

# How to fill a Pit: Examples from the Late Iron Age Settlement of Basel-Gasfabrik (Switzerland)<sup>1</sup>

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**ABSTRACT:** A comparison is made between the bone material of pits and cultural layers of the late Iron Age settlement of Basel-Gasfabrik (Switzerland). The question of whether the pits contain other bone refuse than the cultural layers is explored by taking a look at the history of deposition by comparing species ratios and bone preservation.

**KEYWORDS:** LATE IRON AGE, TAPHONOMY, SWITZERLAND, BASEL-GASFABRIK, ARCHAEOZOOLOGY, PITS, FILLING PROCESS

**RESUMEN:** El trabajo compara los depósitos de osamentas de fondos y niveles culturales en el yacimiento del Hierro final de Basel-Gasfabrik (Suiza). La cuestión de si los desechos óseos entre fondos y niveles difieren apreciablemente se investiga analizando la génesis de los acúmulos a través de una comparación entre proporciones de especies y estado de conservación de los restos.

**PALABRAS CLAVE:** HIERRO FINAL, TAFONOMÍA, SUIZA, BASEL-GASFABRIK, ARQUEOZOOLOGÍA, FONDOS, COLMATACIÓN

## INTRODUCTION

The late Iron Age settlement of Basel-Gasfabrik, which dates from c. 150/140 to 80/70 BC, is located on the left bank of the Rhine, less than 2 km from Basel's modern city center in the north-west of Switzerland. The unfortified settlement occupied an area of about 12 hectares. To date, the settlement is essentially represented by over 300 pits. Other archaeological structures, such as cultural layers, are very rare. The original function of the pits is unknown. Despite their diversity in form and depth, they are all thought to constitute former storage or even workplaces that were then abandoned and refilled. Apart from sediments of differ-

ent origins, the pits contain kitchen refuse and potsherds, parts of house structures and the remains of craftsmen's activities. Although there is a cemetery nearby, some of the pits contain either one to several human skeletons or fragments of human bones.

Under these circumstances the question arises as to what sort of refuse the pits contain. Do we have the bone scraps typical for a settlement, i.e. normal waste from cooking or from the slaughter of animals, or were the pits used to store a special kind of waste? This is a question as old as archaeozoology itself.

One way of answering this question is to compare bone material from the pits with the few resi-

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dues investigated to date from cultural layers found outside the pits.

Since the animal bones have not yet been fully examined, the following remarks should be considered as interim results gathered over the last three years.

## MATERIAL AND METHODS

The sedimentological material that composes the cultural layers is termed "dark earth". This sediment consists of former topsoil material that has undergone massive mechanical and chemical changes. Sediment of comparable composition is generally also found in the upper third of the pit fillings. It may therefore be assumed that the sediments formed in a similar manner. The material from the cultural layers was generally relocated several times before its final deposition (Rentzel, 1998).

The lower two thirds of the pits are filled with sediments of widely varied origin that display virtually no chemical or mechanical changes.

The osteological contents of the two sediment groups were compared with one another in order to determine whether the lower portion of the pits contained different animal bone material together with the other types of sediment than did the dark earth layers. Since this is only possible for pits in which the dark earth areas can be reliably differentiated from the remaining areas, only 9 of the hitherto 35 archeozoologically studied pits can be examined in this manner. To these can be added 4 cultural layer complexes that only supply dark earth material. In the following box plot diagrams, the term "pits" is applied to the lower pit fillings whereas the term "dark earth" covers the cultural layer material as well as the upper pit fillings. The fragment ratios are taken as the basis for calculation.

## COMPARISON BETWEEN PIT FILLINGS AND CULTURAL LAYERS

### *Species ratio*

The most commonly found bones are those of cattle and pigs, sheep and goat bones being less frequently encountered. The ratios of cattle and of sheep or goat bones are very similar in both sediment groups (Figure 1). In contrast, pig bones seem

