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## FORENSIC CLASSIFICATION OF BATTLE AXES

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*The essence of the definition of "battle axe" has been investigated. It is determined, that it is an axe, intended for use as a cutting, chopping-stabbing, chopping-slicing and chopping-stabbing-cutting cold weapon, and consists of an iron (percussive part with a blade) and a hatchet (handle). The history of the development of battle axes – from stone to modern ones – has been studied. The material for making axes has been determined – stone, metal and other materials. For foot soldiers, a battle ax was often the main weapon, for horsemen – an auxiliary one. Battle axes were used mainly for close combat. Some types of axes were used for throwing. Axes were also widely used as ceremonial weapons. The battle ax has spread all over the world, different modifications of it have appeared in different regions. The reasons for the spread of the battle ax were the relative cheapness compared to the sword and the personal preferences of the owner. The purpose of the study was the formation of a forensic battle axes classification. The materials of the research were literary sources, scientific works and expert conclusions on the studied issues. On the basis of the conducted research, a forensic classification of battle axes is proposed.*

*The main characteristics of battle axes include their type; method of action; application method; iron manufacturing technology; number of blades; blade shape; blade width; the presence of additional striking elements; iron material; the shape (cross-section) of the eyelet; the method of attaching the iron to the ax; ax length; ax shape; ax material; the way of holding (grasping) the ax; availability of additional accessories, tuning; the method of making an ax; time of manufacture; construction decoration*

**Keywords:** ax, battle axe, forensic classification, iron, hatchet, blade

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### 1. Introduction

The ax is one of the most ancient tools of man, which has faithfully served him both in the household and on the battlefield for thousands of years.

Battle ax (lat. *Collidis*) is an ax, intended for use as a cold weapon of hacking, hacking-stabbing, hacking-cutting and hacking-barbed-cutting action, which consists of an iron (a striking part with a blade) and an ax (a hatchet).

The battle ax became widespread all over the world, its various modifications appeared in different regions, including the following: celt, sagaris, Scandinavian battle axe, tomahawk, fokosh, francisca, labris, etc. The reasons for the battle ax spread were the relative cheapness compared to the sword and the personal owner preferences.

### 2. Literature review

It was made of stone, metal, and sometimes other materials and was used mainly for close combat [1, 2]. For foot soldiers, the battle ax was often the main weapon, for horsemen it was an auxiliary weapon. Some types of axes were used for throwing. Axes were also widely used as ceremonial weapons [3, 4].

The ax has come a long way through the millennia together with man and still remains a very popular tool [5, 6]. Battle axes experienced a bit of a renaissance after the Vietnam War (1964–1975) and today are experiencing a new wave of popularity, which is contained in their versatility, although the battle ax is not convenient to cut down trees.

### 3. The purpose of the research

The aim of the research was to formation of a forensic classification of battle axes.

To accomplish the aim, the following tasks have been set:

- 1) study of scientific literature related to the researched issues;
- 2) study of the normative and legal framework in relation to the researched issues;
- 3) identification of signs of battle axes classification;
- 4) development of battle axes classification.

#### 4. Materials and methods

The research materials are literary sources, scientific works and expert conclusions on the researched issues. Internet resources, electronic resources and archival libraries collections were studied (Kharkiv State Scientific Library named after V. G. Korolenko, National Library of Ukraine named after V. I. Vernadskyi, National Library of Ukraine named after Ya. Roslav Mudry, National Parliamentary Library of Ukraine, etc.), world's leading museums electronic resources (Arms Museum in the city of Zaporizhzhia, the Egyptian Rosicrucian Museum in San Jose, the State Historical Museum, the Milne Museum, the Tower of London Museum, the Kirin Sequoia Museum, etc.).

Methods: content analysis, analysis and synthesis, logical. Content analysis is used to investigate the opinions of scientists regarding the features of battle axes classification; analysis and synthesis method – for summarizing the material and forming features of battle axes classification and determining their belonging to these features; logical method – for conclusions formulating.

