

Bones: One of the Earliest Secondary Raw Materials

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Recycling and reuse of different raw materials took place throughout the human past, since its very beginnings. However, relations towards the practice of recycling changed considerably over time and among different cultures. In recent times, recycling and reuse went through drastic changes, first with the Industrial revolution and abrupt increase of production and the creation of the “consumer society”, and then, in past decades, with increasing awareness of the environmental protection and sustainable resources. Recycling and reuse are often connected with the shortage and saving (of time, labour, materials, etc.), and archaeological examples are often interpreted through this present-day perspective, i.e., as a reflection of saving and economic profitability. However, reasons and motives for recycling within different communities may not be purely economic, but also cultural, thus reflecting cultural relations towards certain objects and raw materials from which they were made.

Osseous raw materials are particularly specific materials when it concerns reuse and recycling. These include all hard animal tissue – bones, teeth, including ivory, antlers, mollusc shells. They can be obtained from animals killed for food, or they can be collected (e.g., shed antlers or fossil shells). They are, in fact, kitchen debris or collected some already discarded part of an organism, and their use is already some form of recycling. Osseous raw materials, therefore, can be considered as one of the earliest examples of reuse, recycling, and use of discarded materials.

First evidence for the use of osseous raw materials comes from the Lower Palaeolithic. Probably the oldest examples of use are flakes from horn cores discovered at the site of Swartkrans in South Africa, 1,8 to 1 million years old. These were ad hoc used fragments, while the earliest known modified artefacts are those discovered at the site of Broken Hill in Zambia, 300.000-140.000 years old. So far, the oldest objects made from osseous raw materials in Europe were found at the site of Schönningen – these included segments of long bone diaphyses and ribs, used as retouching tools for resharpening and repair of chipped stone tools.

Different bone segments, sometimes just kitchen debris, but sometimes more carefully selected, used for retouching chipped stone tools are known from numerous Middle Palaeolithic sites in Europe and Near East, including Vindija and Veternica.

Since the Upper Palaeolithic, the use of osseous raw materials became more widespread and now we have formal bone industries with specific techno-typological traits. Typological repertoire now includes diverse weapons, such as projectile points and harpoons, and tools – polishers, scrapers, needles, etc. Furthermore, osseous raw materials are now the principal raw material for personal ornaments, and were also frequently used for art objects – numerous anthro- and zoomorphic figurines and engraved plaques were made from bones or mammoth ivory.

In the Pleistocene, bones were also used for constructing dwellings. On several Gravettian and Epigravettian sites, constructions made from mammoth skeletal elements (scapulae, pelvic bones, tusks), usually circular or oval in shape, 4-6 in diameter were discovered. They were covered with hides. Occasionally, they can be extremely large – one such dwelling from the site of Kostienki 11/1a had 9 m in diameter and consisted of over 570 bones from 40 individuals. In Palaeolithic times, there is also evidence for the use of bones as fuel.

In later prehistoric periods, bone industries became more formal and we may observe that the selection of raw material is often planned and strict, and the production techniques are more standardized. Bones intended for tool production are generally separated already during primary butchering, red deer antlers are systematically collected, and marine mollusc shells are traded and exchanged over large distances.

In the Neolithic, typological repertoire included tools (awls, needles, chisels, wedges, scrapers, burnishers, hammers), weapons (projectile points, harpoons, fish hooks), and parts of composite tools – hafts and sleeves. Certain “special” (valued) objects were also made from bones, such as spatula-spoons in the Starčevo-Kőrös-Criş cultural complex which were carefully produced, used for a long time and often repaired.

Osseous raw materials remained the main material for personal ornaments throughout prehistory – probably due to their physical characteristics (especially white colour), but also due to the symbolic value attributed to them for their animal origin. Ornaments were often used for a long time and frequently repaired and modified when broken.

The role of osseous raw materials changed in the historical periods, but they were still in use for diverse daily objects. Some new artefacts emerge in the Roman times – cosmetic and decorative equipment such as cosmetic spatulae, hair pins, combs; writing equipment (stilus), gaming dices, handles for knives with fine figural decorations, etc. Bones and ivory were also often used as inlays and decorations on boxes and furniture.

In the Roman and medieval times, bones were often obtained from butchers or from tanneries. Examples of repair or recycling broken objects are frequent, regardless of the function of the object or raw material.

Even today, bones and shells are used for decorations and jewellery, and bones are used in industry, in construction, as fertilizer, and many more.

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