Excavation of Faunal Skeletal Remains from Archaeological Sites

Guide 4

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THE EXCAVATION OF FAUNAL SKELETAL REMAINS FROM ARCHAEOLOGICAL SITES

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INTRODUCTION

Faunal remains are recovered from the majority of archaeological sites in Britain. These are found in various quantities depending on the type of site and preservation. The excavation of animal remains is as important as any other archaeological evidence as they provide a unique insight into the behaviour of past human populations. It is our duty as archaeologists to provide the most accurate information possible and it is, therefore, important to consider the methods of retrieving faunal assemblages even before the excavation commences. Optimum recovery of faunal remains can only be ensured by careful planning.

The purpose of this paper is to provide insight into some of the different methods of recovery and how best to excavate faunal remains. It is aimed at archaeologist with little or no experience of dealing with and analysing animal bones and will hopefully provide some insight into the importance of correct recovery methods and what information may be derived from the remains. It should be stressed that this paper covers the recovery of skeletal remains only.

WHAT CAN FAUNAL BONES TELL US?

Animals formed an important part of people’s lives in the past and the bones from archaeological sites may provide information on not only diet but also on care, hygiene, climate, status, season of occupation, hunting methods, butchery methods, industries, trade and even religion

A wide variety of species may be recovered from site such as fish, amphibians, reptiles, birds and mammals. Through identification of morphological features (shape), it is possible to identify the skeletal elements and to what species they belong. Some bones may allow the identification of the sex of the species, either through measurements or through sexually dimorphic features such as the canine teeth of pigs (fig. 1) and the presence of spurs on the tarso-metatarsus of birds (fig 2), to provide a couple of examples (Rackman 1994). Ageing mammals is best done through dental wear and eruption as well as bone development and growth (i.e. stages of bone fusion). Other species, such as fish, grow through out life and their bones do not fuse; however, these may be aged by other means such as incremental growth.

Figure 1: Canines of male pig, female pig and dog. The male pig has triangular open ends as they continue to grow where as the female canine is closed.

Figure 2: Tarso metatarsus of Female and male bird. The Male has a spur.

Patterns of seasonality may be possible from certain species such as fish, where the otoliths (ear bones) (fig 3) are excellent indicators of seasonal patterns (Davis 1994:81). The shedding of antlers is likewise an indication of season as this happens in a yearly cycle (Rackman 1994)