#### 5. Research results and discussion

On the basis of the conducted studies of scientific works [7, 8] and expert experience, signs of the classification of battle axes were formed, to which the authors attributed:

- type of axes;
- method of action;
- application method;
- iron manufacturing technology;
- number of blades;
- blade shape;
- blade width;
- presence of additional striking elements;
- iron material;
- shape (section) of the eyelet;
- method of attaching the iron to the ax;
- ax length;
- ax shape;
- ax material;
- way of holding (grasping) the ax;
- availability of additional accessories, tuning;
- method of making the ax;
- production time;
- decoration of the structure.

According to the **types** [9, 10], battle axes are divided into:

- *boarding (intrepel)* – a battle ax, used by military sailors and pirates during boarding at the sailing fleet;
  - *aybalta* - a Central Asian battle ax with a semicircular blade;
  - *halberd* – a contact weapon of hacking-cutting-stabbing action with a combat part that is attached to the ax with a socket and consists of a tip, a wide and long iron (more often in the shape of a crescent moon), sometimes a hook;
    - *English long (Danish)* – an early type of battle ax, which consists of a wide thin blade with pronounced points in the area of the toe and beard;
    - *African (kpinga, kelonda, etc.)* – an ax, used by African tribes;
    - *balta is the eastern name for a battle ax with a narrow blade*;
    - *berdish* – a contact weapon of hacking-cutting action with an iron in the form of a wide cloth in the shape of a half-moon, which is attached to the ax with a loop and the lower part of the iron;
    - *bearded* – a type of battle or household ax, which is distinguished by the extension to the bottom of the front lower part of the blade (beard);
    - *brodax* – a massive one- or two-handed battle ax with a half-moon-shaped iron, attached to the ax handle through the eyelet;
    - *valashka (bartka, fokosh, zallava, kelep)* – a traditional ax of the Carpathian highlanders, which is distinguished by a wedge-shaped iron with a narrow hole and a hammer-shaped buttstock;
    - *vulzh* – a hacking-cutting-stabbing weapon, structurally similar to the berdish, but has a pronounced convexity of the blade with a free space between the handle and the blade;
    - *gwizarma* – a type of halberd with a long, narrow, slightly curved tip, which has a straight, pointed branch at the end;
    - *ge* – a Chinese combat weapon of barbed-chopping action, which was used from the era of the Shang dynasty to the Han dynasty;

