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SENTIMENTALNI REZOVI IZ 19. STOLJEĆA
Restaurirana slika izrađena od kose na staklu

NINETEENTH CENTURY SENTIMENTAL CUTS
A Restored Hairwork Picture on Glass

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U ovom članku se daje kratki povijesni osvrt na predmete izrađene od kose, tehnike rada s organskim materijalom (kosom) te kemijska analiza veziva. Zatim se opisuje predmet i zatečeno stanje te postupci konzervatorsko-restauratorskih zahvata čišćenja, integracije, nadogradnje, konsolidacije i retuša.

This paper presents a short historical overview of artefacts made of hair, the techniques of working with an organic material (hair) and the chemical analysis of the adhesive. The artefact is then described, as is its condition as found, and the procedures of the conservation and restoration interventions of cleaning, integration, rebuilding missing sections, consolidation and retouching.

KLJUČNE RIJEČI: *predmeti rađeni od ljudske kose, arapska guma, restauracija stakla, konsolidacija "crteža" od organskog materijala, nadogradnja ukrasnog drvenog okvira, retuš*

KEY WORDS: *artefact made of human hair, gum arabic, glass restoration, consolidation of "drawings" made of organic material, rebuilding missing sections of the decorative wooden frame, retouching*

1. UVOD

Tijekom 2013./2014. godine u fazi preseljenja i revizije materijala Arheološkog muzeja Istre u "skrivenom" je kutku muzeja pronađen vrlo zanimljiv predmet: uokvirena slika na staklu, izrađena lijepljenjem vlasi kose različitih duljina. Iako predmet svakako ne pripada kategoriji arheoloških nalaza kakvi se inače obrađuju u Konzervatorsko-restauratorskom odjelu AMI-ja, zbog atraktivnosti umjetnine te potrebe za njenim očuvanjem odlučeno je provesti konzervatorsko-restauratorsku obradu. Nažalost, nije nam poznato kako je predmet dospio u muzej.

2. POVIJESNI OSVRT

Predmeti izrađeni od organskih materijala poput ljudske kose privlače pozornost zbog svoje krhkosti, intimnosti i sentimentalne vrijednosti. Izrađeni su nevjerojatnom pažnjom, od vrlo osjetljivog i osobnog materijala.

Tijekom 17. stoljeća nakit za oplakivanje preminulih proizvodi se isključivo za pripadnike elite te ukazuje na socijalni status pokojnika, služeći kao trajni "memento mori" ("sjeti se smrti"). U 18. stoljeću predmeti izrađeni od kose (slike, skulpture i nakit) postaju nadaleko popularni te se iz Engleske šire u druge europske zemlje. Taj je period poznat kao "sentimentalno razdoblje". Nakit za oplakivanje iz toga razdoblja nije više definiran svojom ekonomskom već intimnom i emocionalnom vrijednošću. Različiti oblici takvog nakita u 18. stoljeću odražavaju promjene u stavovima prema smrti. Središte oplakivanja nisu više pokojnici i njihovo slavljenje već ožalošćeni i njihovo žalovanje. U 19. stoljeću razvija se nova ikonografija, koju karakterizira mali repertoar elegijskih motiva: pejzaži i vrtovi, scene, pojedinačna stabla, osobito vrba i čempres, grobovi ukrašeni urnama, ožalošćene žene u pseudoantičkim kapama i s cvjetnim ornamentima. Važno je naglasiti da je ova stereotipna ikonografija povezana sa semantikom žalovanja, kao i s prijateljstvom. Osim što se kosa voljenih pokojnika upotrebljavala u predmetima za oplakivanje, još je češće kosa živih osoba korištena za izradu poklona koji su se darivali za uspomenu, kao vječni znak prijateljstva, sjećanja ili romantične ljubavi.

U 19. stoljeću kosa je diljem Europe prerađivana u nakit, a koristila se i u kreiranju dekorativnih umjetničkih radova. Raznolikost predmeta izrađenih od kose čini se bezgranična, od pramenova umetnutih u medaljone pa sve do vrlo složenih vijenaca izrađenih od kose ispletene u oblike cvijeća ili pak minijaturnih slika na slonovači iscrtanih sipinim crnilom i s fino izrezanom kosom (sl. 1, sl. 2, sl. 3).

1. INTRODUCTION

In 2013/14, during a phase of the relocation and review of materials at the Archaeological Museum of Istria, a fascinating artefact was identified in a "hidden" corner of the museum - a framed picture on glass fabricated by gluing strands of hair of varying lengths. Although the artefact certainly cannot be numbered among the category of archaeological artefacts the likes of which are usually treated at the AMI Conservation -Restoration Department, the attractiveness of this artwork and the necessity of its preservation motivated the decision to carry out conservation and restoration treatment. We do not, unfortunately, know by what means the artefact found its way into the museum.

2. HISTORICAL OVERVIEW

Artefacts fabricated from organic materials such as human hair draw our attention because of their fragility, their intimate nature and their sentimental value. They are crafted with the outmost care, using very sensitive and personal material such as human hair.

In the seventeenth century mourning jewellery was manufactured exclusively for members of the social elite and reflected the social status of the deceased, serving as a permanent *memento mori* ("remember (that you have) to die"). In the eighteenth century objects made of hair (pictures, sculptures and jewellery) become widely popular and spread from England to other European countries. This is the period known as sentimentalism. Mourning jewellery from this period is no longer defined by its economic, but rather by its intimate and emotional value. Various forms of this jewellery in the eighteenth century reflect changes in attitudes towards death. The focus of mourning is no longer the deceased and their glory, but rather the grieving and their grief. A new iconography is developed in the nineteenth century that is characterised by a small repertoire of elegiac motifs: landscapes and gardens, scenes, solitary trees (the willow and cypress in particular); graves decorated with urns, grieving women in pseudo-Antiquity period caps and floral ornamentation. It should be emphasised that this stereotypical iconography is associated with the semantics of grieving and with friendship. Even more frequent than the use of the hair of a deceased loved one in mourning objects is the use of the hair of living persons for the fabrication of keepsake gifts, presented as an eternal sign of friendship, remembrance or romantic love.

