

ASPECTS OF FAUNAL EXPLOITATION IN THE MIDDLE PALAEOOLITHIC: EVIDENCE FROM WALLERTHEIM (RHEINHESSEN, GERMANY)

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Summary

The Middle Palaeolithic open air site Wallertheim was excavated in the 1920's. The site is characterized by a dominance of the species *Bison priscus* in the faunal material. Indications of repeated and selective exploitation of this species by Middle Palaeolithic hunters were provided by detailed taphonomic analysis. The lines of evidence which lead to this conclusion are summarised.

Résumé

Aspects de l'exploitation de la faune au Paléolithique moyen : les données de Wallertheim (Rheinhessen, Allemagne).

Le site de plein air de Wallertheim, daté du Paléolithique moyen, a été fouillé dans les années vingt. Il est caractérisé par la dominance de *Bison priscus* dans le matériel faunique. Des analyses taphonomiques détaillées ont fourni des indications d'exploitation répétée et sélective par des chasseurs du Paléolithique moyen. Les données qui nous conduisent à cette conclusion sont résumées.

Zusammenfassung

Aspekte zur Ausbeutung der Fauna im Mittelpaläolithikum am Beispiel Wallertheim (Rheinhessen, Deutschland).

Die mittelpaläolithische Freilandstation Wallertheim wurde in den 20er Jahren ausgegraben. Charakteristisch an dieser Fundstelle ist die Dominanz von *Bison priscus*. Detaillierte taphonomische Analysen lieferten eine Reihe von Hinweisen dafür, daß die Überreste dieser Tiere von einer wiederholten und selektiven Ausbeutung durch mittelpaläolithische Jäger zeugen. Die Hinweise, die zu dieser Schlußfolgerung führten, werden hier zusammengefaßt.

Key Words

Middle Palaeolithic, Germany, Faunal analysis, Exploitation of bovids, Hunting.

Mots clés

Paléolithique moyen, Allemagne, Analyse de faune, Élevage, Bovidés, Chasse.

Schlüsselworte

Mittelpaläolithikum, Deutschland, Faunenanalyse, Ausbeutung von Bovidien, Jagd.

Wallertheim is situated in the rolling hills of Rheinhessen, some 25 km south-west of Mainz, Germany. The village is in the valley of the Wiesbach, between the Wörrstadt Plateau and the Wissberg hill. The Middle Palaeolithic site is located in a deserted clay pit close to the Wallertheim railway station.

Wallertheim was excavated and analysed during the 1920's by the palaeontologist Otto Schmidtgen (Schmidtgen and Wagner, 1929). Due to the easily accessible section, Wallertheim has remained the object of repeated archaeological and geological investigations into the 1990's (Fauler, 1938; Figiel, 1978; Bosinski *et al.*, 1985; Conard *et al.*, 1995). Despite minor losses of material during the Second World War, the documentation, at least of the faunal material, was so good that the author was able, between 1988 and 1991, to reconstruct major parts of the

features uncovered by the old excavations (Gaudzinski, 1990, 1995a, 1995b).

Geology

The Wallertheim geological section can be divided into two parts. The lower section is formed by three fluvial deposits filling channels cut by the Wiesbach (Bachablagerungen I-III). A total of four superimposed archaeological strata were recognized in Bachablagerung II, the deepest of which was described as the main find horizon because the greater part of the faunal material was found here, together with a lithic assemblage (Gaudzinski, 1995a).

The overlying loess deposits show the sequence typical for the younger Würm/Weichselian of this region and include a basal humus soil, other interstadial soils and two volcanic tuffs. This allows the archaeological horizons to

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be assigned geochronologically to an early Weichselian (^{18}O -stage 5d?) context. This conclusion is supported by the results of malacological, macrofaunal and palynological investigations (Bosinski *et al.*, 1985; Gaudzinski, 1995a).

