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The simplest bone tools

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Tekst jest udostępniony do wykorzystania w ramach dozwolonego użytku.

The simplest bone tools¹ (Pl. 68-69; 101-102)

While describing traces on bones found in animal post-consumptive remains, authors often note the fact of splitting the limb bone along its long axis by hitting the proximal or distal epiphysis (LASOTA-MOSKALEWSKA 1993; FEDOROWICZ et al. 1998; GRĘZAK; LASOTA-MOSKALEWSKA 1999, and others). Such bones are treated by the authors of publications as the simplest tools. Some of those bones bear traces of work that may not be noticed without special analysis. At the same time, such tools lack traces of processing. For this reason they are not separated from mass material and stay among post-consumptive remains.

During archeozoological analysis of post-consumptive bone remains from Tykocin, a series of bones resembling tools was separated. Some of them bore traces of work. This was the basis for their description and characterisation. Moreover, an effort was made to reconstruct the process of their production and use.

This work aims at attracting archaeologists' attention to this type of the simplest bone tools most often found in archeozoological material at sites from different prehistoric ages.

Material and methods

Research material were animal remains from 39 – Tykocin – Rynek site. Excavation work at that site was performed by U. Stankiewicz. Material was described as coming from XVIth and XVIIth century. 34 fragments of long bones split along by hitting the proximal or distal end were chosen from post-consumptive material. These bones were identified from the point of view of species and anatomy. Traces resulting from the splitting and possible traces of use were described. Some of the bones were subjected to microscopic analysis performed under 20 x magnification in Olympus zoom stereo microscope (Olympus Optical Co. Europe, Hamburg, Germany) for the purpose of photographic documentation.

Results

On the basis of macroscopic analysis it was established that all the fragments belonged to domesticated mammals, mainly cattle (Table 1). Only one bone belonged to a horse. Anatomical identification revealed

that most of the remains were fragments of metapodial – metacarpal or metatarsal – bones. Only one fragment was radial bone of cattle.

Half of the tools (17 pieces) from the whole collection were prepared from metacarpal bones of cattle. Some of the tools (7 pieces) were obtained by chopping through the proximal end, the other 10 through distal end.

Among the tools prepared from metatarsal bones, one belonged to a horse and was chopped through the proximal end. The others were produced from the bones of cattle. Most of them (12 pieces) were chopped through proximal end, and 3 – through distal end. One had trochlea chopped off.

All the bones were chopped in a similar manner, in the sagittal plane, cutting the articular surface in half. There was often a shallow trace on the articular surface and 2-3 millimetres below it, resulting from splitting the bone. Such traces were subjected to microscopic analysis, and their picture showed slightly polished surface with no scratches (pl. 101.1). This means that the tools used for chopping were sharp.

Long edges of chopped bones bore no traces of processing. They were either smooth or pleated in a way similar to the one produced by mechanical split of bone. Smoothing resulting from the friction against soft material was observed on some edges (pl. 68.1). This smoothing was usually found on both edges, only sometimes it appeared on one of them. On some bones there were defects disrupting the continuity of the edge. These defects may be treated as signs of wear. Microscopic picture of polished edges showed that smoothing comprised not only split surface but also edges and external parts (pl. 101.2). Smoothing was rather extensive which signifies long use and elasticity of material being processed. Each split bone had a chisel part and oval (pl. 68.2), flat or point ending (pl. 68.3). Many bones bore different traces resulting from their use. The first type grouped traces caused by ending being broken off. The following types of break were registered: crosswise with smooth edges (pl. 69.2) and complex break with crumpled or notched edges (pl. 69.1).

Another type of traces connected with work pertained to traces of end smoothing, with broadening the

¹ The work was partially financed by Archaeological Monuments' Conservator in Białystok.

smooth surface to the external part of diaphysis and marrow cavity (pl. 69.3; 102.1).

