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USE-WEAR ANALYSIS OF BONE AND ANTLER ARTEFACTS OF MEDIEVAL CHERSON

Introduction

The bone and antler artefacts were used widely from earliest time. There were some reasons for this situation. First of all - the raw material was rather accessible as a result of hunting or cattle breeding. The production of the goods doesn't need specific technical equipment on the primitive level. The objects are pretty and long duration.

As usually, the researches paid their attention to the materials of pre-historical and ancient periods. It should be noted the monograph by B.G. Peters, that is most significant investigation of this problem in respect of the ancient time in Russian language. He examined the technology of production and types of goods made from the bone and antler at the territory of North Black Sea Coast.1

As regards the Middle Ages artefacts there are not numerous articles and parts of monographs. However the art critical analysis was in the focus of this works. The article by A.I. Romanchuk had different nature. She has developed the typology of bone and antler goods from the Medieval Cherson. The base of her investigation was vast material by the excavation of Russian and soviet researchers. But the problems of technological analysis have stayed out of framework of this work.3

Most likely, this situation is connected with small quantity of medieval bone subjects. The chronology of such artefacts was not developed. Sometimes they functions are not established. There are difficulties for examination these items in the light of general archaeological and history context of monuments. However, the bone and antler goods content an important information about way of life, a handicraft production and the instruments of medieval Byzantine city.

The main task of this work is the technological analysis of the medieval bone and antler artefacts. All of them were excavated at the Port’s area II of Cherson by the expedition of the Urals State University under the supervision of Dr. A.I. Romanchuk from 1969 till 1996. The total number of investigated items is 114. They were dated by XII-XV ages. Most of them are unpublished yet. The use-wear analysis was made for this aim.

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The method of investigation and general statements

The base of the typology is the development by A.I. Romanchuk. She identified 5 groups and 39 types of bone and antler artefacts of medieval Cherson. Additionally B.G. Peters's analysis was used. He detects 22 types of items of ancient time. All of them were instruments, adornments, and consumer’s goods.

There were two main technological levels of production of such objects. The first one includes the process from the blank obtaining till the finished good. These are sawing, cutting, drilling, chopping, and polishing. The second one is connected with the decoration of the items – the carving, notches, grooving, painting and gilding.

The use-wear analysis was applied for technological analysis of collection. S. Semenov developed this method. First of all it is used for the stone tools. But nevertheless the founder applied it for analysis of bone artefacts from Ancient Olbia and Medieval Sarkel. Currently V.E. Flerova uses this method for bone founds from this fortress with grate success. The principal of use-wear analysis is the determination under the surface of the most specific features. They characterize the production and using of items. The bloc of linear features or striations (grooves and scratch) is the most useful in our case. The form, disposition, parameters of linear features correspond with the kinematics of working operation and the form of the tool.

The technician’s equipment and the practice

A several ways were applied for investigation of the collection. The first step was the visual examination. It was necessary for the determination of the most perspective items and sections of it for the use-wear analysis. After that, the artefacts were studied through the hand-lens or microscope. Usually the use wear of stone tools based under the high-power approach. But only the low-power approach needs for aims of investigation bone artefacts. G.F. Korobkova in Russia and R. Tringham in England developed this variety of use wear method.

The magnification below 30x most appropriate for the analysis of bone and antler objects from Cherson’s collection. The investigation was made through the stereo microscope MBS-10 (МБС-10).

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5 Peters B.G. Kostoreznoe delo v antichnih gosudsrstvah Severnogo Prichernomoria. P. 42-104.
The safe of the object’s surfaces caused some troubles. Possibly two reasons should be detected. These deformations are as the results of usage and a postdepositional processes.

The row material and technology

Most of goods were made from parts of tube bones belong to cattle and antlers of wild animals (dire?). The items from ivory are present but not numerous (the some of spindle whorls and draughtsmen). Besides there are objects from another kinds of bone row materials.

There are clear traces of sawing as results of separation of epiphysisises. The diaphysis was divided along for the plates purposes. These plates were the blanks for many types of bone goods. The coarse-tooth saws were used for this aims. This fact confirms by the observation on the relief of the surfaces: wide and deep furrows correspond with such instruments (Fig. 1.2).