In the nineteenth century hair was used in the manufacture of jewellery across Europe, but was also

Sl. 1 Broš od zlata i emajla te jednostavno upletena kosa pokojnika pod staklom. http://artofmourning.com/2014/03/17/mourning-jewels-at-fellows-auctions/ [25.8.2016]
Fig. 1 Gold and enamel brooch with simply plaited hair of the deceased encased in glass. http://artofmourning.com/2014/03/17/mourning-jewels-at-fellows-auctions/ [25.8.2016]

Sl. 2 Detalj - cvjetovi izrađeni kosom. https://hsmcpa.wordpress.com/tag/victorian/ [25.8.2016]
Fig. 2 A detail of hairwork flowers. https://hsmcpa.wordpress.com/tag/victorian/ [25.8.2016]

Sl. 3 Minijatura - tema žalovanje; tehnika boje sepije na slonovoj kosti. http://artofmourning.com/2014/06/16/6655/ [25.8.2016]
Fig. 3 Mourning miniature - sepia paint on ivory. http://artofmourning.com/2014/06/16/6655/ [25.8.2016]

used in creating decorative works of art. The diversity of objects created using hair appears limitless, from simple locks of hair inserted into medallions, very complex wreaths fabricated of locks of hair woven into floral forms, to miniature pictures on ivory traced out in sepia paint and finely cut hair (Figs. 1, 2 and 3).

Rings, bracelets, earrings, necklaces, brooches, amulets, cufflinks and watch fobs made of hair are often richly decorated with gold, enamel, pearls, semi-precious and precious stones of all kinds - the opulence of the material served to demonstrate the sense of friendship or love (Fig. 4).

Sl. 4 Nakit sentimentalnog karaktera. http://artofmourning.com/2014/09/01/19th-century-jewellery-designs-and-primary-sources/ [25.8.2016]
Fig. 4 Jewellery of sentimental character. http://artofmourning.com/2014/09/01/19th-century-jewellery-designs-and-primary-sources/ [25.8.2016]

The popularity in this period for the fabrication of these objects of materials such as hair was not limited to jewellery alone. Diverse applied arts objects were crafted: pictures with floral motifs adorned walls and three-dimensional bouquets, also made entirely of hair, were exhibited under glass domes on Victorian tables in drawing rooms (Fig. 5). Even a life-size portrait of Queen Victoria is made entirely of human hair. It is known to us that Queen Victoria did in fact have a particular taste for objects made of hair and was fond of wearing jewellery fashioned from hair. Following the death of her beloved husband, the Prince Albert, in 1861, Queen Victoria wore a lock of his hair in a brooch attached near her heart to the end of her life.

Originally this jewellery and decorative objects were crafted by artists and were sold in specialised shops and orders were placed through catalogues. The fabrication of hairwork objects quickly became a popular pastime

Prstenje, narukvice, naušnice, ogrlice, broševi, amuleti, dugmad za manšete i remeni za ručne satove izrađeni od kose često su bogato ukrašeni zlatom, emajlom, perlama, dragim i poludragim kamenjem svih vrsta. Bogatstvo materijala služilo je prikazivanju osjećaja prijateljstva ili ljubavi (sl. 4).

Popularnost predmeta od ovog materijala nije stala samo na nakitu. Izrađivale su se i slike s florealnim motivima, a trodimenzionalni buketi, također u potpunosti od kose, bili su izloženi ispod staklenih zvona na viktorijanskim stolovima u sobama za primanje (sl.5). Postoji čak i portret kraljice Viktorije u prirodnoj veličini izrađen od ljudske kose. Poznato je da je upravo kraljica Viktorija iznimno voljela predmete od kose i rado je nosila nakit od tog materijala. Nakon smrti svog ljubljenog supruga princa Alberta 1861. godine, kraljica je do kraja života nosila pramen njegove kose u brošu pričvršćenom uz odjeću, tik do srca.

Izvorno su nakit i dekorativne predmete izrađivali umjetnici te se prodaja odvijala u specijaliziranim trgovinama, a narudžbe su se primale putem kataloga. Za žene u viktorijansko doba izrada predmeta od kose ubrzo postaje popularan način provođenja slobodnog vremena, do te mjere da se u ondašnjim časopisima[1] publiciraju besplatni uzorci s instrukcijama za "uradi sam" radove od kose. U Engleskoj i Americi organizirali su se i tečajevi za mlade dame, na kojima ih se podučavalo ovoj vještini. Gotovo svaki muškarac iz tog razdoblja dobio je na dar remen za sat izrađen od kose svoje zaručnice, žene, sestre ili majke; remeni od kose ubrajaju se među najuobičajenije takve predmete iz 19. stoljeća (Holm 2004, 139-143).

3. TEHNIKE IZRADE PREDMETA OD KOSE

Postoji nekoliko tehnika izrade, a svakom se proizvodila posebna vrsta predmeta. U daljnjim opisima prikazano je tek nekoliko popularnijih (Adele 2013.).

3.1. *Palette* rad

Kosa je izrezana u oblike i zalijepljena izravno na neku površinu, npr. na tanku pergamenu (od teleće kože), slonovu kost ili staklo. Na taj način nastaju slike čiji motivi nerijetko podsjećaju na one florealne. Pojedinačni pramen ili vlas kose koristio se za oblikovanje finih linija, a sitno isjeckana kosa mogla se rasuti po površini tretiranoj ljepilom, čime se dobivala posebna tekstura (sl. 6) (Adele 2013.).

