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Techniques used in decorating Hellenistic jewellery

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Abstract. *This article presents a part of the decorative techniques used by the craftsman in Hellenistic period on jewellery — to be more precise, the techniques that not require adding new material to create a more colourful piece except enamel. The decision to describe the last technique is given by the repeated mention of the enamel in filigree technique but this method is a part of the polychrome techniques that use different materials or substances to give colour to the jewellery.*

Rezumat. *Acest articol prezintă câteva tehnici decorative utilizate de bijutieri în perioada elenistică. Menționăm că tehnici prezentate sunt acelea care nu necesitau adăugarea unui nou material sau o unei noi substanțe, excepție fiind descrierea emailării. Introducerea ultimei tehnici în acest articol este realizată în urma menționării succesive a emailului la tehnica filigranului. Menționăm că emailul este unul dintre elementele componente ale tehnicii policromiei, precum sticla, intalii, geme și încrustarea pietrelor.*

Keywords: technique, repoussé, granulation, filigree, enamel, engraving, Hellenistic jewellery.

The history of jewellery was born with the advent of the humanity itself. Since its inception, man has used different materials to transform them into ornaments with the intent to distinguish themselves from others. Initially bones and teeth from animals were used, and only later were discovered the naturalness of different materials that beauty and rarity harness. Since then it has used a variety of materials, including those not considered precious.

For making jewellery pieces with a complex stylistic character, artisans had to constantly create decorative techniques. Following the design, they desired they could select one or more techniques such as *repoussé* technique, granulation, filigree, enamel, stones encrustation, engraving, and gilding. The topic of this article is ornamental techniques that not involve the necessity of using or adding another type of material which bond with the piece for decorating the jewellery (*repoussé* technique, granulation, filigree, enamel, and engraving).

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The *repoussé* technique is a decorative technique which renders the desired decor of soft metal foil using a hammer and a chisel with a rounded tip. The process of implementing the model consists in hammering the rear side of the foil that the front part will be pushed[2].

The same technique can be used on the front of the play, but in this case, the process is called not *repoussé* but *chasing*. In Romanian historiography, both cases are defined with the first term, even if the name of the second process is wrong: *repoussé* technique involves viewing the mode in relief but if the design is printed deep in the metal surface, then the proper word to define the technique is *chasing*. In achieving a jewellery like the Thessalian's medallions which often have in the central part the bust of a goddess framed by engraving, filigree or granulation elements, a craftsman used both of the technique's described earlier and the decor is called to be created in high relief style[3].

To create relief on metal foil craftsman's workshop need to have a minimum of tools such as an anvil docile coated with a material that did not allow the foil to break after wrapping successive hammer and chisels of various sizes and shapes. If after the chosen model was not necessarily a relief too large, then the artisan could use the anvil in place, softwood or lead, but one more prominent demanding the use of a substance softer than wood[4]. In this case, the anvil or the softwood was with a pot containing warm tar[5] (Figure 1), which allowed the jewel placed on the surface to be patterned without being destroyed no matter how

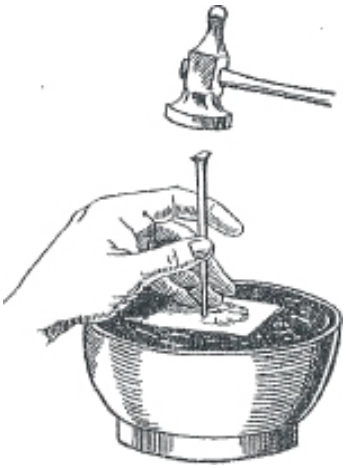

Figure 1. Anvil with tar base (*apud* HIGGINS 1961, 10).

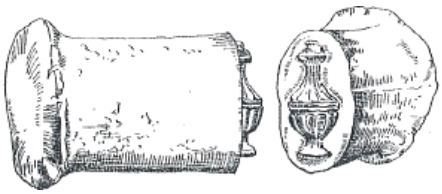

Figure 2. Stamp set for metal sheets (*apud* HIGGINS 1961, 10).

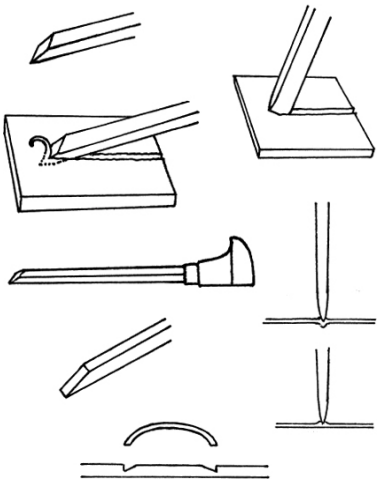

Figure 3. The engraver's toolkit (*apud* MARYON 1949, 116).

[2] HIGGINS 1961, 9.

[3] SEGALL 1945, 2–4; LUNGU, COVACEF, CHERA 2012, 12.

[4] RICHTER 1960, 193.

[5] RICHTER 1960, 193.

prominent was the relief depth. Using these ornamental techniques artisan can realize from simple sets of lines or dots to the most complex requiring decors by successive hammering on both sides of the metal. In order to obtain a deep relief without risking accidental penetration of the foil, it was necessary for the craftsman to trace the outline of the decor and later to work and create the relief within the limits set on the inside part of the piece.