Some bones bore traces of scratches and defects on the bone diaphysis area. Such traces could result from working in hard and rough material, e.g. wood. (pl. 69.4) Some of those traces were parallel (pl. 101.3), and could have been produced while moving the tool in one direction. Other defects and scratches were scattered chaotically (pl. 101.4), and could have been produced by chance.

There were also other traces proving that the tools were prepared for work, found on edges of chopped bones. Those traces resulted from sharpening the bone by planing it.

Analysis of evaluated bones lets us state that the tools bearing traces of smoothing were not broken on the end. Thus, it seems that, considering the character of traces, described tools may be divided into groups differing in the character of work. One group comprises tools with polished edges and/or ends. Such tools were used for working with soft material. The material had to be so delicate that it left no scratches on the bones.

Another group were damaged and partially devastated tools. They were used as chisels for working in hard and sharp material, e.g. wood. Wood splinters could cause scratches and defects.

Discussion of results

Tools from bones chopped along the long axis by hitting the articular surface were obviously produced purposefully and knowingly. To split a long bone one must put it vertically and place a blade on the articular surface, in sagittal or frontal plane. The blade does not have to be sharp nor hard. Another fragment of a sharpened bone may be used for this purpose. The blade is treated as a punch that is hit from the above. Then, the bone breaks in two, like a wooden chip, and the split reaches the opposite end or the diaphysis. In the first case, the other end had to be cut off in order to obtain a blade or point. In the other case, two asymmetrical parts were produced, one of which might have been a tool with oval of point ending, sharp enough not to need any additional processing. The other part of the bone was a waste, as it ended up with the whole opposite epiphysis.

In the collection of archaeological experiments (COLES 1977), a similar description of actions leading to obtaining simple bone tools similar to known Neolithic products from the territory of Denmark, may be found. The tools were experimentally produced from metatarsal bones of cattle, chosen from among morphologically mature animals. This fact assured proper hardness of raw material. Tools from Tykocin were produced from metatarsal and metacarpal bones, as well as, although much more rarely, radial bone. Such bones have thick compact substance of the diaphysis and are very durable. They have straight diaphysis and broadened ends which,

after splitting the bone, formed a comfortable handle. There is also a theoretical possibility that these tools could have been produced with use of tibial bone. However, its triangular cross-section made proper chopping more difficult.

Cattle and horse bones were used for the production of discussed tools. This is understandable from the point of view of similar features of bones of these two species. Also bones of wild animals, representing big ruminants, especially deer, could have been used for this purpose. Worse accessibility of such bones was probably the reason of their more rare use. In the period, when there were no domesticated animals and wild animals were easily accessible, the tools were produced from bones of many species of wild animals. Such collection was found in the material from Upper Palaeolithic period in Maszycka Cave (LASOTA-MOSKALEWSKA 1993). Bones of wild horse, European bison, reindeer, deer and bear were used.

Tools of described type were cheap, simple in production, and the material was easily accessible after each kill of a big animal. The material was a by-product of consumptive slaughter. Lack of necessity of processing or only minimal processing allowed production of such tools in each home, as no abilities or special preparations were required to do it. After chopping bones, bone marrow was probably extracted, which was a common process performed by consumers of that time. However, splitting the bone only for the purpose of marrow extraction was done with easier technique consisting of hitting the diaphysis.

What was the function of described tools? Tools with oval ending might have been used as chisels, for filleting meat and cleaning leather of meat and fat, before the proper tanning. Coles (1977) reports that even now people in Canada use bone tools for this process. While filleting meat and cleaning leather, the edge of the chisel was smoothed which was observed in microscopic analysis of Tykocin bones. The tools were also used for working in harder material, e.g. wood, which resulted in appearance of defects beyond the edge of the tools. Coles (1977) describes that with use of similar tools it was possible to make a hole in alder wood.

Point-ended tools could have been used as awls for piercing leather, making small holes in wood, untangling wool, alternating wicker and phloem in plaitwork. In such cases, delicacy of bones could be an advantage, as it did not damage, tear, fray nor cut the material. Tools with long and smooth edges polished while working could have been used as polishers for final processing of fabrics or leather.

