

## Raw material in the late medieval shoemaking in small Pomeranian towns

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Archaeology provides the key evidence that can be used to answer questions related to medieval crafts. It is invaluable in the situation of shortage of historical written sources that researchers of material culture of medieval Poland have to face.

In this short presentation I would like to present the role of studies on archaeological leather for investigating leathercraft in the Middle Ages. The present research is focused on the quality of the raw material in leathercraft of small towns, which is a barely recognized subject. There are no written sources which could answer this question. In fact, written sources referring to the craft in the Middle Ages are scarce; they start to appear since the 16<sup>th</sup> century onwards and inform us about craft organisations. Under these circumstances archaeological artefacts are our only source of such knowledge.

The region of Pomerania covers the south coast of the Baltic Sea. Gdańsk Pomerania is situated in the middle of it, west of the lower reaches of the Vistula River. At the beginning of the 14<sup>th</sup> century just five towns existed in the region. Since 1308 Gdańsk Pomerania was included into the State of the Teutonic Order, which proceeded with organizing a network of towns. At the beginning of the 15<sup>th</sup> century the total number of small towns reached 20 plus Gdańsk - the capital of this region, one of the most important manufacturing and trading centres on the Baltic Sea. My study is based on assemblages of leather artefacts obtained during excavations in Puck, Gniew, Lębork, and Chojnice. According to tax classifications applicable in the Kingdom of Poland, these towns in late medieval times could be classified as local craft centres. There is no medieval information on the population but it can be estimated to between 500 and 1000 people. Towns of this size formed the basic settlement network in Pomerania.

The chosen collection have been excavated during the archaeological investigations from well preserved archaeological layers with precise dendrochronological dating. Most of them are dated back to the second half of the 14<sup>th</sup> century, or more precisely to the 3<sup>rd</sup> or 4<sup>th</sup> quarter of this century. This is the initial period of development of these towns and their

crafts after location. These four collections comprise the remains of footwear, other leather goods, and offcuts – interpreted as relics of local leather workshops.

The analysis of archaeological collections enables us to draw some conclusions concerning raw material used in leatherworking, for example species distribution of skins, correctness of tanning process, kinds of new or reclaimed leather used.

The skins are classified into species during microscopic analyses. It is possible due to the three taxonomic features of the excavated leather: the grain layer pattern, the distribution of hair orifices on the grain layer, the picture of fibres on the flesh side. The remains of archaeological leather are examined by comparing them with presently tanned skins from a referential collection under the magnification by a binocular microscope. There are difficulties in distinguishing species, in particular goat and sheepskin, which often have to be classified to the general group of small ruminants. Moreover, some part of the examined collection remains unidentified due to the damage of the leather or changes caused by wear or decay during deposition in a cultural layer. Difficulties in discrimination could be caused by the low quality of the tanning process, with puckered, rough grain side, especially on the offcuts from the edge parts of skins. Microscopic analysis was carried out on a collection of over 2100 offcuts (which was a random sample of a much bigger collection) and almost one thousand shoe elements and other recognized leather goods.

The cattle hides were the most frequently tanned material in three of the four investigated small towns and, presumably, in most towns in the Middle Ages. In these collections hides of adult cattle constitute over 70 per cent of offcuts and almost 60 per cent of leather goods. This is a change in comparison to the Early Middle Ages (which in Poland dated back from 10<sup>th</sup> to the half of the 13<sup>th</sup> century). According to the results of an analysis of leather remains from early medieval settlements in Poland there has been a predominance of goat and sheep skins in the 12<sup>th</sup> c. This changed throughout 13<sup>th</sup> century. A similar transition was observed in the collections of leather finds from urban centres of Northern Europe: for example Kołobrzeg in Poland, Lübeck and Schleswig in Germany, London and York in England. This high percentage of cattle hides could be interpreted in a few ways. Archaeozoologists, who reconstruct breeding based on animal bones from excavations, claim that the predominance of cattle (followed by pig) is typical for urban economy. The high percentage could be a corollary of access to raw material from local butcherries. It is also

considered as an indication of good tanning skills enabling to obtain different kinds of leather from cattle hides. And of course it could be an effect of a low demand for more delicate leather products in towns or the character of workshops working with this kinds of skins. Nevertheless, sheep and goat skin together constitute only a small percent of tanned skins in these towns, and the percentage of deerskins is marginal. Only in Gniew goatskin and deerskin prevailed. This could be a result of the local traditions (because the town was established at the end of the 13<sup>th</sup> c. on a previous settlement) or might reflect the production of a specific type of horse riding boots. There are also offcuts of tanned pig- and horse skin, as well as single remnants of carnivores leather used for a vamp and heel stiffener; but they were used only occasionally.