Sometimes we can observe the correlation between the shapes of row material and finished goods. There are the semispherical parts of epiphysisises. They were used as the blanks of spindle whorls and draughtsmen. The natural form does not need of the processing besides minimal smoothing. The traces of cutting and polishing were identified on the edges of these artefacts. The rib’s bones were used for production of the pins and handle of the knifes. In these cases the additional working was minimal too.

The antler is more hard and resistant material than bone. This fact leaded to another technological methods. The longitudinal sawing was applied rare. The round-shaped cross sections were the blanks most often. Correspondingly, the antler row material was used for the production of small in height and diameter round-shaped goods such as spindle whorls and draughtsmen. The dices were made from the antler of solid structure. The longitudinal plates and outgrowths of antler were used for knife’s handles.

A small and thin (1–2 mm) obtained by an interesting technique. The sawing was made at sharp angels to the surface of antler. It leaded to rising of the long of the blanks. Usually, they were used for the buttons.

The planing was one more method of the preliminary processing of the row material. There are clear evidences of this operation on the items. First of all, it is a short (10-15 mm) notches with the smooth surface. The planing was applied for shaping of the blanks.

In many cases the finished form was given by the coarse abrasive. There are numerous scratches in form of parallel lines, long and deep. They are serial, monodirectional and should be coursed by the instruments like the rasp. Interesting to note, S. Semenov identified rasp using (including made from bone) in the assemblage of Ancient Olbia.11

The drilling was widespread operation. Sometimes it was used for through holes (buttons, spindle whorls, draughtsmen – Fig. 2.1-2). In other cases the drilling was applied for not through holes, for example – cavity at the handles of knifes for blades fixing. The form of the holes demonstrates the parameters of the

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drills. Probably, the Middle Ages craftsmen used tools with diameter 2-8 mm and conical end.

The holes should be made by another way, namely by the awl. They are easy for identification. The features of awl using are the diameter of holes 1-2 mm, parallel and very thin striations at the sides of the holes (concentric circles characterized the drilling).

Some of the artefacts (knobs, spindle whorls) were made at the lathe. These objects have spherical, conical, cylindrical shapes or elements of one. As usually, they are symmetrical relatives to they longitudinal axis (Fig. 3.1). Another fiches of lathe processing are the striations and hollows at the butt-ends. The striations are thin, regular, strictly parallel and closely located lines. The hollows are the result of fixing of the blank at lathe.

**Decoration**

As analysis showed there are no differences between tools for preliminary processing and decoration of the goods in many cases. For example, the spindle whorls made by lathe were decorated during the rotation by the cutter. The decor consists of the lines around items (Fig. 3.3). They are not deep, 1 mm in wide, sharply angled in cross section. Probably cutter or chisel was used for it as for concentric circles at the surface of the draughtsmen. The triangular cutter was applied in some cases. For instance, there is the bone ring with the line at the surface. This line has the regular triangular cross section 2 mm wide.

The group of cover plates in the assemblage was decorated by the carving. Usually, there were the images of birds and animals. Probably, they were made by the cutter of different types and chisel. But should be notice the knife was the tool for carving. This fact confirms by the roughness and negligence of the lines of figurines and backgrounds.

The round cavities are often decoration method. They are diameter 4-7 mm, lens-shaped in the cross section. There are concentric circles at its surface (Fig. 3.2). Most likely they were result of drilling by the massive tool. The examples of such instruments are known after collection of Ancient monuments\(^\text{12}\).

Widely spread method of decoration was the so called «compasses ornament». It’s looks like the small concentrically circles (1 or 2-3). There is a little pit at the centre as a result of needle. The circles are always regular (Fig. 1.1). Probably, they were made by uninterrupted movement of the compasses with the cutter. The cross section of the lines led to the conclusion that the working edge was either perpendicular or aslant to the working material. Interesting to note, there are two plates decorated by the ornaments made by the knife at rather primitive level.