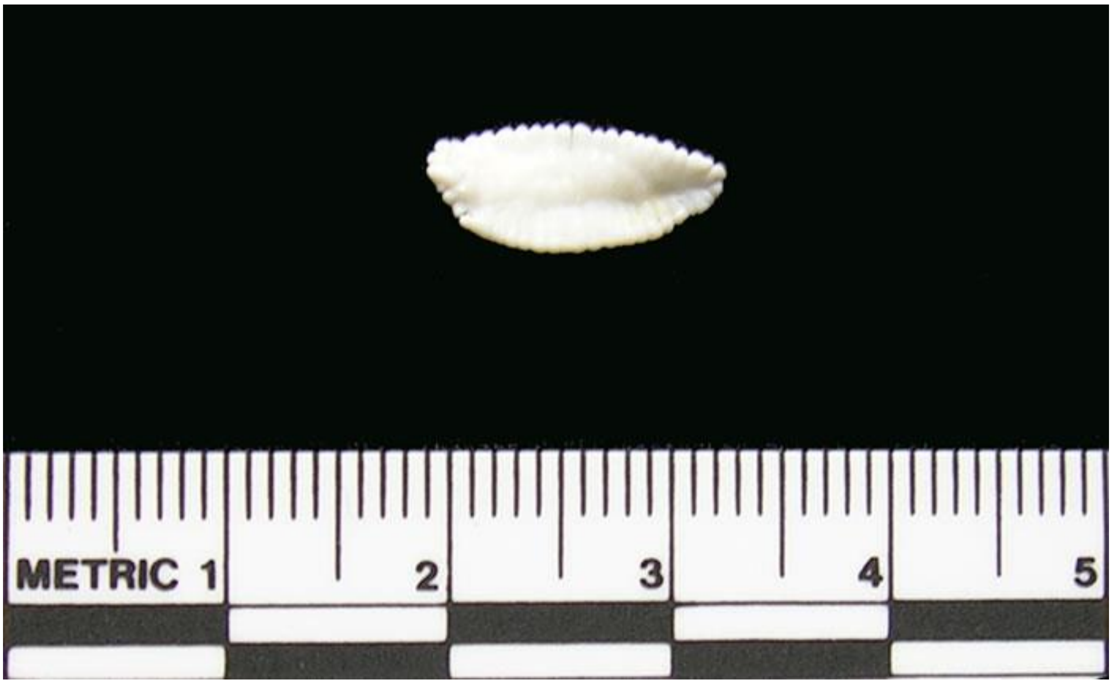

Figure 3: *Otolith of cod*

It may be possible to extract additional information from animal bones. For example, butchery methods can be assessed from chop and cut marks on the bones as well as evidence of scavenging (Binford 1981). On most archaeological sites, the information extracted may at least provide a ratio of the different species present and which parts of the animals are present. This may help identify the type of site. By identifying the different elements present it may be possible to establish whether the site was used primarily for butchery or whether the butchered remains were deposited there subsequent to cooking and consumption of meat. Sometimes one type of element may be present in abundance, such as at Walmgate in York where pits were found with large amounts of sheep metapodials. These were waste from the industrial process of tanning, undertaken during the post medieval period of the site and provided crucial information on the processes and methods in the tanning industry (O'Connor1984)

DISARTICULATED REMAINS

Unlike most human bone, which is often recovered from sites in an ordered and systematic manner, animal bones may be found in any kind of feature in any area of a site. They also vary greatly in size from the smallest rodents, birds or fish to the large mammals such as bovid and horse.

The vast majority of animal remains you find on site are likely to be disarticulated, which means the bones are **not** lying *in situ* in anatomical position to form a complete animal skeleton. Bones may have become disarticulated through a variety of different processes (illustrated in the

Taphonomy section below) and in most cases it is not possible to identify whether disarticulated bones belong to one individual animal. This is why the bones are analysed to a Minimum Number of Individuals; this involves identifying the bones context by context and counting the most frequent single skeletal element of each species (Klein & Cruz-Uribe 1984)

ARTICULATED REMAINS

Occasionally animals may have been thrown into pits partially or completely articulated. It is not uncommon that animals were disposed of in pits and often domestic species such as dogs, cats and even cows may be found apparently dumped into disused pits or ditches. Sometimes animals are found in burial contexts with or without humans or they may have been buried in a ritual context. For example, during the Iron Age, in particular southern Britain, mammals such as cows and horses were buried partially articulated. Some of these animals would have their legs displaced from the body and were believed to be ritual deposits (Grant 1984). It is, therefore, important to note during the excavation of any features whether some bones may be articulated. If this is the case put aside the mattock and have a good trowel to identify the extent of the articulation, which may simply be a dumped leg but it could turn into a complete animal that was buried, in which case it should be treated as you would treat a human burial (*see guide for excavation of human remains*).

Post-excavation analysis can rarely identify if any of the loose bones contained in one bag were originally articulated and belonged to the same animal. It is, therefore, essential that any articulated remains are retrieved and recorded in the appropriate manner by the excavator. **All articulated remains, be it only a leg or a foot, should be bagged up separately with clear indication on the bag that the remains were articulated.** Make clear notes on the context sheets that such remains were uncovered from the feature and in which position they were found (draw a sketch on the back of the sheet). If the remains appear to be from a more or less complete animal it may be worth giving the skeleton a separate context number from the fill.

Faunal remains provide a wide array of information about a site but only if they are excavated and sampled in a correct manner. If the excavation is haphazard, important information may be lost and the analysis may even generate a false impression of the site.

A QUESTION OF IDENTIFICATION

It is not the intention of this paper to enable you to identify animal bones but it is always a good idea to have some basic idea of what you are looking at. In Britain the majority of the faunal remains will come from domesticated species (from the Neolithic onwards), such as bovid, horse, sheep/goat, pig, dog and cat. In addition there will often be a wide selection of bird and fish remains, depending on the location of the site.

MAMMALS:

Size is usually a good indication of the type of mammal, which are generally divided into three main categories; large (horse/cow size), medium (sheep/goat/pig/dog) and small (rodent). Figure 4 illustrates the size variation of the different mammals whilst figure 5 demonstrates the morphological difference between the femoral head of a horse and a cow.

Figure 4: *Femur of dog, sheep, pig, horse and cow*

Figure 5: *Femoral head of cow and horse, note the V-shaped femoral head in the horse which is not present in cow.*

To the untrained eye infant human remains are sometimes mistaken for animal remains, as they are occasionally recovered from domestic features such as postholes and under floor layers (Scott 1999 p.4).