[1] Godey's Lady's Book i Peterson's Magazine / popularni ženski magazini tiskani u Philadelphiji u 19. stoljeću

Sl. 5 Cvjetni buket izrađen od kose. https://tfeanda.com/2015/07/ [25.8.2016]
Fig. 5 Bouquet of hair worked flowers. https://tfeanda.com/2015/07/ [25.8.2016]

activity among women of the Victorian period, to such an extent that magazines of the time[1] published free templates with instructions for "do-it-yourself" hairwork projects. Courses were organised in England and America to teach young women this skill. Practically every man of this period received a watch fob made of the hair of his fiancé, wife, sister or mother; hairwork bands are, namely, numbered among the most common objects of this kind in the nineteenth century (Holm 2004, 139-143).

3. HAIRWORK FABRICATION TECHNIQUES

There are a number of fabrication techniques, each used to manufacture a given type of object. Only a few of the most common are discussed further in the text (Adele 2013).

3.1. Palette Work

Hair was cut into shapes and glued directly to a surface such as thin parchment (vellum), ivory or glass to create designs that are often similar to feathers of hair or vegetative motifs. Individual locks or strands of hair were used to form fine lines, while finely chopped hair could be scattered on a surface treated with adhesive to create a desired texture (Fig. 6) (Adele 2013).

3.2. Table Work

Working on a special braiding table with a hole in the middle, hair was braided using bobbins and weights into a complex lace network, often adorned with gold and pearls. This type of work was particularly arduous: the hair was

[1] Godey's Lady's Book and Peterson's Magazine - popular women's magazines printed in Philadelphia in the nineteenth century.

Sl. 6 Palette *tehnika.*
http://graysantiques.blogspot.hr/2014/04/the-victorian-brooch.html [25.8.2016]
Fig. 6 Palette work.
http://graysantiques.blogspot.hr/2014/04/the-victorian-brooch.html [25.8.2016]

3.2. Rad na stolu

Na specijalnom stolu s rupom u sredini kosa bi se uz pomoć špula i utega plela u zamršenu mrežu traka, često ukrašenu zlatom i perlama. Ova vrsta rada bila je osobito naporna: kosa bi se kuhala u vodi sa sodom 15 minuta[2] te se potom razvrstavala po dužini u pramenove od po 20 do 30 vlasi. Najveći dio nakita koji se izrađivao od

Sl. 8 Drveni stol za obradu i izradu kose.
https://hsmcpa.files.wordpress.com/2014/04/untitled.png [25.8.2016]
Fig. 8 Braiding table for the preparation and working of hair.
https://hsmcpa.files.wordpress.com/2014/04/untitled.png [25.8.2016]

[2] Kosa se iskuhavala iz higijenskih razloga.

cooked in water and soda for fifteen minutes[2], then was sorted by length into bunches of 20 to 30 strands of hair. The majority of jewellery of this kind required very long hair - fabricating a bracelet, for example, required strands with a length of from 50.8 to 61 centimetres. Sometimes the hair was shaped around a wooden mould to achieve a desired shape. The moulds, of special shapes, were crafted by local woodturners. The mould would be attached in the hole at the centre of the worktable. The hair would be wound around a series of bobbins and held by weights to keep the braid straight. When the work was done and the mould/form was still in place it would be immersed in a pot with water and cooked for fifteen minutes, then dried before the object was carefully removed from the form. Only then was it ready for mounting by a goldsmith (Figs. 7 and 8) (Adele 2013).

Sl. 7 Sl. 7 Tehnika rada na stolu - broš ukrašen zlatom.
https://hsmcpa.wordpress.com/tag/victorian/ [25.8.2016]
Fig. 7 Table worked brooch embellished with gold.
https://hsmcpa.wordpress.com/tag/victorian/ [25.8.2016]

3.3. The Sepia Technique - Working with Sepia Paint

Hair was finely chopped and mixed with gum arabic or an adhesive called *musilix*,[3] or ground to a powder with a mortar and pestle and dissolved in distilled water, yielding a brown pigment that was applied to ivory, glass, or fine parchment. Sepia paint could be used to draw out the details. This technique was usually used to depict miniature landscapes or scenes related to death and mourning (Fig. 9) (Adele 2013).

3.4. Hairwork Flowers, Bouquets and Wreaths

Hairwork flowers are fabricated by wrapping the strands around a rod, using fine wire to hold the strands

[2] Hair was cooked for hygienic reasons.
[3] An adhesive of organic origin, obtained from shells.

ovog materijala zahtijevao je vrlo dugu kosu; primjerice, za izradu narukvice bila je potrebna kosa duga 50,8 do 61cm. Ponekad bi se oblikovala uz pomoć drvenog kalupa, ne bi li se dobio željeni oblik. Same su kalupe izrađivali lokalni tokari. Kalup bi se pričvrstio u rupu na sredini radnog stola. Kosa bi se namotala na niz špula te pričvršćivala utezima za pleteni rad kako bi ravno stajala. Kad je rad bio gotov i kalup još na mjestu, uranjao bi se u lonac s vodom te sve prokuhavalo 15 minuta, zatim sušilo te bi se na kraju predmet od kose pažljivo odvojio od kalupa. Tek tada je bio spreman za daljnju obradu kod zlatara (sl.7, sl. 8) (Adele 2013.).

3.3. *Sepija* tehnika - tehnika sipine boje

Kosa je bila fino nasjeckana i umiješana u arapsku gumu ili ljepilo nazvano "musilix"[3] ili bi se pak samljela u prah uz pomoć posude za drobljenje s tučkom te topila u destiliranoj vodi kako bi se dobio smeđi pigment koji se nanosio na slonovu kost, staklo ili fini pergament. Pri slikanju detalja koristilo se sipino crnilo. Ovom su se tehnikom obično prikazivali minijaturni pejzaži ili scene koje su se odnosile na smrt i tugovanje (sl. 9) (Adele 2013.).

Sl. 10 Cvjetovi, buketi i vijenci izrađeni kosom.
https://hsmcpa.wordpress.com/tag/victorian/ [25.8.2016]
Fig. 10 Hairwork flowers, bouquets and wreaths.
https://hsmcpa.wordpress.com/tag/victorian/ [25.8.2016]

[3] Vezivo organskog porijekla, dobiveno iz školjaka.

