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Original Contribution

MEDIEVAL JEWELERY TOOLS FROM NORTHEASTERN BULGARIA

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ABSTRACT: *In 2009, the museum in Shumen received a collection of medieval metalworking tools. Most of them are related to jewelry practice and the production of metal products from precious metals and copper alloys. The collection includes tools of various shapes and practical purposes, including jewelry hammers, pliers, cutters, flutes, drills, punches, etc. The presentation of this rich and diverse collection of iron tools is made with a view to jewelry technology, which requires a strictly defined and specific set of tools to be applied in practice. Some of the tools turn out to be very stable forms, having preserved their character and purpose over time until the late Middle Ages and the modern era. The discovery of many examples from the late periods and modern practice significantly assist in the functional determination of most of the tools found in the production centers in the vicinity of Preslav. The traditions established over time show the conservative spirit in the development and changes of most of the foundry and metalworking practices, perfectly mastered and applied by Bulgarian craftsmen. The fact that even today, modern jewelers observe and follow the basic principles of this craft is indicative. The purpose of some of the tools found during the studies is determined precisely by their long-term use, which dates back to ancient times. If there are any changes, they are insignificant and are mainly expressed in the use of some modern tools and materials in order to facilitate and accelerate the work process, rather than to change it in its essence.*

KEY WORDS: *Medieval jewelery, Iron tools, Northeastern Bulgaria, Metalwork.*

In 2009, the museum in Shumen received a collection of medieval metalworking tools. Most of them are related to jewelry practice and the production of metal products from precious metals and copper alloys. The collection includes tools of various shapes and practical purposes, including jewelry hammers, pliers, cutters, flutes, drills, punches, etc. (fig. 1-36). The presentation of this rich and diverse collection of iron tools is made with a view to jewelry technology, which requires a strictly defined and specific set of tools to be applied in practice.

Some of the tools turn out to be very stable forms, having preserved their character and purpose over time until the late Middle Ages and the modern era. The discovery of many examples from the late periods and modern practice significantly assist in the functional determination of most of the tools found in the production centers in the vicinity of Preslav. The traditions established over time show the conservative spirit in the development and changes of most of the foundry and metalworking practices, perfectly mastered and applied by Bulgarian craftsmen. The fact that even today, modern jewelers observe and follow the basic principles of this craft is indicative. The purpose of some of the tools found during the studies is determined precisely by their long-term use, which dates back to ancient times. If there are any changes, they are insignificant and are mainly expressed in the use of some modern tools and materials in order to facilitate and accelerate the work process, rather than to change it in its essence.

The main group of tools presented in this work are related to the mechanical processing of metal. Forged relief is one of the oldest metal processing techniques that has not changed over time. The practice is associated with a certain set of tools, the main ones being the supporting, striking and cutting ones and those for applying decoration. The metal sheet is given the desired shape with the help of various types of dies, punches, pads, dies, matrices, and stamps. Stamping consists of cutting, drilling, bending and stretching the metal, which is practically carried out with special scissors, saws, punches, chisels, hammers, pliers, etc. Each stamp consists of several elements, the main one being the matrix, followed by the punches. Various iron clamps and restraints are also used for fastening. The chisels and chisels are very well preserved, which is due to their larger size compared to the other tools. In artistic engraving and relief, the full range of awls, scribers, cutters, and scrapers is used.

One of the most important and classic tools for metalworking are hammers. Two of them are presented in the present collection (fig. 1-3). The first two have two working surfaces, and in the second hammer one is not solid, but with an open outline (fig. 1-2). The handles of both specimens have a hole in the middle for placing the wooden handle. The third hammer ends with a sleeve for placing a handle, and the working surface is narrow and flat (fig. 3). Hammers are a basic tool in jewelry practice, described in detail in the 11th century work of the medieval monk Theophilus: "at one end they are wide, and at the other - narrow; and also thin and long, rounded at the end, large and small; so also hammers "horned" above, "expanded" below [1]. Used with hammers with a low and flat striking part and wedge-shaped hammers – rounded and without a sharp part. The working surface must be very well smoothed so that its irregularities do not imprint on the product. The handle must be made precisely, being made of elastic wood. The quality of the hammer is of great importance for the result of

the work. In addition to iron, various types of “soft hammers” made of wood, leather, horn are also used [2]. The correct choice of hammer can increase or limit the deformation of the metal to the side. With flat hammers, the blows are perpendicular to the surface being worked, so this type is used to smooth the surface of the product. With rounded ones, the direction of the blow is the same, but the metal is displaced to the side, depending on the radius of the bend. This type is most suitable for evenly expanding the metal, which is subsequently reshaped with a flat hammer. With a wedge-shaped hammer, the main force coincides with the direction of the blow. At the same time, there is a strong displacement of the metal to the side until it bends at a right angle. With this type of hammer, the shape of the workpiece is greatly changed, after which it is smoothed again with a flat hammer.

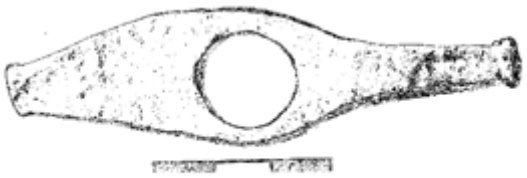

Fig. 1.

Fig. 2.

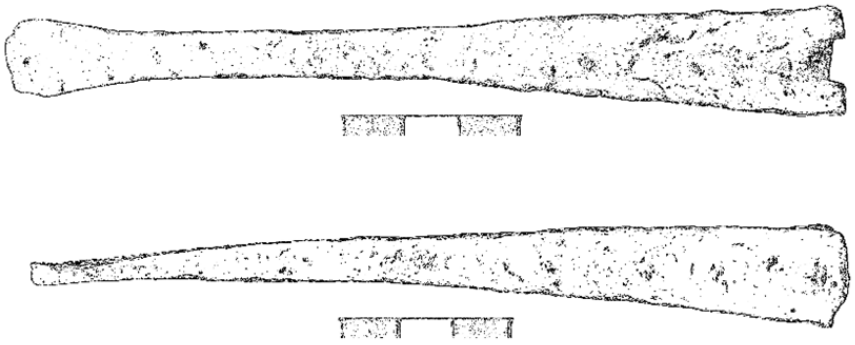

Fig. 3.

Jewelry hammers similar to those presented were found at the Votchinskoe Gradishte, the Vadyanskoe Necropolis and the Kichilkoe Necropolis [3]. Flat hammers are part of the inventory of burials of jewelers from the 9th-10th centuries, in the Varnino and Pecheshursky Necropolises and are part of the jewelry toolkit, together with tweezers, crucibles and anvils, from the workshop discovered at the Ekimautsi hillfort [4]. Four such hammers are part of a treasured find of iron tools in the vicinity of Gamzigrad, Serbia, in the early Middle Ages [5]. Cuneiform hammers were found in the Pecheshursky and Polomsky Necropolises [6]. Hammers of both types were used in Novgorod in the 11th-13th centuries and by Moscow craftsmen in the 15th-16th centuries [7].

The largest group is the chisels - tools for cutting and shaping metal (fig. 4-19). The collection presents tools of various shapes and sizes that were used both in the early and late Middle Ages and more recently. These are also some of the most durable metalworking tools, used both in jewelry production and by blacksmiths. There is no exact distinction between chisels and a large part of chisels, since both types of tools have a similar purpose. The main distinction in the method of sharpening - double-sided for chisels and single-sided for chisels, is not always a criterion for the method of use. In the present collection, two tools with a low body and a wide striking part can certainly be defined as chisels (fig. 18-19). The rest can be used as chisels and chisels with equal success. Theophilus describes precisely the making of the three main types of engraving tools [8]: “The tool must be made of solid hardened iron, the length of the middle finger, have a square cross-section…, with a handle at the end and beveled sides, having two cutting edges… Another tool with a square cross-section is made in the same way, with a bevel angle greater, a sharp tip is formed… In this way, several small and large tools are made. Another tool is made with a round cross-section, the thickness of a straw, and also has a beveled cutting tip (with an oval cross-section).