Some of goods were decorated by shot notches or long lines. Some times they form the net. The different instruments were applied for production of these lines. As usually, they were produced by the knife. It was held straight or at angle to the surface. In other cases the lines were made by the point of knife. The saw should used for this operation. The profile of lines is the stable background for the tools determination. The knife caricatured by the triangular cross section,

\(^\text{12}\) Peters B.G. Kostoreznoe delo v antichnih gosudsrtvah Severnogo Prichernomoria. P. 160. Fig. 1-4-5.
but the saw—rectangular. If the lines look very thin and rather shallow they were produced by the awl or needle.

Most of rod shaped items (bone awls, styluses) were decorated by the helical lines. They were drawn by the point of knife or cutter. There were two ways of this operation. In the first case the object was rotated. The line looks uninterrupted, identical in wide and deep. The cutting instrument was moved in other case. The line consists of separate notches running one after the other.

The parts of frames with gashes were new types of decoration unknown during the Ancient time in Northern Black Sea Cost. The gashes are parallel, the wide—1-3 mm and deep—2-3 mm (Fig. 2.2). Most likely the fine-tooth and thin saw was used for their production. This fact confirms by smoothness of the side of the gashes. Usually, the coarse-tooth saw leaves stepped relief.

Some of goods were painted partly or completely. There are spindle whorls decorated red or green colours. Most clear the heels of paint are observes through the microscope at the hollows of ornament. The traces of black or red paint were fixed at the rosettes of compasses ornament and round cavities. Most interesting is the plate (level 3, room 135) was decorated by round cavities. They were painted by red and black colours as on a chess-board.

The part of items was polished with grate carefulness. Probably, the soft material was used for this aim (hide or fabric). The surface of such artefacts is glossy and smoothed traces of preliminary processing of the blank. The entire character of gloss approved their technological reason but not result of hand or handle effect.

Conclusion

As technological analysis showed the base methods of bone and antler processing were not change from Ancient time in the Northern Black Sea Cost. The main stages were corresponded with the scheme that was reconstructed by B.G. Peters after Ancient materials\(^\text{13}\).

The blank was obtained by sawing or knapping bone or antler row material. The form of finished good was into consideration under selection of parts of animal skeleton. As far as technique was depended on density and structure of row material. After the preprocessing of the finished form was developed by such instruments as saw, knife, chisel, and cutter. The decoration was consisted of polishing, ornamentation or carving. Sometimes the painting was applied to the surface of the good.

The lather was widely used for production of some items. It is necessary to note this mechanism was known at Northern Black Sea Cost during Ancient time\(^\text{14}\).

The bone and antler goods should be made at the different technological levels (for instance, draughtsmen, counters, buttons, spindle whorls etc.). Some of them are characterizes of good quality of row material, traces of lath using, painstaking decoration. Most likely these artefacts were produced by craftsmen

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for the selling purposes. On the another cases the specific features are the carelessness of row material selection, blank obtaining and decoration. Probably, these items were made for self consumption.

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ТРАСОЛОГИЧЕСКИЙ АНАЛИЗ КОСТЯНЫХ И РОГОВЫХ ИЗДЕЛИЙ СРЕДНЕВЕКОВОГО ХЕРСОНА

Трасологический анализ, широко применимый для анализа каменных изделий доисторического времени может быть использован и для изучения костяных и роговых изделий средневекового периода. В основе статьи лежит изучение более 100 изделий такого рода из раскопок Портового квартала 2 Херсона. С помощью микроскопа были изучены основные технические приемы и, в ряде случаев, инструменты на основе следов производства на поверхности костяных и роговых предметов. После распиливания или раскалывания костяного полуфабриката с помощью пилы, ножа, стамески, резца заготовке придавали контур будущей вещи. В зависимости от типа изделия обработка заканчивалась шлифовкой или полировкой поверхности, нанесением орнамента или резьбы. Иногда для украшения использовались краски. Следует отметить, что изделия из кости и рога могли быть изготовлены на разном технологическом уровне.
ILLUSTRATIONS FOR A. SHAMANAEV'S ARTICLE

Fig. 1. 1–2. Port's quarter 2.
1 – the fragment of frame; 2 – the traces of sawing
Fig. 2. 1–2. Port's quarter 2.
The bone and antler artefacts
Fig. 3. 1–3. Port's quarter 2.
The bone and antler artefacts