A quicker method to achieve the relief is the stamping of the metal foil (Figure 2). By stamping two foils and later pasting them, the artisan formed a piece which had a 360° relief, technique often used in the Hellenistic period for making animal heads[6].

Engraving the jewellery was another technique used by craftsmen to decorate the pieces in Hellenistic Age. Through this technique, artisans could execute easily lines and dots on the metal surface of the jewellery. To create lines or points an artisan needed an anvil, a hammer, a flare and a graver[7] (Figure 3).

Following the method of producing a line on a metal surface, the technique used is named differently; the difference between them is made by the tool used. For creating the lines was used a small tool with elongated end and rounded edges called tracer. The shape of the edges of the tool can be explained by the fact that the manufacturer's intention was to provide a recess in metal and therefore does not penetrate the working surface[8]. To prevent the possibility of accidentally damaging the piece when the artisan applies this decorative technique, the whole process was done on a soft surface like a sheet of lead, softwood or a pot of warm tar, that have the roll of taking over a part of the force that metal was hit, but also to allow the expansion of the metal if it was necessary. By using this decorating technique, the piece was not losing any percent of the material, the surface suffering just some changes. In this process, the molecules around the point of impact were merely rearranged, because of the physical property of malleability of metals.

If the craftsman decided that the decor of the jewellery should be made by using the engraving technique, he was using a different tool, called *stiletto*. This type of small chisel was made from an iron bar in rectangular form which had a sharp and oblique peak, but with the opposite end in a round form. When the artisan was using the tracer, he could hold the tool at an angle of 90° or slightly sharp, in the case when using the *stiletto* he needed to fix the tool in a 45° angle, condition that implies more practice or better skills. The workman must first fix the *stiletto* in metal foil and then, through successive chisel hammering held at an acute angle to create the desired setting. If in case of using the tracer does not involve loss of material to achieve the decoration of jewellery in engraving technique losing some part of the material was necessary. So, after rapping successive in the worked surface appeared ditches, and for

[6] OGDEN 1982, 39.

[7] MARYON 1949, 115–116.

[8] MARYON 1949, 115.

them to be uniform, the artisan should use the same angle and the same force during the decorative process.

Another decorative technique used by jewellers of the Hellenistic period is the filigree. This ornamental technique consists of a number of bonding wires on the surface of metal jewellery (Figure 4). Using this technique of realization of geometric shapes such as circles, spirals or arcs forms implies an easier fabrication process. If the complexity of the jewellery involved using multiple threads, then the jeweller could use a wooden template that he fixed with needles[9]. After placing wires in the desired pattern, the wires were fixed on the work surface with a hard solder. Due to the melting point of the alloy used in the process, this type of soldering was a strong one. The alloy used for bonding wires was elected according to the material of jewellery and potential processes that the piece could be subjected later. Depending on the alloy used the melting point range between 550° C and 800–900° C[10]. If the filigree decor had to be soldered on a gold surface, craftsman used a gold-copper alloy, gold-silver or gold-copper-silver, and if the piece was produced from silver, the alloy used was silver-copper or silver-copper-zinc. To lower the melting temperature or to change the colour, artisans could introduce different metals in the alloy composition[11].

In combination with filigree technique was used another method which involved gluing decorative jewellery of beads[12] (Figure 5) along wires of the same material. Apparently, the technique derived from filigree technique, but artisan which used it needed more skills. The granules of gold necessary in the decoration method were not of equal size, but in the ancient

Figure 4. A pair of earrings decorated in the filigree technique. The jewellery is made from gold wires, and end with a *kantharos* from which lion heads emerge (collection of the Museum of National History and Archaeology Constanța, Romania).

Figure 5. Gold pendant decorated with beads (collection of the Museum of National History and Archaeology Constanța, Romania).

[9] HIGGINS 1961, 18.

[10] MARYON 1949, 107.

[11] HIGGINS 1961, 34.

[12] HIGGINS 1961, 18.

times were made in a diameter of between 160th and 180th of an inch part[13]. The method of manufacturing these pearls in ancient period is unknown to us, but after some experiments, several methods of production have been proposed. The method in which resulted pearls as close to the size and shape of the antiquity is the one where were used several layers of coal powder from which in between were placed several pieces of gold in similar shape and size. When the metal reached the melting point the liquid metal do not mix or sink to the bottom of the pot, but it was separated in form of small grains between the powder layers. Once the flask was cooled and the coal was washed, the grains formed were gathered and selected according to size by passing them through different webs which hole in different size.

From the early Middle Ages, granulation technique complete rarely scenery that was made by filigree technique, but grains production methods have been described in treaties dating from the sixteenth century[14].

Benvenuto Cellini mentions the method described above, and Vanoccio Biringuccio describes manufacturing of grains in that was used ash on top of which sat flat wires[15]. Both Vanoccio Biringuccio and Georgius Agricola describe a totally different method of manufacturing the grains used to decorate jewellery that consists of pouring molten metal over water in motion passed first over the birch twigs[16].