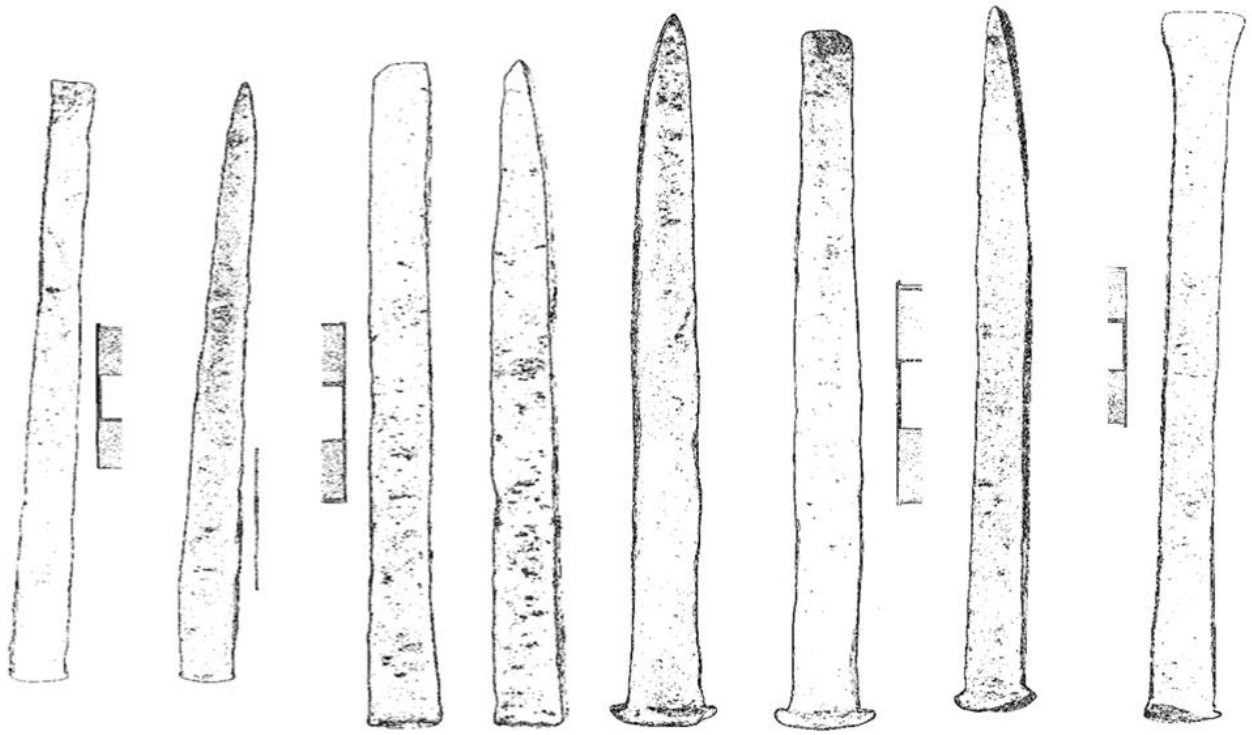

Fig. 4. Fig. 5. Fig. 6. Fig. 7.

Chisels are metal cutters of various sizes - from 120 to 180 mm with a conical pointed working part. Usually, the metal cutter has a quadrangular cross-section with beveled edges. Such a shape of the chisel is convenient to work with, easy to hold in the hand and eliminates unpleasant vibrations of the tool when struck. Chisels are used to cut off pieces of metal, plates, wires. Thin chisels are used to apply ornaments - notches, spiral grooves, etc. Chisels are sharpened in the lower part, depending on the purpose of the tool - for engraving lines, strokes, reliefs, recesses, etc. An important condition is that there are no sharp corners and protrusions on the working surface of the cutters, so as not to pierce the metal sheet. The lower part of the chisel is hardened, while the holder remains soft and elastic. Pads made of resin and adobe are also used, on which the metal sheet is placed. To obtain a distinct thin pattern on the product, a hard base must be used; to reproduce a soft and smooth relief – a flexible base. Chisels are one of the most stable forms over time, where no significant changes are observed. Similar tools to the presented ones have been found in layers with traces of activity from earlier eras [9]. From the period, chisels were found at the fortress of the island of Pukuyul lui Soare [10].

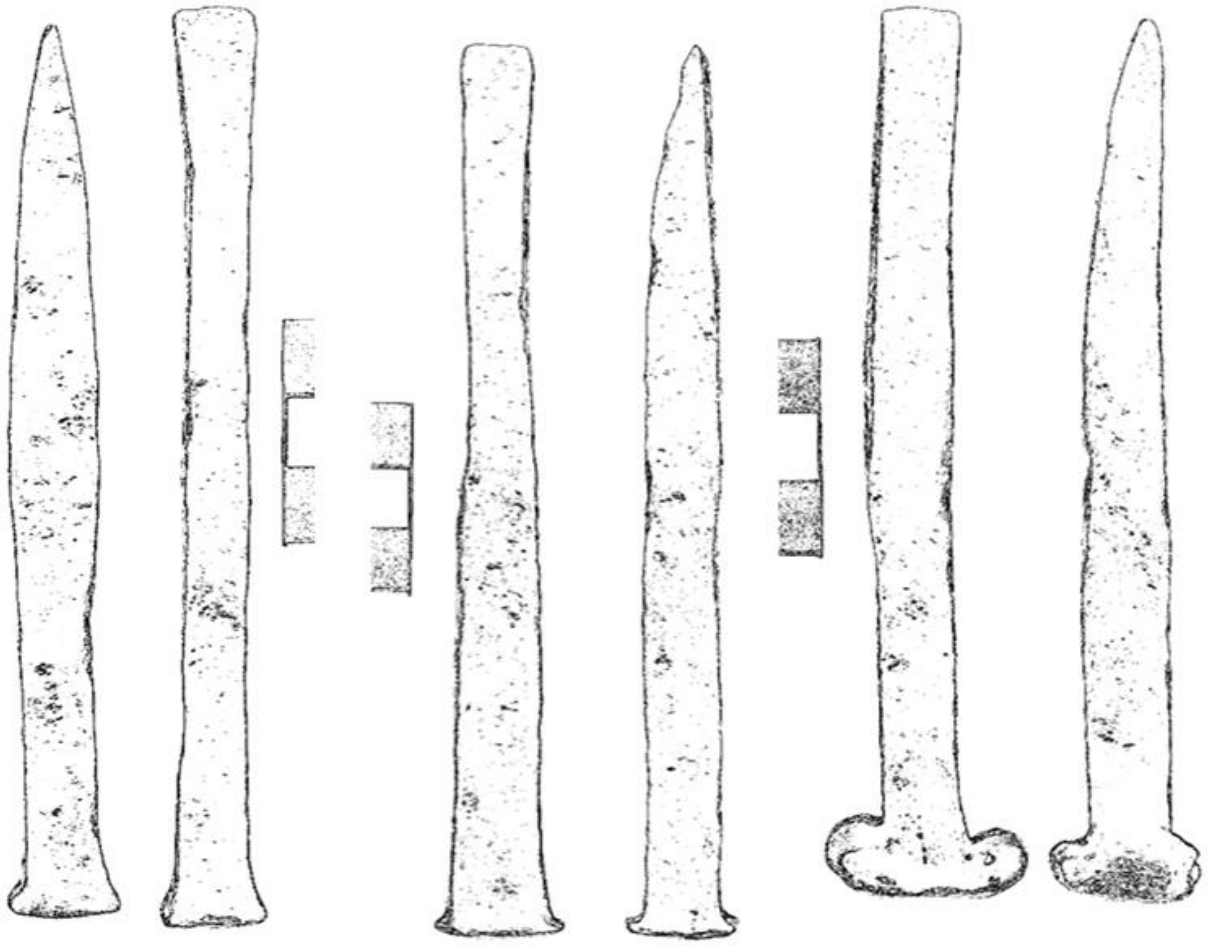

Fig. 8. Fig. 9. Fig. 10.