Tools described in this work seem to have been universal in old household. This is attested by their multifunctionality, great accessibility of raw materials and simplicity of production. Their universality is also attested by geographic and chronological range of appearance. On the territory of Polish lands the oldest tools of this kind

were found in Maszycka Cave (LASOTA-MOSKALEWSKA 1993) belonging to Magdalenian culture from Upper Palaeolithic period. Since Neolithic period these tools were produced from the bones of domesticated animals. They were discovered at the site of Złota by Wawer (FEDOROWICZ et al. 1998), belonging to the globular amphora culture. They were also found in Ukraine, in a locality called Zimne (GRĘZAK, LASOTA-MOSKALEWSKA 1998), among materials connected with the funnel beaker culture.

Before metals were known, bone and stone were basic raw materials for the production of different types of articles. In this situation production of simple bone tools does not raise any doubts. However, even introduction and general use of metals did not eradicate bone material. Simple bone tools were also popular in the period of me-

tals, until middle ages, and even modern times. They were registered in the settlement of Lusatian culture in Grodno (PIĄTKOWSKA-MAŁECKA 1999), in the settlement of the late Roman period in Osinki (LASOTA-MOSKALEWSKA, PIĄTKOWSKA 1997). Among sites from Middle Ages we may mention Krasnystaw (LASOTA-MOSKALEWSKA 1999), Rajgród (LASOTA-MOSKALEWSKA, PIĄTKOWSKA 1999) and Chełm-Bielawin (LASOTA-MOSKALEWSKA, PIĄTKOWSKA 1999a). The newest site, dated XVIth – XVIIIth century, is Tykocin, described in this work.

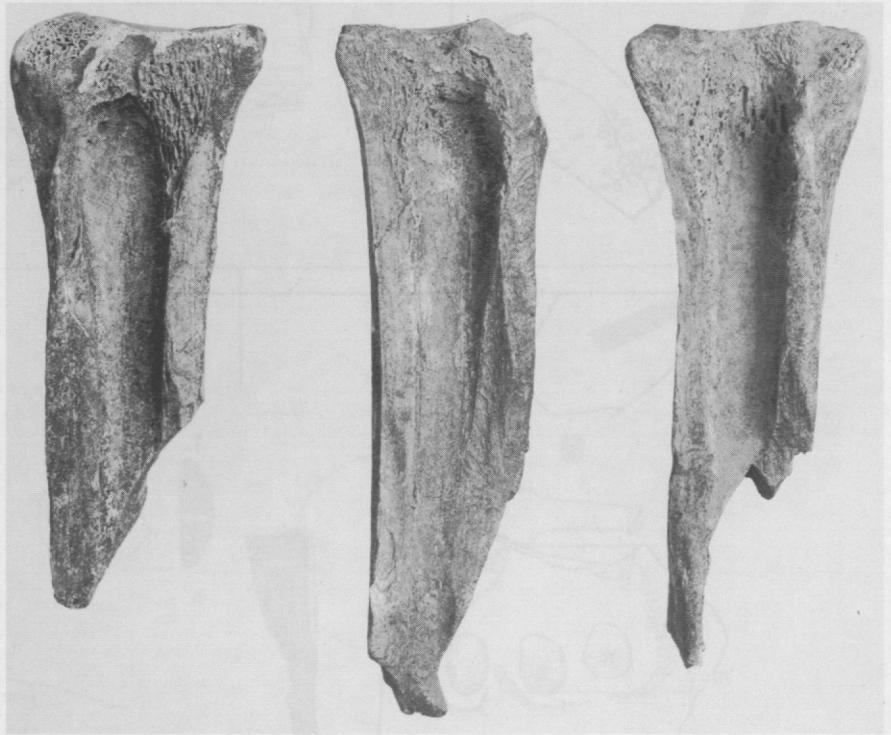
The authors are grateful to U. Stankiewicz, M.Sc., and K. Bieńkowska, M.Sc. for making all the materials available and to Dr Ewa Mystkowska-Bączkowska for the help in microscopic analysis.