After selecting the grain size categories and placing them on the surface of the jewellery design what was wanted, they had to be solder. The results of some analyses made on artefacts dating from ancient times it proves that ancient jewellers used for the fixation of both the grains and metal wires glue made of a metal alloy[17].

Many specialists did several experiments trying to recreate the glue or the substance used by the ancient artisans, but only an Englishman named Littledale concluded that the alloy can be divided chemically and decided to replace the flux with glue[18]. Taking into account the chemical properties of each component, he mixed copper salt (preferably copper carbonate CuCO3) glued fish or a vegetal one in a container whose walls have been coated in advance with copper oxide (CuO). When the vessel walls were heated, the oxide was absorbed by glue and the new resulting mixture used it to smear beads or metal wires placed on jewellery pieces that were solder at last only after they were placed on hot coals. During this process the glue vanished by evaporation, but whose residue (copper) remained in place. When the metal from the surface of the worked piece reached 890° C began to melt it mingle with copper included in glue[19], but the one from depth remains in a solid state because didn't

[13] MARYON 1941, 122.

[14] LEE CARROLL 1974, 34.

[15] LEE CARROLL 1974, 34.

[16] LEE CARROLL 1974, 34.

[17] LEE CARROLL 1974, 37.

[18] HIGGINS 1961, 21.

[19] HIGGINS 1961, 21; FOLLETT 1985, 65.

contain copper. This process reveals us that the metal has two melting points: that one in which the metal surface begins to melt and the one when the entire metal melts[20]. This technique of solder metal elements on jewellery could be applied to gold pieces and silver ones, too.

Etruscan jewellers used amber for solder gold beads on different artefact made from the same material. Whit the help of a microscope it was possible to observe that on the surface of jewellery it was revealing the presence of a thin layer of melted amber that covered both base and grains[21]. Lack of Hellenistic pieces that attest the presence of amber makes us believe that this technique was used only by the Etruscans.

Studying jewellery design we observe that the filigree technique was originally used for making frames for other decorative elements like pearls or leaflets, but also for the demarcation of the area which was later attached email. Since the middle of the archaic period to the end of the Hellenistic one, filigree technique has been used both as a freestanding ornamental technique and for making the frame of email[22], to the detriment of grain that has been used less frequently. If the artisan wanted a piece of silver to be enamel, he needed to avoid adding zinc[23] to flux fixing composition of the decorative elements, because its presence causes the enamel to accede in low percent on the surface of the jewellery.

The enamel is the process of acceding glass on a metal surface at temperatures between 750–850° C. It was found that among the most common pieces that were enamel are from gold and electrum, but a few silver artefacts reveal to us that even this material could be submitted to the process. Electrum found in nature is an alloy of gold and silver, which contains small amounts of copper and other metals and has a light yellow or even white-silver colour[24].

To enamel an object can be done by several methods, but the method used for jewellery called is that named *cloisonné*. First, on the surface of the piece is formed a frame using wires or bands inside which a paste of powdered glass in the desired colour[25] is putted. After the jewellery is heated the paste is fixed to the surface.

The gilding technique was used by the artisans of the Hellenistic period to cover a non-metal or non-precious metal base with thin gold foil with adhesive. Usually this technique is used on components of funeral jewellery or to produced cheap pieces for those which cannot afford jewellery made entirely from precious materials.

[20] LEE CARROLL 1974, 35.

[21] FOLLETT 1985, 64.

[22] HIGGINS 1961, 18.

[23] MARYON 1923, 192.

[24] OGDEN 1982, 23.

[25] VOMER-GOIKOVIČ, ŽIŽEK, FARIČ 2008, 42.

Attraction to beautiful ornaments is a defining feature of humanity. As we conclude, the pleasure to use raw materials that have a shiny appearance, consistency alone or a specific colour was harnessed and pieces of jewellery.

The accidental discovery of smelting ore and separation of metals led to a real series of experiments that were completed by the emergence and development of production techniques and technology achievement for numerous metal objects. By mastering of these processes, man has created objects that he used in daily life, but at one point felt the need to employ metal for improving his personal appearance. Also, jewellery made from rare materials have become, over time, means to reveal the material situation or in other words marks of prestige.

Over time, the development of metallurgy, including toreutics, we observed how some techniques are replacing older ones or were used in interdependence, such as enamel and filigree. Both the technique of filigree and granulation are certified first time Aegean world through jewellery discovered Minoan tombs from Messara[26]. However, in time, the first technique managed gradually to replace the second one, a situation encountered in the Hellenistic period. Among the latest techniques used for decorating jewellery is remarkable polychrome consisting of encrustation or loose stones or coloured glass, but this is a subject for another future article. After analysing the techniques used for decorating jewellery from the Hellenistic period, we can classify these techniques in:

– adding the same metal or alloy — filigree, granulation and soldering;

– adding the same substance or material — enamel and rocks;

– taking out a percent of the material — engraving and perforation[27].

We mention that the *repoussé* technique was not included in any of the categories mentioned above, since it does not involve the addition of another substance or other material, not even removal of some part of the working surface.

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[26] HIGGINS 1961, 21.

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