

main language of the conference, or at least to make the abstracts and overhead projections bilingual?

I returned to England greatly inspired, if rather overwhelmed at seeing 105 archaeobotanists (usually a rare breed) in such a short time. This was one of the best conferences I've been to, and I would strongly recommend the next one to anyone interested.

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[Editors' note: Those interested in receiving or contributing to an archaeobotanical database newsletter should contact Philippa Tomlinson at: Environmental Archaeology Unit, University of York, Heslington, York YO1 5DD, U.K.]

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## Papers from the bone taphonomy workshop at York, September 1991

### Taphonomic factors in a human skeletal assemblage

#### Introduction

Most human burials excavated from British archaeological sites were (barring cases of mutilation through disease, injury or surgery) originally interred as complete individuals. Thus the numbers of each skeletal element originally present in an assemblage can be taken as known. Patterns of deficits in skeletal elements are thus usually explicable in terms of post-depositional factors, including losses during recovery. This is in contrast to most archaeological animal bone assemblages: their original composition with respect to skeletal elements is rarely known and hence patterns of loss through taphonomic factors are difficult to assess directly.

The present work comprises a study of the relative representation of various skeletal elements in a collection of human burials from Ipswich, Suffolk, U.K., and an attempt is made to distinguish patterns of loss resulting from differential destruction of skeletal elements in the soil from those brought about by differential recovery during excavation.

### The assemblage

Bones from 250 burials were recovered during excavations at the site of the Blackfriars' Friary, Ipswich, by Suffolk Archaeological Unit in 1983-5. Of these, 226 were adults (Mays 1991) and form the basis of the present study. The burials were of medieval date and were of friars and lay benefactors interred in the friary between its foundation in AD 1263 and its suppression in AD 1538. Interments were almost invariably in the supine position. The bones were carefully hand-recovered; no sieving for small bones was carried out.

### Methods

A skeletal element was recorded as present if it was represented by a complete or incomplete bone. The representation of each element in the whole assemblage of 226 adult skeletons ( $Rep_T$ ) was calculated by expressing the total number of an element present ( $T_o$ ) as a percentage of that expected ( $T_e$ ) if all burials were represented by complete skeletons:

$$Rep_T = T_o/T_e$$

Probably the three most important factors reducing skeletal completeness at the Ipswich Blackfriars site were:

- (i) damage to burials by the cutting of later features (principally further burials);
- (ii) recovery factors during excavation;
- (iii) preservation factors—destruction of bone in the soil.

Burials showed similar patterns of *relative* representation of skeletal elements whether or not they had been cut by later features (although, as expected, skeletons in graves which had been cut by later features tended to be less complete). This indicates that damage to burials by later features did not influence the composition of the assemblage with respect to the various skeletal elements. On this basis, the remainder of this paper focuses on preservation and recovery factors.

The overall state of preservation of each skeleton was classified as 'good', 'moderate' or 'poor' on the basis of visual assessment of the degree of erosion of the external surfaces of the bones (an assessment of whole-bone

preservation as opposed to histological preservation (Hanson and Buikstra 1987) of the skeletons). Scoring of burials into these preservation categories was found to be reproducible by the author. Preservation varied markedly between individuals, with burials at the site ranging from soil silhouettes with only a few fragments of bone present, to almost complete, intact skeletons. There was no correlation between preservation and age, sex, or location of the burials, or with whether or not a burial was cut by a later feature, but there was a significant correlation between preservation and skeletal completeness, the poorly preserved burials also tending to be less complete. This implies that poor survival of bone in soil played a part in reducing skeletal completeness.

In an attempt to distinguish the effects of differential recovery from those of preservation factors on the composition of the assemblage, the representation of each skeletal element was calculated separately for those burials classified as being of 'good' preservation ( $N = 51$ ) and those classed as 'poorly preserved' ( $N = 55$ ), giving  $Rep_G$  and  $Rep_P$  respectively. A measure of the relative deficit of a skeletal element in poorly preserved burials, compared with well preserved ones, ( $Rep_{P/G}$ ), is given by:

$$Rep_{P/G} = \frac{Rep_P}{Rep_G} \times 100$$

## Results

Figure 18 shows  $Rep_T$  and  $Rep_{P/G}$  for each skeletal element.