Identification of leather species is crucial for investigating what kind of leather was used for different types of shoes and their elements, and whether the shoemakers intentionally selected and combined different sorts of leather. Shoes produced in the second half of the 14<sup>th</sup> century in small-town shoemakers' workshops represented the most popular types known from towns around the Baltic Sea, distinguished by height and their fastening system. The models of low-cut shoes fastened over the instep with a split lace and shoes tied with tailed toggles were the most common in urban contexts not only in examined towns but throughout the Northern and Central Europe. High shoes lace tied around are rarely seen here, but this type of footwear is typical for an earlier period - the 1<sup>st</sup> half of the 14<sup>th</sup> century. In the 2<sup>nd</sup> half this type was less frequent and replaced by front-toggle fastened shoes. Vamps of high boots occurred but occasionally (except Gniew, where they were found in large numbers); presumably their uppers were intended for reuse. There are only slight disparities between the collections from small towns and the main trading centre of Gdansk. In the small towns shoes that could be described as luxurious – decorated or with excessively elongated toes – were almost absent. But the general assortment of shoes was typical for the 2<sup>nd</sup> half of the 14<sup>th</sup> century in Central Europe.

The predominant part of footwear was made completely from one kind of leather – predominantly cattle hide, which amounted to more than 54 per cent of the examined specimens from Chojnice and more than 65 per cent from Puck. A common practice in late medieval shoemaking was stitching together a vamp made from sheep, goat or deer skin with a sole from cattle leather. This is obviously justified (because of cattle leather's

durability). But there were also examples of joining two pieces of one vamp made from different sorts of leather or the reinforcements different from the uppers. It is interesting, because this kind of practice was forbidden in medieval London (Ordinances of the London Cordwiners' Company, 1303), but combining different materials in one shoe could be a good way to make the best use of the raw material used (for example, a cattle hide heel stiffener reinforced a soft vamp made of sheepskin, or goatskin top band finished the edge of a bovine vamp). Mixing leather is quite common in toggles in toggle-fastened boots. There are no traces of repairing or re-stitching, so it had to be a result of shoemakers' carelessness or problems with leather accessibility. There also seems to have been a correlation between shoe style and leather species used. Most of the non-cattle leather shoes were low shoes with straps for adults, horse riding boots and different types of high shoes but meant for children.

Correct cutting of the tanned animal skin was a crucial shoemaker's skill and thus was entrusted to the most experienced craftsmen of a workshop. Analyses of the raw material confirm deliberate selection of skins or hides of different quality for particular parts of footwear. The most important structural elements – the soles and vamps – were cut out of the best and most durable dorsal part, whereas the quarters and uppers or tongues were made of looser parts of hides or skins. Linings were made of offcuts from larger elements, while the poor quality skin from the groin was often used for additions or reinforcements mostly or completely hidden from sight. Children shoes were the only exception. They were deliberately made of poor quality, inferior parts of skins or hides, which caused them to stretch irregularly.

Examination of directions of hair orifices on the outer surfaces of late medieval footwear, allows to determine the layout of the cutting pattern on a given animal skin. It showed that medieval shoemakers provided for directions of pliability of hides and adjusted their patterns accordingly. In the vast majority of patterns, they were laid out in a way that nowadays would be considered correct or acceptable. Deviations from these rules were found, similarly to the selection of the raw material, mostly on children footwear, which jointly indicates that these products were made from larger offcuts. Their layout, incompatible with correct directions of pliability, may be considered deliberate and aimed at maximal utilisation of all parts of skins or hides rather than resulting from lack of skills in

cutting or poor assessment of the quality of the material. Thriftiness of the craftsmen can be seen in the size and shape of the obtained production wastes from small towns. The processed animal skins or hides were used almost completely and their flawed or inferior parts, such as mammary glands or protrusions on the extremities, were cut out closely or even used, although it must have caused discomfort. Secondary materials were in common use and were reclaimed from decently-preserved parts of damaged shoes, mostly boots, which now we find in the form of small offcuts with traces of stitches. Also a considerable part of offcuts (with no stitches and visible damage) bear the traces of use on the grain side or felted fibres on the flesh side during the microscopic observation. This indicates that at least c.a. 15% of offcuts originally assessed as new skin came from reused material. This confirms the general assumption about the shortage of raw leather in the medieval towns.

