



Drvene romaničke vratnice splitske katedrale
istraživanje, restauriranje i zaštita

Wooden Romanesque Doors of the Split Cathedral
Research, Conservation and Protection

Izdavač:
Hrvatski restauratorski zavod

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Tisak:
Novi val d.o.o.

Naklada:
500 primjeraka

ISBN: 978-953-7389-26-0 / CIP zapis dostupan je u računalnom katalogu
NSK u Zagrebu pod brojem 000995584

Split, svibanj 2018.

Publisher:
Croatian Conservation Institute

For the publisher:
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Editors:
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Design:
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Printed by:
Novi val d.o.o.

Copies:
500

ISBN: 978-953-7389-26-0 / CIP: 000995584

Split, May 2018

Hrvatski restauratorski zavod / Croatian Conservation Institute
Institut za povijest umjetnosti - Centar Cvito Fisković / Institute of Art History - Cvito Fisković Centre

Međunarodni skup, 8. svibnja 2018. / International conference, May 8th 2018
Izložba, 8. svibnja - 8. lipnja 2018. / Exhibition, May 8th – June 8th 2018
Galerija umjetnina, Split / Museum of Fine Arts, Split

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Tajana Pleše

U Europskoj godini kulturne baštine, kojoj je jedan od glavnih ciljeva slaviti, razumijevati i štititi jedinstvenu vrijednost bogate i raznovrsne kulturne baštine, Hrvatski restauratorski zavod i Institut za povijest umjetnosti – Centar Cvito Fisković dobili su jedinstvenu priliku predstaviti izložbom i znanstveno-stručnim skupom dojmljive nove zaključke o jednom od iznimnih umjetničkih djela – Buvinim vratnicama. Poticanjem na interdisciplinarnu suradnju, produbili smo spoznaje o toj splitskoj raskošnoj riznici umjetničkog stvaralaštva 13. stoljeća. Povezivanjem tih novih saznanja s onim međunarodnim, Buvinine su vratnice smještene u širi europski kontekst. Ukupnost svih spoznaja o tom simbolu Splita, čvrsto ukorijenjenom u bogatu umjetničku povijest samoga grada, upućuje na važnost kulturne baštine u identitetu jednog naroda, potičući nas na promišljanje o mjestu koje ona zauzima u našim životima.

During the European Year of Cultural Heritage, focused on celebrating, understanding, and protecting the unique value of rich and diverse cultural heritage, the Croatian Conservation Institute and the Institute of Art History – Cvito Fisković Centre were given an exceptional opportunity to present new and impressive results about one outstanding work of art, Buvina's door, through an exhibition and a scientific conference. By encouraging interdisciplinary cooperation, we have expanded our understanding of the splendid Split treasury of 13th-century artistic production. Through contextualising new findings with international examples, Buvina's door was placed in a wider European context. The sum of knowledge about this symbol of Split, firmly rooted in the city's rich art history, highlights the importance of cultural heritage for the identity of a nation, encouraging us to consider its place in our everyday lives.

Joško Belemarić

Na dan svetkovine sv. Jurja, 23. travnja 1214. godine, splitska katedrala dobiva pozlaćene vratnice koje je izradio Andrija Buvina – *pictor de Spaleta*, kako ga se naziva u jednom dokumentu. A da je Buvina zaista bio i slikar, svjedoči spomen freske s prikazom sv. Kristofora, što ju je naslikao u Protironu ponad Peristila. Na dva krila vratnica niže se po sedam parova udubljenih četvornih polja s prizorima iz evanđelja, života i muke Kristove, od *Blagovijesti* do *Uzašašća*. Prizori iz ciklusa Kristova djetinjstva i javnog djelovanja spuštaju se na lijevoj strani odozgo prema dolje, dok se prizori muke i smrti uzdižu na desnoj strani redom od dna do vrha. Tako su vjernici bez truda i prekida, kao u nekoj gigantskoj knjizi, pratili Kristov život. Zajednički ikonološki nazivnik cjeline mogao bi upućivati na njihov antiheretički karakter, na što nas navodi zapis splitskoga srednjovjekovnog kroničara Tome Arhiđakona, da je nadbiskup Bernard – koji je zacijelo koncipirao program vratnica – bio izravno zadužen za organiziranje antipatarenske kampanje u Dalmaciji i Bosni te da je napisao *Compilatio contra hereticos*.

Ova izložba ne priča samo o Buvininu velebnom djelu, nego i o kompleksnim restauratorskim radovima koje je proveo restaurator Švimberský 1908. godine pod paskom konzervatora Centralne komisije u Beču i don Frane Bulića, njihova povjerenika u Splitu. Danas, nakon „restauracije restauracije“ koje se posljednjih nekoliko godina prihvatila Žana Matulić-Bilač (konzervator-restaurator savjetnik u Hrvatskom restauratorskom zavodu), možemo razumjeti po čemu je taj zahvat bio istinski međaš suvremene restauratorske prakse, ali i u kolikoj mjeri nam je ograničio mogućnost doživljaja originalne polikromije koja je cjelini vratnica i svakom figuralnom polju davala karakter monumentalnog reljefnog tepiha, te koliko nam je umanjio osjećaj izvornog plasticiteta Buvinina kiparskog duktusa. Današnje restauratorske metode omogućavaju da dođemo do vjerodostojnih virtualnih rekonstrukcija i da shvatimo stvarne zanatske i umjetničke domete Andrije Buvine. Cijeli kaleidoskop novih spoznaja koje se podastiru ovom izložbom potvrđuju davno izrečenu tvrdnju Maxa Dvořáka da su Buvinine vratnice u europskoj romaničkoj umjetnosti unikum i jedan od najvažnijih dokumenata za povijest srednjovjekovne plastike uopće.

On 23rd April 1214, the Feast of St. George, Split Cathedral received the gilded door created by Andrija Buvina – *pictor de Spaleta* (as he is called in one document). The fact that Buvina was also a painter is confirmed by a mention of a fresco depicting St. Christopher which he painted in the Protiron above the Peristyle. There are seven pairs of indented rectangular fields with scenes from the Gospels, life and suffering of Christ (from *Annunciation* to *Ascension*) on the two wings of the door. Scenes from Christ's childhood and work go from the top to the bottom on the left side, and scenes of death and Passion from the bottom to the top on the right, so worshipers could, without effort or interruption, follow the life of Christ like reading from a giant book. The common iconological denominator of the entire door might point to its antiheretical character, indicated by the medieval chronicler Thomas the Archdeacon from Split, who said that Archbishop Bernard – who must have designed the door – was directly responsible for organizing a campaign in Dalmatia and Bosnia against the patarenes, and wrote *Compilatio contra hereticos*.

This exhibition does not only tell the story of Buvina's masterpiece, but also about the complex restoration carried out by conservator Švimberský in 1908 under the watchful eye of the conservator of the Central Committee in Vienna and Frane Bulić, their commissary in Split. Today, after "the restoration of the restoration", taken up by Žana Matulić-Bilač (consultant conservator-restorer at the Croatian Conservation Institute) during the last few years, we can understand why this operation was a true milestone of contemporary restoration practice, as well as to what extent it limited our experience of the original polychromy which gave the entire door and every figural field the character of a monumental relief tapestry, and how it diminished the original plasticity of Buvina's sculptural oeuvre. Contemporary restoration methods enable us to achieve credible virtual reconstructions and understand the real craftsmanship and art of Andrija Buvina. The entire kaleidoscope of new findings presented in this exhibition confirms Max Dvořák's longstanding statement that Buvina's door is unique in European Romanesque art and one of the most important documents for the history of medieval sculpture in general.

Splitska katedrala sv. Dujma – drvene vratnice Andrije Buvine (1214.)

Split Cathedral of St. Domnius – Andrija Buvina’s Wooden Door (1214)

Tehnički podaci

Dimenzije: 525,3 x 356 x 13,2 cm

Površina: 18,7 m²

Ukupna razvijena ploha rezbarija vratnica: oko 57 m²

Težina vratnica: oko 1210 kg prije restauriranja 1908. (danas oko 1500 kg)

Elementi konstrukcije: 380 (sačuvano 374)

prednji dio konstrukcije: 346 elemenata (340 sačuvano)

srednji dio konstrukcije: 34 elementa

poledina (izvorna): 16 (?) komada (nije sačuvana)

Materijali: drvo, željezo, polikromija

Drvo: orah (*Juglans L.*), hrast (*Quercus L.*), ariš (*Larix europaea*)

Ostalo: željezni čavli - 5-9 x 0,6 x 1,6 cm: 632 komada izvorno (jedan sačuvan)

drveni čavli (okviri) - 2 x 0,3 cm: 366 komada izvorno (pet sačuvano)

Tehnike obrade drva: cijepanje, sječenje, tesanje, piljenje, blanjanje, rez-barenje, dubljenje

Tehnika završne obrade: impregniranje, prepariranje, pozlaćivanje i bo-jenje (oslikavanje)

Preperacija: kreda, gips, olovna bijela

Vezivo: tutkalo i žumanjak

Detektirani pigmenti: cinober, olovna bijela, minij, indigo, azurit, ugljena crna, smeđi i crveni željezni oker, crveni lak, orpiment

Ikonološki program

Blagovijest, Kristovo rođenje, Put triju kraljeva, Poklonstvo triju kraljeva, Pokolj nevine djece, Bijeg u Egipat, Prikazanje u hramu, Krštenje Kristo-vo u Jordanu, Svadba u Kani, Iskušavanje Krista u pustinji, Ozdravljenje opsjednutoga iz Gerase, Krist i Samarijanka, Ozdravljenje slijepca od ro-đenja, Uskrisenje Lazarovo, Poslanje 72 učenika, Krist tuguje nad Jeruza-lemom, Ulazak u Jeruzalem, Posljednja večera, Pranje nogu učenicima, Krist na Maslinskoj gori, Judin poljubac, Krist pred Pilatom, Bičevanje Kri-stovo, Raspeće, Skidanje Krista s križa, Polaganje Krista u grob, Silazak Krista u pretpakao, Kristovo uzašašće

Technical inforamtion

Dimensions: 525.3 x 356 x 13.2 cm

Surface: 18.7 m²

Total carved surface: around 57 m²

Door weight: around 1210 kg before the 1908 restoration (today around 1500 kg)

Construction elements: 380 (374 preserved)

front part of the construction: 346 elements (340 preserved)

middle part of the construction: 34 elements

back (original): 16 (?) pieces (not preserved)

Materials: wood, iron, polychromy

Wood: walnut wood (*Juglans L.*), oak wood (*Quercus L.*), larch wood (*Larix europaea*)

Other: iron nails - 5-9 x 0.6 x 1.6 cm: 632 original pieces (one preserved)
wooden nails (frames) - 2 x 0.3 cm: 366 original pieces (five preserved)

Woodworking techniques: splitting, cutting, trimming, sawing, planing, carving, gouging

Finishing techniques: impregnation, preparation, gilding and painting

Preparation: chalk, plaster, white lead

Binder: animal glue and egg yolks

Detected pigments: vermilion, white lead, red lead, indigo, azurite, char-coal black, brown and red iron ocher, red varnish, orpiment

Iconographic compositions

Annunciation, Nativity of Jesus, Journey of the Magi, Adoration of the Magi, Massacre of the Innocents, Flight into Egypt, Feast of the Presentation of Our Lord Jesus, Baptism of Jesus in the Jordan River, Marriage at Cana, Temptation of Christ, Exorcism of the Gerasene Demoniac, Jesus and the Samaritan Woman, Healing the Man Blind from Birth, Raising of Lazarus, Mission of the 72 Disciples, Jesus Grieves over Jerusalem, Jesus’ Triump-hant Entry into Jerusalem, Last Supper, Washing the Feet of the Apostles, Agony in the Garden, Kiss of Judas, Christ before Pilate, Flagellation of Christ, Crucifixion, Descent of Christ from the Cross, Entombment of Christ, Christ’s Descent into Limbo, Ascension

Tehnike i materijali u oslikavanju vratnica

Preparacija: olovna bijela

Vezivo: proteinsko

Inkarnat: olovna bijela, cinober

Zelena draperija: azurit, ugljena crna, orpiment, indigo, smeđi oker

Crvena draperija: cinober, olovna bijela i crveni lak

Zlato na smeđoj: smeđa podloga, zlato

Polikromija vratnica

Fotografije vratnica snimljene prije restauriranja 1908. godine, premda crno-bijele, jasno govore o bogato nataloženim povijesnim slikanim slo-jevima. Odlukom o njihovu uklanjanju u restauratorskim radovima 1908. godine i upotrebom metalne nazubljene alatke za taj posao, do današ-njega su vremena stigle tek čestice izvorne boje, koje su detektirane mi-kroskopima, a uzorci obrađeni u laboratoriju Hrvatskog restauratorskog zavoda i Tehničkog sveučilišta u Münchenu. Virtualno su mogle biti re-konstruirane tek tri kasete, ali su istražene osobitosti slikarstva vratni-ca: punila i vezivo, paleta pigmenata te tehnike slikanja i pozlaćivanja.

Techniques and materials used for painting the door

Preparation: white lead

Binder: protein based

Carnation: white lead, vermilion

Green drapery: azurite, charcoal black, orpiment, indigo, brown ochre

Red drapery: vermilion, white lead, red varnish

Gold on brown: brown base, gold

Door polychromy

Photographs of the door taken before the 1908 restoration, though black and white, clearly show centuries of rich painted layers. Because of the decision to remove the layers during the 1908 restoration using a metal notched tool, today we only have traces of the original color, detected by microscopes and analyzed at the laboratory of the Croatian Conserva-tion Institute and the Technical University of Munich. Only three cassettes could be virtually reconstructed, but painting characteristics on the door were thoroughly researched – fillers and binder, pigment palette, and painting and gilding techniques.

Radovi na vratnicama 1908. godine

Restauration from 1908

Franko Ćorić

Donji dijelovi vratnica pokazuju sukobljene teorijske postavke onodobne zaštite spomenika. Iako u raskoraku s današnjim standardima, radovi iz 1908. godine bili su iskorak u odnosu na stilsko restauriranje. Glavni konzervator Središnjeg povjerenstva Max Dvořák htio je konsolidirati i zadržati zatečeno stanje bez, za stilsko restauriranje tipične, idealne rekonstrukcije *per analogiam*. Anton Švimberský vratnice je konsolidirao, usporio njihovo propadanje, ali i tehnološkim postupkom trajno izmijenio. Pod pritiskom lokalne sredine, predvođene Franom Bulićem, ipak je izrezbario nove, najdonje reljefne trake. Dvořák ih je kao neautentične dao prekriti poslije uklonjenim daskama.

The lower part of the door shows conflicting theories on monument protection at the time it was restored. Even though they differ from today's standards, the 1908 restoration was a significant progress compared to style restoration. The head conservator of the Central Commission, Max Dvořák, wanted to consolidate and maintain the existing condition without the ideal *per analogiam* reconstruction typical for style restoration. Anton Švimberský consolidated the door, slowed down its decay, but also significantly altered it through technological processes. Under the pressure of the local community, led by Frano Bulić, he still carved new relief bands at the bottom of the door. As they were not authentic, Dvořák had them covered with planks which were later removed.



Konzervatorsko-restauratorski radovi (2014. - 2018.)

Conservation and Restoration (2014 - 2018)

Žana Matulić Bilač

Prvotno koncipiran kao jednogodišnji restauratorski program Hrvatskog restauratorskog zavoda, istovremen s obilježavanjem 800. godišnjice nastanka vratnica, postupno je proširen u projekt koji je rezultirao nizom spoznaja. Izvor proučavanja nisu bile samo današnje vratnice, nego više njihova 64 segmenta iz depoa Muzeja grada Splita, kao i nacrti iz Arheološkog muzeja u Splitu te dosjei o zahvatu na vratnicama iz 1908. godine.

Najveći dio radova na vratnicama odnosio se na površinsko čišćenje, pri čemu se slijedilo načelo sukcesivnosti: od suhog k mokrom (u šest do osam sljedova), od blažeg k jačem, te od manjeg k većem pritisku, integrirajući kemijski i fizikalni aspekt čišćenja u cjelinu. Naposljetku je zatečeni lak restauriran nanošenjem čistog otapala. Ostale stavke radova bile su: fumigacija, učvršćenje segmenata te rekonstrukcija radova iz 1908. godine. Zbog velike površine vratnica (više od 56 m² razvijene plohe) te radovima u jeku restauriranja katedrale, radovi su se provodili u bitno otežanim uvjetima.

Initially conceived as a one-year restoration program of the Croatian Conservation Institute, in the year of the 800th anniversary of the construction of the door, it was gradually expanded into a project that led to a series of discoveries. The research did not solely focus on the door as they are today, but also on the 64 segments from the depot of the Split City Museum, as well as drawings from the Split Archaeological Museum and files on the 1908 restoration.

Most of the work on the door dealt with surface cleaning based on the succession principle: from dry to wet (six to eight times), mild to stronger, and from low to high pressure, integrating the chemical and physical aspect of cleaning. Finally, the varnish was restored by applying a clean solvent. Other work included fumigation, strengthening segments and reconstructing the work carried out in 1908. Due to the large surface of the door (more than 56 m² of developed surface), and work at the time when the cathedral was being restored, the work was carried out under difficult conditions.