Jewelers' pliers are distinguished from blacksmiths primarily by their reduced size. The present collection includes two pairs of pliers with curved arms, designed for drawing wire through special metal plates with holes, called hatets (fig. 20-21).

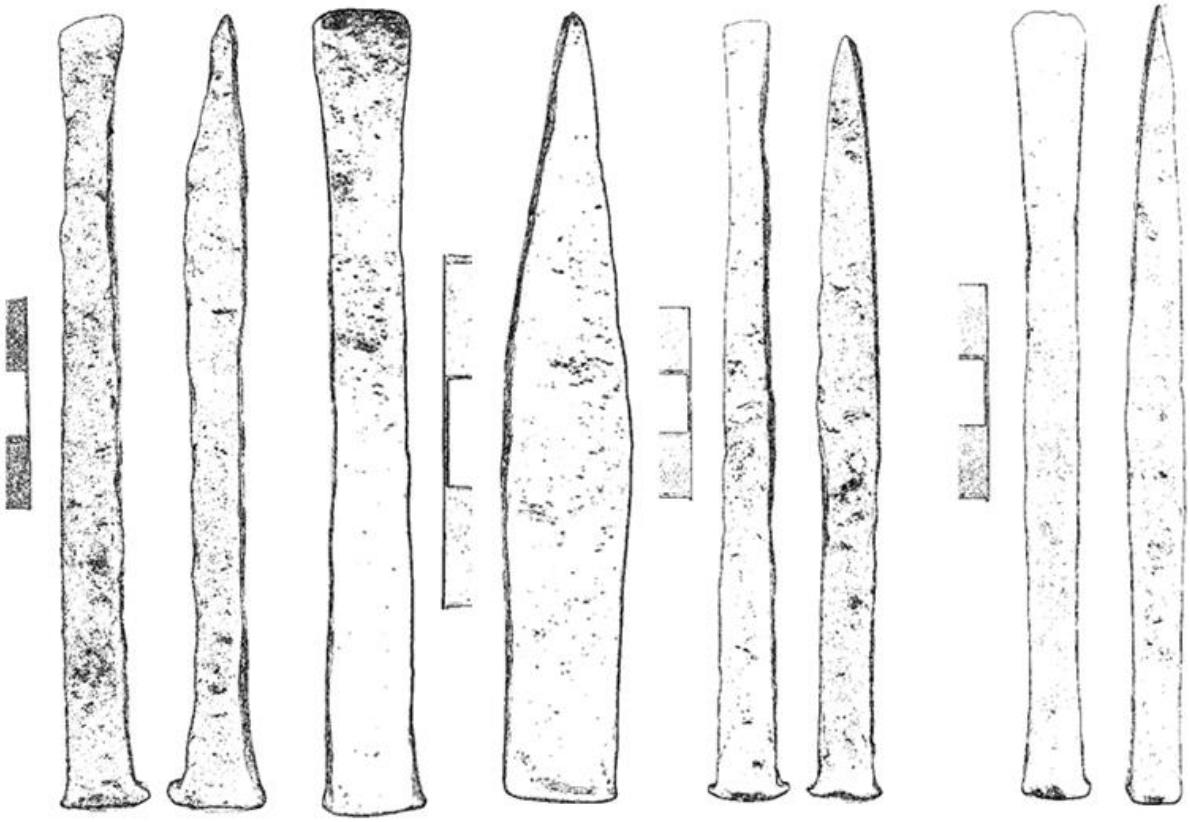

Fig. 11. Fig. 12. Fig. 13. Fig. 14.

By passing the soft wire through the different sized holes (fillers), wires of different sizes are obtained. Usually their length is from 20 to 30 cm, and their working surfaces are notched for better grip. One, and in some pliers both handles are screwed at the end, so that there is a place to wind the wire drawn through the hatet. Among the tools described by Theophilus, there is mention of medium-sized pliers to the handles, to which a wide and thick iron plate with round holes was attached, in cases where a small object had to be held for a long time [11]. It also mentions long, large pliers for casting metal, very small pliers held at the end by other larger ones, used for small objects, etc.

According to the Müller-Will classification, compiled on the basis of the toolkit of monuments in Scandinavia, pliers with a length of up to 300 mm were used mainly for jewelry work, and larger specimens were used in iron metalworking [12]. The same applies to the size of the anvils. Pliers with different shapes of the working part and handles are in use, depending on the activity for which they are intended. The principle of operation of the pliers consists in connecting the handles and jaws by a common axis of rotation. The force applied to the handles is transmitted to the closed jaws and opens them. In order to transmit greater effort, the handles are lengthened and the length of the

jaws is reduced. The gripping force of the jaws increases as they approach the axis of rotation. In order to prevent the workpiece from slipping, notches are made on the inside of the jaws.

Fig. 15.

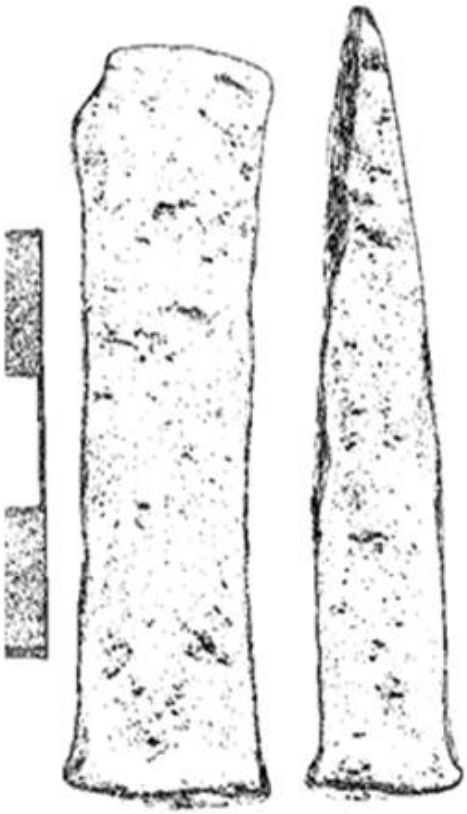

Fig. 16.

Fig. 17.

Such come from the Ekimautsi site and medieval Pskov [13]. Fully preserved jeweler's pliers, with straight long handles and those with a curved shoulder and small jaws, were found at Pukuyul Louis Soare [14]. A whole set of tools, including tweezers, an anvil and drawn wire come from the production complex in Gnezdovo [15]. Two pairs of pliers were found at the Kichylkosky and Neritsky necropolises (10th-11th centuries), in the basin of the Vychegda River [16]. In the burial of a master jeweler from the Varninsky necropolis on the banks of the Cheptsi River, dated to the 8th-9th centuries, a fully preserved set of tools was found, including pliers with long handles and curved jaws [17]. Pliers have been found in the Polomsky 1 necropolis (9th-10th centuries), the Omutnitsky necropolis (9th-13th centuries), and jewelry workshops in

Novgorod (in the 13th century horizon) [18]. Pliers with long handles and different shapes and sizes of jaws have been preserved in the treasure trove of iron tools near Gamzigrad, Eastern Serbia [19].