Table 1. Bone fragments described as Tykocin tools.

Anatomical description and method of bone chopping	Species	Number
Metacarpal bone chopped along through proximal end	Cattle	7
Metacarpal bone chopped along through distal end	Cattle	10
Metatarsal bone chopped along through proximal end	Cattle	12
Metatarsal bone chopped along through distal end	Cattle	3
Metatarsal bone chopped along through proximal end	Horse	1
Radial bone	Cattle	1
Total		34

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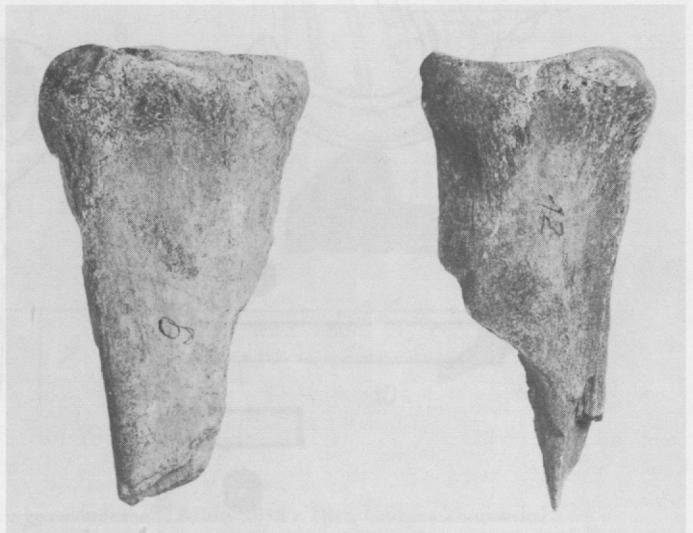
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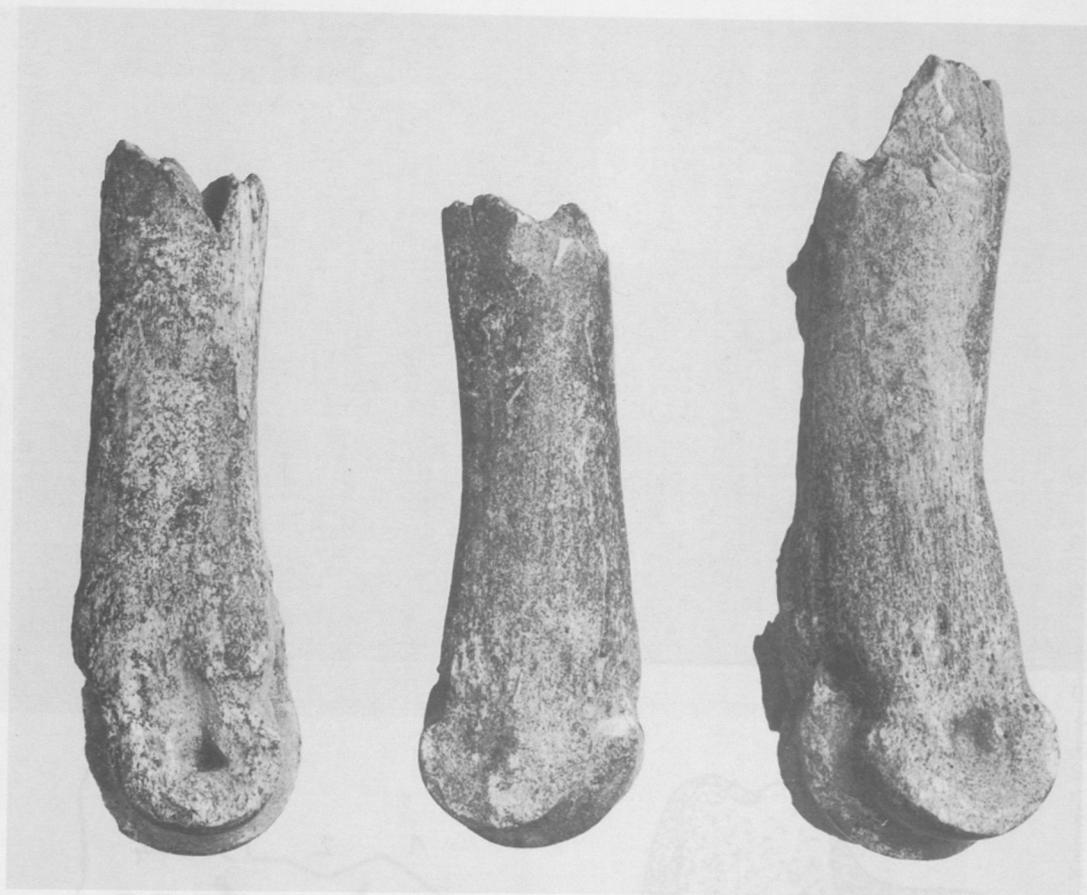