Obrada drva u srednjovjekovnoj Dalmaciji

Woodworking in Medieval Dalmatia

Igor Fisković

Vrsnoću naše srednjovjekovne baštine podjednako su obilježile umjetni-ne izrađene u kamenu i drvu. Velebne vratnice majstora Buvine i korske klupe u splitskoj prvostolnici antologijska su djela u europskim okvirima. Stotine pisanih dokumenata svjedoče o tome kako su se duž hrvatske obale rezbari udruživali sa slikarima na izradi romaničkih i gotičkih poliptiha, raspela, korskih sjedala, drvenih stropova. Ponajbolji pak slikari 15. stoljeća, poput Blaža Jurjeva Trogiranina ili Dujma Vučkovića Splićanina, ostavili su odlična djela u rezbarenim okvirima. Dubrovčani Stjepan Ugrinović i Petar Radojković izvozili su ih u Italiju, dočim su zauzvrat Petar de Riboldis iz Milana i Andrea da Murano franjevcima u Zadru i Puli izradili monumentalne figuralne i pozlaćene oltare. Za sakristiju trogirske katedrale Grgur Vidov izrezbario je ormar s intarzijama vrhunske zanaatske perfekcije, a Zadranin Ivan drvorezbarskim se umijećem istaknuo u dekoriranju Duždeve palače u Veneciji. No najveću je slavu postigao Splićanin Juraj Petrović, inače kanonik katedrale, s desetak uprizorenja Krista na križu (1441.-1478.), dojmjljive gotičke ekspresivnosti. Arhivske isprave otkrivaju pak stotine imena domaćih majstora, čija djela, u tako osjetljivom materijalu, nisu preživjela minula stoljeća, svjedočeći o tome kako je Dalmacija bila zemlja kamena, ali i drva.

The splendor of our medieval heritage is equally marked by stone and wood artwork. The grand door made by Buvina and the choir benches in the Split cathedral are anthological works in the European framework. Hundreds of written documents testify that carpenters and painters from the Croatian coast worked together to construct Romanesque and Gothic polyptychs, crucifixes, choir benches, and wooden ceilings. The best painters of the 15th century, like Blaž Jurjev from Trogir or Dujam Vučković from Split, left excellent works in carved frames. Stjepan Ugrinović and Petar Radojković from Dubrovnik exported them to Italy, and in turn, Petar de Riboldis from Milan and Andrea da Murano made monumental figural and gilded altars for Franciscans in Zadar and Pula. For the sacristy of the Trogir cathedral, Grgur Vidov carved a cabinet with inlays of the highest craftsmanship, and Ivan from Zadar distinguished himself as a craftsman working on the ornaments of the Doge's Palace in Venice. But the greatest glory was achieved by Juraj Petrović from Split, canon of the cathedral, with around 10 portrayals of the crucifixion (1441-1478) with impressive Gothic expressiveness. Archival documents reveal hundreds of names of local masters, whose work was made out of delicate material and did not survive, testifying that Dalmatia was a country of stone as well as wood.





Splitska katedrala: od mramora do pozlaćenog i obojenog drva, i natrag

Split Cathedral – From Marble to Gilded and Painted Wood, and Back

Josip Belamarić

Od pozlaćenih vrata Andrije Buvine i korskih klupa do galerija na dva reda stupova mauzoleja, drvo se u splitskoj prvostolnici oglašavalo poput galije na valovima – škripom. U tijesnom prostoru Dioklecijanove rotunde, koja je 1500-ih godina dobila izgled sakralnog Globe teatra, sve je bilo u međusobnom kontaktu. Katedrala je ostala velikim dijelom označena drvenom građom sve do 1880-ih godina, kad je provedena radikalna purifikacija njezina interijera.

No u fokusu izlaganja bit će nova zapažanja o Buvinim vratnicama. Prilog će dodati nove argumente tvrdnjama o Buvini kao originalnom umjetniku, čije djelo predstavlja onakvu umjetnost kakvu je u osvit 13. stoljeća mogla dati domaća sredina u Dalmaciji, prije nego što će romanička skulptura Splita i Trogira, par desetljeća kasnije, biti obnovljena svježim impulsima iz Italije. Lokalni ferment u oblikovanju Buvinina stila moguće je danas još bolje objasniti, osobito nakon nedavnog iznenađujućeg autorova otkrića djela Buvininih suvremenika, braće Mateja i Aristodija. Razmatrat će se i neka pitanja tehnike oblikovanja i montaže, izvornog položaja i funkcije vratnica, njihova odnosa prema izvornom portalu Dioklecijanova mauzoleja, njihova ukupnog izgleda te izvora pojedinih motiva i, općenito, Buvinina stila.

From Andrija Buvina's gilded door and benches for the choir to the gallery on two rows of columns in the mausoleum, the wood in the Split Cathedral creaks like a galley on the open sea. In the small space of Diocletian's rotunda, reconstructed in the 1500s to look like a sacral Globe Theatre, everything was in direct contact. The cathedral remained largely marked with woodwork until the 1880s, when a radical purification of its interior was carried out.

This presentation will focus on new observations on the Buvina door. The appendix will add new arguments to support Buvina as an original artist whose work is the kind of art that came from the Dalmatian middle-class in the 13th century before, a few decades later, the Romanesque sculptures in Split and Trogir were restored with fresh influences from Italy. Local impact on the development of Buvina's style can be even better explained today, especially after a surprising discovery of works by Buvina's contemporaries, brothers Matej and Aristodij. The issues concerning design and assembly techniques, original position and function of the door, their relationship to the original portal of Diocletian's mausoleum, overall appearance and source of individual motifs and Buvina's style will be investigated.

Split, unutrašnjost katedrale sv. Dujma, kraj 19. stoljeća

Split, interior of the Cathedral of St. Domnius, end of the 19th century



Split, Buvinine vratnice, detalj s prikazom *Raspeća*, stanje prije obnove 1908. godine

Split, Buvina's door, *Crucifixion*, a detail before the 1908 restoration



Drvene romaničke vratnice splitske katedrale – istraživanje, restauriranje i zaštita

Romanesque Wooden Door of the Split Cathedral – Research, Conservation and Protection

Žana Matulić Bilač

Upravo dovršen četverogodišnji konzervatorsko-restauratorski projekt Hrvatskog restauratorskog zavoda, u čijem su fokusu monumentalne romaničke drvene vratnice splitske katedrale, od nastanka do danas ugrađene u antički portal nekadašnjeg Mauzoleja, odnosi nas uz pomoć raznih medija izravno u svijet gradbenih materijala 13. stoljeća u Splitu: svijet konstruiranja, izrade i oblikovanja 380 segmenata vratnica spojenih u cjelinu sa 632 kovana i 732 drvena čavla, ali i u svijet materijala, recepata i tehnika njihova prepariranja, oslikavanja i pozlaćivanja. Zbrajanjem takvih pojedinačnih tehničkih podataka uspjeli smo današnju sliku vratnica, koja je postala svojevrsna ikona, zamijeniti novom, sasvim imaginarnom, ali stvarnijom, istinitijom i točnijom.

Slika koju donosimo jednostavna je, ona predstavlja oslikanu skulpturu, jedinstvo slike i kipa tako svojstveno romaničkoj umjetnosti, ali ovdje trajno nestaloj u nizu provedenih restauratorskih postupaka A. Švimberskog 1908. godine, koji ih je transformirao optički, fizički i kemijski, uklanjajući pritom njihovu polikromiju, a kovane čavle zamjenjujući mesinganim vijcima.

Višemesečno detektiranje sićušnih ostataka preostale polikromije i njihovo analiziranje, proučavanje tragova na 65 segmenata od 114 ispiljenih u restauriranju vratnica 1908. (i zamijenjenih replikama), analiza 15 fotografija koje je snimio bečki fotograf J. Wlha, zatim kronologije radova rekonstruirane na temelju dosjea o toj obnovi koji se čuvaju u Hrvatskom državnom arhivu u Zagrebu, nedavno otkrivenih restauratorskih nacрта iz Arheološkog muzeja u Splitu koji ih dopunjavaju, te na temelju svega posvećenom traganju i obradi materijala istovremeno sa samim restauriranjem - nastala je nova slika vratnica o kojoj danas govorimo.

Konzervatorsko-restauratorski dio projekta na vratnicama koji se provodio istovremeno, *in situ*, bio je fokusiran na uklanjanje nataloženog materijala od 1908. godine do danas, na njihovu forenzičku analizu, da bi se spoznali uvjeti u kojima se od tada, a i danas nalaze, ponajprije kao sakralni spomenik koji više od 800 godina živi u kontekstu svojega nastanka i svoje liturgijske funkcije, ali i kao fizički dostupan izložak unutar malog prostora ulazne niše katedrale, vrlo zanimljiv nebrojenim turistima koji pohode tipični mediteranski grad koji se transformira u jeku turističkoga *booma*.

Na ulazu u katedralu, ugrađene u unutarnji okvir kamenog portala, od vanjskih uvjeta zaštićen drvenim vratima iz 1910. godine i zavjesom, vratnice se nalaze izravno izložene prvom i posljednjem pogledu posje-

The recently completed four-year-long conservation and restoration project of the Croatian Conservation Institute, which focused on the monumental Romanesque wooden door from the Split Cathedral that was still in its original position in the Roman portal of a former Mausoleum, transports us through various mediums directly to the 13th-century world of building materials in Split. It was a world in which 380 door segments were joined together with 632 iron and 732 wooden nails, but also a universe of materials, recipes, and techniques of preparation, painting, and gilding. By summing up this type of technical data, we are able to offer a new, completely imaginary, but more realistic, truthful and exact interpretation of the door.

Our interpretation is simple, it represents a painted sculpture, a unity of painting and sculpture characteristic of Romanesque art that has been lost in a series of previous restorations by A. Švimberský in 1908, who optically, physically, and chemically transformed it, removing its polychromy and replacing iron nails with brass screws.

It took several months of detecting tiny remains of original polychromy and analysing them, studying traces found on 65 out of 114 segments that have been removed (and replaced with replicas) during the 1908 restoration, inspecting 15 photographs by a Viennese photographer J. Wlha, researching chronology of previous restoration based on documents from the Croatian State Archives in Zagreb, reviewing recently discovered conservation plans from the Split Archaeological Museum, and exploring and working with materials concurrently with the conservation to create a new interpretation of the door.

Conservation and restoration part of the project, done *in situ*, focused on the removal of deposited material from 1908 till the present, on its forensic analysis to understand the environmental conditions since it is a sacred monument used for more than 800 years, easily accessible within a small space of the entry niche of the cathedral to interested tourists visiting a typical Mediterranean city that was transformed during the tourist boom.

At the cathedral entrance, set in an inner frame of a stone portal and protected from the elements by wooden doors from 1910 and a curtain, Buvina's door are the first and last object that visitors see, and often touch, resulting in layers of vax, cream, and various other impurities.

The cleaning of the door was done in sequences that included around ten dry cleaning processes, then cleaning using various types of ionized wa-

tilaca toga prostora, a vrlo često i dodiru, čime se nanose slojevi voska, krema i različitih nečistoća.

Čišćenje vratnica obavljalo se u sljedovima od desetak restauratorskih postupaka suhog čišćenja, zatim čišćenja ioniziranim vodama različitih kemijskih svojstava uz ispiranje deioniziranom vodom, slijedeći načelo postupnosti, minimiziranja vlaženja i pritiska. Naposljetku je očišćena površina, odnosno lak iz 1908. godine, restauriran nanošenjem čistog otapala, čime mu je vraćen optički efekt i izvorna restauratorova zamisao.

Gledajući u cjelini, radovi su od 2014. do 2018. godine bili koncipirani kao „restauriranje restauriranog“ A. Švimberskog. Fumigacijom vratnica, koja je kao i sam rad provedena *in situ*, zaustavljena je aktivnost drvnih insekata koja je detektirana samo u drvu iz 1908. godine. Analize izotopa ¹⁴C provedene su na četiri uzorka te su postavljena nova pitanja o dataciji gradbenog i konstrukcijskog sklopa. Identifikacija drva hrasta (*Quercus L.*) za izradu osnovne rešetke vratnica, a oraha (*Juglans regia L.*) za rezbarene trake i figuralne reljefe omogućila je praćenje porijekla i upotrebe toga drva u umjetnosti Europe i Mediterana, a detektiranje tragova više od 25 alatki kojima su vratnice istesane i izrezbarene, potaknula nas je na popisivanje alatki za obradu drva na području Dalmacije od rimskog do industrijskog doba. Detekcija vrsta punila i palete pigmenata Andrije Buvine, koji se u zapisu (uz dataciju vratnica u 1214. godinu) naziva *pictor de Spaleta*, otvorila je sasvim nova područja istraživanja romaničkog slikarstva u Splitu i u Dalmaciji, dijelom se nadovezujući na ranija djela, a dijelom otvarajući sasvim nove poveznice serijom paralelnih, malih analitičkih cjelina srodnih djela iz toga vremena.

Radovi na vratnicama odškrinuli su niz novih područja istraživanja naše srednjovjekovne umjetnosti, ali su već sada doveli u naš moderni svijet novu ikonu, virtualnu, ali satkanu u cjelinu od niza istinitih, znanstvenih spoznaja.

ter with different chemical properties, and rinsing with deionised water, following the principle of gradual cleaning, minimizing the wetting and pressure. In the end, the cleaned surface, i.e. the varnish from 1908, a clean solvent was applied, restoring the original optical effect and restoration idea.

Conservation that lasted from 2014 to 2018 was imagined as “the restoration of the restored” by A. Švimberský. Insect activities, detected only in wood from 1908, were stopped by fumigating the door *in situ*. The analysis of the ¹⁴C isotope was done on four samples, which raised new questions about the date of the door. The identification of oak (*Quercus L.*) used as material for the construction of the basic grid of the door, and walnut (*Juglans regia L.*), used for the carved bands and figural reliefs, enabled us to track the origin and use of that wood in European and Mediterranean art, while detecting more than 25 different tool marks encouraged us to document woodworking tools used in Dalmatia since the Roman period. Detecting the composition of fillers and pigments used by Andrija Buvina, recorded in a document as the *pictor de Spaleta* (and 1214 as the date the door was constructed), revealed new areas of research of Romanesque painting in Split and Dalmatia, partially adding to earlier works, but also providing new links to smaller parallel analytical units of similar works from the period.

Conservation and restoration of Buvina's door revealed new areas of research of Croatian medieval art and recreated an old icon into a new, virtual one, based on new scientific discoveries.

Split, Buvine vratnice, desno krilo, detalj nakon konzervatorsko-restauratorskih radova

Split, Buvina's door, right wing, a detail after conservation and restoration



Split, Buvine vratnice, detalj prije i poslije radova

Split, Buvina's door, detail before and after conservation and restoration



Split, Buvine vratnice, stanje 1899. godine i virtualna rekonstrukcija oslika

Split, Buvina's door, from 1899 and visual reconstruction of the painted layer



Teorijski aspekti konzervatorskog koncepta za Buvinine vratnice iz 1908. godine

Theoretical Aspects of the Conservation Concept from 1908 for Buvina's Door

Franko Ćorić

Antonin Švimberský (1863.-1945.), profesor na strukovnoj školi za drvenu tehnologiju u češkom Chrudimu, restaurirao je od srpnja do prosinca 1908. godine monumentalne romaničke vratnice splitske katedrale. Radovi iz 1908. godine, iako u raskoraku s današnjim standardima, predstavljaju povijesnu prekretnicu, iskorak u odnosu na stilsko restauriranje. U želji da u drveno-tehnološkom smislu konsolidira vratnice, Švimberský ih je međutim tehnološkim postupkom i trajno izmijenio, dok donji dijelovi vratnica pokazuju sukobljene teorijske postavke onodobne zaštite spomenika. Radovi na vratnicama obilježeni su trokutom između uvriježene prakse stilskoga restauriranja, potrage za metodologijom nove, konzervatorske teorijske paradigme u zaštiti kulturne baštine (tzv. *Moderne Denkmalpflege*), te osobnih preferencija i shvaćanja samoga Švimberskoga, ali vrlo vjerojatno i praktičnim i pragmatičnim rješenjima unutar enormnog posla izvedenog u pet mjeseci.

Glavni konzervator bečkoga Središnjeg povjerenstva Max Dvořák ujesen 1907. godine pregledao je vratnice koje su u vrijeme radova u i na katedrali preventivno bile pohranjene u krstionici te je u veljači 1908. godine koncipirao konzervatorske smjernice. Smatrao je da njihov status jednoga od najvažnijih spomenika dalmatinske srednjovjekovne skulpture, poznatog i izvan granica monarhije, zahtijeva radikaln konzervatorski pristup, samo nužno uklanjanje oštećenja i ne dopušta nikakve dopune. Valjalo ih je stoga konsolidirati, spriječiti širenje crvotočine i usporiti propadanje. Htio je spriječiti za stilsko restauriranje tipične idealne rekonstrukcije analogijom i hinjenja povijesnosti iza kojih su se krila popravljjanja, dopunjavanja i modificiranja autentičnih spomenika zbog osobnih koncepcija ili preferencija restauratora, što je u pravilu značilo visoku dozu subjektivnosti i čak umjetnički koncept. Stoga se, kao i Alois Riegl, zalagao za sudjelovanje povjesničara umjetnosti i tehničara na štetu umjetnika u radovima na kulturnim dobrima, a time i za stvaranje osnova za novu, konzervatorsku profesiju.

Švimberský se našao u procijepu između Dvořákova konzervatorskog načela minimalne intervencije, zabrane rekonstrukcija, umjetničke slobode i obnove polikromije te pritiska lokalne sredine predvođene konzervatorom stare garde, don Franom Buličem, koja je vratnice htjela doživjeti u staroj slavi, vraćene na njihovo mjesto. Švimberský im je neuspješno predlagao izlaganje saniranih vratnica u katedralnom muzeju i izradu replike. Dvořák je zahtijevao da sanirani dijelovi izgledom zadrže alterirano zatečeno stanje, a da novi budu jasno naznačeni, čak i na štetu estetske vrijednosti. Izgubljene dijelove vratnica htio je zamijeniti jed-

Antonin Švimberský (1863 – 1945), a professor at the vocational school for wood technology in Chrudim, Czech Republic, restored the monumental Romanesque door of the Split Cathedral from July to December 1908. Restoration carried out in 1908, albeit far from modern professional standards, represents a historical milestone, different from stylistic restoration. In order to consolidate the door by using technological procedures, Švimberský had permanently altered it. Furthermore, the lower part of the door reveals conflicting theories in contemporaneous monument protection. Interventions on the door are defined by a triangle between the accepted practice of stylistic restoration, search for a new theoretical frame in conservation methodology in the protection of cultural heritage, i.e. *Moderne Denkmalpflege*, and Švimberský's individual preferences and understanding, but also practical and pragmatic solutions within the enormous amount of work carried out over a period of five months.