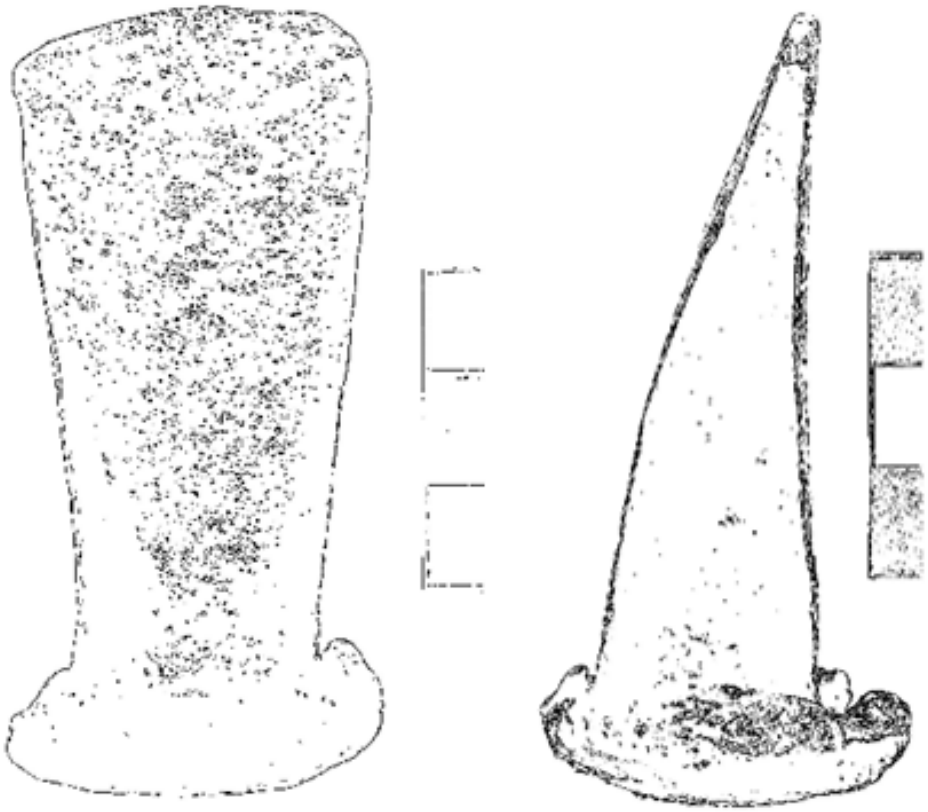

Fig. 18.

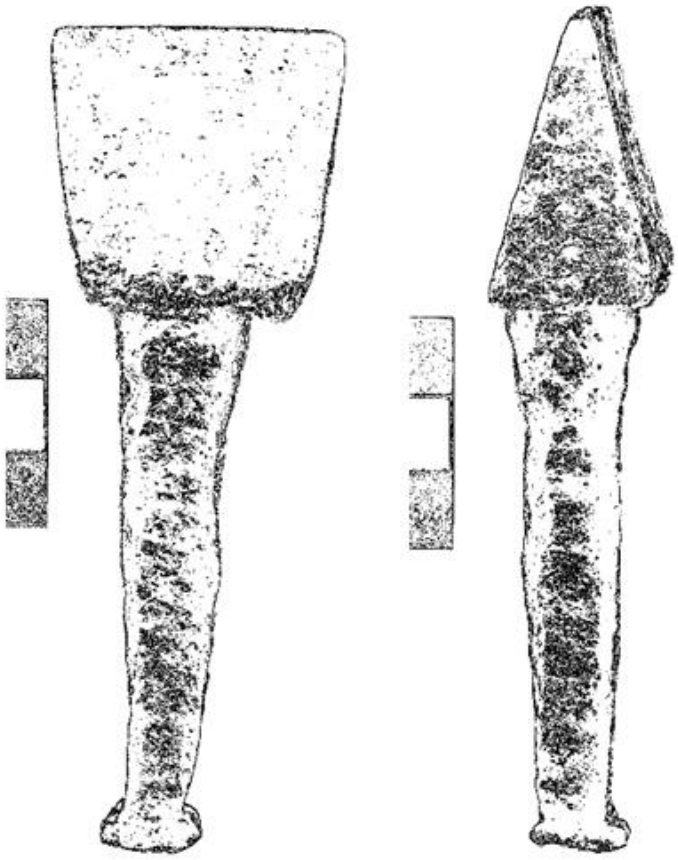

Fig. 19.

In the collection of tools there are also three drills, the device of which is similar – a pointed spiral working part and a transverse holder at the upper end (fig. 22-24). To them we must add the three flutes (fig. 25-27) with a curved and pointed expanded part at both ends. Drills and flutes were used both in metalworking and in woodworking. The flutes have a special place in the process of creating and shaping the wax and lead models, according to which the metal was subsequently cast in the sand double molds. The tools have a quadrangular cross-section and a characteristic curvature at one or both ends, pointed in most of them. They were used for cutting/engraving the decorations on the surface of the models and for smoothing the wax spurts along the edges of the cuts of the ornament. Similar tools for retouching wax and lead models were also used by Vratsa goldsmiths in later times (17th-18th centuries) [20]. In addition to retouching wax, this type of tool, called "izimala" by the Renaissance masters, was also used for smoothing lead models. They were also used for turning activities. The cutters for external turning look like ordinary chisels with a straight or inclined blade. The width of the blade varies from 10 to 20 mm. The cutters for internal recesses are of two types. The straight type are ordinary cutters with a hook-shaped blade and a straight shank, their length varies from 125 to 300 mm, and the width of the blade is from 15 to 25 mm. The cutters

with a long handle are intended for working in depth. The second type of cutters has an elongated straight blade with a tongue curved at the end by 180°. The massive handle extends upwards from the blade at an angle of 45° [21]. The present riffles belong to the first type and are similar to those found at medieval sites in our country and abroad [22]. Similar tools have been found during the exploration of various settlements and hillforts in Volga Bulgaria (Izmersko Selishte, Kirno-Ostrovno Selishte, Starokuybyshevsko Selishte, etc.) [23].

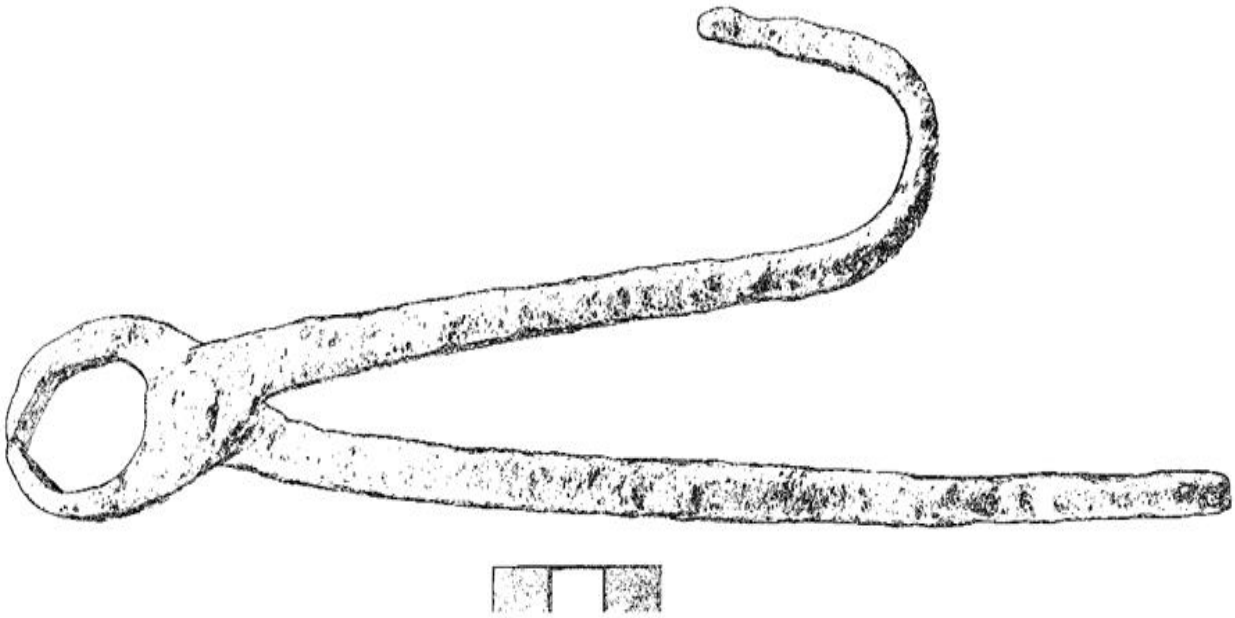

Fig. 20.

