comfortably with an age of 15+ from the other remains) and another, immature individual, perhaps only represented by a single tooth, who could have been aged 3–5, 8–10 or 14–16.

Either option is feasible. Unfortunately, because of the nature of the material, it is impossible to be specific.

5.6 Sex and pathology

As the most reliable indicators of sex, such as the pelvis and the femoral and humeral heads, were either missing or too small to be useful, an assessment of sex was not possible. No pathological lesions were noted.

5.7 Cremation technology and burial practice

The bones had been subjected to a fairly marked degree of cracking, twisting and curved lateral splintering. In addition, many cranial fragments had warped, causing the inner and outer tables to separate. These occurrences indicate that a high temperature was achieved during firing. Ubelaker suggests that curved lateral splintering and marked warping can be indicative of bone being burnt while still 'fresh', ie soon after death (Ubelaker 1978, 35).

This suggestion, however, is difficult to support in an archaeological context.

It is known that the colour of bone changes with increasing temperature (Ubelaker 1978, 34). In general, the higher the temperature, the lighter the colour. Black colouration occurs below 800°C, while temperatures above 800°C produce calcined bone, ranging in colour from bluish-gray to white. Furnaces in modern crematoria operate at between 820°C and 980°C (Wells 1960, 35).

In their uncleaned state, the Olcote bone fragments appeared brown, whereas the predominant colour of the cleaned bone was pale beige-white throughout. Despite the poor condition of these remains, the presence of warped and splintered bones and the light, even colouration suggests that the entire skeleton had been fired to a high temperature and that cremation technology was well understood. Sufficiently high temperatures can be achieved by using peat (Section 10.4.1).

It is unclear how carefully the remains were collected following firing. The presence of some small hand bones and teeth suggests that they had been carefully collected. It is possible that subsequent erosion has reduced what were originally much fuller remains.

It is uncertain whether the small fragment size is to some degree due to the remains being deliberately broken after cremation. Many of the fragments had clearly broken along fracture lines during the burning process although some deliberate crushing cannot be ruled out.

5.8 Summary

The cremated remains from the Olcote cairn were found beside a broken cremation urn. The volume of the cremated remains was very small and the individual fragments were in very poor condition. Consequently, only a small percentage of the total could be identified and very few of the fragments provided any meaningful information.

Unfortunately, because of the poor condition of the remains, it cannot be stated with certainty how many individuals were represented in this cremation. The most convincing evidence points to most of the remains belonging to a young adult. However, the presence of a single, developing, permanent molar indicates that either this was a stray tooth, which somehow became incorporated with the remains of another individual, or that the entire remains were those of an adolescent, aged about 16 years.

The sex of this individual (or individuals) is unknown. There was no evidence of disease and the cause of death could not be ascertained.

Cremation technology appears to have been well understood and high, even temperatures were achieved during firing.