Setting

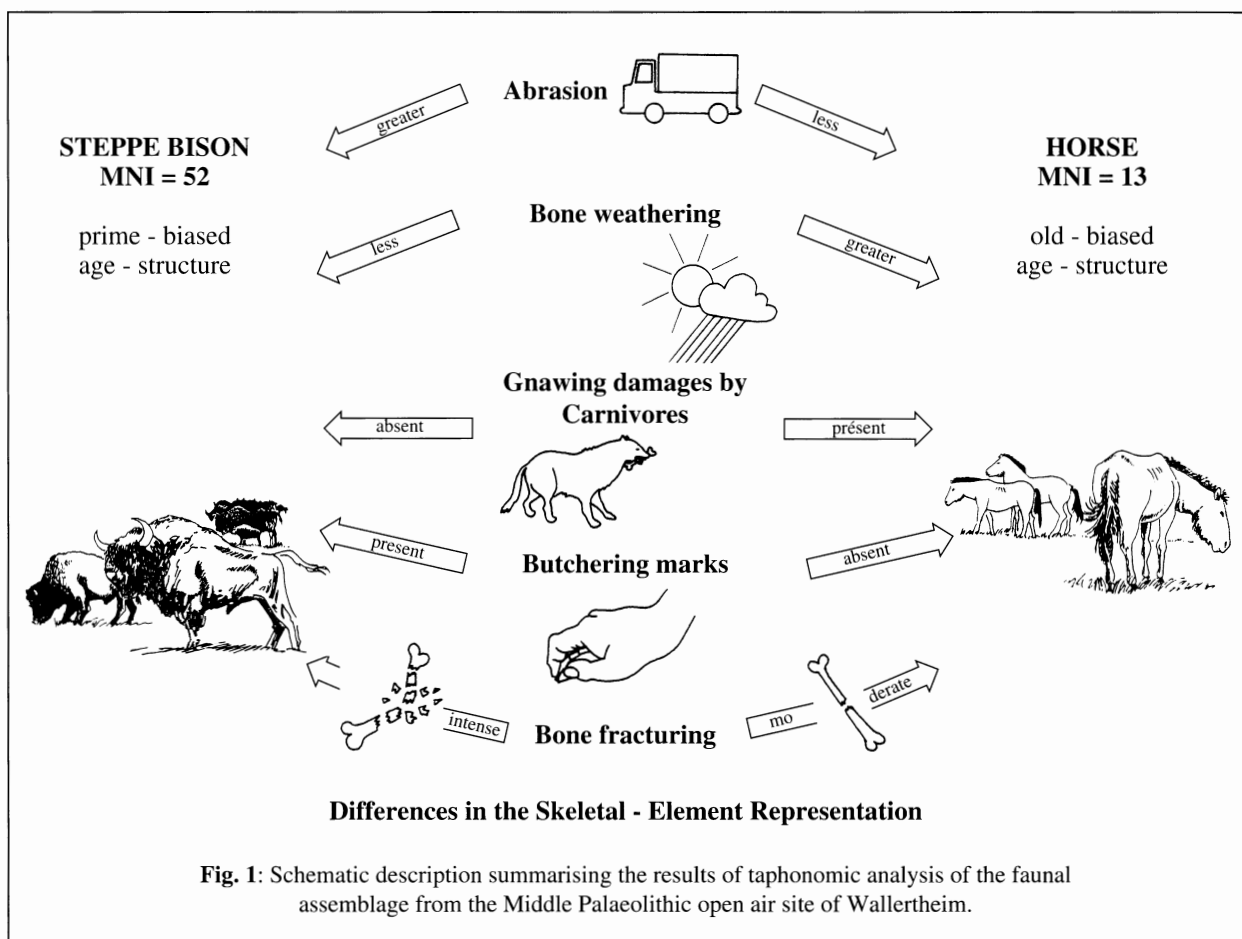
The open air site Wallertheim preserves aspects of a riverine environment in which both hominid and non-hominid agents have played a role in the accumulation of large faunal remains. The faunal assemblage of the main horizon B1 comprises nine different species representing a range of habitats. Species typical for forested environments, such as *Sus scrofa*, occur alongside species more characteristic of open conditions such as *Bison priscus*.