- *glaiive* – a contact long-armed weapon of hacking-cutting-stabbing action with a long, narrow iron with a point and hooks on the buttstock, which is attached to the ax with a socket;
- *dadao* – a type of Chinese halberd, consisting of an ax blade that exceeds the length of the handle;
- *dafu* – a Chinese two-year-old battle ax up to 1000 mm;
- *long* – a battle ax with a long, narrow blade;
- *dong son* – a Vietnamese battle axe;
- *diao* – a Chinese battle ax with a semicircular sharpened buttstock;
- *celt* – a type of bronze ax and hoe with a sleeve at the buttstock, directed perpendicular to the blade, into which a bent or straight ax was inserted;
- *keteriya* – an one-handed battle ax of ancient Sri Lanka, which consisted of a solid iron and a short wooden ax;
- *klevets (kelep)* – a cold weapon of barbed-chopping action on a short handle, the faceted and narrow fighting part of which resembles a bird's beak with a hammer-like buttstock;
- *labrys* – an ancient Greek two-sided battle or ceremonial ax, common in the culture of the pre-Greek Minoan civilization;
- *lohaberaxt* – a German halberd with a wavy blade and a hook at the upper end of the ax;
- *masakari* – a Japanese combat ax on a long (up to 2000 mm) handle with heavy iron, which has a semicircular blade and a massive buttstock;
- *ono* – a Japanese ax with a wide blade and a not massive buttstock, sometimes a fighting stick is in the form of a scroll; total length – up to 1800 mm;
- *palstab* – a celt with a tip in the form of a hoe, mounted on an ax;
- *panabas* – a Filipino one- or two-handed battle ax;
- *parashu (farasa)* – an ancient Indian battle ax, made of ordinary steel and bamboo;
- *polex* – a battle ax on a long handle (hatchet), equipped with a battle hammer and a faceted spear, a distinctive feature is a long spike on the top;
- *raifu* – an ancient Japanese stone ax;
- *sagaris (sagara)* – a Persian (Saka) two-sided battle ax with a long thin handle, an elongated blade with a heavy bent or pointed buttstock;
- *Samoan* – a battle club in the form of an ax, intended for breaking skulls and bones;
- *ax* – a contact weapon of hacking-cutting action with an iron with a wide blade in the shape of a half-moon, which is attached to the ax with an eyelet;
- *Scandinavian* – a Northern European medieval battle ax with a thin wide blade that diverges symmetrically;
- *sovnia* – a European cold weapon of the 15th century, similar to a straightened scythe;
- *tabar* – a Rajputan battle ax with a semicircular blade and a thin handle;
- *toki kakauroa* – a New Zealand battle axe, derived from the New Zealand battle club;
- *tomahawk* – a battle ax of North American Indians;
- *francisca* – a battle ax of the Franks and other Germanic tribes with an arc-shaped iron, which expands in the direction of the cutting edge;
- *fu* – a Chinese battle weapon with an iron similar in shape to an ax;
- *fuetsu* – an ancient Japanese metal ax;
- *khyrbat (wallbat)* – a European medieval simple throwing weapon, which is a small all-metal, roughly made ax, without any coating of the ax with two sharpened processes in the upper part and a sharpening at the end of the ax;
- *Chekan* – a contact weapon of shock-stabbing-shattering action with a combat part, consisting of a striker and a beak, which is attached to the ax with an eyelet;
- *Swiss* – a two-handed battle ax with metal strips along the ax for protection and a faceted metal beak, sharpened for piercing armor and helmets;
- *shuangfu* – a one-handed double battle axe;
- *yue* – heavy axes common in the Zhou dynasty.

According to the **method of action** [11, 12], battle axes are divided into the following types:

- *chopper* – an ax, intended for inflicting chopper injuries;
- *chopping-spiking* – an ax, designed for inflicting chopping and pricking injuries;
- *chopping-stabbing-cutting* – an ax, intended for inflicting chopping, pricking and cutting injuries;
- *chopping-cutting ax* – an ax, designed for inflicting chopping and cutting injuries.

According to the **method of application** [13, 14], there are:

- *contact battle ax* – an ax that is held in the hand during use;
- *throwing battle ax* – an ax, designed to hit a target at a distance.

The classification of battle axes according to the technology of making the iron, the number, shape and width of the blade, the presence of additional striking elements, the material of the iron, the shape (section) of the loop, the method of attaching the iron to the ax, the shape and material of the ax, the presence of additional accessories, tuning are given in Table 1 [15].