Sl. 9 Tehnika sepija.
http://artofmourning.com/2012/11/05/tho-lost-to-sight-to-memory-dear-miniature/ [25.8.2016]
Fig. 9 Sepia work.
http://artofmourning.com/2012/11/05/tho-lost-to-sight-to-memory-dear-miniature/ [25.8.2016]

in place. Variations in the sizes of the rods, the quantities and colour of hair used, and the incorporation of beads yielded a diversity of flower, leaf and tendril shapes and sizes, which could then be combined to form decorative bouquets and wreaths (Fig. 10) (Adele 2013).

4. DESCRIPTION, ANALYSIS OF THE CHEMICAL COMPOSITION OF THE ADHESIVE AND THE STATE OF PRESERVATION OF THE FLORAL MOTIF PICTURE MOUNTED ON GLASS

4.1. Description of the Artefact

Pictures mounted on glass with floral decorative motifs fabricated entirely of hair served to frame two portrait photographs. The lavish branching heart-shaped wreath is executed in elongated leaves, branches and flowers encircling two oval photograph frames placed centrally, above which we find a ribbon into which a message or the names of fiancées/spouses were printed. The ribbon is borne in the beaks of two doves in flight. The picture has a wooden frame of rectangular form, 44 by 44.5 centimetres (width by height). The front is adorned with stylised vegetative ornaments. The inside and outside edges are simply profiled, while the middle is decorated with a ribbon of stylised flowers similar to tulips, beneath which are geometric forms, circles and rectangles alternating on the substrate. The surface of the frame is dark brown. The prominent parts of the ornament in the central strip are emphasised in gold colour (Fig. 11).

3.4. Cvjetovi, buketi i vijenci izrađeni od kose

Cvjetovi od kose izrađivani su njenim namatanjem oko štapa, pri čemu se koristila fina žica, koja bi vlasi držala zajedno. Mijenjanjem veličine štapa, količine i boje kose te ponekad ubacivanjem kuglica bilo je moguće izraditi vrlo raznovrsne oblike i veličine cvjetova, listova i vitica, koji su se zatim spajali u dekorativne bukete i vijence (sl.10) (Adele 2013.).

4. OPIS, ANALIZA KEMIJSKOG SASTAVA VEZIVA I STANJE OČUVANOSTI SLIKE NA STAKLU S FLOREALNIM MOTIVIMA

4.1. Opis predmeta

Slika na staklu s florealnim dekorativnim motivima, u cijelosti izrađena od kose, imala je funkciju ukrasnog okvira za dvije portretne fotografije. Bogato razgranati vijenac srcolikog oblika izveden je duguljastim listićima, grančicama i cvijećem, a okružuje dva ovalna okvira za umetanje fotografije koji se nalaze u središtu. Iznad njih se nalazi traka na koju se upisivala poruka ili pak imena zaručnika/supružnika. Traku drže u kljunu dva goluba u

4.2. Materials Used in the Fabrication of the Picture / Analysis of the Chemical Composition of the Adhesive

In order that the conservation and restoration procedures be conducted using the most suitable materials and to learn more about the actual technique used to fabricate the artefact, a sample of the adhesive used to attach the hair to the glass substrate was subjected to a chemical composition analysis using the Fourier transform infrared spectroscopy method (FTIR). Given that the initial hypothesis was that the adhesive was organic in nature and because of the very small sample size required to conduct the analysis, FTIR spectroscopy was immediately seen as a very suitable method by which to characterise the adhesive in question. The analysis was conducted by creating a pellet, i.e. mixing the quantity of the sample (3 milligrams) with 120 milligrams of potassium bromide (KBr), a salt that serves in this analysis only as a carrier of the sample as it is transparent to IR rays. Once formed, the pellet is dried for four hours at 60°C to remove any moisture, the signal of which might cover part of the sample band in the spectrum. The spectrum of the

Sl. 11 Slika na staklu izrađena od kose (foto: M. Petrović).
Fig. 11 The glass mounted hairwork picture (photo by: M. Petrović).

letu. Slika je uramljena drvenim okvirom pravokutnog oblika, dimenzija 44 x 44,5 cm (š x v). Prednja strana ukrašena je stiliziranim biljnim ornamentima. Vanjski i unutarnji rubovi su jednostavno profilirani, dok je središnji dio ukrašen trakom od stiliziranih cvjetova nalik tulipanu, a ispod njih se nalaze geometrijski oblici, krugovi i pravokutnici koji se naizmjence redaju na podlozi. Površina okvira je tamnosmeđe boje. Istaknuti dijelovi ornamenata u središnjoj traci naglašeni su zlatnom bojom (sl. 11).

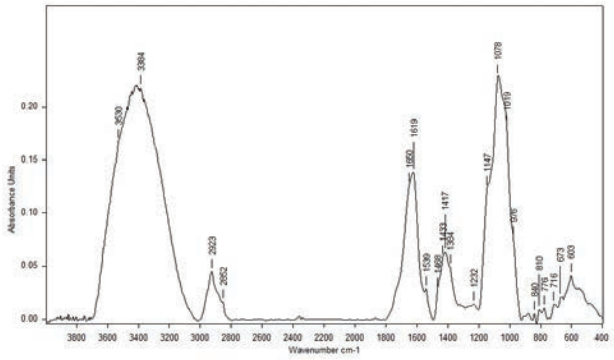
4.2. Materijali korišteni pri izradi slike /Analiza kemijskog sastava veziva