This type of tool was also used in woodworking, and more specifically in the formation of deep and narrow recesses in it, when the tools are of smaller dimensions [24]. The tools are defined as figured wood cutters for a woodturning machine and for manual use. The so-called "scrapers" found on some ancient sites are also associated with woodworking [25]. Such use of the tools cannot be ruled out where there is reliable evidence of woodworking and other tools related to it have been found, but the main purpose of the flutes is related to metalworking.

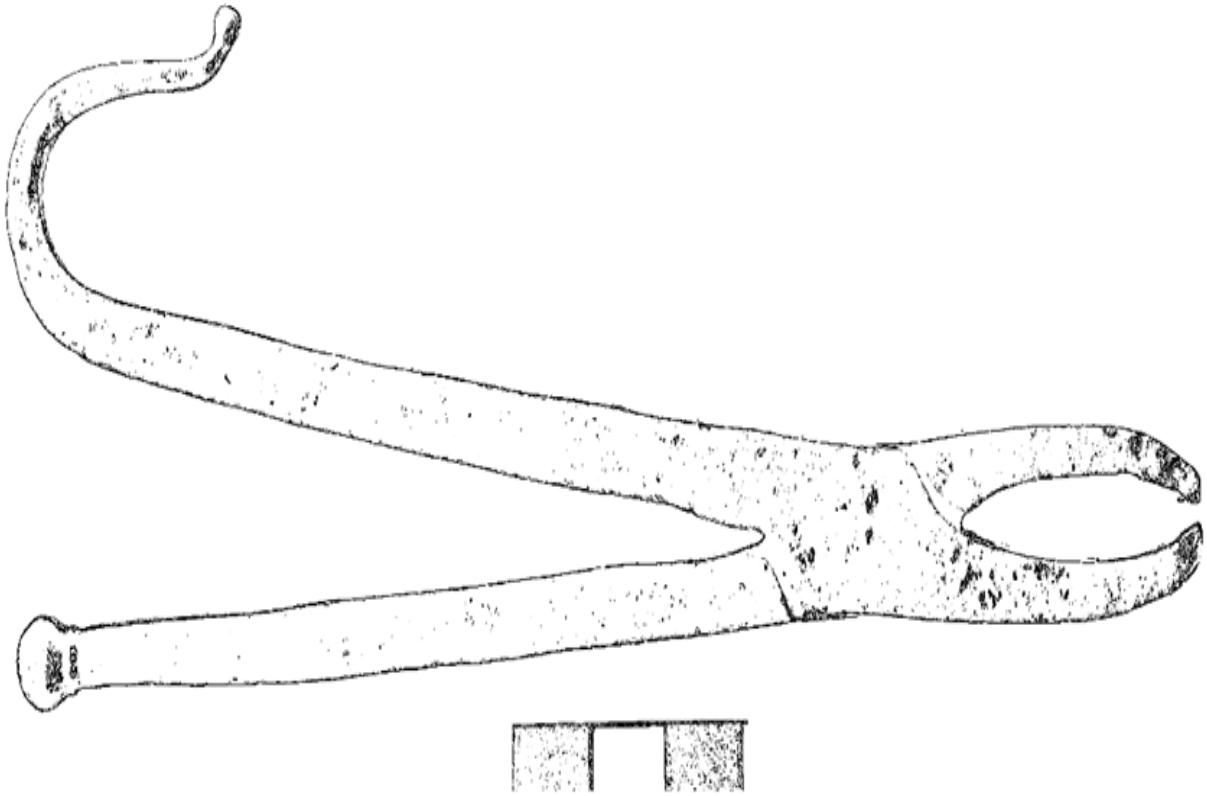

Fig. 21.

The next large group of tools from the find are the punches or zambi, as they are often called (fig. 28-34). A significant group of punches was found during the research of the two production centers for artistic metal in the vicinity of Preslav [26]. Tools for applying decoration originate from the lands of the Vyatichi in Ancient Russia [27]. They were mainly used for hammering out decorations with incised patterns, for cutting out small plates and many other objects. Punches are iron cutters with a round, rectangular or square cross-section.

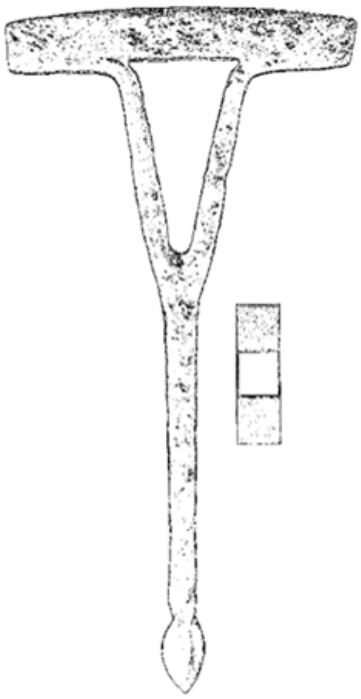

Fig. 22.

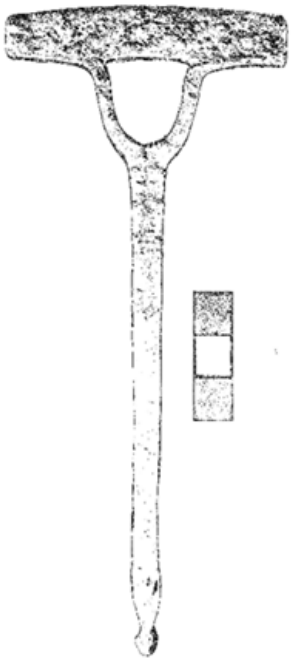

Fig. 23.

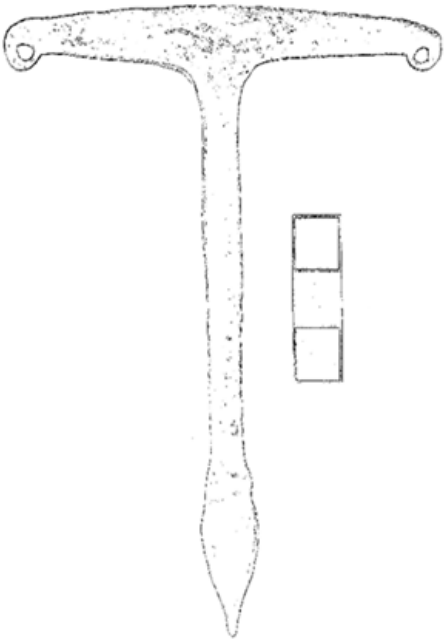

Fig. 24.

A thickening is left in the middle part for stability when gripping and damping vibrations during impact. The working end is hardened. The middle part, which damps vibrations, remains unhardened. These are stable forms that were used later. This type of tool is common on all monuments with traces of metalworking activity and is an indicator of such. The aesthetic function of the products also determines the diverse ornamentation on them, obtained by means of a diverse set of cutters and percussion instruments used for different operations. The craftsmen apply the ornament at different production stages in the manufacturing process. The ornament is made simultaneously with the shaping of the product in the casting process or during the stamping afterwards. The cast ornament is distinguished by a great variety – openwork and relief (convex and incised). It is present on flat and volumetric ornaments. The elements of the decor can be incised on the stamping matrix, in the foundry mold or on the model according to which the casting is carried out. The decor, performed after the shaping of the object, is found on flat products and ornaments made by forging or stamping.