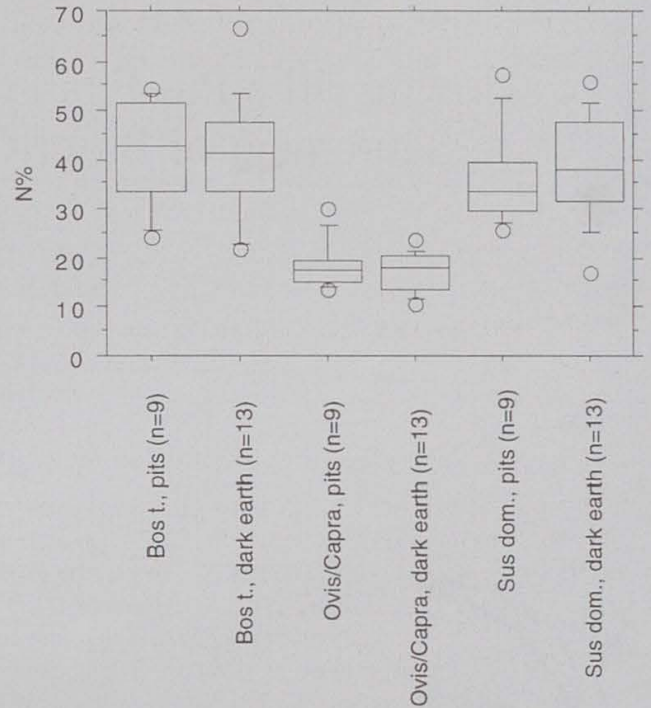


FIGURE 1

Proportion (fragments) of cattle (*Bos taurus*), sheep/goat (*Ovis/Capra*) and pig (*Sus domesticus*) in pits and dark earth material (definition see text) in the late Iron Age settlement of Basel-Gasfabrik.

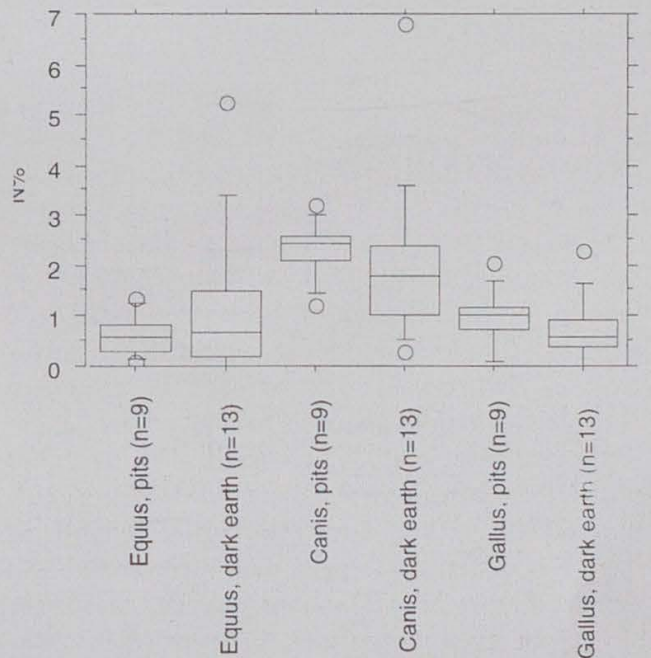


FIGURE 2

Proportion (fragments) of horse (*Equus*), dog (*Canis*) and poultry (*Gallus*) in pits and dark earth material (definition see text) in the late Iron Age settlement of Basel-Gasfabrik.



to be rather more frequently found in the dark earth material. The difference is, however, not significant.

The remaining three species of domestic animals generally only account for a small percentage of the determinable total material. While horse bones appear in similar ratios in both sediment groups (Figure 2), the lower pit fillings tend to contain more dog and chicken bones.

#### *Butchering and fire marks*

While bones displaying traces of fire are almost equally common in both sediment groups (Figure 3), bones bearing butchering marks are markedly more frequent in the lower pit fillings. The ratio of traces of cutting to those of hacking is higher in the dark earth areas than in the lower pit fillings.

Viewed as a whole, it can be said that there is considerable similarity in the composition of the two sediment groups: of 8 investigated features, only 3 display differences between the sediment types. These exceptions are dog and chicken bones and bones showing traces of butchering, that could all be shown to be rather more frequent in the lower pit fillings. All in all, this result suggests that little thought was given as to whether - and which - bones should be disposed of in the pits or not.

#### FILLING PROCESS

Based on the results from the sedimentological investigations and also on the generally good preservation of all the archaeological finds in the pits, it must be assumed that they were filled deliberately. Apart from incidental fillings, there was no natural illuviation of surrounding topsoil material.