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1. Three tools made of cattle metatarsal bones split from the side of proximal end. Edges are well polished. (Phot. by M. Dąbski).
 2. Tool made of cattle metacarpal bone. The ending has oval shape. (Phot. by M. Dąbski).
 3. Two tools made of cattle metatarsal bones. In the left tool ending is straight, while in the right it is sharp. (Phot. by M. Dąbski).



1



2



3



4

1. Three tools made of cattle metacarpal bones. Endings are broken off and edges are uneven. (Phot. by M. Dąbski).

2. Tool made of cattle radial bone. The ending is broken off, and the surface is smooth. (Phot. by M. Dąbski).

3. Tool made of cattle metatarsal bones. Traces of polishing on the ending. (Phot. by M. Dąbski).

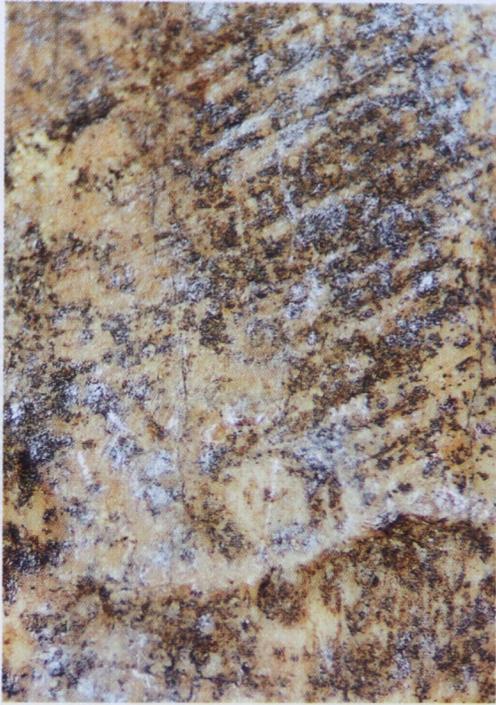
4. Tool made of horse metatarsal bone. The ending is broken off and the surface of the tool bears many traces evidencing working with hard material. (Phot. by M. Dąbski).



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2



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4

1. Microscopic image of the place, where a blade has been applied. (Phot. by authors).
2. Microscopic image of a polished surface of a tool. (Phot. by authors).
3. Microscopic image of scratches formed in the result of work. Scratches are parallel. (Phot. by authors).
4. Microscopic image of defects formed in the result of working with hard material. (Phot. by authors).



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1. Microscopic image of polishing traces on the tool ending. (Phot. by authors).

2. Stary Wal (Alte Wall) i Janowo z oznaczonym kościołem (Kirch) św. Barbary, na mapie granicy polsko-pruskiej S. Suchodolskiego z około 1705 r., w skali około 1:50 000. Mapa ma orientację południową, Geheimes Staatsarchiv Preussischer Kulturbesitz, Berlin-Dahlem.