Ne bi li se konzervatorsko-restauratorski postupci proveli što primjerenijim materijalima te se doznalo više o samoj tehnici izrade predmeta, uzorak veziva kojim su vlasi pričvršćene na staklenu podlogu podvrgnut je analizi kemijskog sastava metodom infracrvene spektroskopije u Fourierovoj transformaciji (FTIR). S obzirom na to da je početna pretpostavka bila da se radi o vezivu organske prirode, kao i zbog vrlo male količine uzorka potrebnog za provedbu analize, FTIR spektroskopija odmah se nametnula kao vrlo prikladna metoda kojom će biti moguće karakterizirati vezivo. Analiza je provedena izradom pastile, odnosno miješanjem preuzete količine uzorka (3 miligrama) sa 120 miligrama kalijevog bromida (KBr), soli koja pri ovoj analizi služi samo kao nosač uzorka i nevidljiva je IR zrakama. Nakon izrade pastila je sušena 4 sata na 60°C kako bi se uklonila vlaga, koja bi svojim signalom mogla prekriti dio vrpca uzorka u spektru. Spektar ispitnog uzorka veziva snimljen je pri rezoluciji od 4 cm^{-1}, a rezultat je srednje vrijednosti 64 snimljena spektra (sl. 12).

U FTIR spektru vidljiva je vrpca istezanja veze OH oko 3300 cm^{-1}, zatim ona istezanja veze CH na 2923 i 2852 cm^{-1} te ona savijanja karboksilne grupe C=O na 1619 cm^{-1}, dok vrpce na 1078 i oko 1420 cm^{-1} pripadaju vibracijama istezanja veze CO odnosno savijanja veze CH (Derrick et al. 1999, 179). Snimljeni spektar uspoređen je sa spektrima poznatih supstanci i standarda te je osim vrijednosti i oblika pojedinih vrpci provedena komparacija oblika čitavog spektra. Pretraživanjem dostupnih biblioteka i usporedbom spektara istih vrijednosti valnog broja vrpci utvrđena je visoka podudarnost FTIR spektra ispitnog uzorka s onim arapske gume. Arapska guma materijal je prirodnog porijekla koji neke vrste drveća proizvode u svojoj kori (*Acacia senegal, Acacia seyal*), a sastavljen je od mješavine raznih polisaharida i topiv je u vodi (sl. 13).

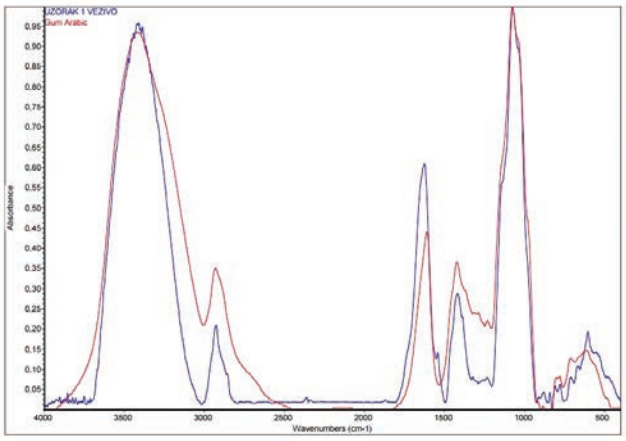
Ljepljiva svojstva arapske gume poznate su tisućljećima, a danas se koristi u proizvodnji kozmetike, lijekova, tekstila, slatkiša i drugih prehrambenih proizvoda. Kao

test sample of the adhesive was imaged at a resolution of 4 cm^{-1}, and the result is the mean value of 64 imaged spectra (Fig. 12).



Sl. 12 FT-IR spektar uzorka veziva.
Fig. 12 FT-IR spectrum of the adhesive sample.

The stretching band of the OH bond is visible in the FTIR spectrum at around 3300 cm^{-1}, the C-H bond stretching band at 2923 and 2852 cm^{-1}, and that of the carboxyl group C=O at 1619 cm^{-1}, while the bands at 1078 and at around 1420 cm^{-1} belong to the vibrations of the stretching of the C-O bond and of the out-of-plane bending of the C-H bond (Derrick et al. 1999, 179). The imaged spectrum was compared with the spectra of known substances and standards - also compared along with the values and form of individual bands was the form of the entire spectrum. A search of the available libraries and a comparison of the spectra of the same values of band wavenumber established a high correspondence with of the FTIR spectrum of the test sample with that of gum arabic. Gum arabic is a material of natural origin produced in the bark of some trees (*Acacia senegal, Acacia seyal*) composed of a mixture of various polysaccharides and is soluble in water (Fig. 13).



Sl. 13 FT-IR spektar uzorka veziva i arapske gume.
Fig. 13 FT-IR spectrum of the adhesive sample and of gum arabica.

vezivo u izradi likovnih i pisanih artefakata u upotrebi je jednako dugo, posebno u tehnikama poput akvarela ili pastela (Garzanti 1977,839), a obično je dostupna u granulama ili kao prah.

U izradi slike od kose arapska guma poslužila je kao ljepilo kojim su vlasi učvršćene na staklo. Ipak, iako se radi o izdržljivom i postojanom ljepilu, zbog visoke topivosti u vodi staklena je ploha s motivima izrađenim od kose vjerojatno izvorno bila dodatno zaštićena, npr. još jednom staklenom plohom[4], a zbog istog je razloga predmet potrebno čistiti otapalima u kojima arapska guma nije topiva, poput etilnog alkohola (Montenegro et al. 2012, 16-17). Određene su studije pokazale da zbog sadržaja pojedinih enzima, polifenola, ali i tanina, arapska guma posjeduje antimikrobna svojstva pa usprkos činjenici da sadrži uglavnom polisaharide i proteine, srećom ne predstavlja poželjnu hranu za bakterije, plijesni i insekte (Ronchetti 1986,418).

4.3. Stanje očuvanosti

Materijal korišten pri izradi slike na staklu u stabilnom je stanju. Staklena podloga slike je napuknuta na nekoliko mjesta i nedostaju dva manja ulomka, a dijelovi crteža odvojili su se djelomice od podloge. Na slici su vidljivi prethodni popravci cijanoakrilatnim ljepilom, kojim su lijepljeni ulomci stakla, i tragovi ponovnog učvršćivanja odlijepljenih dijelova crteža (kose).