In Autumn 1907, the main conservator in the Viennese Central Commission Max Dvořák inspected the door, temporarily stored in the baptistery. In February 1908, he designed guidelines for conservation. He thought that, due to its status as one of the most important monuments of Dalmatian medieval sculpture, it demanded a radical approach to conservation, with only necessary restoration of the damage, without any additions. Therefore, the door needed to be consolidated, the spread of wormholes prevented and decay slowed down. He wanted to prevent ideal reconstructions through analogy and perception of history, typical for stylistic restoration, that hide repairs, fillings and modifications of authentic monuments because of personal concepts or preferences of the restorer which in turn meant a high dose of subjectivity and even artistic concept. Therefore, like Alois Riegl, he advocated for art historians and technicians to take part in restoration of cultural goods, and for the creation of a base for a new conservation profession.

Švimberský found himself in the gap between Dvořák's conservative principle of minimal intervention, banning reconstruction, artistic freedom and restoring polychromy, and the pressure of the local community led by the old school conservator don Frano Bulić, who wanted to experience the doors as they once looked and returned to their original position. Švimberský urged them to exhibit the renovated door in the cathedral museum and construct a replica, but his proposition was not accepted. Dvořák demanded that the reconstructed elements retain the altered existing appearance, and for the new ones to be clearly marked, even to

Split, Buvinine vratnice, detalj nakon intervencije
Maxa Dvořáka

Split, Buvina's door, a detail after Max Dvořák's
intervention

nostavnim novim daskama. Lokalna sredina odgojena u duhu stilskoga restauriranja to nije prihvaćala pa je na njezin zahtjev Švimberský počeo s rezbarenjem novih, krajnje donjih reljefnih traka. Dvořák ih je uskoro dao prekriti daskama koje su nakon Drugog svjetskog rata uklonjene. Na pojedinim su mjestima nađena kompromisna rješenja umetanjem reljefnih traka u nove daske. Komade crvotočnog drveta i stare hrastovine Švimberský je bio pohranio u Arheološkom muzeju u Splitu radi „budućih tehničko-arheoloških studija“.

the detriment of the aesthetic value. He wanted to replace the missing parts of the door with simple new boards. The local community, raised in the spirit of style restoration, did not accept it, and asked Švimberský to carve a new, extremely low relief bands at the very bottom of the door. Dvořák soon covered them with boards which were removed after World War II. In some places, compromise solutions were found by inserting relief bands into new boards. Švimberský stored pieces of wormwood and old oak in the Split Archaeological Museum for "future technical-archeological research".



Drvene vratnice iz bazilike sv. Sabine – u iščekivanju obnove

The Wooden Door of Santa Sabina, Awaiting Restoration

Marisol Valenzuela

Drvene vratnice iz bazilike sv. Sabine, datirane u 5. stoljeće, još uvijek se nalaze na izvornom položaju. Otvaraju se u vrijeme posebnih svečanosti kako bi se omogućio pristup prostranom središnjem brodu bazilike sv. Sabine na brežuljku Aventin u Rimu.

Iako ih narteks dijelom štiti od vremenskih utjecaja, vrijeme i višestoljetno djelovanje čovjeka nanijelo im je znatnu štetu. Od antike do danas vratnice su preživjele mnoge prirodne katastrofe, poput požara i potresa. Osim prirodnih čimbenika, učestale su i brojne intervencije na arhitekturi bazilike. Neke od njih djelo su poznatih arhitekata, poput Domenica Fontane (1587.) i Francesca Borrominija (1647.) ili Antonija Muñoz u 20. stoljeću.

Osim dokumentiranih intervencija na vratnicama, mnogobrojne su i one nedokumentirane. Od 28 izvornih panela s prikazima scena iz Novog i Starog zavjeta, deset ih nedostaje. Izvorni slijed panela najvjerojatnije je izmijenjen, no njihov trenutni broj i poredak odgovara opisu iz najstarijih pisanih izvora koji datiraju u drugu polovicu 16. stoljeća. U 19. stoljeću paneli su uokvireni rezbarenim ukrasima.

Ministarstvo za kulturnu baštinu, aktivnosti u kulturi i turizam počelo je prve konzervatorsko-restauratorske radove 2008. godine. Radovi su nastavljeni 2011. godine intervencijom na strukturalnim aspektima potpornog sustava koji je oštećen zbog nepovoljnih mikroklimatskih uvjeta uzrokovanih starim staklenim sustavom zaštite.

Tijekom tih radova provelo se i određivanje vrste drveta od kojih su vratnice napravljene te je potvrđena usmena predaja prema kojoj su vrata izrađena od čempresa.

S obzirom na to da vratnice danas imaju prirodnu boju, buduće intervencije na rezbarenim površinama trebale bi uključiti i ispitivanje tragova polikromije. Osim toga, analiza tragova alata mogla bi odgonetnuti mogući izvorni redoslijed panela te identificirati majstore koji su sudjelovali u izradi toga jedinstvenog primjerka skulpture 5. stoljeća.

Wooden door from the Basilica of St. Sabina, dating back to the 5th century, is still in its original position. It is opened during festivities to allow access to the spacious central nave of the Basilica of St. Sabina on the Aventine hill in Rome.

Although the narthex partly protects the door from the elements, passage of time and multitude of human activities have caused considerable damage. From Antiquity to the present, the door has survived many natural disasters such as fire and earthquakes. In addition to natural factors, there were also numerous interventions on the architecture of the Basilica. Some of them were the work of famous architects such as Domenico Fontana (1587), Francesco Borromini (1647) and Antonio Muñoz (20th century).

In addition to documented interventions carried out on the door, there were many undocumented ones. Of the 28 original panels featuring scenes from the New and Old Testament, ten are missing. The original sequence of panels has been completely altered, but their current number and order corresponds with the description from the earliest written sources dating to the second half of the 16th century. In the 19th century, the panels were framed with carved decorations.

In 2008, Ministry of Cultural Heritage, Culture and Tourism started the first conservation and restoration. The work continued in 2011 with interventions on the structural aspects of the support system, damaged due to unfavorable microclimatic conditions caused by the old glass protection system.

During the work, the type of wood was also determined, confirming the oral tradition that stated cypress wood was used for the door.

Today, the door is not painted, and future interventions on carved surfaces should also search for traces of polychromy. Additionally, analysis of tool markings could identify the possible original order of panels and identify different masters involved in making this unique copy of a 5th century sculpture.

Rim, vratnice crkve sv. Sabine

Rome, wooden door from the Basilica of St. Sabina



Rim, vratnice crkve sv. Sabine, detalj

Rome, wooden door from the Basilica of St. Sabina, a detail



Romaničke drvene vratnice u crkvi sv. Marije na Kapitolu u Kölnu – stanje i teme istraživanja

Romanesque Wooden Door in the Church of St. Maria im Kapitol in Cologne – Current State of Research and Investigation Topics

Regina Urbanek

Drvena vrata s dva krila, poznata i kao *Bildertür*, u bivšoj sveučilišnoj crkvi sv. Marije na Kapitolu jedinstven su primjer figuralne umjetnosti salijskog razdoblja. Datacija vrata u vrijeme od 1045. do 1065. godine, do danas nije dovedena u pitanje. Vrata su planirana i napravljena kao glavni ulaz u crkvu i na tom su mjestu ostala do 1900. godine. Nakon restauriranja 1985. godine, vratnice su smještene unutar crkve na zapadnom dijelu južnog bočnog broda.

Izrađene su od hrastovih drvenih dasaka s 13 reljefa na svakom krilu. Reljefi su pričvršćeni čavlima i uokvireni perforiranim ukrasom i kuglicama, a sjecišta su obilježena okruglim izbočinama. Ukraša je obrubljen oslikanim natpisima i profiliranom dekoracijom. Na oba krila sačuvani su tragovi polikromije. Lijevo krilo vrata prikazuje Isusovu mladost, a desno Isusov dolazak, križni put i uskrsnuće te silazak Duha Svetoga (Duhovi).

Brojni opisi i slike s početka 19. stoljeća znak su velikog zanimanja za vrata. Međutim, izvorna polikromija – u to vrijeme već jako oštećena – otkrivena je tek kad je 1937. godine uklonjen jednobojni preslik i otkriven originalni oslik.

Sveobuhvatnim istraživanjima drvene konstrukcije i polikromije tijekom restauratorskih radova 1985. godine, postignuti su važni rezultati. Uočeno je da postoje dvije faze polikromije, izvedene u vrlo kratkom vremenu. Dok se prva faza nesumnjivo pripisuje vremenu nastanka vratnica, druga odgovara ranoj fazi rekonstrukcije ukrasa. Neki su dijelovi iznova klešani i dodani, kao i okvir s oslikanim natpisom i kuglicama. Na naknadno dodanim dijelovima postoje samo slojevi druge faze polikromije. Također, čavli iz druge faze razlikuju se od onih u prvoj fazi.

Od tada je istraživanje gotovo privedeno kraju, osim nekih manjih studija. Međutim, nedavna zapažanja i razmišljanja o vratnicama otkrivaju i proturječnosti, kao što su izvorni položaj vrata, kronologija konstrukcije i montaže te datiranje dviju faza polikromije.

Do danas ne postoji jasna razlika između dviju faza na sačuvanim dijelovima romaničke polikromije ako uzmemo u obzir dodane ukrase. U usporednom istraživanju i datiranju tih dviju faza trebali bi se uzeti u obzir kontradiktorni aspekti istraživanja o ranoj fazi izgradnje. Drugi uvjet je usporedna studija tehnika i materijala suvremene romaničke skulpture kako bi se odredio datum nastanka i istaknule veze između radionica. Neodgovorena pitanja o vratnicama odnose se na stražnju stranu, polikromiju i povijest restauriranja. Poznati su nam samo mali dijelovi sudbine vratnica tijekom Drugoga svjetskog rata.

The double wing wooden door, also known as *Bildertür*, in the former university church of St. Maria im Kapitol are a unique example of figurative art from the Salian period. The date when the door was made, between 1045 and 1065, has not been called into question. The door was planned and constructed as the main entrance to the church, and it remained in the same position until 1900. After the restoration in 1985, carried out by the State Office for the Preservation of Monuments, the door was relocated to the west end of the south aisle.

The door was made using oak boards with 13 panels with reliefs on each wing. The panels were nailed to the door and framed with perforated decorations and beaded bars with protruding knobs on the intersections. The ornament is framed with painted inscriptions and tendril decorations. Polychromy is present on both sides of the door. The youth of Christ is portrayed on the left wing of the door, and the ministry of Jesus, Passion and Resurrection, as well as the miracle of Pentecost, on the right.

Numerous descriptions and pictures from the beginning of the 19th century illustrate the high level of interest in the door. However, the original polychromy – at that time already heavily damaged – was not discovered until 1937 when the monochrome coating was removed and the original paint revealed.

Comprehensive research of wooden construction and polychromy, during the restoration in 1985, achieved important results. It became apparent that there were two phases of polychrome. It is assumed that the two phases were carried out in a very short period of time. While the first phase is undoubtedly attributed to the period when the door was built, the second phase corresponds to the early stage of decoration reconstruction when several new carved panels and borders with painted inscriptions and beaded bars were added. On the elements that were added later, only the polychromy from the second phase is present. Furthermore, the nails that were used obviously differ from the ones used before.

Since then, research has almost come to an end, except for some smaller studies. However, recent observations and reflections on the door reveal some contradictions, such as the original position of the door, the chronology of construction and assembly, and the dating of two phases of polychromy.

To date, there is no clear difference between the two phases of the preserved parts of the Romanesque polychromy if we take the added decoration into account. Comparative research and dating of the two phases



Köln, vratnice crkve sv. Marije na Kapitolu

Cologne, wooden door from the Church of St. Maria im Kapitol

of polychromy should consider the contradictory aspects in the research concerning the early stage of construction. The second condition is the comparative study of techniques and materials of contemporary Romanesque sculpture to determine the date of emergence and highlight the connections between the two workshops. Unanswered questions concerning the door refer to the reverse side, polychromy, and the history of restoration. We have very little information on the location and fate of the door during World War II.



Restauriranje srednjovjekovne drvene skulpture i iskustvo instituta Opificio delle Pietre Dure iz Firenze

Restoration of a Medieval Wooden Sculpture and Experience of the Opificio delle Pietre Dure Institute in Florence

Laura Speranza

Iskustvo i stručnost koju je stekao Odjel za restauraciju drvene plastike instituta Opificio delle Pietre Dure, omogućili su razvoj i usavršavanje istraživanja i učinkovitih, manje invazivnih tehnika.

U ovom predavanju bit će predstavljeno neuobičajeno istraživanje oslikanoga drvenog reljefa s prikazom sv. Ivana Krstitelja, koji je izrađen od orahova drva. Ta veličanstvena skulptura nalazi se u crkvi San Giovanni Maggiore, jednom od najstarijih i najvažnijih vjerskih objekata u Napulju. Bitno je napomenuti da je arhitektura crkve dugo obnavljana kako bi se popravila velika oštećenja nastala tijekom potresa. Ne samo da je skulptura pretrpjela brojne nedaće, nego je i bila predmet kontroverzi među stručnjacima. Naime, skulptura je datirana od 7. do 14. stoljeća.

Reljef je velikih dimenzija (visine 220 cm), izrezbaren iz jednog debela oraha s malim dodacima na objema stranama. Dodani dijelovi ojačani su s nekoliko slojeva slijepljenog platna od kudjelje. Zahvaljujući toj tehnici, rezbarije s desne strane reljefa dobro su sačuvane, kao i velik dio oslikanog sloja, iako su termiti i stezanje materijala uzrokovali teška oštećenja strukture drva. Na stražnjoj su strani reljefa vidljivi tragovi alata, a sačuvane su i masivne željezne kuke kojima se reljef pričvršćivao na zid.

Kemijskim analizama potvrđeno je nekoliko slojeva preslika na skulpturi. Stratigrafskom analizom identificirano je pet ili šest slojeva preslika. U najrecentnijem je presliku sv. Ivan Krstitelj preslikan u Krista Iskupitelja. Smeđe obojena kosa istaknuta pozlatom pretvorena je u Kristov crveni plašt, a prekrasan crveni ogrtač sv. Ivana Krstitelja premazan je lakom i obojen u plavo.

Izvorni oslik nije bilo moguće prezentirati jer je sačuvan u samo nekoliko fragmenata. Tijekom konzervatorsko-restauratorskih radova otkriven je jedan od najranijih slojeva koji se pretpostavljeno datira u 14. stoljeće (boja odjeće sv. Ivana Krstitelja).

Rendgenske snimke svečeve glave pokazale su da su izvorne oči bile velike i izrađene od stakla ili keramike. Oči koje su danas sačuvane napravljene su kombinacijom krede i ljepila kojom su ispunjene očne šupljine.

U ovom će predavanju biti predstavljeni dugotrajni i zahtjevni konzervatorsko-restauratorski radovi te rezultati laboratorijskih istraživanja.

The experience and expertise gained by the Department for Wooden Sculptures of the Opificio delle Pietre Dure Institute enabled the development and improvement of research and efficient, less invasive, techniques.

In this lecture, an unusual research of the painted wooden relief depicting St. John the Baptist, made of walnut wood, will be presented. This magnificent sculpture is located in the San Giovanni Maggiore church, one of the oldest and most important religious buildings in Naples. It is important to note that the reconstruction of the damage on the church, caused by a massive earthquake, took a long time. Not only was the sculpture touched by tragedy, it was also the subject of controversy among experts. In fact, the sculpture has been dated from the 7th to the 14th century.

The large relief (height 220 cm) was carved from one walnut tree with small additions on both sides. The added parts were reinforced with several layers of glued hemp canvas. Due to this technique, the carvings on the right side of the relief and a large part of the painted layer are well preserved, although termite infestation and wood contraction caused severe structural damage. Traces of carving gouges and massive iron wall hooks can be seen on the reverse side of the relief.

Chemical analyses confirmed several layers of paint on the sculpture. Stratigraphic analysis identified five or six layers of overpaint on the original layer. The most recent overpaint transformed St. John the Baptist into Christ the Redeemer. Brown colored hair, accentuated with gilding, was transformed into the red cloak of Christ, and the beautiful red cloak of St. John the Baptist was covered in varnish and colored blue.

Because only a few fragments of the original painted layer remained, it was not possible to present it. During the conservation and restoration, one of the earliest layers was brought to light, probably dating back to the 14th century (the color of St. John the Baptist's clothing).

The X-ray of the head of the saint showed that the original eyes were large and made of glass or ceramics. The eyes that have been preserved were made with chalk and glue used to fill the eye sockets.

The long and demanding conservation and restoration, and the results of laboratory research, will be presented in this lecture.

Napulj, polikromirana drvena skulptura sv. Ivana Krstitelja iz crkve San Giovanni Maggiore

Naples, polychrome wooden sculpture of St. John the Baptist from the Church of San Giovanni Maggiore



Rimski alat za obradu drva u Dalmaciji

Roman Woodworking Tools in Dalmatia

Smiljan Gluščević

Ne znamo u kakvim su točno objektima živjeli domoroci, a u kakvim najprije vojnici, potom i ostali rimski građani koji su uglavnom zbog trgovine ili kolonizacije dolazili s vojskom i nakon nje. Arheološki ostaci govore nam o manje ili više raskošnim i freskama ukrašenim građevinama i u gradu i na selu. Kao i u samom Rimu, i u provincijama je većina stanovništva morala živjeti u kućama izrađenim od drva. Od drva je bio i sav namještaj, bez obzira na to je li riječ o kućama dobrostojećih ili siromašnih građana.

Za izradu svih tih kuća, namještaja, brodova, odnosno općenito predmeta od drva, bili su potrebni obrtnici, koje su nazivali *fabri*. Vrlo su traženi bili drvodjelje i tesari (*fabri tignarii*) ili oni uže specijalizirani, poput brodograditelja (*faber navalis*). Udruživali su se u cehove – udruge, odnosno u kolegije (*collegia*).