The bodies, or parts of the bodies, of the different species clearly lay in the area draining into the Wiesbach and were originally deposited in the stream channel. Modification of the thanatocoenose due to subsequent fluvial processes, such as sorting of bones by constant

water flow, cannot be demonstrated (Gaudzinski, 1995a). Specific bones within an assemblage of disarticulated animal skeletons can be differentially sorted by fluvial transport (Voorhies, 1969; Behrensmeyer, 1975). Less dense bone elements of a certain form and size, such as ribs, vertebrae or scapulae, will be preferentially sorted by water flow (Behrensmeyer, 1975). Such elements are present in the Wallertheim faunal assemblage together with teeth, skeletal elements which resist transport longest because of their high density. The composition of the faunal assemblage shows that the thanatocoenose has neither been assembled or otherwise altered to a great extent by fluvial mechanisms. The Wallertheim thanatocoenose can therefore be interpreted as autochthonous. In consequence, the animals must have died close to the location at which their remains were buried (Gaudzinski, 1995a).

Taphonomy

Analysis of the faunal remains from the main horizon suggests that the Wallertheim assemblage is composed



both of remains of species hunted by man and a naturally occurring background fauna. This is the conclusion of a comparative taphonomic study of remains of those species which dominate in this layer. The species analysed in this way are steppe bison *Bison priscus*, with a MNI of 52 and horse, with a MNI of 13. The MNI's were calculated according to the most frequent skeletal element, which is right M₃ for *Bison* and right M¹ for *Equus*. There is a number of differences between the two species which are described below (fig. 1).

Abiotic processes have modified the remains of steppe bison and horse in various ways. The remains of steppe bison have been affected by abrasion to a greater or lesser extent. Elements of the horse skeletons have been altered to a much lesser degree by this form of surface modification. Overall, the degree of rolling does not seem great enough to suggest the transport of meatless bones by fluvial processes. Abrasion can be caused by several factors (Shipman, 1981; Behrensmeyer, 1982, 1988); in this context sandblasting of a bone held in a river bed is the most likely cause of the observed surface modification.

The bones of both species also differ in the degree of the development of weathered surfaces due to climatic causes. The steppe bison bones are relatively less weathered than the horse bones. The majority of bison bones show features described by Behrensmeyer (1978) as typical for weathering stages 0-1 and 2. Horse bones, by contrast, can be assigned rather to stages 2 and 3. Bones in weathering stage 1 show cracking parallel to the fibrous structure of the bone, whereas, characteristically, the surfaces of skeletal parts in stage 2 are beginning to flake away. Stage 3 is reached when large areas of the bone surfaces are missing, but weathering of the bone does not extend deeper than 1.0 - 1.5 mm (Behrensmeyer, 1978: 151).

The development of the abiotic features abrasion and weathering suggests that there is a temporal discontinuity in the thanatocoenose. If traces of abrasion are interpreted as reflecting the interval of time between the disarticulation of a bone from the skeleton and its final burial, it seems plausible to suggest that the bones did not arrive in the river bed simultaneously. Some of the bones must have been exposed to sand abrasion longer than others. Bones of one and the same skeleton might have reached the river bed at different times, but in this case, greater differences in the degree of climatic weathering might have been expected. The presence of only moderate weathering in stages 0-3 (Behrensmeyer, 1978) suggests that the bones were buried rapidly and not subsequently re-exposed.

A relationship between presence of gnawing and climatic weathering was established, since many of more

heavily weathered bones are also gnawed by carnivores (Gaudzinski, 1995a).

The analysis of traces of carnivore gnawing shows further differences between the dominant species at Wallertheim. Gnawing was observed on many horse bones from the main horizon. Traces of carnivore activity could not be observed on the bison bones. This does not mean that the representation of the bones of this species was unaffected by carnivore activity: it is possible that, for example, hyenas are responsible for the absence of certain bones (Marean *et al.*, 1992). Nevertheless, the contrast between more heavily weathered, gnawed horse bones, and less heavily weathered, ungnawed bison bones, does show that modification of the thanatocoenose by carnivores did not occur in the same way for the two species.