Sl. 14 Zatečeno stanje slike na staklu (foto: M. Petrović).
Fig. 14 The condition of the picture on glass as found (photo by: M. Petrović).

[4] U trenutku pronalaska slika nije imala staklenu zaštitu i unutar okvira nema dovoljno prostora za nju; također, nije moguće utvrditi je li drveni okvir slike original ili je ona kasnije nanovo uramljena.

The adhesive properties of gum arabic have been known of for centuries – it is used presently in the manufacture of cosmetics, medications, textiles, sweets and other food products. It was long used as an adhesive in the fabrication of artwork and written artefacts, especially in techniques such as aquarelle or pastel (Garzanti 1977, 839), and is usually available in grains or as a powder.

In fabricating hairwork pictures gum arabic served as an adhesive with which to attach the strands of hair to glass. Although this is a resistant and durable adhesive, due to its high solubility in water the glass surface with the hairwork motif was likely protected - with an additional glass surface, for example[4]. For this same reason the artefact needs to be cleaned with another solvent, such as ethyl alcohol, in which it is not soluble (Montenegro et al. 2012, 16-17). Some studies have shown that because it contains some enzymes, polyphenols and tannin, gum arabic possesses antimicrobial properties and that – despite that fact that it consists for the most part of polysaccharides and proteins – it does not, happily, constitute a desirable food for bacteria, mould and insects (Ronchetti 1986, 418).

Sl. 15 Detalj - zatečeno stanje izmaknutog crteža (foto: M. Petrović).
Fig. 15 A detail of the condition of the displaced drawing (photo by: M. Petrović).

[4] When found the picture did not have protective glass plating – there is no room in the frame for any such glass plate. It is also, however, not possible to ascertain if the wooden frame of the picture is the original or if it was reframed at some subsequent point in time.

Također, uočava se da su neki dijelovi otpali: u jednom dijelu kompozicije crtež je bio smaknut dok je u nekim dijelovima u potpunosti nedostajao (sl. 14, sl. 15).

Na drvenom okviru najveća su oštećenja uočena na donjem dijelu ornamentalne trake: više ulomaka ornamenta je otpalo. Manji nedostaci uočavaju se i na vanjskim bridovima letvica, gdje je boja istrošena (sl. 16, sl. 17).

Sl. 16 Zatečeno stanje drvenog okvira (foto: M. Petrović).
Fig. 16 The condition of the wooden frame as found (photo by: M. Petrović).

5. KONZERVATORSKO-RESTAURATORSKI RADOVI

Predmet je prvo rastavljen na dijelove. Rastavljanje je bilo potrebno zbog različitosti materijala: drvenog okvira i slike na staklu, s obzirom da različiti materijali iziskuju različite konzervatorsko-restauratorske postupke.

5.1. Zahvati na staklenoj podlozi i crtežu

Stakleni ulomci su očišćeni od prljavštine (prašine) vatiranim štapićima uronjenim u etilni alkohol. Postupak je provođen vrlo oprezno, zbog osjetljivosti materijala kojim je izrađen crtež. Zatim su ulomci pažljivo okrenuti na stražnju stranu (poleđinu), da se pri lijepljenju ne bi oštetio crtež koji se nalazi na prednjoj strani. Ulomci su privremeno fiksirani ljepljivom paos trakom te su cijanoakrilatnim ljepilom (*Super Attak*) zalijepljene spojnice od mesingane žice. Ulomci su integrirani u cjelinu te su uz pomoć spojnica učvršćeni, a na spojeve loma naneseno je dvokomponentno epoksidno ljepilo (*Araldit 2020*) (sl. 18, sl. 19).

Dva nedostajuća dijela staklene podloge nadomještena su novim staklom. Postupak rezanja stakla u ovom

4.3. State of Preservation

The material used in the fabrication of the glass-mounted picture is in a stable state of preservation. The glass substrate of the picture is cracked in a few places, with two small fragments of glass missing, and parts of the hairwork drawing have become separated from the glass on which it is mounted. Previous repairs are visible on the picture where cyanoacrylate glue has been used to adhere fragments of the glass. Also visible are traces of the re-adhesion of parts of the hairwork drawing that had become separated.

It is also evident that some parts have dropped off, that in one part of the composition the position of the hairwork drawing has shifted and that some parts of the drawing are entirely missing (Figs. 14 and 15).

The most significant damage to the wooden frame was observed on the lower part of the ornamental strip: several fragments of the ornament have fallen off. Smaller areas of deterioration are also evident on the outer edges of the laths, where the paint has worn off (Figs. 16 and 17).

Sl. 17 Detalj - zatečeno stanje ukrasnog drvenog okvira (foto: M. Petrović).
Fig. 17 A detail of the condition of the decorative wooden frame as found (photo by: M. Petrović).

Sl. 18 Čišćenje slike na staklu (foto: M. Petrović).
Fig. 18 Cleaning of the picture on glass (photo by: M. Petrović).

Sl. 19 Lijepljenje ulomaka stakla (foto: M. Petrović).
Fig. 19 Gluing fragments of the glass (photo by: M. Petrović).

zahvatu jednak je postupku rezanja stakla pri izradi vitraja ili tiffany tehnike. Prvo se nedostajući dio iscrta olovkom na papiru. Papirnata šablona služi da bi se nedostajući dio precizno i u mjerilu prenio na staklo. Šablona se postavlja na staklo te se flomasterom ocrtaju konture nedostajućeg dijela, a zatim se nožem za staklo reže po označenim linijama. Rubovi izrezanih ulomaka stakla se bruse (brusilicom za staklo), a potom se nedostajući dijelovi pozicioniraju i lijepe dvokomponentnim epoksidnim ljepilom (sl. 20).