Table 1

Classification features of battle axes and their types		
No.	Classification features	Types of battle axes
1	Iron manufacturing technology	– felling; – forging; – casting; – stamping
2	Number of ax blades	– single-bladed; – two-bladed; – three-bladed
3	Ax blade shape	– curved; – moon-shaped; – levels; – concave; – wavy (concave-curved)
4	Blade width	– wedge-shaped; – narrow-bladed (up to 100 mm); – wide-bladed (over 100 mm)
5	Presence of additional striking elements of the ax [16]	– with a hook; – with a dagger; – with a hammer; – with a feather; – with a gun; – with a stiletto; – with a spike (tooth)
6	Ax iron material	– basaltic; – bronze; – gold; – stone; – ceramic; – bony; – silicon; – brass; – copper; – jade; – pewter; – lead; – silver; – steel
7	Eyelet shape (section)	– polygonal; – arbitrary; – round; – oval; – ovoid; – triangular
8	Method of attaching the iron to the ax	– mounted; – with the help of fasteners; – combined; – rope (binding); – planting; – in-ear; – petioled
9	Ax shape	– curved; – cranked; – smooth
10	Ax material [17, 18]	– wooden; – bone; – composite; – metal; – polymeric
11	Availability of additional accessories, tuning [18, 19]	– bracelets; – flow; – garda; – household appliances – saw, knife, scissors, screwdrivers, estimates, hammer, awl, opener, strap cutter, pliers, corkscrew, keyholes, etc.; – corset; – lancets (elders, aids); – tip; – covering with leather; – ratchet ring; – belts; – rondels; – lanyard; – smoking pipe – a longitudinal hole in an ax, used for smoking

**According to the ax length:**

- *long-armed* (ax more than 1000 mm);
- *short-handled* (ax up to 500 mm);
- *medium-sized* (ax 500...1000 mm).

**According to the method of holding an ax, they are divided into:**

- *one-handed* – axes that are held with one hand when used;
- *two-handed* – axes that are held with two hands when used.

**According to the method of production, they are distinguished:**

- *factory (industrial)* – an ax, manufactured by enterprises and manufacturing firms in the conditions of technically equipped industrial production in compliance with the requirements of the relevant state or company standards and specified technical conditions;
- *artisanal* – axes, made by master gunsmiths in the conditions of official business or other activities in artisanal workshops, in terms of their characteristics, are close to industrial weapons, but in terms of the degree of quality and (or) uniformity of external design, construction and dimensions, they do not meet the standards of industrial production;
- *home-made* – axes, made and assembled in a home-made way from parts of completely home-made production or with the use of individual parts of weapons and (or) products of other purpose of industrial or artisanal production.

**According to the time of manufacture, axes are:**

- ancient – more than 100 years old;
- modern – less than 100 years old;
- newcomers – modern axes, made according to the type of ancient battle axes.

**Finishing the battle ax construction:**

- *engraving* – a method of obtaining an image by removing the surface layer of the material;
- *inlay* – a technique of decorating iron with a combination of materials (gold, silver, precious and semi-precious stones, pearls, ivory, etc.) that differ in color, and texture.

**Research limitations.** Closed access to archival sources in scientific libraries.

Prospects for further research. On the basis of the proposed forensic of battle axes classification, it is possible to formulate signs of their classification as cold weapons in the existing Ukrainian methodology for the study of cold weapons and structurally similar products.

## 6. Conclusions

1. Based on the study of scientific works and literary sources, the definition of "battle axes" has been formulated. A battle ax is intended for use as a cold weapon of hacking, hacking-stabbing, hacking-cutting and hacking-barbing-cutting action, which consists of an iron (a striking part with a blade) and a hatchet.

2. The material for making the striking part with a blade has been studied. The iron of the ax was made of stone, metal and other materials. Ancient axes were made from large bones, branches or tree trunks; modern axes – wooden, composite, metal and polymer.

3. It is determined, that battle axes were used mainly for close combat, in some cases as throwing weapons, and also as ceremonial weapons.

4. The distribution of battle axes and their modifications has been studied.

5. On the basis of the conducted studies of scientific works and expert experience, the signs of the forensic classification of battle axes have been formed: type of axes; method of action; application method; iron manufacturing technology; number of blades; blade shape; blade width; presence of additional striking elements; iron material; shape (section) of the eyelet; method of attaching the iron to the ax; ax length; ax shape; ax material; the way of holding (grasping) the ax; availability of additional accessories, tuning; method of making an ax; production time; decoration of the structure.

## Conflicts of interest

The authors declare that they have no conflict of interest in relation to this research, whether financial, personal, authorship or otherwise, that could affect the research and its results, presented in this article.

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