Tijekom gotovo dva stoljeća arheoloških istraživanja u Dalmaciji mnogo se puta naišlo na različite alatke koje bi se mogle pripisati stolarskom zanatu. Nažalost, najčešće su to nalazi bez detaljnijih podataka o mjestu nalaza, s rijetkim iznimkama o, za arheologiju tako važnom, kontekstu, ponekad i bez podataka o bilo kakvoj lokaciji. Takav alat postoji u različitim muzejima na obali i u zaleđu. Unatoč znatnom broju, katkad je vrlo teško s potpunom sigurnošću kazati radi li se o drvodjeljskom ili npr. kamenoklesarskom alatu, posebice kad je riječ o teslama, s obzirom na to da su se upotrebljavale u oba zanata.

Stolari su bili dio svih rimskih postrojbi, ali u našim krajevima na nadgrobnim spomenicima nisu zabilježeni natpisi koji to izrijeком spominju. Međutim, na nekoliko takvih spomenika, posebice na onima s nekropole velikog rimskog logora u Burnu kod Kistanja (*Burnum*), sjedištu najprije rimskih legija, a poslije augsilijarnih jedinica, nalazimo prikaze različitih alata. Katkad se bez dvojbi mogu pripisati isključivo drvodjeljskom alatu, ali su kojiput prikazani i s alatkama koje su mogle služiti i u nekim drugim strukama. Takvi su alati npr. spomenuta tesla koja je služila (a i danas služi u drvenoj brodogradnji) za obradu drva, ali i za obradu kamena. O njezinu značenju i raširenosti diljem Rimskog Carstva možda posredno govori i činjenica da mnogi nadgrobni spomenici, koji nisu ni u kakvoj vezi sa zanimanjem pokojnika, u svojem zaglavlju imaju prikaz ascije u apotropejskog funkciji, dakle funkciji zaštite groba (*sub ascia deasciare*). Takvi su alati npr. kutomjer, visak ili šestar, koji su bili dio kompleta alata različitih zanatlija.

We are not sure what kinds of structures were used by indigenous people, Roman soldiers or citizens who followed the army when they came to Dalmatia. Like in Rome, most people in the provinces probably lived in wooden houses. Furniture was also made out of wood, both in wealthy and poor households.

Craftspeople, or *fabri*, were needed to construct all those houses, furniture, ships, i.e. wooden objects. There was a high demand for carpenters and woodworkers (*fabri tignarii*) or specialists, like ship builders (*faber navalis*). They formed guilds and associations, i.e. colleges (*collegia*).

For more than two centuries of archaeological research in Dalmatia, numerous tools that could be attributed to carpentry have been found. Unfortunately, they are mostly finds without detailed information about the context of their discovery. Such tools can be found in different museums along the coast and the hinterland. Despite their considerable number, sometimes it is difficult to be completely sure whether they were wood-working tools or, for example, stonemason's tools, especially in the case with adzes, used in both professions.

Carpenters were a part of all Roman troops, but there are no documented inscriptions in Croatia that specifically mention them. However, in several such monuments, especially from a cemetery of a Roman military camp *Burnum* near Kistanje, depictions of various tools were found. Sometimes they can be identified as exclusively woodworking tools, but other times they are depicted with equipment used in other professions. One such item is an adze (still used for building wooden ships) used as a tool in wood and stone processing. Its importance and distribution across the Roman Empire is evident in the fact that many funerary monuments, not related to the profession of the deceased, depicted adze in an apotropaic function, to protect the grave (*sub ascia deasciare*). Other such tools are an angle, plummet or calliper, used in different professions.

According to available data, museums in Dalmatia (especially the Split Archaeological Museum) hold a relatively large number of such tools. Most common amongst them are various axes, augers, and chisels.

The only complete tool set was found in grave 555 on a Roman cemetery in Relja in Zadar. The set dates to the turn of the 5th century. It included a tool that is almost impossible to confirm on other sites – a scraper. It is still used in the same form today and called *rašket* by shipbuilders.

Arheološki muzej Split, antička stela, detalj

Split Archaeological Museum, Roman stele, a detail

Prema dostupnim podacima, u dalmatinskim muzejima (ponajviše u Arheološkom muzeju u Splitu) nalazi se relativno velik broj takvih alatki. Među njima najčešći su različiti tipovi sjekira, svrdala, a donekle i različitih dljeta.

Jedini cjelovit komplet alata, potvrđen i arheološkim kontekstom, nađen je u grobu 555 na rimskodobnoj nekropoli na Relji u Zadru, a datiran je u prijelaz 4. u 5. stoljeće. Među alatkama se nalazi i jedna koju gotovo da i nije moguće potvrditi na drugim nalazištima – strugalica, koja se u nepromijenjenom obliku upotrebljava i danas, a u kolokvijalnom brodograditeljskom žargonu naziva se rašketa.

Među alatima nalazimo i turpiju, koja je služila za obradu i oštrenje zubaca drvodjeljske pile. Drugu turpiju polukružnog oblika koja se klasificira kao turpija za obradu drva nalazimo u Arheološkom muzeju u Splitu. Tu je i oštrica blanje koja se također ne razlikuje od današnjih, a jedina je do danas poznata u Hrvatskoj.

Jedan od najrjeđih nalaza je stolarska pila (tj. njeni ostaci), koju i u antici, ali i poslije, nalazimo prikazanu na različitim spomenicima ili dokumentima. Osam ulomaka listova pila nađeno je na različitim lokacijama tijekom recentnih istraživanja u Burnu, što potvrđuje veliku važnost drvodjelja među obrtnicima koji su bili povezani s rimskom vojskom na tako velikoj aglomeraciji kao što je vojni logor.



Other tools include a file, used for the processing and sharpening wood-working saws. Another file, semi-circular in shape, classified as a file for processing wood, can be found at the Split Archaeological Museum. The only known example of a drawing knife in Croatia, not different from modern ones, is also located in the same museum.

One of the rarest finds is a carpenter's saw (i.e. its remains) depicted on various monuments and documents from the Roman times. Eight fragments of saw blades were found in various locations during recent excavations in *Burnum*, confirming the importance of woodworkers connected to the Roman army stationed in a large military camp.

Detektirane vrste drva u dalmatinskoj umjetnosti i obrtu

Detected Wood Species in Dalmatian Art and Craft

Jelena Trajković

Nalazi drva iz pretpovijesnog razdoblja u Mujinoj pećini, datirani između 45000-39000 pr. n. e., potvrđuju da se drvo koristilo od početka civilizacije. Mnogi drveni uporabni predmeti izgubljeni su tijekom vremena, ili postoje a da nikad nisu popisani ni analizirani prema načelima konzervatorsko-restauratorske struke.

Ovaj pregled je ograničen na drveni materijal samo restauriranih predmeta. U postupku restauracije identificirano je i drvo od kojega su izrađeni. Prikupljeni su podaci o vrstama drva 33 drvena predmeta čija se starost kreće od pretpovijesti do 19. stoljeća. Nažalost, u vremenskom slijedu postoje veliki prekidi (dugi i po nekoliko stoljeća).

Starost triju od njih provjerena je i potvrđena analizom ¹⁴C. Ostali su datirani drugim metodama prihvaćenim u povijesti umjetnosti. Izrađivači tih predmeta često su nepoznati, a upotrebljavali su domaće vrste drva. Detektirane vrste drva odražavaju dostupnost drveta pogodnog za obradu ručnim alatima u to vrijeme. Drveni predmeti također pokazuju poznavanje važnih svojstava drva kao i vještine majstora-umjetnika nužne za izradu predmeta potrebne kvalitete.

Drvo u promatranim slučajevima pripada četirima četinjačama (golosjemenjače) i sedam listača (kritosjemenjače dvosupnice). Zastupljene vrste drva četinjača su jela (*Abies sp.*), ariš (*Larix sp.*), smreka (*Picea sp.*) i bor (*Pinus sp.*), a zastupljene vrste drva listača su javor (*Acer sp.*), jasen (*Fraxinus sp.*), orah (*Juglans sp.*), topola (*Populus sp.*), hrast (*Quercus sp.*), lipa (*Tilia sp.*) i vrba (*Salix sp.*). Četinjače su uglavnom korištene za konstrukcije (grede, ploče, okviri), gdje su poželjne ravne površine, dok je upotreba listača raznovrsnija, već prema razlikama u njihovoj strukturi i svojstvima. Gustoća drva je možda najistaknutije svojstvo važno za njegovu obradu. Tvrdocu drva valja sagledavati s njegovom gustoćom. Oba svojstva utječu na obradivost drva ručnim alatima i na namjenu predmeta. Pregled upućuje na odraz strukture drva na gustoću drva te na pripadajuću tvrdocu tipičnu za odabrane vrste drva. Kratko se raspravlja o tome kako moguće varijacije u strukturi drva utječu na svojstva obradivosti.

Četinjače obično rastu s izrazito ravnim i čistim deblom od zemlje do vrha krošnje. To je razlog što su četinjače prvi izbor za izradu jednostavnih i ravnih (često dugačkih) dijelova konstrukcija čije su površine glatke. Zbog dugačkih drvnih vlakanaca (stanica drva), u drvu četinjača relativno je lako postići ravnu i glatku površinu predmeta, naročito na mjestima na kojima su vlakanca ravna. Ipak, duga vlakanca lagano se začehnu rez-

The finding of wood used in prehistoric times in *Mujina pećina* (i.e. The Cave of Flies) from 45000-39000 BCE confirms that wood is used from the beginning of civilization. Many wooden artefacts have been lost through time, or they exist, but they were never listed or analysed by conservation or restoration practice.

This review is limited to wooden material of only those artefacts that came to the restoration. They were analysed and the wood they were made of was identified. The data from 33 wooden objects dating from prehistory to 19th century was collected and the species of wood was identified. Unfortunately, there are large time gaps between some of them.

The age of three among them was checked and confirmed by ¹⁴C analysis. Others were dated by other accepted methods used in the history of art. The authors of those wooden artefacts are often unknown and wood they used was native to the region. Detected species of wood reflect the availability of the wood that was suitable for conversion with hand tools at the time. Wooden artefacts also demonstrate the knowledge of important wood properties as well as the skills of master craftsmen-artists necessary for producing desired objects of required quality.

Wood in the cases of study belongs to four conifers (i.e. gymnosperms, softwoods) and to seven broadleaved species (i.e. angiosperm dycotyledon, hardwoods). Among the wood of conifers there was wood of fir (*Abies sp.*), larch (*Larix sp.*), spruce (*Picea sp.*), and pine (*Pinus sp.*), and among the wood of broadleaved trees there was wood of maple (*Acer sp.*), ash (*Fraxinus sp.*), walnut (*Juglans sp.*), poplar (*Populus sp.*), oak (*Quercus sp.*), lime (*Tilia sp.*), and willow (*Salix sp.*). Softwoods were mainly used for construction purposes (beams, panels, frames) where flat surfaces were preferred, while the use of hardwoods is more versatile according to diversity in their structure and properties. Density is perhaps the most prominent feature of wood needed for processing. Hardness of wood usually goes hand in hand with its density. Both features influence wood's suitability for conversion with hand tools and the artefact's purpose. The review points to the reflection of wood structure on wood density and belonging hardness typical for selected wood species. The influence of possible variations in wood structure on the woodworking properties is briefly discussed.

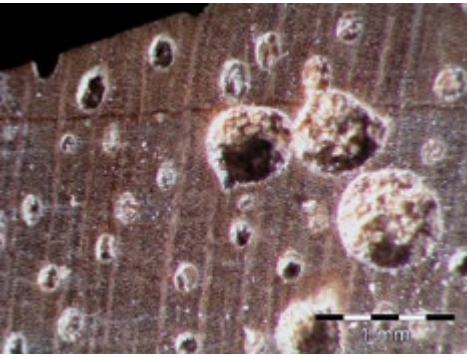
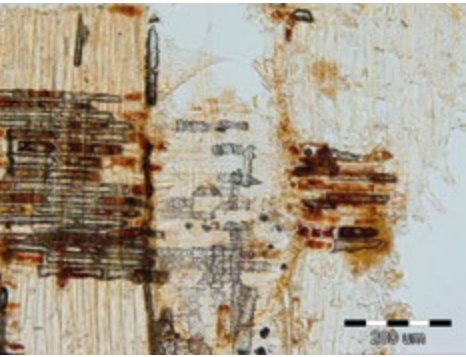
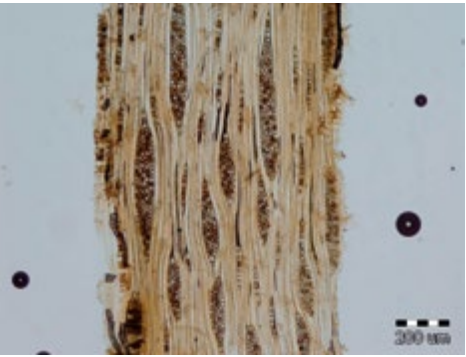
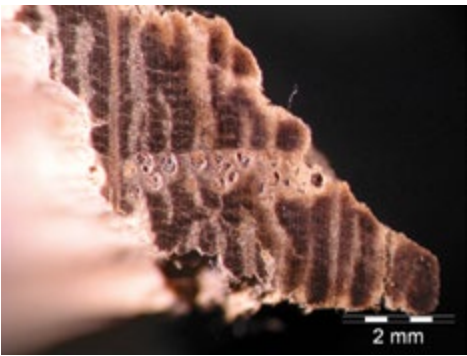
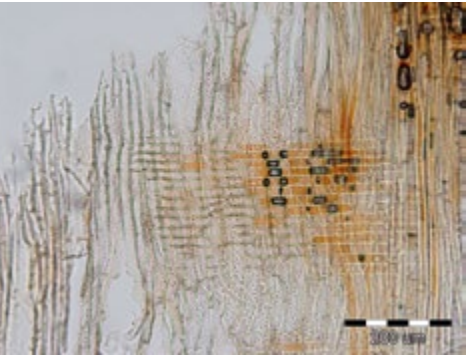
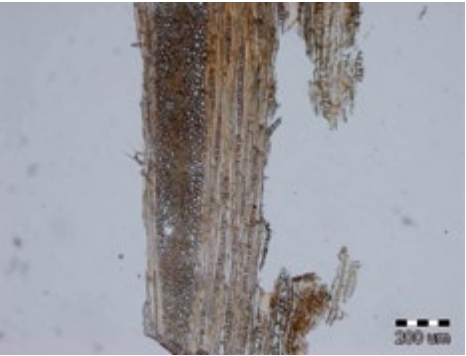
Conifer trees usually grow with distinctly straight and clear boles from the ground to the top of the crown. This explains the conifer wood as the first choice for simple and straight (often long) parts of constructions

Split, Buvinine vratnice, mikroskopske snimke gradbenih materijala vratnica (orah i hrast)

Split, Buvinina's door, microscopic imaging of construction materials (walnut and oak wood)

barenjem i kiparenjem pa su zato listače bolje za postizanje finih zaobljenih površina. Drvo je po prirodi nehomogen i složen materijal, pa je (ne) jednoličnost drva nezaobilazan pojam u njegovoj obradi.

with smooth surfaces. Due to long wood fibres (i.e. wood cells) in conifer woods, it is relatively easy to get flat and smooth surface of the object, especially when the fibres (i.e. grain) are originally straight. Still, long fibres easily snap out of wood in carving and sculpturing. That is one of the reason why hardwood species are better for reaching finely rounded surfaces. The uniformity of wood structure is also an unavoidable concept in woodworking because the wood is by its nature an (in)homogeneous and complex material.



Određivanje starosti Buvininih vratnica i korskih klupa iz splitske katedrale te drvenih greda iz crkve sv. Donata u Zadru metodom ¹⁴C

Radiocarbon Dating of the Master Buvina's Door and Choir Benches from the Split Cathedral and Wooden Beams from the Church of St. Donatus in Zadar

Ines Krajcar Bronić

Određivanje starosti metodom radioaktivnog ugljika ¹⁴C vrlo je pogodna i točna metoda apsolutnog datiranja organskog materijala. Izotop ¹⁴C je kozmogeni izotop koji nastaje u gornjim slojevima atmosfere te nakon oksidacije kao CO₂ zajedno s ostalim izotopima ugljika (¹²C, ¹³C) postaje dio prirodnog ciklusa ugljika. U svim živim organizmima uspostavljena je ravnoteža između radioaktivnog raspada ¹⁴C i njegova nadoknađivanja iz atmosfere. Nakon smrti nadoknađivanje prestaje, dok se raspad nastavlja. Mjereći koncentraciju preostalog ¹⁴C u organskom materijalu, možemo odrediti vrijeme proteklo od smrti organizma. Zbog vremena poluraspada izotopa ¹⁴C od 5730 godina, najveća starost koja se može odrediti tom metodom iznosi oko 60 000 godina. Metodom ¹⁴C mogu se datirati različiti organski materijali (drvo, drveni ugljen, kosti, sjemenke, žito, papir, pergament, kosa i dr.). Drvo je vrlo pogodan materijal za datiranje, budući da svaki god drveta odražava koncentraciju ¹⁴C u atmosferi tijekom formiranja goda.

Sve mjerne tehnike su destruktivne pa se uzorak mora kemijskim metodama prevesti u odgovarajući materijal pogodan za mjerenje. Ako se mjerenje provodi tehnikom akceleratorске masene spektrometrije (AMS), uzorak se pretvara u grafit. Prednosti tehnike AMS-a u odnosu na radiometrijske tehnike su: manja potrebna masa uzorka i manja mjerna nesigurnost.

Konvencijska ¹⁴C starost izražava se u godinama prije sadašnjosti (*Before Present*, BP), pri čemu je 0 BP = AD 1950. Kako bi se dobile kalendarske godine, potrebno je provesti dendrokronološku kalibraciju primjenom kalibracijskog programa (npr. OxCal) i korištenjem najnovijih kalibracijskih krivulja. Rezultat kalibracije su vremenski rasponi dani svaki sa svojom vjerojatnošću.