A further difference between the bones of bison and horse is shown by artificial cut- and fracture marks, which are only present on the bones of bison. Cut marks were found only infrequently and are not numerous enough to be analysed systematically. By contrast, the position of almost 100 impact fractures was established. This aspect showed that bones were fractured in a standardized way, the blows always being directed to the weakest part of the bone.

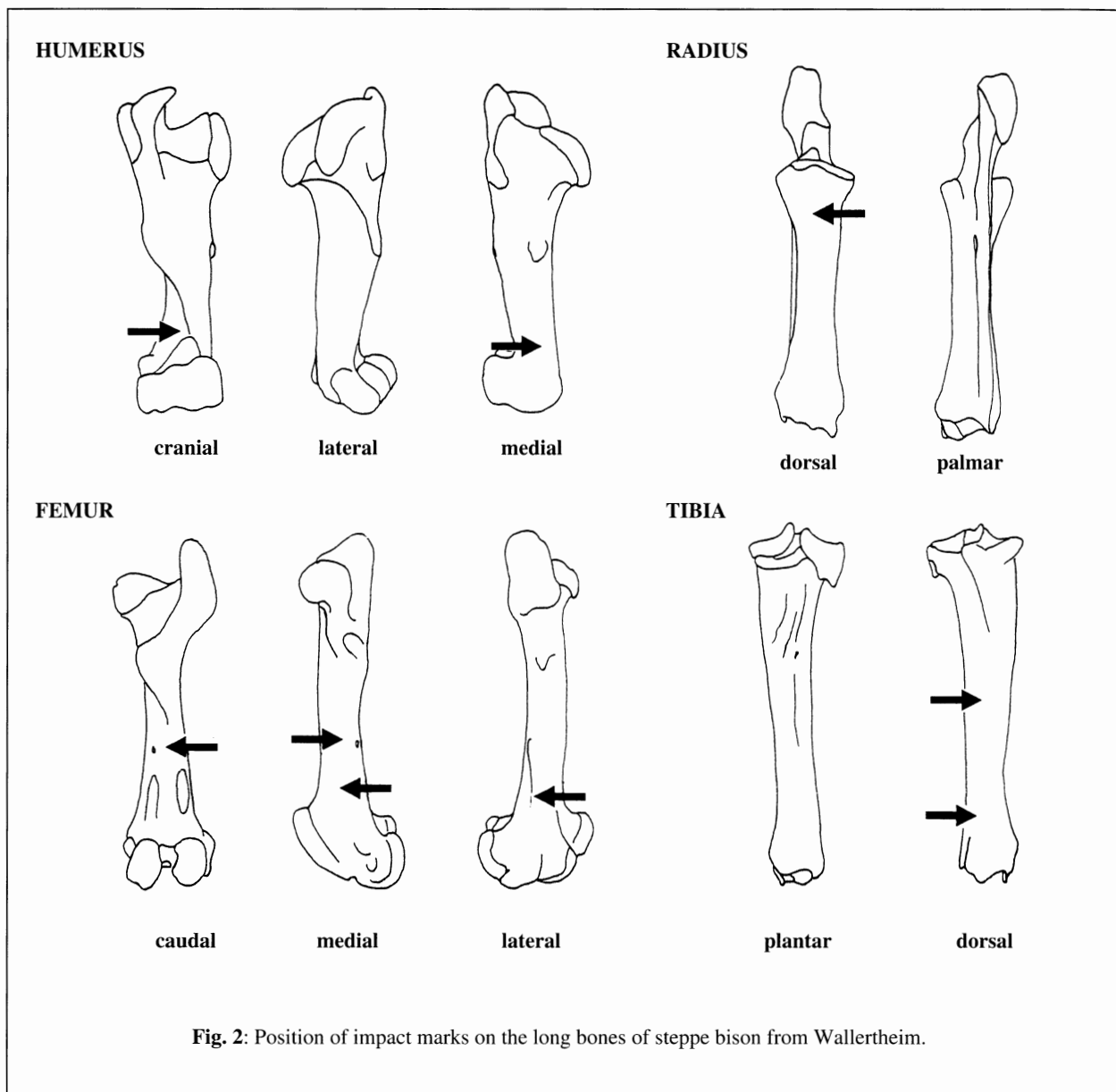
The humerus is one of the bones most frequently showing impact marks ($n = 33$) and was fractured by blows to the cranial or medial face of the distal diaphysis. The point of impact was immediately above the epiphysis on the medial face close to the olecranon (i.e. higher) on the cranial face (fig. 2). All observed impact fractures on left and right femora are immediately next to the upper third of the *fossa plantaris*. The radius was fractured by a blow to the dorsal face and close to the proximal epiphysis. The tibia was broken open by blows to the plantar/lateral face, either in the middle of the diaphysis or directly adjacent to the distally located groove of the tendon (fig. 2). Metapodia were fractured by a blow to the central diaphysis on the palmar face. This method of bone fracture for the extraction of marrow, with resultant fracture patterns similar to those found at Wallertheim, can be followed into the Holocene (Sadek-Kooros, 1972; Berke, 1987). Not only impact fractures but also the overall greater degree of fragmentation of the bison bones, distinguishes them from those of horse (Gaudzinski, 1995a).