Fig. 25.

Fig. 26.

Fig. 27.

The last two tools from the collection complement the rich toolkit in the work of creating and shaping the initial artistic idea in the image of the model. The iron ruler (fig. 35) and the compass (fig. 36) serve precisely to refine and outline the ornament on the soft surface of the plastic model or the hard base of the metal sheet. A set of similar tools, along with many others, some of which have been mentioned, have been found at archaeological sites in our country and abroad. In a dwelling-workshop from the 10th century at the Ekimautsi site, Moldova, a full set of jewelry tools was discovered - crucibles, punches, awls, pliers, anvil, hammer, wire drawing board, two dies, silver and copper wire, etc. Jewelry tools were also found outside the workshop, which, like those in Kiev, Vyshegrad, Serensk, Spas-Gorodok, Raiki, and Ryazan, was multi-disciplinary and involved both non-ferrous and ferrous metalworking [28].

The presented collection of iron tools used in jewelry practice proves the existence of a very well-developed production during the Middle Ages in our lands.

This is confirmed by the production centers for artistic metal in the vicinity of the first Bulgarian capital Preslav and by the numerous single and collective finds of blacksmith and jewelry tools found during the study of the numerous

settlements and fortresses of this era. Future research will confirm this by finding a new toolkit, among which the current find is a good basis for a comparative analysis of known and new objects. The fact that the collection does not have an exact location in no way diminishes its scientific value, but on the contrary proves that on the territory of Northeastern Bulgaria during the Middle Ages there was a very well-developed production and processing of ferrous and non-ferrous metals. Both the traditions in the technology of metalworking and the perfectly mastered practical skills and knowledge in this direction contribute to this. The wealth of plots and compositions on the products, a product of this production, fully testify to the level of development of this craft.

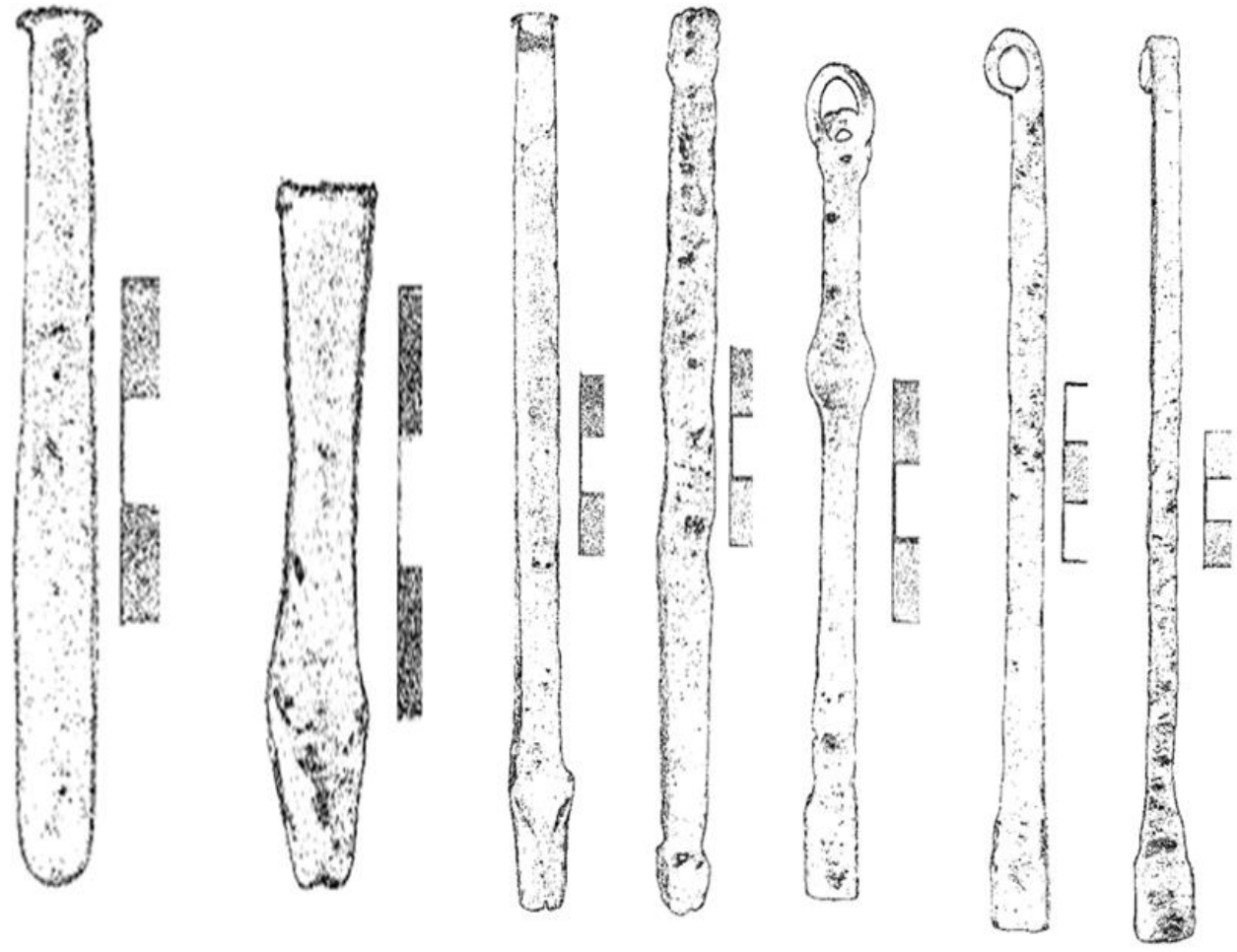

Fig. 28. Fig. 29. Fig. 30. Fig. 31. Fig. 32. Fig. 33. Fig. 34.

Fig. 35.

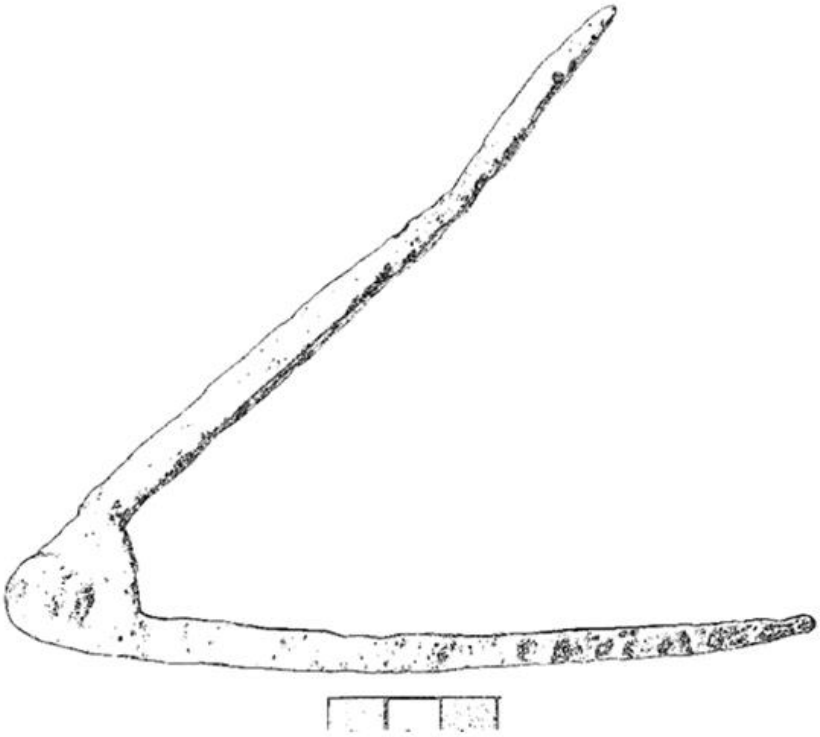

Fig. 36.