It could be argued that excavators tend to be less careful when excavation a skeleton which appears poorly preserved than one which is apparently in a good state of preservation; had this been the case at Ipswich then this differential recovery would clearly have been a source of differences in the relative representation of the various skeletal elements in well and poorly preserved burials. At the Ipswich Blackfriars site, permanent teeth were little affected by preservation factors, generally being whole, even in poorly preserved individuals: thus it was thought that any differences in the numbers of permanent teeth present from poorly preserved and well preserved burials might help show up any differences in the care with which the

inhumations were excavated. However, similar numbers of teeth were recovered from poorly and well preserved skeletons, suggesting no important differences in the care with which they were excavated.

The data for  $Rep_{P/G}$  in Fig. 18 are listed in sequence, with the bones with the lowest values at the top and those with the highest at the bottom. Thus, the further up the diagram an element is placed, the greater its deficit in poorly preserved compared with well preserved burials and, by implication, the greater its vulnerability to destruction in the soil. On this basis, the bones most vulnerable to destruction seem to be those having a high proportion of cancellous bone, for example the sternum, vertebrae and ribs. Among the vertebrae, the lumbar are the least and the cervical the most affected by soil erosion, as expected given the relative strength and robusticity suggested by their gross morphology. Also showing a relatively large deficit in poorly preserved compared with well preserved skeletons are the hyoid and the smaller bones of the hands and feet. This implies that preservational factors were implicated in their destruction in the soil, or at least damaged them sufficiently to render them unidentifiable, and hence were an important cause of their fairly low numbers in the assemblage as a whole. Conversely, as might be anticipated, elements with a high proportion of cortical bone—the skull, mandible and the larger bones of the appendicular skeleton—seem to be relatively less affected by preservational factors (that is, they show smaller differences in numbers between the poorly preserved and well preserved burials).

The pattern of relative representation of different skeletal elements in the assemblage as a whole ( $Rep_T$ ) may be considered a result of a combination of preservation and recovery factors (assuming minimal losses of elements during post-excavation processing). If preservation factors alone influenced the relative representation of elements in the assemblage as a whole, we might expect elements to follow the same rank order for  $Rep_T$  as they do for  $Rep_{P/G}$ . Figure 18 shows that the rank order for  $Rep_T$  is fairly similar to that for  $Rep_{P/G}$ , suggesting that preservation factors are a major influence on the composition of the assemblage as whole. However, several anomalies are apparent. The carpals and hand phalanges were present in rather lower numbers than might be expected