Figure 6 *shows a femur from an infant, a dog and a cat. The infant bone is unfused, which means that the individual has not yet fully developed and the ends are not yet fused onto the main bone shaft. The appearance of the ends in such cases are billowed (like ripples in sand), where as the other bones are fully fused and have smooth ends.*

Teeth of mammals are frequently found as they survive particularly well. Figure 7 shows examples of molars of Horse, cow, sheep/goat, pig and dog whilst Figure 1 show the canines of a pig and a dog. Canines are very small in horse and cow and are often absent.

Figure 7: Molar teeth of horse, cow, pig and dog

BIRD

Bird remains may be distinguished by their hollow shaft (fig 8).

Because birds need to be light to enable them to fly the bones are hollow inside or the trabecular structure is very open. The bones on the outside are also different as they are much smoother and glossy in appearance compared to mammal bones (fig 9).

Figure 8: Bird bones – note hollow shaft

Figure 9: Bird bones (Mallard)

FISH

Fish again are different and look different. Naturally they do not have long bones such as mammals and birds. Their bones also allow for continuous growth. The bones have an appearance of layers of thin sheets often translucent to look at. The ribs are very fine and the vertebrae look as if made up by a series of concentric circles (Figure10). Finally the Otoliths (ear bones) are very important to identify as they provide significant information. These may look like small pieces of chalk or pebbles but by closer investigation they have a bevelled oval appearance with fine ripples along the edges (Figure 3)

Figure 10: Fish Vertebrae

TAPHONOMY/PRESERVATION

Many factors determine the preservation of bones on an archaeological site and there is no doubt that the bones recovered form only a very small percentage of the actual original representation. Figure 11 illustrates the taphonomic processes affecting the amount of bone recovered for analysis (Davis 1995). The final processes such as recovery may be controlled to some extent by the archaeologist and it should be stressed that even a 100% recovery from site is still only a small sample of the original amount.

Due to the variable sizes and robustness of animal bones taphonomic factors may favour preservation of some species and not other. In many cases the larger bones survive soil conditions better where as trampling may cause smaller bones to remain more intact than larger bones. Different features may hence provide different information despite containing in effect a similar assemblage (Lyman 1994)