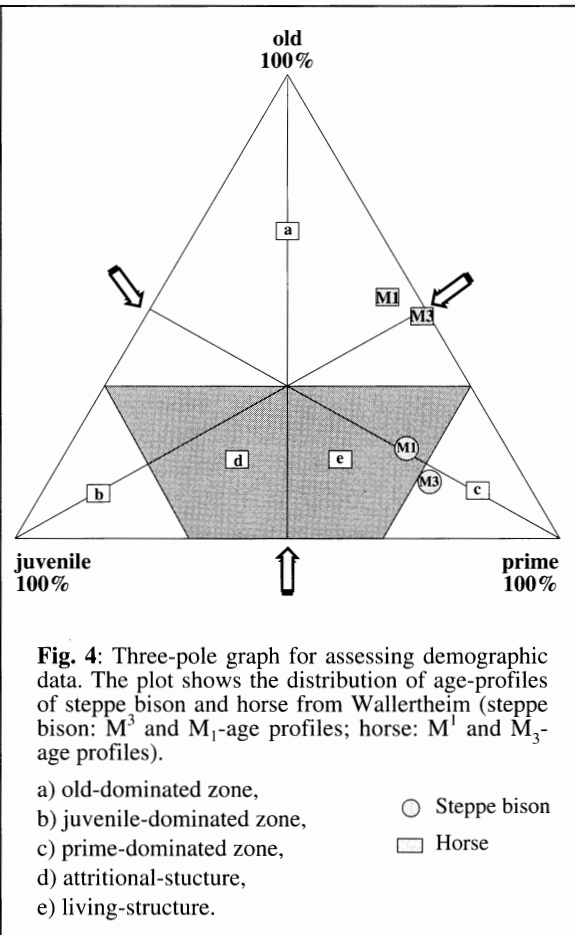
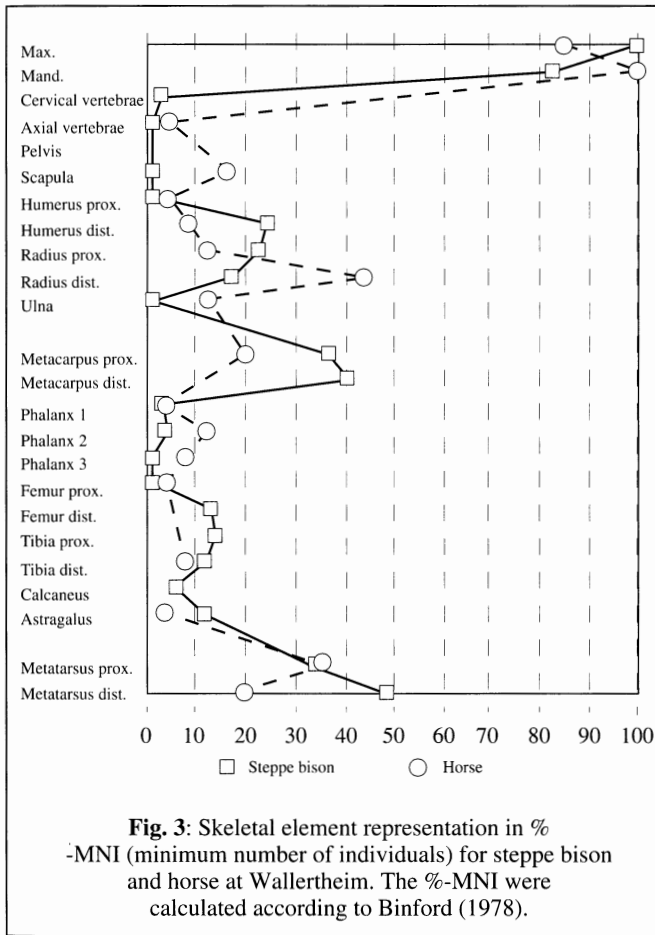
Representation of parts of the skeleton also varies for the two species. The fore and hind limbs of horse are present in other proportions than are those of bison. This can be illustrated (fig. 3) by considering %-MNI's calculated for each skeletal element according to Binford (1978).