Prethodni popravak cijanoakrilatnim ljepilom, kojim su se pokušali vratiti na mjesto odlijepljeni dijelovi crteža (kosa), zadao nam je velike poteškoće jer ga je bilo i na kosi, s koje ga je bilo iznimno teško ukloniti. Nakon nekoliko bezuspješnih pokušaja njegova odstranjivanja raznim otapalima (topla voda, etilni alkohol, aceton), na tu su površinu postavljeni oblozi natopljeni odstranjivačem cijanoakrilatnih ljepila (*ViaCol Saratoga*). Rezultat tog postupka bio je zadovoljavajući: odstranjena je većina starog ljepila, a kosa je očuvana (sl. 21).

Već smo spomenuli da je kosa vrlo osjetljiv materijal pa je stoga konsolidacija predstavljala logičan slijed rada. Nakon iskušavanja različitih sredstava (*Mecosan, Primal, Paraloid b72*) najboljom se pokazala petpostotna otopina Paraloida b72 u acetonu. Tom je otopinom kosa učvršćena za staklenu podlogu te su ujedno vraćeni živost i sjaj crtežu.

Ne bi li se olakšala rekonstrukcija crteža te kako bi retuš bio što precizniji, na paos papiru je crnom bojom nacrtano zatečeno stanje, a nedostajući dijelovi iscrtani su crvenom bojom. Crtež na paos papiru u mjerilu 1:1

5. CONSERVATION AND RESTORATION WORK

The artefact was first disassembled. Taking it apart was necessary on account of the differences in materials – the wooden frame and the picture mounted on glass – given that different materials require different conservation and restoration processes.

5.1. Intervention on the Glass Base and the Drawing

The glass fragments were cleaned of dirt (dust) with cotton swabs immersed in ethyl alcohol. This procedure was done with great care on account of the sensitive nature of the material with which the drawing is made. The fragments were then carefully turned over onto their back (reverse) sides so that the drawing on the front would not be damaged in the course of gluing. The fragments were temporarily affixed using adhesive tracing (translucent) tape and then attached to one another at the joints using cyanoacrylate glue (Super Attack) and clasps of brass wire. The fragments were integrated to form a whole and attached using the clasps, with two-component epoxy glue (Araldit 2020) used to adhere the fracture joints (Figs. 18 and 19).

Sl. 20 Nedostajući ulomci nadomješteni novim staklom (foto: M. Petrović).
Fig. 20 Missing fragments are replaced with new glass (photo by: M. Petrović).

Sl. 21 Čišćenje starog veziva oblozima natopljenim odstranjivačem cijanoakrilnih ljepila (foto: M. Petrović).
Fig. 21 Cleaning of the old adhesive with pads soaked in cyanoacrylate glue remover (photo by: M. Petrović).

Sl. 22 Rekonstrukcija crteža te vraćanje otpalih dijelova kose u cjelinu (foto: M. Petrović).
Fig. 22 Reconstruction of the drawing and restoring parts of the hairwork that had fallen off (photo by: M. Petrović).

postavljen je ispod staklene slike te je potom tamnim kistom iscrtana reprodukcija. Retuš je izveden tušem sepija boje, u vrlo blagoj nijansi, svjetlijoj od originala crteža (sl. 22, sl. 23).

5.2. Restauratorska obrada na ukrasnom drvenom okviru

Drveni okvir očišćen je mekanom četkom; iščetkana je cijela površina, a zatim su ostaci prašine odstranjeni kistom uronjenim u mješavinu etilnog alkohola i destilirane vode (30% : 70%). Na ukrasnoj traci okvira uočeno je dosta manjih pukotina pa je premazana lanenim uljem, koje je "nahranilo" i vratilo sjaj drvu.

Nakon čišćenja i konsolidacije, s okvira je uzet otisak dvokomponentnim vinilpolisiloksanskim silikonom (*3M ESPE express*) te je u taj kalup nanesena dvokomponentna

Two missing sections of the glass base were replaced with new glass. The procedure to cut the glass in this intervention is the same as the procedure when cutting glass to fabricate stained glass or the *Tiffany* technique. The missing section is first sketched out with pencil on paper. The paper template is used to precisely and to scale transfer the missing section onto the glass. The template is placed on the glass and a marker used to draw out the contour of the missing section, whereupon the glass is cut along the marked lines using a glasscutter. The edges of the cut sections are ground (with a glass grinder) before the new sections are positioned and glued with two-component epoxy glue (Fig. 20).

The previous repairs effected with cyanoacrylate glue in an attempt to restore parts of the drawing (hair) that had come undone to their original position was a source of great difficulty as the glue had set on the hair from which it was exceedingly hard to remove. After a few unsuccessful attempts to remove the glue using various solvents (hot water, ethyl alcohol, acetone), pads soaked in a cyanoacrylate glue remover (ViaCol Saratoga) were placed on the surfaces from which the glue was to be removed. The results of this procedure were satisfactory - most of the old glue was removed and the hair preserved (Fig. 21).

We have already noted that hair is a very sensitive material; consolidation was consequently the logical next step in our work. Following trial consolidations using various substances (Mecosan, Primal, Paraloid B72), the best method proved to be the use of a 5% solution of Paraloid B72 in acetone. This solution, namely, consolidated the hair with the glass base and also restored the vibrancy and gloss of the drawing itself.

To facilitate the reconstruction of the drawing and to make the retouch as precise as possible, the condition as found was sketched out on tracing paper in black colour, and the missing sections drawn out in red colour. The 1:1 scale drawing on tracing paper was placed under the glass mounted picture and the reconstruction drawn out with a thin brush. The retouch was executed in sepia colour ink, in a very light nuance, lighter than the original drawing (Fig. 22) (Fig. 23).