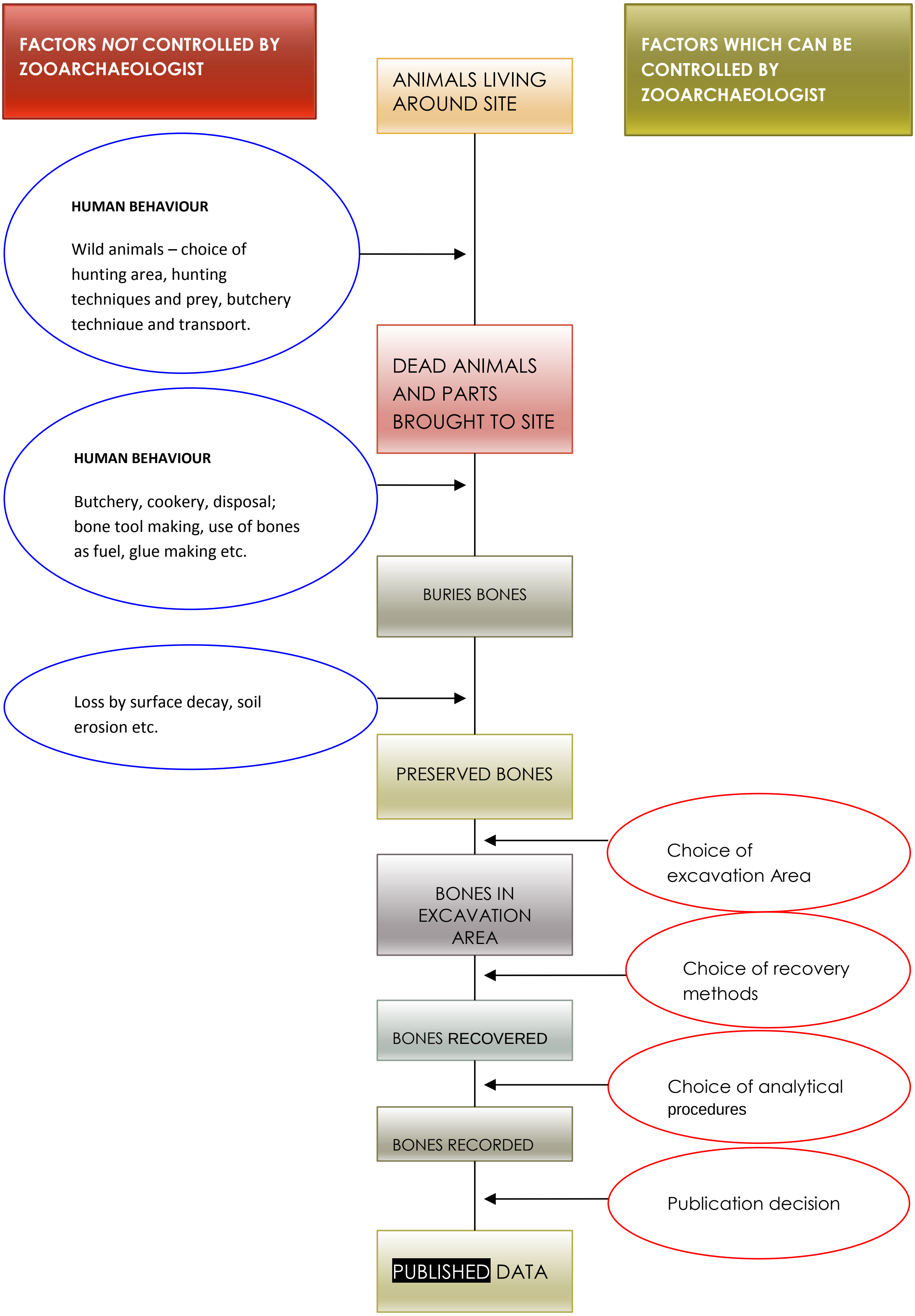

Figure 11: Factors which may affect the archaeological faunal data.
(Adapted from Davis 1995:22)

SAMPLING STRATEGIES

Most excavations are carried out under severe time and financial constrictions, limiting the amount of time the archaeologist may spend on the excavation and processing as well as the analysis. It is therefore often necessary to sample sites, which produce large amounts of bone. Regardless of budget and time constraints, it is always worth carefully considering sampling strategies and how information may best be retrieved within the allowed perimeters

A larger sample of animal remains is often a better representation of the complete faunal assemblage preserved on site but more important than simply collecting huge amounts of bones is *the manner in which they are collected*. It is always a good idea to contact a zooarchaeologist for advice on the matter and they should be able to advice on the best strategies within the given time and financial limits. Sampling should be carefully planned prior to excavation and the correct equipment should be organised. Below are some suggestions of possible sampling strategies, which may be useful as a reference.

POSSIBLE SAMPLING STRATEGIES (FROM O'CONNOR 2000)

1. ***Full recovery***

   This method is often not very practical and given that even a 100% sample is still only a small proportion of the original representation it is worth considering whether sub sampling might be a better option within the time constraints of the site.

2. ***Some recovery of bones from all contexts***

   This method suggests a sample strategy where a smaller sample from every single feature is sampled. This could result in a large amount of unnecessary soil samples (see below).

3. ***Full recovery from some contexts***

   As this method suggests, the archaeologist identifies which features are best for sampling; this can be done in a *subjective* manner. It may also be carried out in an *objective* manner, where features are randomly selected according to grid or context number regardless of their nature. Needless to say, this could result in features with large amounts of bone being completely ignored. However if the features are selected by an experienced archaeologist it may not be a bad option all together.

4. ***Some recovery from some contexts***

   The same principles apply to this method as the one above and may be used with some consideration. A number of features in this method may be selected subjectively or objectively for recovery. Further more the recovery from each feature would only be partial.

EXCAVATION AND RECOVERY METHODS

Regardless of the sampling strategy we need further consider what method of excavation to use. The most commonly used method is “hand collection”, relying on the observation skill of the archaeologist. The problem with this method is a visual bias resulting in only larger bones being collected. As noted above, animals come in all different sizes, and this method would therefore result in a bias towards the larger species. Also the human error in this method causes different features to be excavated differently depending on person excavating, light conditions and tools used (O’Connor 2000:31).

The most efficient method for animal bone recovery is usually **a combination of hand collecting and sieving**. This involves collecting a number of soil samples from the excavated features, depending on the chosen sampling strategy above.