Finally, the age structure of the bison and horse populations are different. Age profiles were calculated for both

species on the basis of measurements of crown height (Klein *et al.*, 1983; Klein and Cruz-Urbe, 1984). For the sake of a clearer depiction of variation in age structure the profiles were represented in a triangular diagram (Stiner, 1990). For this, the established age groups were placed into three categories, representing individuals in their young, prime-age and old life-phase. The proportional representation of each age category was then plotted along the three axes of the graph, within which different zones represent different mortality patterns.

Bison is mainly represented by prime age individuals, i.e. animals at the height of their reproductive career. The age profiles lie at the boundary between prime-dominated and living-structure (fig. 4). Prime-dominated mortality profiles in an animal population, in particular, reflect selective mortality of animals over a long period of time (Haynes, 1991). Such a mortality pattern only rarely occurs naturally and is different from that of a population subject to selective hunting by non-human predators and that of a stable, living population. It is distinct from age





profiles which can be observed naturally without human influence. Ethnoarchaeological studies demonstrate a relationship between prime-dominated age structures and human hunting involving stalking (Stiner, 1990; Binford, 1978). The discrepancy between the age structures based on the upper and lower dentition might be caused by modification of the assemblage by carnivore activity.

The age structure of the horse is, by contrast, dominated by older individuals and can thus best be described as “old-biased” (fig. 4). “Old-biased” mortality patterns are commonly regarded as reflecting different processes where scavenging by carnivores seems to be only one variable (Tilson *et al.*, 1980). A thanatocoenose characterized by the dominance of old-age individuals might reflect natural mortality together with a secondary age-dependent destruction of carcasses by carnivores (Stiner, 1990).

Conclusion

All in all, the demonstrated differences suggest convincingly that the bison bones underwent a different taphonomic

history, in which man, on the evidence of cut- and impact marks, played a role. This different history, together with the prime-dominated mortality pattern of bison and the presence of artefacts in the main find horizon, can be interpreted as indications of selective hunting of these species by man. The high minimum number of individuals (over 50 animals), and the results of the analysis of abiotic surface alterations of bone, point to a repeated exploitation of this biomass over a long period of time.

In contrast to this, the old-biased structure of the horse population is underlined by carnivore gnawing and a higher degree of climatically induced weathering. Since the horse bones show no trace of human modification they can most probably be interpreted as part of a natural background fauna.

This evidence for a consistent, monospecific exploitation of bovids in the middle Palaeolithic throws new light on the subsistence strategies of Neanderthals.

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