5.2. Restoration Work on the Ornamental Wooden Frame

The wooden frame was cleaned with a soft brush, the entire surface was lightly scrubbed clean, after which the remains of dust were removed with a brush soaked in a mixture of ethyl alcohol and distilled water

Sl. 23 Retuš slike na staklu izveden tušem sepija boje (foto: M. Petrović).
Fig. 23 Retouching the picture on glass with sepia coloured ink (photo by: M. Petrović).

epoksi smjesa (*Araldit SV 427*) u omjeru 1:1 (sl. 24, sl. 25). Nakon što se epoksi smjesa osušila, nadogradnje su pozicionirane na odgovarajuća mjesta. Nadogradnje i otpali originalni ulomci zalijepljeni su na ukrasnu traku okvira ljepilom za drvo (*Pattex*), zbog reverzibilnosti te mogućnosti manipulacije za vrijeme sušenja. Zatim su prostori između originala i nadogradnje pažljivo popunjeni dvokomponentnom epoksi smjesom (*Araldit SV 427*), čime je estetski ujedinjen ukrasni reljef okvira. Nadograđeni dijelovi su retuširani; podloga je obojena crnom uljanom bojom, a reljef zlatnom bojom. Potom je drveni okvir premazan završnim zaštitnim slojem - voskom (*renaissance microcrystalline waxpolish*), koji pruža drvu potrebnu zaštitu i sjaj, a kako je ekološki, pogodan je za rad (sl. 26). Zatim je okvir okrenut na poleđinu i umetnuta je slika. Spajanje je izvedeno vrlo jednostavno: čavlići su umetnuti u već postojeće rupe, da se ne oštećuje dodatno okvir. U cilju dodatne zaštite, na kutovima su postavljeni gumeni čepovi (sl. 27, sl. 28).

Sl. 25 Nadogradnja nedostajućih dijelova ukrasne trake okvira (foto: M. Petrović).
Fig. 25 Rebuilding missing sections of the frame's decorative strip (photo by: M. Petrović).

Sl. 24 Detalj - okvir u fazi čišćenja (foto: M. Petrović).
Fig. 24 A detail of the the frame during the cleaning phase (photo by: M. Petrović).

(30% : 70%). A significant number of small cracks were observed on the frame's ornamental strip - it was coated with flax oil to "feed" and restore the lustre of the wood.

An impression was taken from the frame following the cleaning and consolidation using a two-component vinyl polysiloxane silicone (3M ESPE Express) - a two-component epoxy blend (Araldit SV 427) was placed in the resulting mould in a 1:1 ratio (Figs. 24 and 25). Once the epoxy blend of the rebuilt missing sections had dried they were positioned at the appropriate places. The rebuilt sections and the original sections that had fallen off were glued to the frame's ornamental strip using wood glue (Pattex) for its quality of reversibility and the ability to manipulate the sections in the course of drying. The spaces between the original surface and the rebuilt sections were carefully filled with a two-component epoxy blend (Araldit SV 427) aesthetically unifying the decorative relief of the frame. The rebuilt sections were retouched, the substrate painted in black oil paint, and the relief in gold colour. The wooden frame was then coated with a final protective layer of wax (Renaissance Micro-Crystalline Wax Polish), which provides the wood with the necessary protection and lustre and - given that it is environmentally friendly - is suitable for this work (Fig. 26). The frame was then

Sl. 26 Detalj - retuš ukrasne trake okvira (foto: M. Petrović).
Fig. 26 A detail of the retouching of the frame's decorative strip (photo by: M. Petrović).

Sl. 27 Detalj - poleđina slike (foto: M. Petrović).
Fig. 27 A detail of the back of the picture (photo by: M. Petrović).

turned on its back and the picture inserted. The two were joined very simply - small nails were inserted in the existing holes such that no further damage was done to the frame. For extra protection rubber bungs were placed at the corners (Figs. 27 and 28).

6. CONCLUSION

Although there is sporadic treatment of materials from ethnographic collections at the Archaeological Museum of Istria, nineteenth century artefacts are certainly a rarity. In the case of the hairwork picture there is the significant and so far unresolved question of its origin. The picture

Sl. 28 Restaurirana slika na staklu izrađena od kose (foto: T. Draškić-Savić).
Fig. 28 The restored glass mounted hairwork picture (photo by: T. Draškić-Savić).

6. ZAKLJUČAK

Iako se u Arheološkom muzeju Istre sporadično obrađuje i materijal etnografskih zbirki, predmeti iz 19. stoljeća svakako su rijetkost. U slučaju slike izrađene vlasima kose postoji veliko, do sada neodgovoreno pitanje njena porijekla. Slika je bila pohranjena na nedostupnom mjestu u spremištu AMI-ja, bez ikakve oznake. Međutim, s obzirom na lijep motiv te specifičnost materijala kojim je izrađena, odlučeno je pristupiti njezinoj obradi. Iako je restauratorska praksa raznovrsna, u njoj se često određeni postupci ponavljaju na različitim predmetima, što za restauratora predstavlja niz repetitivnih radova. Prezentirano istraživanje i rad na slici izrađenoj kosom bilo je ne samo izazov za restauratorsku struku već i osvježenje zbog rijetkosti takvih predmeta, odnosno mogućnosti dobivanja novih saznanja i istraživanja novih metodologija rada.

Nakon restauratorskih zahvata slici je vraćen originalni sjaj i zaključujemo da je sav trud pri obradi i restauraciji slike pravilno uložen.

was stored in a difficult to reach place in the museum's storage area and bore no label. Given the beauty of the picture's motif, however, and the specific nature of the material of which it is made, it was decided that it be subjected to treatment. Although restoration practice is diverse, there are certain procedures that are repeated on various artefacts that, for the restorer, constitute a series of repetitive actions. The research and work on the hairwork picture presented here were not only a challenge from the aspect of the restoration profession, but also in a way refreshing because of the rarity of these kinds of objects and in terms of the opportunity to acquire new insight and to research new work methodologies.

Following the restoration intervention the picture was restored to its original radiance and we can conclude with the conviction that the effort made in the treatment and restoration of the picture was well invested.

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