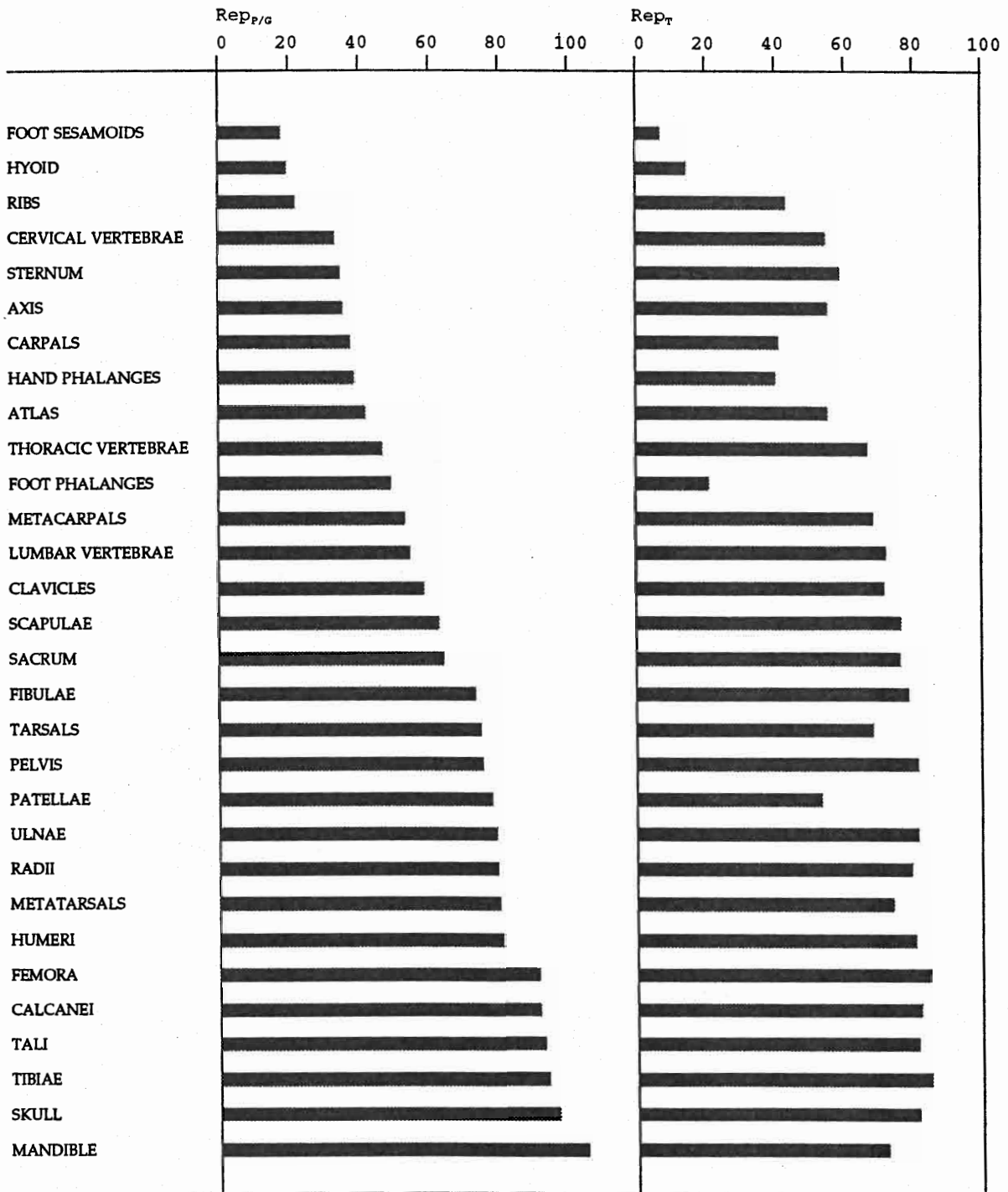


Figure 18. Rep<sub>T</sub> and Rep<sub>P/G</sub> (for explanation, see text) for each skeletal element in the assemblage of human remains from Blackfriars Friary, Ipswich

from their positions in the ranking in the diagram of  $Rep_{p/G}$ . This implies that recovery factors, in addition to their destruction in the soil, played a part in reducing their numbers overall.  $Rep_{p/G}$  was greater for foot phalanges than for hand phalanges, suggesting that the former had a greater resistance to destruction in the soil. Despite this, foot phalanges were present in lower numbers in the assemblage as a whole, suggesting differential recovery—more of the (generally smaller) foot phalanges than hand phalanges were missed during excavation.

Patellae were present in only slightly smaller numbers in poorly as opposed to well preserved burials, but nevertheless are under-represented in the assemblage as a whole compared with bones of similar size and cancellous:cortical bone ratio (for example tali and calcanei). This would seem to imply poorer recovery of patellae during excavation—surprising given their fairly large size and in view of other indications that the Ipswich bones were, in general, fairly carefully recovered (for example, fragments of ossified throat cartilages and pleural and other soft tissue calcifications were recovered, and recovery of sesamoid bones was surprisingly good with 13.2% of the expected number of foot sesamoids present in the assemblage). It may be that patellae appear rather undistinctive to excavators and, if dislodged from their anatomical positions during cleaning of the skeleton or the removal of the grave fill, may not be recognised as bones, particularly if the soil is rather light coloured and/or stony.

#### Discussion

Analysis of a medieval human bone assemblage excavated from the site of the Ipswich Blackfriars suggests that destruction of bone in the soil was an important factor in reducing skeletal completeness. As might be anticipated, those elements of the skeleton which tended to survive least well in the soil were the fragile bones such as the hyoid or those with high proportions of trabecular bone such as the ribs, vertebrae and sternum. Least affected were those with a high cortical bone content, such as the skull, mandible and the long bones of the appendicular skeleton.