The samples for sieving are usually collected in similar sized buckets so that the quantity of the samples may be accurately recorded. These are usually recorded in litres and commonly collected in 10L buckets. It is important to fill out a sample sheet and provide a sample number for each feature noting the number of buckets collected, how they were collected (did you collect every 5th shovel full or did you do it more subjectively by collecting from the bottom only?) what the type of feature it was (pit, ditch, refuse layer), and whether there was anything noteworthy about the feature such as charcoal, concentrations of bone etc. also note why the sample was taken and what percentage of the feature was sampled. All this should be agreed before the excavation as it is better if all features involved are sampled in a similar manner, though sometimes features of particular interest may be selected for special treatment, and it is therefore important that the sampling methods for each feature are described separately

SIEVING

Sieving is a science in itself and studies have been carried out on the best methods. For animal bones a small sieve size is often required in order to retrieve even the smaller bones as these may yield as much information as any large bone. Fish, small mammals, amphibians, reptiles and birds are often vastly under represented on archaeological sites as they are difficult to spot with the naked eye. The size of such bones require a mesh size no larger than 1-2mm. some sieving are carried out on 10-12mm mesh size where studies have shown that a large amount of information is lost (O’Connor). Sometimes, however, depending on the quantity that needs sieving it is impracticable to sieve all thorough a 1-2mm mesh and it may be required to select some for small mesh size sieving and some to be sieved through a larger mesh size. This is where the “sample sheets” filled out during excavation are important as the archaeologist may have observed a larger amount off small bones in a sample and it would, therefore, be most productive to select those for small mesh size sieving.

On most sites in Britain wet sieving is the most practical method of sieving as the soil in many places is clayey and needs breaking down

BAGGING AND PROCESSING

Once the bones have been excavated it is important to consider an appropriate method of storage. The bones may, as most other artefacts, be stored in plastic bags. It is a good idea to have a selection of sizes as very large bags may be required for the larger mammal bones. It is also helpful to have a few crates on site as you may uncover complete skulls, which in larger mammals take up a substantial amount of space and may be very fragile. Newspaper is a good idea to prevent the skull sliding around in the crate in transit (in the ideal world this would be acid free tissue but this is only really necessary if the skull is to be stored long term). All plastic bags should be perforated to allow air to circulate. All too often bones are stored in sealed bags, which cause them to crumble and become extremely fragile.

As the bones go off to be processed it is helpful if there are at least two labels in each bag. If the deposit is very wet, put the labels in a small zip bag as this will help prevent the writing from vanishing as even permanent markers are not always permanent if exposed to damp conditions over long periods of time. Naturally the labels need to be water resistant too.

Once the bones have been washed and the samples are sieved they need to dry. It is very important that they are not exposed to extreme heat. If dried outside *never* leave them to dry in the sun and if inside, the room must not be very hot as this heat will cause the bones to dry too fast and they will warp. Leave them to dry in a place no warmer than room temperature.

SORTING THE SIEVING

Sorting of sieved material can unfortunately be very time consuming and is often a job carried out by non-specialists. Bone is not really difficult to recognise but some elements are deceptive and may not be correctly identified such as otoliths (figure 9) and the tracheal rings of birds (very fine thin 1p sized rings) (O'Connor 2000:35). The best thing is to be aware of anything that may remotely look like "something" pick it out, as it is better to discard a few things during analysis than miss out important elements. Once the sieving is sorted it is important to ensure that both the context and the sample number are written on the bag and labels.

It is preferable if the bones are numbered, though this is very time consuming and sometimes not within the financial scope of the project. The numbers on the bone should include to site code and the context number. Make sure you do not use the joint surfaces for writing on, choose an area that is not too close to the "edge" of the bone as wear and tear may cause the bone to break and the number to be lost. Try to write as small as possible in order not to obstruct any parts of the bone surface using black or white ink.

CONCLUSION

Faunal remain form an important part of any archaeological excavation. The manner in which they are collected determines the accuracy of the end result and careful planning is eminent in order to ensure at least some recovery of all the different species present on site. Sampling and sieving is inevitable in most cases as it may be near impossible and too time consuming for the archaeologist to hand collect even the smallest of bones. Articulated remains should be treated as human remains and recorded in a similar manner. It may not look important but once the remains have been removed there is no going back and if not photographed and recorded properly information may be lost forever.

HAPPY DIGGING!

RECOMMENDED FURTHER READING

Centre for Archaeology Guidelines 2002: Environmental Archaeology – A Guide to the theory and practice of methods, from sampling and recovery to post excavation. English heritage 2002/01

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