Važno je napomenuti da se navedenom metodom određuje starost materijala, a ne vrijeme korištenja tog materijala (za gradnju ili izradu umjetničkih predmeta). Datiranjem drva dobije se dakle vrijeme nastanka određenoga goda drveta.

Tijekom istraživanja Buvininih vratnica splitske katedrale metodom ¹⁴C, određena je starost pet drvenih fragmenata iz vratnica te dvaju drvenih fragmenata korskih klupa.

Određena starost uzoraka Z-5720 i Z-5721 (vratnice) smješta te fragmente u razdoblja cal AD 1155 – 1210 i cal AD 1054 – 1191. Može se zaključiti da su ta dva fragmenta dio originalnih vratnica iz 1214. godine. Uzorci Z-5719 i Z-6037 su nešto mlađi (cal AD 1245 – 1272 i cal AD 1225 – 1266)

Radiocarbon (¹⁴C) dating is a convenient and accurate method of absolute dating of organic materials. Radiocarbon is a cosmogenic isotope formed in the upper atmosphere and after oxidation to CO₂ it becomes involved in the carbon cycle together with other carbon isotopes (¹²C, ¹³C). Equilibrium between radioactive ¹⁴C decay and its replenishment is established in all living organisms. After death the replenishment stops while the radioactive decay continues. By measuring the ¹⁴C remained in the organic material we can determine the time elapsed since death. Due to the half-life of 5730 years, the maximal age that can be determined is about 60 000 years. Various organic materials can be ¹⁴C dated (charcoal, wood, bone, seeds and grains, paper, parchment, hair, etc.) and wood is a very convenient material since each of the tree rings reflects the ¹⁴C activity of the atmosphere in the year of its formation.

Measurement techniques require conversion of a sample to a suitable measurement material. In case of accelerator mass spectrometry (AMS) technique, a sample has to be converted to graphite. Advantages of the AMS techniques over the radiometric techniques are lower mass of a sample required and lower uncertainty.

A conventional ¹⁴C age is expressed in years Before Present, where 0 BP = AD 1950. Dendrochronological calibration has to be performed to obtain calendar ages by a calibration program such as the OxCal and most recent calibration curves. As a result of calibration, a calibrated age span or spans are obtained each with a certain probability.

It is very important to stress that by the ¹⁴C method the age of a material is determined, and not the time when the material was used, e.g. for building or sculpturing. In other words, when the wood is dated, the result will be the time when the tree-ring was formed.

During the study of the Master Buvina's door of the Split Cathedral ¹⁴C method was used to date 5 wood samples from the door and 2 samples from the choir benches.

Samples Z-5720 and Z-5721 from the door give the calibrated age spans cal AD 1155 – 1210 and cal AD 1054 – 1191, respectively. It may be concluded that these two wooden pieces belong to the original door from AD 1214. Samples Z-5719 and Z-6037 are somewhat younger (cal AD 1245 – 1272 and cal AD 1225 – 1266, respectively) indicating that these pieces could not have been built into the door in AD 1214. Sample Z-5469 is considerably younger than the others, it is dated to cal AD 1481 - 1650 (probability 68.2 %), and therefore it was not a part of the original door.

Split, Buvinine vratnice, ¹⁴C analize segmenta vratnica (hrast i orah), koji dokazuju da je rezbarenje izvedeno u svježem, a osnovna konstrukcija u odležanom drvu

Split, Buvina's door, ¹⁴C analyses of door segments (oak and walnut wood) proving that carving was done in green wood, while the basic construction was made from cured wood

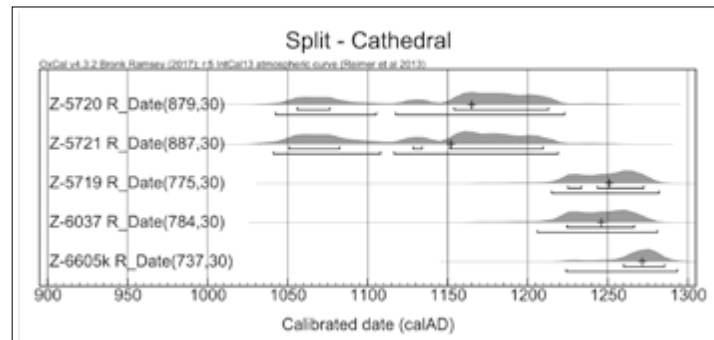
pa nisu mogli biti dio vratnica iz 1214. godine. Uzorak Z-5469 je znatno mlađi od ostalih, cal AD 1481 – 1650 (vjerojatnost 68,2 %) i nije dio originalnih vratnica.

Dva su drvena fragmenta korskih klupa također datirana. Z-6605 je datiran u drugu polovicu 13. stoljeća (cal AD 1266 – 1281). Z-6038 datiran je u godinu cal AD 1955, pa se može zaključiti da je taj fragment ubačen tijekom restauracije ili popravka klupa u 20. stoljeću.

U ovom izlaganju prikazat ćemo i rezultate određivanja starosti drvenih greda iz crkve sv. Donata u Zadru. Uzorci greda uzeti su 1970. godine tijekom restauriranja crkve i datirani su u laboratoriju u Zagrebu kao uzorci Z-175, Z-177, Z-178, Z-179. Konvencijske starosti su rekalibrirane tijekom 1999./2000. godine. Prema dobivenom rezultatu, sječa hrastova drveta za gredu mogla je biti na kraju 8., odnosno na početku 9. stoljeća, što potvrđuje hipotezu da je crkva sv. Donata sagrađena u prvoj polovici 9. stoljeća.

Two samples from the choir benches were also dated. Z-6605 was dated to the second half of the 13th century (cal AD 1266 – 1281). Z-6038 was dated to cal AD 1955, so it may be concluded that this piece of wood was added to the bench during reconstruction/repair in the second half of the 20th century.

Radiocarbon dating of wooden beams from the St. Donatus' Church in Zadar will be also presented. Samples were taken in 1970 during the restoration of the church and dated in the Zagreb Radiocarbon Laboratory as samples Z-175, Z-177, Z-178 and Z-179. The conventional ages were re-calibrated in 1999-2000 by applying development in radiocarbon calibrations. The obtained result placed the felling of the oak tree used for making the beam to the turn of the 9th century supporting the hypothesis of construction of the St. Donatus Church in the first half of the 9th century.



Analiza tragova alata na drvenim vratnicama splitske katedrale

Traceological Investigation of the Wooden Door of the Split Cathedral

Charles Indekeu

Pri proučavanju materijalnih svjedoka ljudske povijesti, posebno umjetnina koje su izrađivali, moguće je osloniti se na širok spektar znanstvenih disciplina – na povijesna, arhivska, povijesno-umjetnička i arheološka istraživanja te na ikonologiju.

Predmet i njegova degradacija otkrivaju mnoge podatke zahvaljujući primjeni znanosti o materijalima koja u svojim analizama poseže za brojnim tehnikama preuzetima iz kemije i fizike.

Proučavanjem i usporedbom alata za obradu drveta moguće je primijetiti da je osnovni oblik različitih alata (sjekira, tesla, pila, dlijeta, strugača, bušilica, struga itd.) ostao gotovo nepromijenjen.

Kako bismo razumjeli vrstu i namjenu alata koji su upotrebljavani u izradi vratnica splitske katedrale, potrebno je proučiti povijest rimskih tehnika obrade drva. Rijetki su pisani izvori iz vremena stvaranja vratnica koji govore o tehnici obrade drva. No s obzirom na to da u ovom slučaju govorimo o sprezi arhitekture i obrade drva, treba imati na umu da se stoljećima prevodila Vitruvijeva knjiga *O arhitekturi*.

Na zapadu se tek u 16. stoljeću pojavljuju knjige koje opisuju tehnike obrade drva i alate koji se za to koriste. Dotad se tehnička vještina smatrala manje vrijednom.

Srećom, sačuvani su mnogi srednjovjekovni prikazi alata koji se mogu pronaći u ilustracijama scena iz Biblije (izgradnja Babilonske kule, Nojne arke, hrama u Jeruzalemu, scene iz života sv. Josipa itd.), prikazima svetaca (poput sv. Tome, sv. Barbare, sv. Huga, sv. Modualda itd.) ili u opisima povijesnih tema (izgradnja Cortone, priče iz života Karla Velikog, bernske kronike itd.).

Različiti tragovi ovise o vrsti alata, čiji je izgled rezultat višetisućljetnog iskustva i ergonomske prilagodbi te načina njihova korištenja. Osim toga, izgled tragova alata ovisi o vrsti drva na kojem se primjenjuju.

Prve detaljne studije o toj temi objavio je ruski arheolog Sergej Semenov, koji je proučavao mikroskopske tragove upotrebe prapovijesnih kamenih alatki kako bi pokušao utvrditi način njihova korištenja te prirodu materijala koji se njima obrađivao. Upravo je on u svojim publikacijama skovao izraz tragologija.

Antički i srednjovjekovni alati nalaze se u mnogim muzejima diljem svijeta. Izradom točnih kopija starih alata moguće je replicirati tragove njihove upotrebe i mikroskopskog trošenja.

While studying the material evidence of human history, especially art, it is possible to rely on a large number of disciplines – historical, archival, art and archaeological research, as well as iconography.

The object and its degradation can reveal a lot of information when we apply materials science which conducts research using methods from chemistry and physics.

Through the study and research of tools used for woodworking, it is possible to notice that the basic form of tools (axes, adzes, saws, chisels, scrapers, drills, etc.) has largely stayed the same.

In order to understand the type and purpose of the tools used to make the door of the Split Cathedral, we need to study the history of Roman woodworking techniques. But considering we are talking about a combination of architecture and wood, we should also bear in mind that *De Architectura* by Vitruvius was translated for centuries.

In the West, it was not until the 16th century that books describing woodworking and tools that were used for it, appeared. Up till then, society considered technical skills less valuable.

Fortunately, a lot of tools from the Middle Ages are portrayed in illustrations of scenes from the Bible (building the tower of Babel, Noah's Ark, Temple in Jerusalem, scenes from the life of St. Joseph, etc.), portrayals of saints (St. Thomas, St. Barbara, St. Hugo, St. Modualdus, etc.), or descriptions of historical events (building of the city of Crotone, scenes from the life of Charlemagne, chronicles of Bern, etc.).

Tool marks differ based on types of tools, shaped through millennia of use and ergonomic adaptations, as well on the way they were used. Also, the shape of the tool depends on the type of wood on which it will be used.

The first detailed research on this topic was published by a Russian archaeologist Sergei Semenov. He studied microscopic traces of wear on prehistoric tools in an attempt to determine the way they were used, and the material they were used on. He was the one to come up with the term *traceology*.

Tools from Antiquity and the Middle Ages can be found in numerous museums around the world. By making copies of old tools we can replicate the marks they left and microscopic wear traces.

This type of data enables us to compare marks left on historical objects in order to better understand and interpret them. Determining the type

Split, Buvinine vratnice, tragovi blanje, pužnog svrdla i tesle

Split, Buvinina's door, marks made by a drawing knife, flute auger, and adze

Takvi podaci omogućuju usporedbu tragova na povijesnim predmetima kako bi ih mogli razumjeti i interpretirati. Određivanje vrste tragova ne može se smatrati znanstvenim dokazom, ali može pridonijeti multidisciplinarnim istraživanjima te utvrđivanju *post quem* ili *ante quem* datacije. Još uvijek ne postoji glosar alata za obradu drveta, a znanstveni korpus potrebno je dopuniti.

Proučavanjem tragova alata na vratnicama splitske katedrale moguće je odrediti osnovne alate stolarske profesije, poput tesle, svrdla i dlijeta. Porijeklo nekih tragova još uvijek nije moguće otkriti jer su slični oštećenim tragovima alata, no svojim oblikom ne izgledaju kao tragovi identificiranih vrsta alata.

Izgled i izrada samih vratnica dobro su opisani u djelima hrvatskih znanstvenika kao uobičajena tehnika izrade masivne stolarije koja je karakteristična za svoje vrijeme. Rijedak ukrasni element su ornamentalne okrugle izbočine na vanjskoj površini vratnica koje nemaju neku funkciju. Jedna od pretpostavki koja može objasniti njihovu pojavu je da su imitacija velikih brončanih čavala koji se mogu vidjeti na nekim monumentalnim vratima iz rimskog vremena (poput onih iz Pompeja ili Herkulana), koji su pričvršćivali brončane ploče na prednju stranu obloge.

of mark cannot be considered scientific proof, but it can contribute to interdisciplinary research and determine *post quem* or *ante quem* dating. We still do not have a complete glossary of woodworking tools, and the scholarly corpus needs to be completed.

By studying tool marks on the door of the Split Cathedral, it is possible to determine the basic carpentry tools like the adze, drill and chisel.

The construction and form of the door has been thoroughly researched by Croatian scientists as a normal technique of making massive carpentry characteristic for that period. A rare decorative element are the ornamental knobs on the outer surface of the door that do not have a clear function. One assumption is that they imitate large bronze nails present on some monumental Roman doors (like the ones from *Pompeii* or *Herculaneum*) used to fasten bronze plates



Značenje drva u urbanom razvoju i rezidencijalna arhitektura srednjovjekovnih dalmatinskih gradova

Significance of Wood in Urban Development and Residential Architecture of Medieval Dalmatian Towns

Danko Zelić

Svjedočanstva o uporabi drva kao građevnog materijala sve donedavno nisu privlačila znatniju pozornost istraživača urbanističko-arhitektonske povijesti srednjovjekovnih dalmatinskih gradova. Premda ih je glavina u gradovima tijekom prve polovice 15. stoljeća zamijenjena građevinama zidanim od kamena, drvene se kuće često bilježe u arhivskim spisima i gradskim statutima 13. i 14. stoljeća. Budući da je njihova brojnost u tom vremenu, poglavito u suburbanim prostorima gradskih središta, neprijeporno vezana uz priljev stanovništva iz zaleđa, vjerovalo se da je odabir drva kao građevnog materijala odraz tradicija i/ili skromnijeg imovinskog statusa došljaka. Drvene su kuće zapravo promatrane kao nužan stadij „izgrađenosti“, građevinski sloj koji je morao prethoditi kasnijoj monumentalizaciji urbanog pejzaža. Posrijedi je, međutim, prilično složen proces, a glavni su razlozi fenomena proširenosti drvenih kuća bili pravne naravi.

Polazeći od analize podataka u arhivskim izvorima, i u dokumentarnim, ali i u zakonskim tekstovima, u prvom će dijelu izlaganja biti ukratko analizirani stariji pravni običaji prema kojima su pravila izgradnje stambenih objekata, pa tako i odabir građevnog materijala, bili povezani s vlasništvom nad građevinskim zemljištima.

U drugom dijelu izlaganja bit će riječi o još uvijek vidljivim „otiscima“ davno nestalih drvenih građevina u postojećim kasnosrednjovjekovnim urbanim strukturama. Premda se to može učiniti čudnim, upravo su drvene gradnje odredile ne samo temeljne oblike i dimenzije građevinskih čestica nego i tlocrte blokova, pa i cijelih dijelova gradova, a u nekim slučajevima bile su modul za pomno elaborirane urbanističke planove (po-put dviju dubrovačkih regulacija iz druge polovice 13. stoljeća).

U zaključnom dijelu bit će predstavljena arhivska svjedočanstva o unutarnjim drvenim konstrukcijama i drvenoj opremi unutrašnjosti (kamenih) dubrovačkih kuća prve polovice 15. stoljeća. S obzirom na činjenicu da iz tog doba nije sačuvan ni jedan stambeni interijer, brojni ugovori s narudžbama drvodjeljskih radova iznimno su dragocjeni i, zapravo, jedini izvori informacija o arhitektonskim rješenjima privatnih prostora.

Not until very recently has the use of wood attracted particular attention of scholars dealing whether with issues of urban development or the architecture of the dwelling in medieval Dalmatia. Although most wooden houses in towns were replaced by solid masonry buildings during the first half of the 15th century, they do appear frequently in the 13th- and 14th- century documentary sources. Given that their abundant quantity, particularly in then suburban areas of towns, was related to the influx of inhabitants from the adjoining hinterland, it was traditionally believed that the material used for these buildings has been chosen because of cultural preferences and/or modest economic conditions of their owners. In other words, wooden structures were being considered as a necessary intermediate stage in the course of events that would eventually lead to the 'monumentalisation' of townscapes. In fact, the process was not as simple because the main reasons behind the use of wood as a building material were of legal nature.