The observation of leather remains led us to some conclusions concerning the quality of the tanning process.

According to written sources, in small towns of Poland tanning was a part of shoemakers' production. There is no evidence of strict specialisation into fellmongers, tanners, carriers and leather workers. The guild of shoemakers in Gdańsk (the capital town of the region and one of the important Hanseatic towns at the Baltic coast) in the 2<sup>nd</sup> half of 14<sup>th</sup> century owned a tannery and two oak bark mills which had a permission for tanning raw hides and skins for their own use. In case of a shortage of tanners, they could even produce it as a commodity. Written sources from the 15<sup>th</sup> to the 18<sup>th</sup> century indicate that the low-grade vegetable tanning, called "simple tanning" in Polish, producing leather appropriate for shoemaking and simple leather goods was the basic occupation of shoemakers, regardless of the category of the town. Tawyers and whittawyers producing luxurious kinds of leathers appeared only in the largest towns at the end of the 15<sup>th</sup> century; there is no mention of carriers whatsoever.

This assumption based on written sources can be confirmed through archaeological investigations. For example three tanning tubs, dated back to the 15<sup>th</sup> c., with a layer of lime inside were unearthed at the backyard of an urban plot in Puck (diameter 1.35 m, oak plank). The occurrence of tufts of animal hair in the corresponding cultural layers proves its tanning function, however several hundred offcuts have also been found. They were not only primary waste from the initial trimming of hides to remove unusable parts such as the area

of the head, legs or udders, but also typical intersectional offcuts resulting from cutting out elements of shoes, such as soles. It is archaeological evidence for joining these two professions in one workshop.

The way raw skins or hides were prepared had a direct impact on the quality of the end product. Flaws visible on the leather remnants are often a consequence of mistakes committed during the particular tanning activity like trimming, tanning or finishing. The most frequent are: remains of hair on the grain layer, wide open hair orifices, uneven, rough grain layer or the incisions on the flesh side. These flaws, nowadays considered unacceptable, were present not only on the offcuts from the outlying area of skins but also the intersection offcuts and leather goods. Moreover, the substantial part of the examined leather finds tended to delaminate in effect of maceration of the non-tanned parts of tissue. It could be caused by too high concentration of the first tanning solution and in consequence too fast tanning of the external layers and foreclosing for further saturation. The specimens with deformed or delaminated grain surface were also registered in all of the investigated towns. Analyses of manufacturing waste (offcuts) coming from the local leather workshops, where a similarly high percentage of delaminated offcuts was noted (52.6-70.2%), indicated that shoemakers from the investigated towns displayed a rather unimpressive competence in this regard. On the other hand the possibility of intentionally incomplete tanning cannot be excluded in some cases. It would refer to the leather designed to retain greater stiffness, assigned for soles. Incomplete delimiting, which impeded tanning, rendered the soles waterproof, but at the same time made them much more prone to delamination than vamps.

To summarize the microscopic analysis, only a small portion of the examined collection from the small towns can be described as a completely correctly tanned leather according to current criteria. Nearly half of the products from Lębork dated to the second half of the 14<sup>th</sup> century, as well as over one third of the total number of 14<sup>th</sup>-century products from Gniew were thoroughly tanned. In the case of Chojnice only a quarter of all of the shoemaker's products were made of properly tanned skins or hides, whereas in Puck – merely one out of ten. The leatherworkers either lacked sufficient knowledge and skills or deliberately set the bar low in regard to quality, for instance by shortening the time hides were kept in tanning tubs or pits.

This provides an interesting question about the differences between current and former perception and evaluation of leather quality.

This is only an outline of the issues relating to the raw material in shoemaking craft of the late medieval times. It seems that in the case of small town crafts, very poorly elucidated by written sources, the only way to gain some new knowledge is a rigorous and thoughtful analysis of large and well-dated archaeological collections.