Two main models can be cited for the filling process:

a) A pit was consistently used as a "waste bin" in normal daily life, with the result that it would probably sometimes have taken months or years to fill it. Besides the eventual dangers implied by a slow process of refilling (some of the pits were quite deep), this model raises the question of what happened to the waste generated each day while the pit was being used in its primary function. If one can exclude the use of a different waste pit, possibilities will have been the river Rhine close by, intermediate dumps/rubbish heaps or the formation of cultural layers (the similarity in the

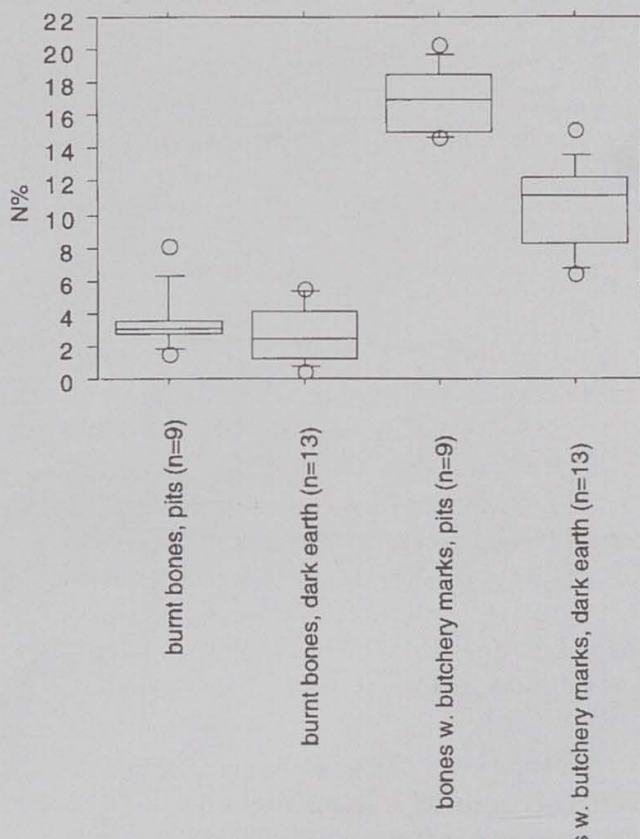


FIGURE 3

Proportion (fragments) of burnt bones and bones with butchery marks in pits and dark earth material (definition see text) in the late Iron Age settlement of Basel-Gasfabrik.

composition of the bone material between dark earth and pits makes this rather likely!).

b) The waste was collected someplace else (intermediate dumps/rubbish heaps) and, as soon as the pit was out of primary use, it was filled up with waste more or less at one go.

#### *Bone preservation*

The comparison between the state of preservation of the bones in the dark earth and those in the lower pit material sheds some insight into the filling history of the pits. The similarity or dissimilarity between layer and pit material also tells us something about filling rate.

The proportion of "fatty" bones, i.e. bones with a well-preserved, shiny surface, is markedly higher in the lower pit fillings than in the dark earth material (Figure 4).

In contrast, poorly preserved bones and bones with rounded broken edges are, not unexpectedly, more frequently encountered in the dark earth layers (Figure 5).



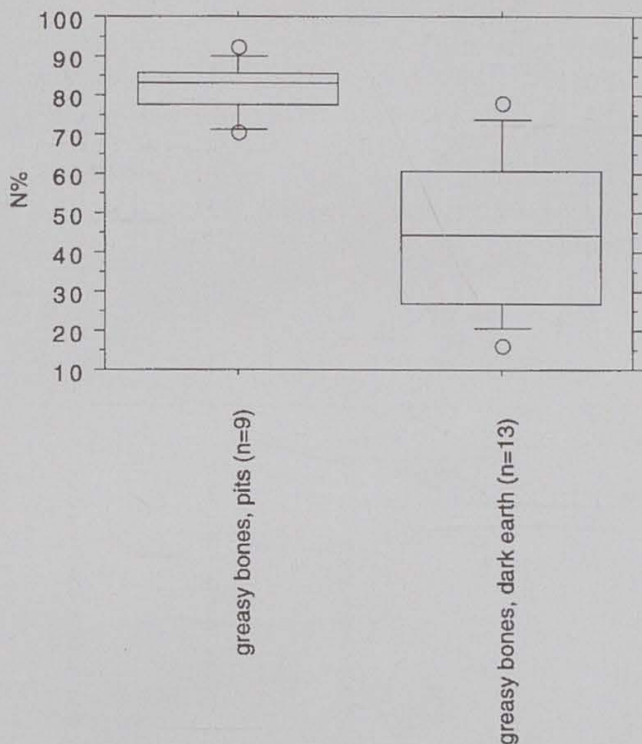


FIGURE 4

Proportion (fragments) of greasy bones in pits and dark earth material (definition see text) in the late Iron Age settlement of Basel-Gasfabrik.