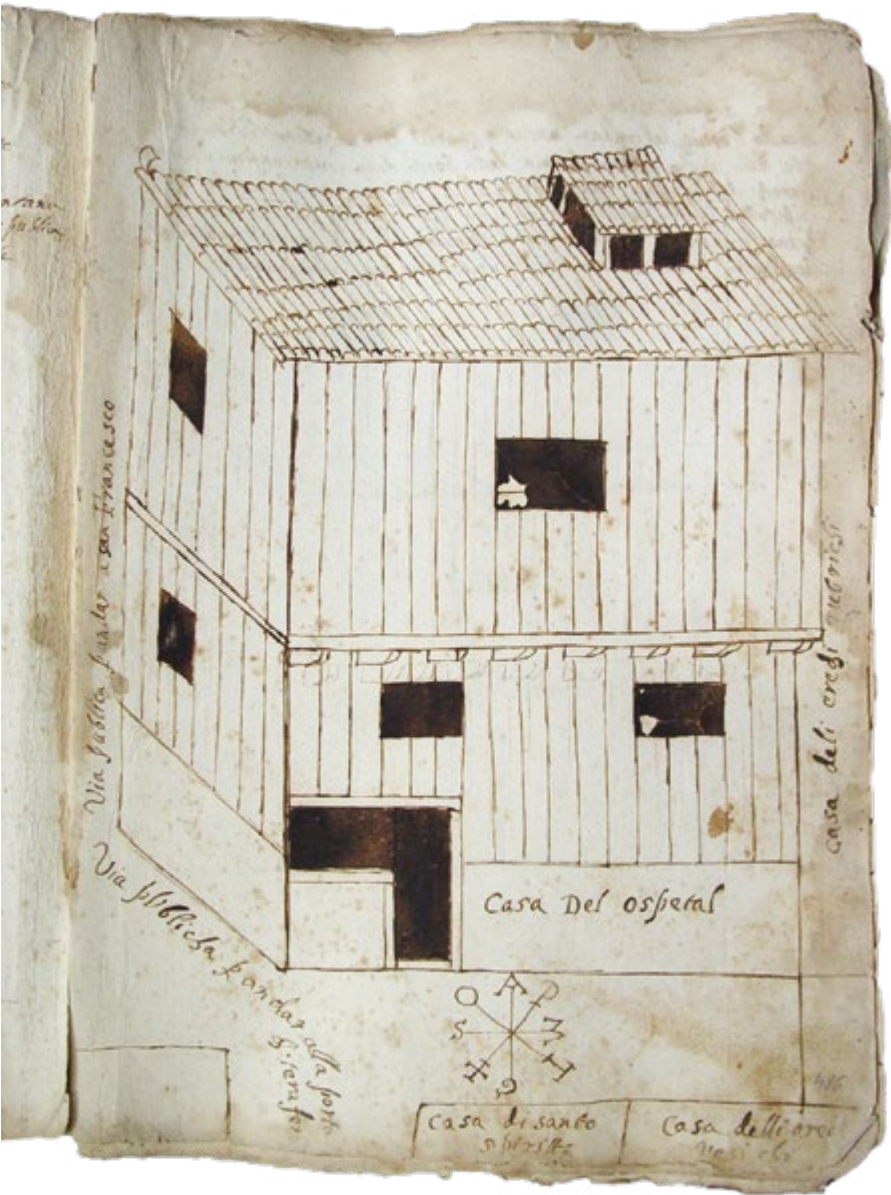
Starting from the analysis of data in archival sources, both the documentary and legislative ones, my first topic will be to briefly analyse the part played by the ancient legal customs, notably those concerning the ownership of the building land.

In the second part of the paper I will discuss the imprints of long-lost wooden buildings that are still visible in existing late medieval urban layouts. Although it might sound odd, those were precisely the wooden constructions that determined not just the shapes and dimensions of single building lots but the layouts of whole town districts, and, in some cases, even of the elaborate urban development plans, as corroborated by two late-13th-century regulation plans for Dubrovnik.

In the concluding part I will present the archival evidence concerning the interior wooden constructions and furnishings of (masonry) houses in Dubrovnik in the first half of the 15th century. Given that no interiors from that period survive, numerous commissioning contracts are in fact the only extant source of knowledge regarding the architectural design of the interiors, i.e. the private spaces.

Šibenik, katastik hospitala sv. Marije i sv. Lazara, crtež šibenske kuće, 1607.

Šibenik, Land Registry of St. Mary and St. Lazarus Hospital, drawing of a house in Šibenik, 1607



Grednjak iz crkve sv. Donata – rotonde Sv. Trojstva u Zadru

Beam from the Church of St. Donatus – Rotunda of the Holy Trinity in Zadar

Pavuša Vežić

Crkva sv. Donata znak je povijesnoga grada u Zadru, ujedno i arhitekture ranoga srednjeg vijeka u Dalmaciji. Jedna je od najvažnijih građevina predromaničke arhitekture Europe. Sagrađena je kao jedna zgrada iz dva projekta. Prema prvome, podignuta je kao slobodnostojeća rotonda za koju nije moguće znati je li bila dovršena, a prema drugome, kao kompleksna rotonda s prigradenim narteksom i stubištem te nadograđenim matronejom (galerijom) i oratorijima. Podignuta je zajedno s krilom biskupske palače uz koju je služila vjerojatno kao rezidencijalna kapela. Riječ je o rotondi građenoj zacijelo kasnih desetljeća 8. stoljeća i dovršenoj ranih godina 9. stoljeća, čini se u vremenu zadarskoga biskupa Donata. S preuređenjem su neki dijelovi, kao prenamijenjena građa s prvotne rotonde, dospjeli u konstrukcije one povišene i proširene. Dakle, u predromaničkoj građevini upotrijebljeni su predromanički spoliji! Ovdje će biti riječi o drvenim gredama tesanim, rovašenim i ličenim za konstrukciju krova prvotne rotonde, upotrijebljenim potom za gradnju grednjaka u podu galerije nadograđene s izgradnjom kompleksne rotonde.

Otkrivene su 1957. godine u istraživanjima koja je vodio I. Petricioli. No tada nisu uočeni ukrasi. Ustanovljeni su 1970. godine s konzervatorskim radovima koje je vodila K. Radilić. Tada su registrirane 44 grede, neke posvjedočene tek ležištima u zidu, ali bez ostataka drva. U svemu, bilo ih je pedesetak. Za one koje su ukrašene rovašenjem očito je da su iz prvotne građe preupotrijebljene u konstrukciji nadograđenog matroneja (galerije). Na jednome kraju imale su nožicu ili stopu oblikovanu dvjema zakošenim plohama raščlanjenima prutovima i žljebovima. Jedna od greda bijaše sačuvana gotovo u punoj dužini, više od šest metara. Na suprotnome kraju ima grubo tesani utor, struk napravljen vjerojatno za vezivanje užeta radi prenošenja i podizanja građe. Izvorna dužina rovašenoga ukrasa bila je 80 do 90 cm. Ornamenti su urezani na bočnim ploham i u podgledu. Otkriveni su, više ili manje oštećeni, ukrašeni dijelovi sedam greda. Skraćeni su još u vremenu preupotrebe te zorno pokazuju da izvorno bijahu ukras neke prvotne konstrukcije. U njoj su bili istaknuti, vidljivi u slobodnome prostoru, možda kao rogovi u podgledu strehe.

Grede su tesane iz hrastovih trupaca. Do sada objavljene analize drva metodom radioaktivnog ugljika upućuju na to da su debla posječena u 8. stoljeću, vjerojatno u njegovoj drugoj polovici.

The Church of St. Donatus is a symbol of Zadar's history, as well as early medieval architecture in Dalmatia. It is one of the most important structures of pre-Romanesque architecture in Europe. It was built as one building from two projects. During the first project, it was built as a free-standing rotunda but we are not sure whether it was completed. During the second project, it was constructed as a complex rotunda with a narthex and a staircase, and an added *matroneum* (gallery) and oratories. It was built at the same time as the wing of the Bishop's palace, and probably used as a residential chapel. It is a circular structure, built probably in the last decades of the 8th century and completed in early 9th century, during the time of Bishop Donato. With the redesign, some elements from the original structure were reused for the larger and higher structure. Therefore, pre-Romanesque spolia was used for a pre-Romanesque building! My topic will be trimmed, carved and painted wooden beams used for the dome in the original rotunda which were later used as floor beams in the gallery, added when the more complex rotunda was constructed.

The beams were discovered in 1957 as part of the research led by I. Petricioli, but no ornaments were noticed at the time. There were around fifty beams in total, and forty-four were discovered in 1970 during conservation led by K. Radilić (some only as holes in the wall without any remnants of wood). Carved beams were reused for the *matroneum* (gallery). On one end, they had a stop formed with two beveled surfaces divided with rods and grooves. More than six meters of one beam (almost the full length) has been preserved. On the opposite end, it has a trimmed slot, probably for the rope for moving and lifting it. The original length of the carved ornament was 80 to 90 cm. The ornaments were carved on the lateral surfaces and soffit. The more or less damaged ornament was discovered on seven beams. They were shortened when they were reused and it is obvious they were originally used as decoration and prominently displayed, perhaps as horns on the roof.

The beams were made from oak logs. Published wood analysis using carbon dating suggests that the tree trunks were probably cut in the second half of the 8th century.

Zadar, crkva sv. Donata, detalj grednjaka

Zadar, Church of St. Donatus, a detail of a beam



Drvene gotičke tavanice - karika između arhitekture, drvodjeljstva i slikarstva na drvu

Wooden Gothic Ceilings - Link Between Architecture, Woodwork and Wood Paintings

Ivana Svedružić Šeparović

Drveni, polikromirani i rezbareni gotički stropovi čine važnu komponentu gotičke arhitekture. Prikaze tih arhitektonskih elemenata nalazimo u nizu istovremenih slikarskih djela, dok su izvorni arhitektonski elementi (zbog promjene mode, ukusa i uvjeta stanovanja u većini europskih gradova) zamijenjeni suvremenijim konstrukcijama. Teške materijalne prilike u dalmatinskim gradovima nisu dopuštale luksuz promjene interijera, pa se do današnjih dana sačuvao niz takvih fragilnih konstrukcija koje spajaju graditeljski, drvorezbarski, slikarski, a ponegdje i pozlatarski zanat.

Konstrukcija kasetiranih stropova izvorište ima u antici, kao i ornamentika koja je prati. Gotička palača Grisogono na splitskom Peristilu ima sačuvana dva gotička stropa, iznimna zbog očuvanosti oslika na svim površinama i elementima stropova. Iščitavajući slikane i rezbarene motive, možemo slijediti njihov trag od antičkih kamenih profilacija, preko gotičke kamene plastike do oslikanih motiva na dijelovima stropa.

Zanimljiva je i simbolika motiva koja se zadržava u oblicima, ali značenjski je možemo iščitavati u kontekstu mijene povijesnih prilika.

Zbog financijskih (ne)mogućnosti, u kasnijim građevinskim intervencijama upotrebljavane su lagane konstrukcije, pa je izvorni strop u pravilu ostao dobro očuvan. Na velikom uzorku bilo je moguće ispitati originalni nosilac, spojeve, tehniku izrade drvenih elemenata i nanose boje. Upravo su nam analiza bojenih slojeva i sagledavanje cjelovite umjetnine omogućili njezino atribuiranje lokalnim radionicama te su tako potkrijepljene teze povjesničara umjetnosti koje su se temeljile na arhivskim podacima.

Provedene analize pigmenata dovode se u vezu sa slikarskim ostvarenjima istog razdoblja i pridonose poznavanju materijalnih i umjetničkih prilika srednjega vijeka u Dalmaciji.

Wooden, polychrome and carved Gothic ceilings are an important component of Gothic architecture. These architectural elements are portrayed in a series of contemporary paintings, while the original architectural elements (due to changes in fashion, tastes and living conditions in most European cities) have been replaced with more modern constructions. Difficult economic conditions in Dalmatian towns did not allow the luxury of redesigning interiors, so they have retained a number of fragile constructions that combine architectural, wooden, painting, and sometimes goldsmith crafts.

The construction of cassette ceilings originated in Antiquity, as well as ornaments that appear on them. The Grisogono Gothic palace on the Split Peristyle has two preserved Gothic ceilings, exceptional because of preserved paintings on all surfaces and elements of the ceiling. By studying painted and carved motifs, we can trace them from Antique stone profiles, through Gothic stone sculptures to painted motifs on parts of the ceiling.

There is another interesting element - symbolism of the motifs retained in the forms, and its meaning can be discerned through the context of changing historical circumstances.

Due to economic resources, or lack thereof, light constructions were used during later construction interventions, so the original ceiling is generally well preserved. On a large sample, it was possible to examine the original carrier, joints and technique used to make the wooden elements and apply paint. The analyses of the painted layers and reflection on the complete artwork have made it possible to attribute it to local workshops and thus support the theses of art historians based on archival data.

Pigment analyses confirm the connection with paintings from the same period and contribute to furthering the knowledge on economic and artistic circumstances in the Middle Ages in Dalmatia.

Split, palača Grisogono, polikromirani gotički strop

Split, Grisogono Palace, Gothic ceiling with polychromy



Polikromije predromaničkog kamenog crkvenog namještaja u Dalmaciji, sinteza Polychromy on Pre-Romanesque Stone Church Furniture in Dalmatia. A Synthesis

Miona Miliša

U posljednjem desetljeću velik broj istraživanja i objavljenih radova u inozemstvu posvećen je ostacima polikromije na antičkoj, predromaničkoj i romaničkoj kamenoj skulpturi. Unatoč tome, danas se, stoljećima nakon nastanka te iste skulpture, često zaboravlja da su sve pleterne kamene skulpture i dekorativni arhitektonski dijelovi (dovratnici, nadvratnici, okviri prozora, stupovi, kapiteli) uglavnom bili bojeni.

Originalni polikromirani sloj do današnjih se dana sačuvao samo na rijetkim artefaktima. U prethodnom stoljeću dosta je bojenog sloja stradalo u „čišćenjima“ predromaničkih ulomaka od slojeva žbuke, zemlje i ostalih nečistoća. Sastav kamena kao materijala mnogo je otporniji od sastava pigmenata i preparacije, od čega se i sastoji sloj polikromije. Samim tim polikromirani sloj ima znatno kraći vijek trajanja. Završnom fazom bojenja, pri izradi ranosrednjovjekovne pleterne skulpture, nastojao se istaknuti sam motiv u reljefu. Prema navedenom, pri promatranju pleternih kamenih reljefa treba imati na umu da gledamo artefakt koji nije u izvornom, obojenom izdanju. Svi su predromanički reljefi bili obojeni pretežito trima bojama: plavom, crvenom i oker (oker je često zamjenjivao zlatnu). Rijetki i skromni ostaci polikromije nalaze se na nekim reljefima u Splitu, Zadru i Dubrovniku.

Iako su uistinu rijetki ostaci izvorne predromaničke polikromije na ulomcima liturgijskog namještaja na istočnoj obali Jadrana, analizama se uspjelo izdvojiti nekoliko ključnih pigmenata te rekonstruirati pretpostavljeni originalni izgled nekoliko pluteja s dubrovačkog područja, nekoliko pluteja sa splitskog područja i jedan ciborij iz Zadra. Prema rezultatima analize izrađena je računalna rekonstrukcija originalnog sloja polikromije. Rekonstrukcija boje prikazuje njegov vjerojatni izvorni izgled.

Prilikom istraživanja primijenjene su sljedeće metode dokumentacije analiziranog uzorka: fotografska dokumentacija ostataka izvorne polikromije (makrofotografije i mikroskop), izrada kemijskih analiza (FTIR i XRF), uvrštavanje rezultata u bazu analiziranih uzoraka te računalna rekonstrukcija pretpostavljenog izvornog izgleda.

Neiskrivljeno viđenje i točan opis likovnih motiva složen je postupak. Uključuje mnoštvo posrednika između umjetnine, vizualne činjenice i opisa riječima. Kad govorimo o nekom pojmu, konkretno o ostacima boje na kamenom crkvenom namještaju, nastojimo podastrijeti sva prethodna znanja o tome. Ono što znamo jest da je boja imala ne samo dekorativno nego i simboličko značenje. Nastala je u trenutku kad je kameni namještaj već bio ugrađen u sakralni prostor.

In the last decade, a large number of research and published works outside of Croatia have been devoted to the remains of polychromy on Roman, pre-Romanesque and Romanesque stone sculptures. Nonetheless, today, centuries after the birth of the same sculptures, we often forget that all interlace stone sculptures and decorative architectural elements (door frames, door heads, window frames, pillars, capitals) were painted.

The original polychrome layer has been preserved only on rare artifacts. In the previous century, many layers of paint fell victim to “cleaning” layers of plaster, soil and other impurities from pre-Romanesque fragments. Composition of pigments and preparations, the main components of polychromy, are a lot less resistant than the composition of stone. Therefore, the layer of polychromy will last a significantly shorter time. The final phase of painting, when making early medieval interlace sculptures, sought to emphasize the relief motif. According to the above mentioned, when observing interlace stone reliefs, we should keep in mind that we are observing artifacts not in their original, painted state. All pre-Romanesque reliefs were predominantly painted in three colors: blue, red, and ochre (ochre often replaced gold). Rare and modest remnants of polychromy were found in some reliefs in Split, Zadar and Dubrovnik.

Even though original pre-Romanesque polychromy on fragments of liturgical furniture on the eastern Adriatic are rare, analyses have identified several key pigments and reconstructed the presumed original appearance of several plutei from the Dubrovnik and Split area, and a ciborium from Zadar. A computer reconstruction of the original polychrome layer was made based on the results of the analysis. The color reconstruction shows its probable original appearance.

The following methods of documentation for the analyzed sample were applied: photographic documentation of the residues of the original polychromy (macro photography and microscope), chemical analyzes (FTIR and XRF), incorporation of results into the analyzed sample database, and computer reconstruction of the presumed original appearance.

The undistorted appearance and correct description of art motifs is a complicated process. It includes a multitude of mediators between the artwork, visual facts, and written descriptions. When talking about a concept, specifically about the remnants of paint on stone church furnishings, we strive to provide all the previous knowledge about it. Color not only had a decorative but also a symbolic meaning. It was applied when stone furniture was already built into the sacral space.

Arheološki muzej u Zadru, ciborij prokonzula Grgura, 11. stoljeće, detalj s tragovima izvorne polikromije

Archaeological Museum in Zadar, ciborium of the proconsul Grgur, 11th century, a detail with traces of original polychromy,

Ispreplitanje i povezanost uloga naručitelja, donatora, projektanta, svećenika i majstora-klesara ne smije se zanemariti. Klesari, graditelji, kovači, slikari i drugi majstori cirkulirali su od bizantskih gradskih središta do hrvatskoga zaleđa. Tako su se prenosili i pigmenti.

Stvaranju predodžbe o bojenim predromaničkim reljefima svakako pridonose i mozaici. Predromaničko kiparstvo je s ranokršćanskih mozaika baštinito motive i polikromiju. Uprizorenja na mozaicima u usporedbi s pleternim plutejima ostala su ista, čak i s istim temeljnim načelima u pristupu kompoziciji.

Postoji sukladnost između monumentalnog i knjižnog slikarstva linearnog iskaza, prema izrazitim načelima predromaničkog stila. Boje koje se pojavljuju pri dekoraciji inicijala iste su kao one koje nalazimo u kutovima kamenih ulomaka ukrašenih pleternom ornamentikom te kao one koje se pojavljuju u freskoslikarstvu toga istog razdoblja (zelena, plava, crvena, žuta).