Catalogue of tools

1. Jeweler's hammer, iron, two working parts; one – located transversely; the other – longitudinally; in the middle – a round hole. Dimensions: length – 8.5 cm; width – 2.3 cm; d (hole) – 1.6 cm. Medieval fund of RIM-Shumen. No. 24701.

2. Jeweler's hammer, iron, two working surfaces – a striking surface with a rectangular shape and a round one (zamba); formed from curved plates; on the body – a rectangular and round hole. Dimensions: length – 8.8 cm; width – 1.8 cm; thickness – 0.6 / 0.8 cm. Medieval fund of RIM-Shumen. No. 24702.

3. Jeweler's hammer, iron, conical shape; pointed and widened with rolled ends; ends with a sleeve at the upper end. Dimensions: length – 14.2 cm; width – 1.2 cm. Medieval fund of RIM-Shumen. No. 24682.

4. Chisel, iron, elongated shape, beveled diamond-shaped part, square section; hammered striking part. Dimensions: length – 22.5 cm; width – 1.2 cm. Medieval fund of RIM-Shumen. No. 24662.

5. Chisel, iron, shortened shape, beveled diamond-shaped part, square section. Dimensions: length – 11.2 cm; width – 0.7 cm. Medieval fund of RIM-Shumen. No. 24663.

6. Chisel, iron, elongated shape; beveled working part widened at the lower end; rectangular section; hammered striking part. Dimensions: length – 13.8 cm; width of working part – 1.4 cm; width – 0.8 cm. Medieval Fund of RIM-Shumen. No. 24664.

7. Chisel, iron, shortened form; beveled working part; undercut working part; circular cross-section. Dimensions: length – 9.7 cm; width – 0.8 cm. Medieval Fund of RIM-Shumen. No. 24665.

8. Chisel, iron, elongated shape; beveled working part expanding in the middle of the body with a rectangular cross-section; square-shaped hammered striking part. Dimensions: length – 12.5 cm; width – 1.0 cm; thickness – 0.6 cm. Medieval fund of RIM-Shumen. No. 24666.

9. Chisel, iron, elongated shape; beveled working part on one side; hammered striking part. Dimensions: length – 14.3 cm; width – 0.8 cm; thickness – 0.6 cm. Medieval fund of RIM-Shumen. No. 24667.

10. Chisel, iron, shortened shape; pointed on one side; split and hammered ends at the striking part; rectangular cross-section. Dimensions: length – 12.4 cm; width – 0.8 cm; thickness – 0.6 cm. Medieval Fund of RIM-Shumen. No. 24668.

11. Chisel, iron, shortened shape; double-sided beveled and sharpened working part at an angle at the end; rectangular chisel; hammered striking part. Dimensions: length – 11.5 cm; width – 0.8 cm; thickness – 0.8 cm. Medieval Fund of RIM-Shumen. No. 24669.

12. Chisel, iron, shortened shape; beveled and pointed working part; rectangular cross-section; widening in the middle; striking part with a round shape. Dimensions: length – 7.0 cm; width – 1.0 cm; thickness – 0.6 cm. Medieval fund of RIM-Shumen. No. 24670.

13. Chisel, iron, elongated shape, beveled and pointed working part; square cross-section at the upper end under the undercut striking part and lanceolate shape from the middle to the pointed end. Dimensions: length – 12.3 cm; width cross-section – 0.8 cm; width – 0.9 cm; thickness – 0.5 cm. Medieval fund of RIM-Shumen. No. 24671.

14. Chisel, iron, elongated shape; beveled on both sides and pointed towards the working part; rectangular section, widened in the middle. Dimensions: length – 11.2 cm; width – 0.6 cm; thickness – 0.5 cm. Medieval fund of RIM-Shumen. No. 24672.

15. Chisel, iron, elongated shape; one-sided beveled working part; round section; hammered striking part. Dimensions: length – 11.2 cm; width – 0.8 cm; thickness – 0.6 cm. Medieval fund of RIM-Shumen. No. 24673.

16. Chisel, iron, shortened shape; double-sided sharpened working part; rectangular section; hammered striking part. Dimensions: length – 5.3 cm; width – 1.3 cm; thickness – 0.8 cm. Medieval fund of RIM-Shumen. No. 24674.

17. Chisel, iron, elongated shape; one-sided pointed working part with inwardly curved ends; rectangular cross-section, passing into a round one towards the striking part. Dimensions: length – 12.3 cm; width – 1.2 cm; width (cross-section) – 1.0 cm. Medieval Fund of RIM-Shumen. No. 24675.

18. Chisel, iron, shortened shape; beveled and widened working part; strongly depressed striking part; rectangular cross-section. Dimensions: length – 7.5 cm; width – 3.2/2.2 cm; thickness – 1.8 cm. Medieval fund of RIM-Shumen. No. 24676.

19. Chisel, iron, beveled on both sides working part with triangular cross-section and attached to it – struck part with rectangular cross-section and depressed striking part. Dimensions: length – 11.0 cm; width – 3.7 cm; thickness (cross-section) – 1.5 cm. Medieval fund of RIM-Shumen. No. 24677.

20. Pliers, iron, completely preserved; two arms – one curved outwards, hingedly connected; with arcuately curved working parts. Dimensions: length – 22.0 cm; width – 2.6 cm; thickness – 0.8/1.5 cm. Medieval fund of RIM-Shumen. No. 24686.

21. Pliers, iron, fully preserved; two hinged arms; one – curved outwards, the other – straight with a ball at the end, the working parts – slightly curved. Dimensions: length – 16.0 cm; width – 1.5 cm; thickness – 1.0 cm. Medieval fund of RIM-Shumen. No. 24687.

22. Drill, iron, T – shaped, spirally curved lower part; rectangular section, ending with a two-sided branch and a transverse plate with a rectangular section. Dimensions: length – 14.8 cm; width – 7.6 cm; thickness (section) – 0.6 cm. Medieval Fund of RIM-Shumen. No. 24681.

23. Drill, iron, T-shaped, spirally curved at the lower end; square cross-section, ending with a two-sided branch and a rectangular plate for a holder. Dimensions: length – 15.3 cm; width – 7.0 cm; thickness (section) – 0.6 cm. Medieval Fund of RIM-Shumen. No. 24679.

24. Drill, iron, T-shaped, spirally curved at the lower end; oval section ending with a cross-forged holder with a flat shape and bent ends. Dimensions: length – 11.0 cm; width – 8.8 cm; thickness (section) – 0.8/0.6 cm. Medieval Fund of RIM-Shumen. No. 24680.

25. Riffle, iron, elongated shape; pointed and flattened at one end; and widened at the other end with inwardly turned sides. Dimensions: length – 15.0 cm; width – 1.0 cm; thickness – 0.6 cm. Medieval Fund of RIM-Shumen. No. 24678.

26. Riffle, iron, elongated shape, pointed at one end and widened, and strongly curved at the other end with edges curved inward. Dimensions: length – 14.0 cm; width – 0.5 cm; thickness – 0.4 cm; width (section) – 1.4 cm. Medieval fund of RIM-Shumen. No. 24683.

27. Riffle, iron, working parts curved on both sides in opposite directions at an angle; one ends with a sharp tip; the other - widened and curved at the end.

Dimensions: length – 17.5 cm; width – 0.6/2.0 cm. Medieval fund of RIM-Shumen. No. 24685.

28. Punch, iron, shortened shape; rectangular section; working part – smoothed and oval; hammered striking part. Dimensions: length – 7.7 cm; width – 0.9 cm; thickness – 1.0 cm. Medieval fund of RIM-Shumen. No. 24693.