Losses of the small bones of the hands and feet were attributable to preservation and recovery factors and there are indications that loss of patellae may largely reflect recovery.

Although some post-depositional movement of bones in articulated skeletons frequently occurs (discussions in Reynolds 1976; Boddington 1987; Brothwell 1987), the location of the various bones in the skeleton can, to a great extent, be anticipated during excavation. This would be expected to reduce losses of small bones in articulated skeletons compared with disarticulated material, where the positions of bones cannot be anticipated.

Although the overall composition of the Ipswich assemblage with respect to skeletal elements is broadly similar to that observed at other cemetery sites (e.g. Ancaster, Cox 1989; Ipswich School Street Anglo-Saxon cemetery, Mays 1989; West Tenter Street, London, Waldron 1987), the results clearly cannot be extrapolated uncritically to other sites, since preservation and recovery of bone must vary with soil chemistry, the anatomical knowledge of the excavators, and the recovery methods used.

#### Acknowledgment

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## Short contribution

**A quick, semi-quantitative method for recording nematode gut parasite eggs from archaeological deposits**

### Summary

The current quantitative approach to parasite remains is discussed and found to be overcomplicated in relation to the results produced and in view of the increasing need for rapid recording techniques in environmental archaeology. The simpler, semi-quantitative method presented here has been tested and found to produce adequate results in a short time, using uncomplicated equipment.

### Introduction

The aim of this contribution is to examine the quantitative approach to the preparation of soil samples for parasite egg analysis employed by Jones and co-workers, and to suggest a simpler method. The efficacy of the latter is supported by the results of analyses of samples from excavations in Carlisle and York.

As has been suggested elsewhere (e.g. Kenward 1992) it is becoming increasingly necessary to develop rapid recording techniques for biological remains from archaeological sites as funding diminishes in relation to volume of work, particularly as the trend continues towards intensive surveys of sites (as opposed to investigation of a few, possibly

atypical, contexts). Such techniques for recording insect and plant remains are now well established (Hall and Kenward 1990; Kenward *op. cit.*). Parasite egg analysis remains a somewhat laborious task which to date has largely been carried out using relatively specialised techniques and equipment. This is unfortunate in view of the fact that results are rarely precise, often just indicating the likely presence or absence of faeces in a deposit, sometimes indicating a particular host species, generally *Homo sapiens*. It is increasingly necessary to develop a more rapid technique in the light of work discussed by Jones *et al.* (1988, 275-6), which highlights the fact that parasite eggs can be preserved in a much wider range of archaeological deposits than previously expected, including sediments containing little trace of other organic materials.

Currently, results from parasite egg analysis are presented in number of eggs per gram of sample. These counts are obtained using either a dilution method, such as the modified Stoll technique (Jones and Hutchinson 1991; Hall and Kenward 1990, 297) or a salt solution flotation method (Hall and Kenward (*ibid.*), where a saturated magnesium sulphate solution was used). Both techniques stem from methods used by parasitologists to detect worm eggs or larvae in the fresh faeces of humans (Davey 1966, 110-12) and other mammals (MAFF 1971, 1-16).

A wide assortment of both dilution and flotation methods suitable for the concentration of eggs of various or particular species have been brought together by the Ministry of Agriculture, Fisheries and Food (MAFF 1971, 1-16) for use by veterinarians, and these methods have been adopted, with very little modification, by environmental archaeologists studying parasite eggs in samples of ancient deposits. Hence, we have also adopted the clinical parasitologist's practice of estimating numbers of eggs per gram of deposit (originally eggs per gram of *fresh faeces*), a value designed to be one of 'a series of counts or comparison of counts in animals of *known history*' (my emphasis) or to be 'of some help in the diagnosis of helminthiasis provided they [the counts] are interpreted with caution' (MAFF 1971, 1). In the context of veterinary parasitology we are warned that 'the assumption that the size of worm burdens may be accurately deduced from faecal egg counts has not proved