Nužna je konsolidacija ostataka polikromiranog sloja gdje god je on sačuvan. Ostaci boje na kamenim reljefima, odnosno polikromirana predromanička skulptura, zaista su rijetko temeljito obrađeni. U bojama pojedinih motiva mogu se pronaći odgovori o njihovu značenju i simbolici.

The interweaving and connection between the roles of the client, donor, designer, priest and master-sculptor cannot be ignored. Stonemasons, builders, blacksmiths, painters and other masters traveled from Byzantine city centers to the Croatian hinterland. Pigments were transported in the same manner.

Mosaics certainly contribute to creating an idea of painted pre-Romanesque reliefs. Pre-Romanesque sculpture inherited motifs and polychromy from early Christian mosaics. Mosaic motifs, compared to interlace plutei, did not change, even with the same basic principles of approaching composition.

There is compatibility between the linear expression of monumental paintings and illuminated manuscripts based on explicit principles of the pre-Romanesque style. Colors used for the initials are the same ones found in the corners of stone fragments adorned with interlace ornaments, and those appearing in fresco paintings of the same period (green, blue, red, yellow). Consolidation of remnants of the polychrome layer is necessary wherever it is preserved. The remnants of paint on stone reliefs, or polychrome pre-Romanesque sculptures, are rarely thoroughly processed. Using colors, we can find answers about the meaning and symbolism of individual motifs.



Pigmenti splitskog slikarstva 13. stoljeća, materijalna i tehnološka obilježja

Pigments from 13th-century Split Paintings – Material and Technological Characteristics

Jurica Matijević

Do devedesetih godina 20. stoljeća proučavanje hrvatskoga romaničkog slikarstva bilo je primarno usmjereno na povijesnoumjetnička istraživanja. Pronalaskom Trogirskog poliptiha i opsežnim istraživanjima njegove tehnologije u sklopu doktorske radnje dr. sc. Christine Thieme (objedinjenih u knjizi *Das Tafelbild aus der Kathedrale von Trogir*), otkrivena su vrata tehnoloških istraživanja romaničkog slikarstva u Hrvatskoj. Za potrebe toga rada provedena su više ili manje iscrpna tehnološka istraživanja još nekoliko djela hrvatskoga romaničkog slikarstva, pogotovo splitskog. Riječ je o trima ikonama: *Gospi od Žnjana*, *Gospi od Zvonika* i *Gospi od Sustjepana* te raspelu sv. Klare. Istraživanja na tom tragu nastavljena su u radu Žane Matulić Bilač. Ona je istraživanja splitskoga romaničkog slikarstva proširila na sva sačuvana djela, uključivši raspelo Sv. Križa i raspelo sv. Luke, Buvinine vratnice, korske klupe splitske katedrale i reljef triju svetih zaštitnika. Sva ta istraživanja rezultirala su brojnim novim podacima o gradbenim materijalima splitskoga romaničkog slikarstva, od kojih se znatan dio odnosi na pigmente.

Usmjeravajući pažnju samo na pigmente korištene u splitskom slikarstvu 13. stoljeća, pojavljuje se potreba za širim kontekstualiziranjem dosad dobivenih podataka o slikarskim materijalima romaničkoga razdoblja.

Dosadašnja istraživanja potvrdila su upotrebu sljedećih punila i pigmenata: gips, kreda, olovna bijela, azurit, ultramarin, indigo, minij, cinober, lakovna crvena boja, auripigment, realgar, željezovi oksidi (žuti, crveni i smeđi okeri), ugljena crna. U izlaganju će se detaljnije govoriti o kemijskim obilježjima pojedinih pigmenata, načinu proizvodnje i specifičnostima primjene. Također će biti riječi o tehnici krizografije – ukrašavanju slikanih površina tankim trakama pozlaćenog kositra.

Riječ je o paleti usklađenoj s paletom juga Europe, prije svega Italijom. Promatrajući tu paletu, neka pitanja ostaju otvorena. Glede crvene lakovne boje, uočava se njezino često korištenje. Dosadašnja istraživanja nisu dala odgovor o kojim je lakovnim bojama riječ. Također je uočena odsutnost zelenih pigmenata iz palete. Za sada je potvrđeno dobivanje zelene boje indirektnim putem, miješanjem žutih i plavih pigmenata. I odsutnost verdigrisa je znakovita, jer je on u paletama talijanskih slikara prisutan tek početkom 14. stoljeća.

U cjelini, paleta splitskoga romaničkog slikarstva svjedoči o vremenu pojave novih pigmenata, kao dijelu ranosrednjovjekovnih inovacija. Takav je umjetni cinober, čiju su sintezu umjetnim putem vjerojatno otkrili Kinezi,

Until the 1990s, the study of Romanesque painting in Croatia primarily focused on art history research. The discovery of the Trogir polyptych, and extensive research into techniques used in its making, carried out by Christine Thieme, PhD, as part of her doctoral thesis (published as a book *Das Tafelbild aus der Kathedrale von Trogir*), paved the way for further research into techniques used in Romanesque painting in Croatia. For the purpose of the thesis, more or less detailed technological research on several other examples of Romanesque painting in Croatia was carried out, especially on pieces from Split. Three icons were analyzed, *Our Lady of Žnjan*, *Our Lady of the Belfry* and *Our Lady of Snow*, as well as the crucifix of St. Clare. This line of research was continued in the work of Žana Matulić Bilač. She expanded the research of Split Romanesque painting to include all preserved artwork, including the crucifix of the Holy Cross and crucifix of St. Luke, Buvinine's door, choir benches from the Split cathedral, and the relief of the three patron saints. All of these studies have resulted in new information on the building materials of Split Romanesque painting and especially about pigments.

By focusing only on pigments used for 13th-century painting in Split, there is a need for a wider context of the obtained information on painting material from the Romanesque period.

Previous research confirmed the use of fillers and pigments such as plaster, chalk, white lead, azure, ultramarine, indigo, red lead, vermilion, varnish red, orpiment, realgar, iron oxides (yellow, red and brown ocher), and charcoal black. Chemical characteristics of certain pigments, their production and specificity of application will be discussed in more detail. Chrysography, a technique for decorating painted surfaces with thin ribbons of gilded tin, will also be discussed.

It is a palette that matches the one from the south of Europe, especially Italy. Looking at that palette, some issues remain open. In terms of red varnish, it appears it was used often. Previous research has not provided an answer as to which varnish colors were used. The absence of green pigments from the palette has also been noticed. For now, it has been confirmed that green color was obtained indirectly, mixing yellow and blue pigments. The absence of verdigris is also significant, as it is present in the palettes of Italian painters only from the beginning of the 14th century.

The palette of Split Romanesque painting is evidence of the appearance of new pigments as part of innovations in early Middle Ages. This is the case with vermilion, most likely artificially synthesized by the Chinese,

Split, Buvinine vratnice, mikropresjeci čestica inkarnata – vidljivi i UV dio spektra

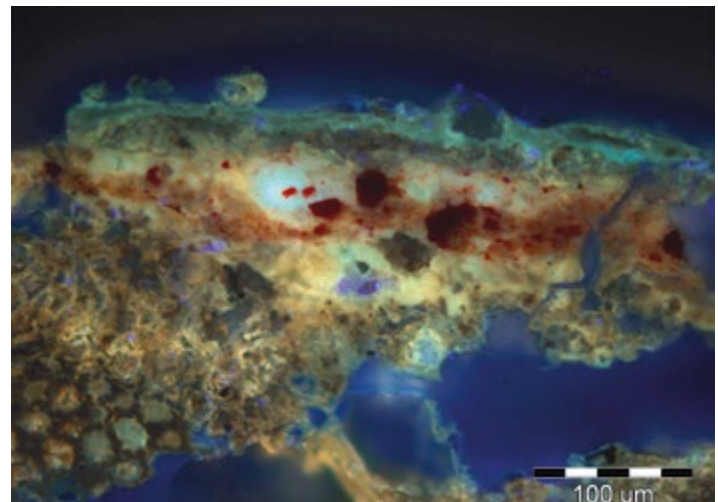
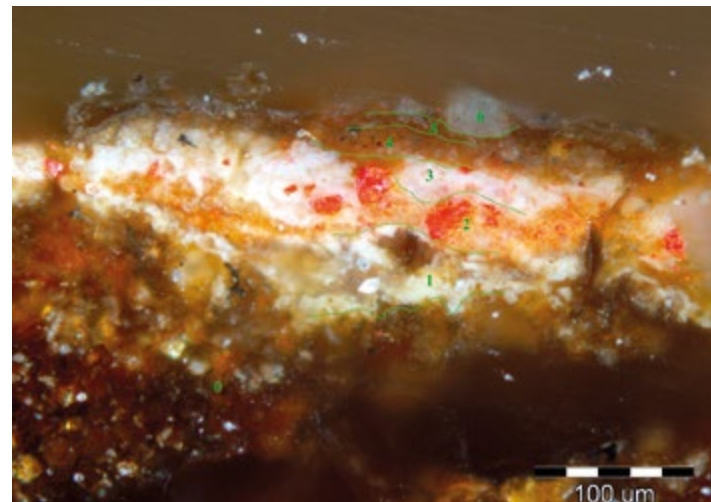
Split, Buvinine's door, micro section of a carnation fragment – visible and UV light

a Arapi prenijeli na Zapad. Pojedine su pak tehnologije usavršene, što je rezultiralo kvalitetnijim pigmentima. Početkom 13. stoljeća usavršavanjem tehnologije pročišćavanja proizveden je kvalitetni ultramarin. No inovacije 14. stoljeća, često vezane uz srednjovjekovnu manufakturu, poput upotrebe olovno-kositrove i žute, u to doba nisu još nastupile.

Posebnost se najjasnije očituje u primjeni specifične tehnike krizografije na priličnom broju umjetnina. Stoga će posebno biti riječi o toj tehnici, uz reference na povijesne izvore koji opisuju načine izrade i primjene kositrene folije.

and brought west by the Arabs. On the other hand, some techniques were perfected, resulting in better quality pigments. At the beginning of the 13th century, with the improvement of refinement techniques, quality ultramarine was produced. But 14th-century innovations, often connected with medieval manufacture such as the use of lead-tin and yellow, did not occur at that time.

Uniqueness is clearly manifested in the use of chrysography on a large number of works of art. Hence, this technique will be discussed, with references to historical sources describing the ways of making and using tin foil.



Teze o transferima u srednjovjekovnoj umjetnosti Mediterana

Theories on the Transfers in Medieval Art of the Mediterranean

Zoraida Demori Staničić

Umjetnost 13. stoljeća važna je tema povijesti umjetnosti u Dalmaciji kojoj su pridonijeli brojni hrvatski, ali i strani istraživači različitih generacija. Dugi kontinuitet istraživanja, a posebno praktična pitanja koja, osobito danas, proizlaze iz područja konzerviranja i restauriranja, s obzirom na to da se radi o vrijednim djelima nacionalne baštine, pridonose boljem poznavanju mnogih djela slikarstva i sitnoslikarstva, skulpture, arhitekture i umjetničkog obrta, uz nove rezultate i znanstvene teze.

Novije analize slikarstva 13. stoljeća u dalmatinskim gradovima omogućile su različita čitanja pojedinačnih slika, poliptiha i slikanih raspela. Posebnu važnost pritom imaju istraživanja umjetnosti Mediterana koja umjetničke pojave i djela tumače unutar trajnih veza Istoka i Zapada; stoga se i u sklopu talijanskog slikarstva 13. stoljeća, koje se donedavno tumačilo isključivo unutar apeninskih pokrajina i gradova, sada otkrivaju međutjecaji koji su preko Apulije i Sicilije dolazili do gradova na Levantu i natrag. Istim uvriježenim rutama kojima su u Svetu zemlju odlazili (i vraćali se) hodočasnici, vojnici i trgovci, putovali su umjetnici i umjetnine.

Utjecaji te umjetnosti koja se danas naziva *lingua franca* (kako ju je prije četrdeset godina nazvao Hans Belting, a onda prihvatili mnogi drugi umjesto starog termina *Crusader Art* koji su uveli bizantolozi starije generacije) mogu se iščitavati na mnogim dalmatinskim slikama, skulpturama i freskama iz 13. stoljeća, posebno na slikama na dasci. Poznate slike Bogorodice i raspela iz Dalmacije, poglavito one iz Splita, tumače se u takvom kontekstu.

An important topic of art history in Dalmatia is 13th-century art with contributions by numerous researchers from Croatia and abroad. The long continuity of research and practical issues that, especially today, arise from conservation and restoration given that these are valuable works of national heritage, contribute to a better understanding of many paintings and miniatures, sculptures, architecture and artistic crafts with new results and scientific theses.

New analyses of 13th-century paintings in Dalmatian towns have made it possible to interpret individual paintings, polyptychs and painted crucifixes in a different way. Research of art of the Mediterranean, which interprets new artistic ideas and works through permanent links between the East and West are especially important. Therefore, as part of Italian painting from the 13th century, which until recently has only been interpreted within the provinces and cities of the Italian peninsula, influences that travelled through Apulia and Sicily to the cities in the Levant and back have been revealed. The same common routes used by pilgrims, soldiers and merchants to travel to and from the Holy Land, were used by artists and artworks.

The influence of this type of art, today called *lingua franca* (named by Hans Belting forty years ago and accepted by many others instead of the old term *Crusader Art* introduced by scientists of the older generation studying the Byzantine Empire) can be observed on many Dalmatian paintings, sculptures and frescoes from the 13th century, especially paintings on wood. Famous paintings of the Virgin Mary and Crucifix from Dalmatia, especially the ones from Split, are interpreted in this context.

Trogir, riznica katedrale, Trogirski evanđelistar, 13. stoljeće

Trogir, Cathedral Treasury, 13th century





Arsen Duplančić

Petar Zečević, Detalj Buvininih vratnica (1846.)
Petar Zečević, A detail of Buvina’s Door (1846)

Arheološki muzej u Splitu, akvarel na papiru, dim.: 23,7 x 28,7 cm (crtež), 26,3 x 38,5 cm (list albuma), signatura: PZ. 1846.
Split Archaeological Museum, watercolour on paper, dim.: 23.7 x 28.7 cm (drawing), 26.3 x 38.5 cm (album page), signature: PZ. 1846

Tekst sa strane lijevo: *Parte della porta maggiore del duomo di Spalato.* (nesigurno čitanje: *fu intagliata da Andrea Gavina*) *dei tempi di Tomaso Arcidiacono, che nacque nel 1200 e morì nel 1268 questa porta già sussisteva. – Sono 28 gli ...* (tekst ispušten) *rappresentano la vita di Gesu Cristo.*

Arheološki muzej u Splitu dobio je 1892. godine iz ostavštine bivšega gradonačelnika Antonija Bajamontija album crteža splitskoga slikara amatera Petra Zečevića (1807.-1876.). Među crtežima je akvarel dijela lijeve strane Buvininih vratnica s reljefima: *Svadba u Kani* i *Iskušavanje Krista u pustinji*. Dijelom su još nacrtani prizori: *Isusovo prikazanje u hramu* i *Isusovo krštenje* (gore) te *Isus ozdravlja opsjednutoga iz Geraze* i *Isus sa Samarijankom* (dolje). Zečevićev akvarel je važan zato što

Inscription on the left side: *Parte della porta maggiore del duomo di Spalato.* (uncertain reading: *fu intagliata da Andrea Gavina*) *dei tempi di Tomaso Arcidiacono, che nacque nel 1200 e morì nel 1268 questa porta già sussisteva. – Sono 28 gli...* *rappresentano la vita di Gesu Cristo.*

In 1892, Split Archaeological Museum received an album of drawings by an amateur painter Petar Zečević from Split (1807 – 1876) from the inheritance of Antonijo Bajamonti, a former major of Split. The album contained a watercolour of a part of the left wing of Buvina's door with relief depictions of *Marriage at Cana* and *Temptation of Christ*. Partially depicted are also the scenes *Feast of the Presentation of Our Lord Jesus* and *Baptism of Jesus* (in the upper part), and *Exorcism of the Gerasene Demoniac* and *Jesus and the Samaritan Woman* (in the lower part). The watercolour is

je najstariji prikaz Buvininih vratnica i do sada nije objavljen. Cijeli album i list restaurirani su 1993. godine u Hrvatskom državnom arhivu u Zagrebu.

important because it is the oldest illustration of Buvina's door, not previously published. The entire album and the watercolour were restored at the Croatian State Archives in 1993.



Joško Belamarić

Thomas Graham Jackson, Vratnice majstora Andrije Buvine (1885.)

Thomas Graham Jackson, Andrija Buvina's door (1885)

Muzej grada Splita, akvarelirani crtež, papir, dim.: 36 x 25,5 cm, inv. br.: MGS-7067

Split City Museum, watercolour drawing, paper, dim.: 36 x 25.5 cm, inv. no.: MGS-7067

Na Dan sv. Jurja 1214. godine katedrala svetog Dujma dobila je pozlaćene vratnice, koje je izrezbario i oslikao Andrija Buvina – *pictor de Spaleta*, kako ga naziva dokument.

Opravdano se upozorava na konzervativnu bizantsku ikonografiju i, istodobno, na suvremene zapadnjačke sheme što ih je majstor, između ostalog, mogao usvojiti posredovanjem nadbiskupa Bernarda, koji je u Split (kako nas izvještava Toma Arhiđakon) donio mnoge dragocjene rukopise. Buvinini likovi ne govore individualnim gestama, nego su stilizirani tvrdim proporcijama, modelirani sumarno i linearno. Ipak, treba ponoviti tvrdnju Maxa Dvořáka da su Buvinine vratnice u europskoj romaničkoj umjetnosti unikum i jedan od najvažnijih dokumenata za povijest srednjovjekovnog kiparstva uopće.