29. Punch, iron, shortened shape; round cross-section of the working part; conically expanding upwards; at the end it ends with a sleeve. Dimensions: length – 5.0 cm; width – 1.2 cm; d (sleeve) – 1.2 cm. Medieval fund of RIM-Shumen. No. 24694.

30. Punch, iron, elongated shape; round cross-section of the working part, expanding upwards; body – polyhedral cross-section. Dimensions: length – 15.0 cm; width – 1.5 cm; thickness – 1.0 cm. Medieval fund of RIM-Shumen. No. 24695.

31. Punch, iron, elongated body; rectangular cross-section; decoration on the inside; working parts – square shapes in an incised cross-shaped ornament. Dimensions: length – 14.0 cm; width – 0.9 cm; thickness – 0.7 cm. Medieval fund of RIM-Shumen. No. 24696.

32. Punch, iron, shortened shape; flat cross-section; hanging loop at the end; working part – oval cross-section of inwardly curved plates. Dimensions: length – 10.0 cm; width – 0.8 / 0.5 cm; thickness – 0.2 cm. Medieval fund of RIM-Shumen. No. 24697.

33. Punch, iron, elongated arm; hanging eye at the end; working part – with P – shaped cross-section, formed from curved flat plates. Dimensions: length – 14.8 cm; width – 0.8 cm; thickness – 0.3 cm. Medieval fund of RIM-Shumen. No. 24699.

34. Punch, iron, elongated body; curved hanging eye; rectangular cross-section; working part – round, formed from a curved plate. Dimensions: length – 20.0 cm; width – 1.0 cm; thickness – 0.5 cm. Medieval fund of RIM-Shumen. No. 24700.

35. Scriber, iron, straight arm pointed at the end, incised decoration at the upper end, ending with a hanging eye, to which a ring is attached. Dimensions: length – 12.6 cm; width – 0.6 cm; d ring – 3.2 cm. Medieval fund of RIM-Shumen. No. 24690.

36. Compass, iron, completely preserved; two arms pointed at the end and hinged; with rectangular section. Dimensions: length – 15.2 cm; width – 2.3 cm; arm – 0.7 cm. Medieval fund of RIM-Shumen. No. 24689.

References:

[1] Theophilus. On Divers Arts. The Foremost Medieval Treatise on Painting, Glassmaking and Metalwork. (Writhen 1125.). Translated by John G. Hawthorne and Cyril Stanley Smith. New York, 1989, p. 85.

[2] Brepol, E. Theory and practice of jewelry. Leningrad, 1982, p. 204.

[3] Biryukov, A. Metalworking inventory of the Middle Ages in the European north-east. – In: Ancient artisans of the Urals. Izhevsk, 2001, p. 162, 168, fig. 1, 20-22.

[4] Ivanov, A. Ivanov, A. Burials of "craftsmen" based on the materials of medieval burial mounds of the Chepet river basin. – In: Ancient artisans of the Urals. Izhevsk, 2001, p. 178, fig. 1, 5; with 180, fig. 3, 9; Fedorov, G. Ekimautsi settlement. - KSIA, L, 1953, p. 120, fig. 51, 6.

[5] Špehar, P. Remarks to Christianisation and realms in the central Balkans in the light of archaeological finds (7th – 11th c.). – In: Castelum, civitas, urbs. Centres and Elites in Early Medieval East-Central Europe. Hrsg. O. Heinrich-Tamáska, H. Harold, P. Straub und T. Vida. Leipzig-Budapest, 2014, p. 90, fig. 20, A.

[6] Ivanov, A. Opp. cit., p. 180, fig. 3, 23;179, fig. 2, 8.

[7] Rosenfeld, R. Tools of Moscow craftsmen. – In: Antiquities of the Moscow Kremlin. Moscow, 1971, p. 270, fig. 4, 7-9; Singh, V. Proizvodstvennye complexes of estates of Slavenskogo raskopa. - In: Novgorod Archaeological Readings - 3. Veliky Novgorod, 2011, p. 236, fig. 3, 8; Singh, V. Metalworking tools of ancient Novgorod. - Historical journal: scientific research, No. 6 (36), 2016, p. 712, fig. 1, 7-10.

[8] Theophilus. Opp. cit., p. 91.

[9] Voronyatov, A. Metalworking of the Pochep settlement: masters of culture of the Western Baltic circle and the initial stage of the style of barbarian indented enamels. - Archeological news, 20, 2014, p. 192, fig. 4, 1, 3; Rogov, E. Set of carpentry and carpentry tools from the excavations of building U6 settlement Panskoye I. - In: Archeological news, 7, 2009, p. 156, fig. 2, 2, 3.

[10] Diaconu, P., D. Vilceanu. Păcuilul lui Soare. Vol. I, Bucureşti, 1972p. 166, Fig. 66, 1, 3, 5.

[11] Theophilus. Opp. cit., p. 86-87.

[12] Sedov, V. Medieval Ladoga. New archaeological discoveries and research. Leningrad, 1985, p. 56, note 68.

[13] Fedorov, G. Opp. cit., p. 120, fig. 51, 5; Zakurina, T. Metalworking tools and workshop equipment in medieval Pskov. - KSIA, 220, 2006, p. 115, fig. 2, 6.
[14] Diaconu, P., D. Vilceanu. Opp. cit., p. 166, Fig. 66, 2, 4.
[15] Veshniakova, K., V. Bulkin. Craft settlement complex of Gnezdovskogo settlement (based on materials from the excavations of I. I. Lyapushkina). – In: Archaeological collection. Nesting. 125 years of research on the monument. Moscow, 2001, 40-53, p. 46, fig. 8.
[16] Biryukov, A. Opp. cit., p. 162, 168, fig. 1, 23-24.
[17] Ivanov, A. Opp. cit., p. 170, 178, fig. 1, 13.
[18] Singh, V. Proizvodstvennye complexes of estates of Slavenskogo raskopa. - In: Novgorod Archaeological Readings - 3. Veliky Novgorod, 2011, p. 239, fig. 6, 2.
[19] Špehar, P. Remarks to Christianisation and realms in the central Balkans in the light of archaeological finds (7th – 11th c.). – In: Castelum, civitas, urbs. Centres and Elites in Early Medieval East-Central Europe. Hrsg. O. Heinrich-Tamáska, H. Harold, P. Straub und T. Vida. Leipzig-Budapest, 2014, p. 90, фиг. 20A.
[20] Georgieva, S., D. Buchinski. Old goldsmithing in Vratsa. Sofia, 1959, p. 251, Tabl. LXXXVI-7, 17.
[21] Kolchin, B. Metalworking techniques in ancient Russia. Moscow, 1953, p. 112, fig. 51.
[22] Doncheva, S. The production of artistic metal in Bulgaria in the 10th century. Veliko Tarnovo, 2021, p. 660, rev. II.4.15.
[23] Kazakov, E. Bulgarian village of the 10th-13th centuries, Lower Kama. Kazan, 1991, p. 46, fig. 15-7, 8, 10, 29. Ibidem., p. 47.
[24] Rogov, E. A set of carpentry tools from the excavations of building U6 settlements Panskoye I. Archeological news, 7, 2009, p. 156, fig. 2,1.
[25] Doncheva, S. Opp. cit., c. 678-679, rev. II.4.25-26.
[26] Saracheva, T. Tools for applying the decor of Vyatich ornaments. - Archaeological collection. Vol. 111, 1999, 74-81.
[27] Rabinovitch, R., S. Ryabtseva. About the sources of raw materials for craft production in the medieval settlement of Ekimautsi in Moldova. – In: Производственные центры: sources, "roads", distribution area. Materials of thematic scientific conference. St. Petersburg, 2006, 117-122.