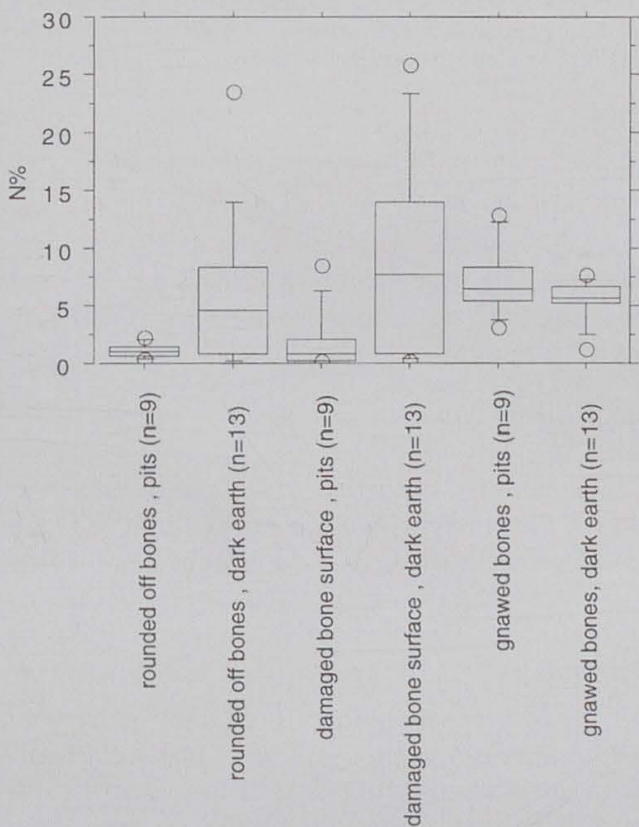


FIGURE 5

Proportion (fragments) of rounded bones, bones with damaged bone surface and gnawed bones in pits and dark earth material (definition see text) in the late Iron Age settlement of Basel-Gasfabrik.

Bones with bite marks appear in equal proportions in the two groups.

In agreement with the sediment material, bones from the dark earth layers have also undergone chemical and mechanical transformation that the bones and sediments of the lower pit fillings largely missed. At present, it is impossible to determine when these changes took place. Whereas the dark earth sediments were already in a weathered state when definitively disposed of, this does not necessarily hold for the bones. Since the dark earth sediments were more water-permeable and better aerated than those in the lower pit fillings, at least a greater leaching out/degradation of the bones could have taken place later on. This is only contradicted by the higher proportion of rounded bones in the dark earth material. Since the sediments of the cultural layers were moved about several times before finally remaining in place, this could account for the more frequently encountered rounding of the bones. The similar and generally low proportion of bite marks and the generally good state of preservation of the bones does at least suggest that not too long a period of time elapsed between generation of the bone waste and its deposition, both in the case of the pit material and in the case of the dark earth material.

CONCLUSION

As a conclusion one can say that, judging from the results accumulated to date, bone material derived from general settlement waste is deposited both in the dark earth layers and in the lower pit fillings. With a few exceptions, it does not seem to have mattered whether the waste finally ended up together with building elements and formerly excavated material in the lower pit fillings or with weathered topsoil material outside the pits. Because of the general intermixing of the animal bones with other filling materials and the small number of matchable bone fragments, one must conclude that the waste was intermediately deposited elsewhere before its final deposition. This at least applies to the content of the lower pit fillings. Since it is difficult at present to judge when the poorer preservation of the animal bone material took place in the dark earth layers, it is impossible to decide whether one must also assume intermediate deposition of the bones in this case, as well. In view of the

small proportion of bitten material in both types of samples and of the generally good state of preservation of the bones, this interim deposition either did not last for a very long time, or else occurred in a location that was protected from dogs, pigs and weathering.

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