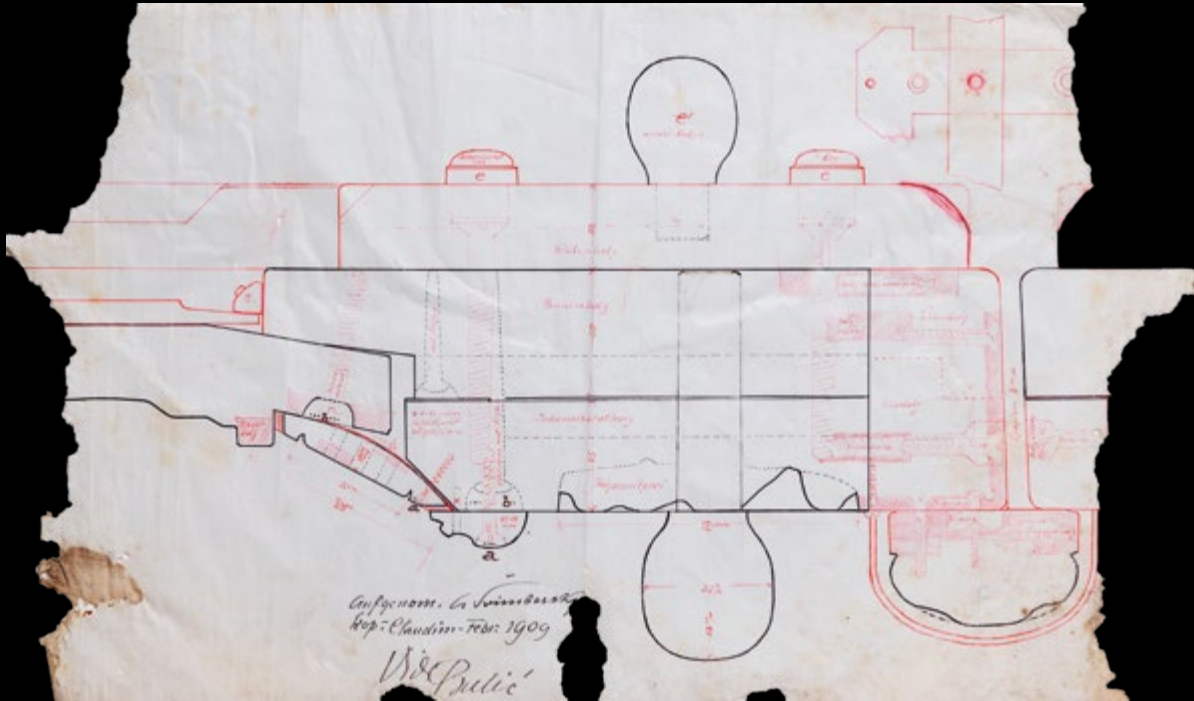
In 1214, on the Feast of St. George, the Cathedral of St. Domnius received a gilded door, carved and painted by Andrija Buvina – *pictor de Spaleta* (as he is mentioned in a document).

It is justified to indicate conservative Byzantine iconography and, at the same time, contemporary Western schemes, which could have been adopted by the master through archbishop Bernard, who brought numerous valuable manuscripts to Split (according to Thomas the Archdeacon). Buvina's characters do not speak in individual gestures, they are stylised with rigid proportions, modelled in a summary and linear manner. However, it is worth repeating a claim by Max Dvořák that Buvina's door are unique in European Romanesque art, and one of the most important sources for the history of medieval sculpture.

Buvina je uspio postići neusporedivu ikonografsku i dekorativnu konzistentnost cjeline goleme površine (5,30 x 3,60 m) u kojoj ni četvorni centimetar toga rezbarenog „tepiha“ nije ostao bez ukrasa. Vodeći viktorijanski arhitekt, T. G. Jackson, autor toga akvarela, prvi je zapazio da dio tog ornamentalnog repertoara izravno oponaša ukrasne lozice portala nedalekog Jupiterova hrama.

Buvina accomplished an incomparable iconographic and ornamental consistency throughout this large monument (5.30 x 3.60 m), covering the entire surface with various ornaments. Leading Victorian architect T. G. Jackson, author of this watercolour, was the first to notice that some of the ornaments imitate decorative vines on the portal of the nearby temple of Jupiter.

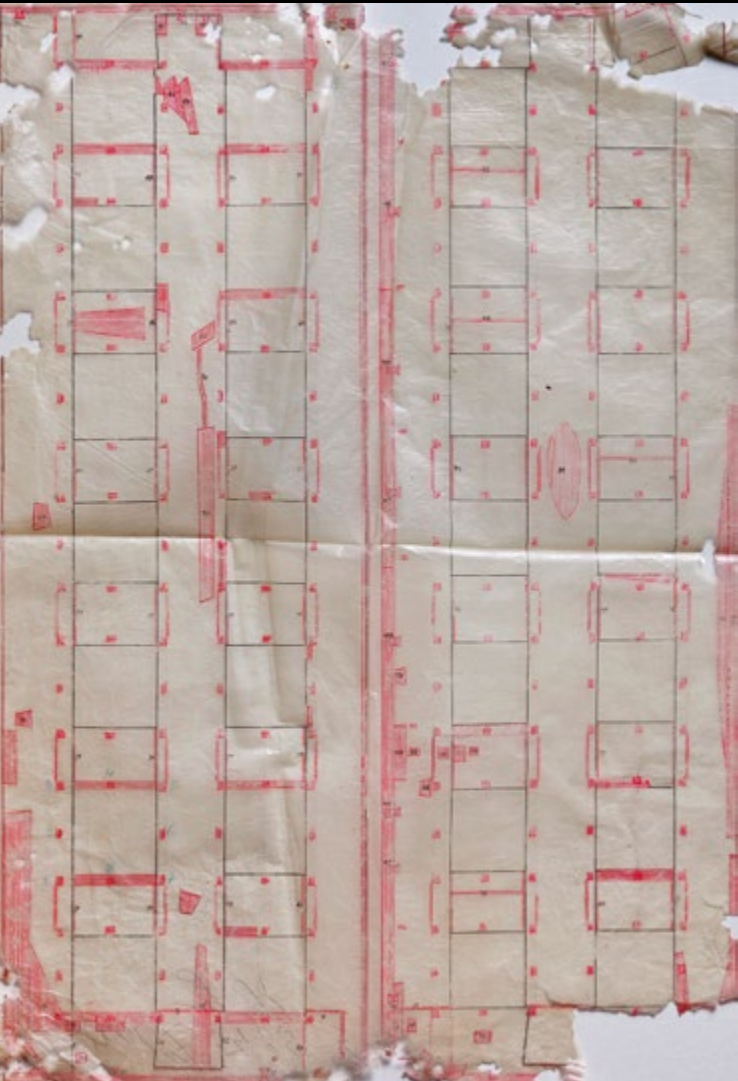




Franko Ćorić

Antonin Švimberský, Nacrti Buvininih vratnica, Chrudim (1908./1909.) Antonin Švimberský, Drawings of Buvina's door, Chrudim (1908/1909)

Arheološki muzej u Splitu, nacrti Buvininih vratnica, crteži, paus papir, impregnirano platno, tuš, dim.: 59,3 x 51,8 cm / 27,2 x 45,3 cm / 27,8 x 47,8 cm, signatura: Z5435 8 ZK
Split Archaeological Museum, drawings of Buvina's door, drawings, tracing paper, impregnated canvas, ink, dim.: 59.3 x 51.8 cm / 27.2 x 45.3 cm / 27.8 x 47.8 cm, signature: Z5435 8 ZK



Nacrti cjeline i detalja vratnica crtani rukom njihova restauratora iz 1908. godine, Antonina Švimberskog, koji se čuvaju u Arheološkom muzeju u Splitu, izvorno su bili priloženi spisu br. 5453/1909 Središnjega povjerenstva od 12. 11. 1909. godine, koji se danas, uz 48 ostalih dosjea vezanih uz Buvinine vratnice iz razdoblja od 1884. do 1911. godine čuva u Hrvatskom državnom arhivu u Zagrebu. Na nacrtima su crvenom tintom precizno označeni novi dijelovi. Prvi nacrt prikazuje prednjicu, drugi dopune hrastove jezgre i novu hrastovu pozadinu. Na oba su krila gornji vanjski rubovi zamijenjeni, a s unutarnje strane dodan po komad orahovine. Treći nacrt (mjerilo 1:1, iz dva dijela) prikazuje presjek jedne kasete vratnica sa svim detaljima konstrukcije. Za novo spajanje profilacija, okvira i pozadine s jezgrom korišteni su vijci od mesinga. Preostala dva nacrti koja nisu izložena prikazuju novo rješenje mehanizma za aksijalno zakretanje.

Drawings of Buvina's door and its details from 1908, were made by hand of their restorer, Antonin Švimberský. Originally, they were part of a document no. 5453/1909 of the Central Committee from 12th November 1909, stored in the Croatian National Archives in Zagreb along with 48 other files connected with Buvina's door from 1884 to 1911. They are now kept in the Split Archaeological Museum. Drawings in red ink precisely mark new parts of the door. The first drawing is of the front of the door, the second depicts additions to the oak core and new oak background. The upper exterior edges were replaced on both wings, and a piece of walnut wood was added in the interior. The third drawing (scale 1:1, in two parts) is a cross section of one door cassette with construction details. Brass screws were used to connect mouldings, frames, and background to the core. The remaining two drawings are not exhibited, depicting a new solution for the axial rotation mechanism.

Žana Matulić Bilač

Andrija Buvina, Segmenti vratnica splitske katedrale (1214.) Andrija Buvina, Segments of the door from the Split Cathedral (1214)

Muzej grada Splita, 65 segmenata vratnica splitske katedrale, drvo hrasta (*Quercus L.*) drvo oraha (*Juglans regia L.*), željezni čavli, rezbareno, tesano, kovano, dim.: 11,5 x 1,1 x 2,5 cm (najmanji segment), 91,3 x 16,5 x 4,4 cm (najveći segment), inv. br.: MGS-6671 (15 komada) i MGS 28332 (47 komada)

Split City Museum, 65 segments of the door from the Split Cathedral, oak wood (*Quercus L.*), walnut wood (*Juglans regia L.*), iron nails, carved, hewn, wrought, dim.: 11.5 x 1.1 x 2.5 cm (smallest segment), 91.3 x 16.5 x 4.4 cm (largest segment), inv. no.: MGS-6671 (15 pieces) and MGS 28332 (47 pieces)

Radovima na vratnicama koji je, uz smjernice Maxa Dvořáka i uz nadzor don Frane Bulića, izveo Antonin Švimberský 1908. godine, demontirano je i ispiljeno najmanje 114 segmenata raznih oblika i veličina, koji su zatim zamijenjeni novoizvedenima. Najveći dio (osim dasaka poleđine i dijela ravnih, prema procjeni manje važnih segmenata) pažljivo je označen i uz nacрте spremljen u depo Arheološkoga muzeja u Splitu. Godine 2002. darovani su Muzeju grada Splita. Tu se, pojedinačno inventirani, i dalje čuvaju u depou, a dvaput su bili segmentarno izloženi. Radovi na vratnicama od 2014. do 2018. godine uključivali su i pronalazak, objedinjavanje i istraživanje nacрта koji su ostali u Arheološkom muzeju u Splitu s preostalim segmentima vratnica (65) koji su mapirani, budući da je veći dio njihovih oznaka izgubljen. Tragovi na njima bili su pak glavni putokaz u otkrivanju kompleksnog konstrukcijskog sklopa vratnica koji u tijekom

At least 114 segments of various shapes and sizes were removed, sawed, and replaced during the 1908 restoration by Antonin Švimberský, with Maxa Dvořák's guidance and under the supervision of Frane Bulić. Most of them (apart from planks from the back and some straight, considered less important segments) were carefully marked, drawn and stored in the depot of the Split Archaeological Museum. Segments were donated to the Split City Museum in 2002. They are still in the museum depot, and they were exhibited twice. Conservation and restoration of the door from 2014 to 2018 included the finding, unification and research of drawings from the Split Archaeological Museum with remaining door segments (65) that were mapped, since most of their markings were lost. Traces that were present on them were the main guide in uncovering the complex construction of the door, left intact during the latest restoration, as

ovih radova nije dirnut, kao i načina njihove izrade i spajanja. Također, budući da je drvo vratnica s ostacima polikromije tretirano materijalima koji su promijenili njihov kemijski sastav, segmenti su omogućili shvaćanje izvornih kemijskih kompozicija materijala, ali i studiju o drvodjeljskom i rezbarskom alatu upotrijebljenom u izradi vratnica.

well as understanding its construction and assembly. Furthermore, since the wood with traces of polychromy was treated with materials that altered its chemical composition, preserved segments enabled analysis of the original chemical composition of materials, but also a study of wood-working and carving tools used for the construction of the door.





Pavuša Vežić

Greda iz crkve sv. Donata u Zadru (8. stoljeće) Beam from the Church of St. Donatus in Zadar (8th century)

Arheološki muzej Zadar (AMZ) / AMZ, greda br. 5, drvo hrasta (*Quercus L.*), rezbareno, dim.: 17,5 x 9,5 x 235 cm, inv. br.: 1068
Archaeological Museum in Zadar, beam no. 5, oak wood (*Quercus L.*), carved, dim.: 17.5 x 9.5 x 235 cm, inv. no.: 1068

Hrastova greda nalazila se u podu ispred svetišta galerije sv. Donata u Zadru. Izvorno je bila duža od šest metara. Na jednome kraju ima rovašenjem ukrašene bočne plohe i podgled. Na plohama je ornament zbijeno stiliziranoga akantusa, povijuša koja se u liku sinusoide proteže dužinom ukrašene plohe. U podgledu je tanka izdužena vitica. U žljebovima ukraša djelomično je očuvan crveni nalič, olovni minij (Pb_3O_4).

The oak beam used to be located in the floor in front of the sanctuary of the gallery in St. Donatus' Church in Zadar. Length of the original beam was more than 6 meters. Lateral surfaces and soffit on one end of the beam are carved. Stylised acanthus ornament is located on lateral sides, with a vine that stretches along the entire length of the decorated surface in the form of a sinusoid. The soffit is decorated with a thin elongated tendril. Red coating, minium (Pb_3O_4), is partially preserved in the ornament grooves.

Joško Belamarić

Thomas Graham Jackson, Kor katedrale u Splitu (1885.)
Thomas Graham Jackson, Choir of the Split Cathedral (1885)

Muzej grada Splita, akvarelirani crtež, papir, dim.: 36,5 x 26,2 cm, inv. br.: MGS-7066-1
Split City Museum, watercolour drawing, paper, dim.: 36.5 x 26.2 cm, inv. no.: MGS-7066-1

Korske klupe dugo su se smatrale djelom Andrije Buvine, a u literaturi ih se i danas datira u širokom rasponu - od 12. do 14. stoljeća. Pa ipak, ne bi trebalo sumnjati da rezbare korskih klupa – jer na njima je radilo više majstora – treba tražiti u domaćoj sredini, po svemu sudeći u šestom desetljeću 13. stoljeća, u vrijeme kad se mijenjala kompletna unutrašnjost splitske katedrale.

Krasni akvarelirani crtež T. G. Jacksona predočava nam karakteristični pogled na kut sjeverne klupe prije restauratorskih radova. Engleski je arhitekt posebnu pozornost posvetio prikazu osovljenog lava na bočnoj strani, koji je djelo trogirskog drvorezbara Ivana Budislavića iz 1440-ih godina. U to je vrijeme romaničko-gotička cjelina transformirana u kasnogotički kor koji je poput golemoga drvenog sklopa (u dokumentima se

Previously considered to be the work of Andrija Buvina, the choir benches from the Split Cathedral are still dated from the 12th to 14th century. Still, we should not doubt that carvers of choir benches – several masters worked on them – came from the local area, most likely in the sixth decade of the 13th century, at a time when the entire interior of the Split Cathedral was being renovated.

The beautiful watercolour drawing by T. G. Jackson presents us with a characteristic view of the corner of the north bench before the restoration. The English architect paid particular attention to the depiction of a raised lion on the lateral side, a work by woodcarver from Trogir Ivan Budislavić, dated in the 1440s. At the time, the Romanesque-Gothic complex was transformed into a late Gothic choir placed in the middle of the

naziva *machina lignea*) stajao usred rotunde stare katedrale, dok još dake nije bio probijen istočni zid mauzoleja i dodana zgrada baroknog kora u koji su 1615. godine klupe bile premještene.

rotunda of the old cathedral, like a giant wooden construction (mentioned in documents as *machina lignea*). The intervention occurred before the east wall of the mausoleum was breached and a Baroque choir building built, where the benches were moved in 1615.



Corner of the bench.
The corner of the bench with the lion carved by Ivan Budislavić 1440-1450.
part - 1440. The main part - 1450.

Žana Matulić Bilač

Segment korskih klupa splitske katedrale (druga polovica 13. stoljeća) Choir bench segment from the Split Cathedral (second half of the 13th century)

Riznica splitske katedrale, rezbareno drvo javora (*Acer L.*), dim.: 10,3 x 20,5 x 3,5 cm
Split Cathedral Treasury, carved maple wood (*Acer L.*), dim.: 10.3 x 20.5 x 3.5 cm

Romanički nasloni korskih klupa splitske katedrale izvorno su stajali u svetištu ispred oltara kao jednostavne klupe ili su, prema drugoj hipotezi, bili dijelom oltarne ograde svetišta. Sredinom 15. stoljeća ugrađeni su u raskošniju konstrukciju koja je stajala nasred katedrale, flankirani ogradama s lavovima, kompozicijom koju je osmislio po svoj prilici Ivan Budislavić. Godine 1615. klupe su prenesene u novoizgrađeni kor iza oltara. Na tom su mjestu dvaput mijenjale osnovnu formu, ovisno o izmjeni stavova o njihovu izvornom položaju. Restaurirane su početkom 20. stoljeća (prema nalogu Centralne komisije), a zatim 1962. godine, kad je demontirano pet segmenata koji u novoj kompoziciji nisu našli svoje mjesto. Do danas je sačuvan samo jedan s prikazom jelena, izložen u riznici. Prema tragovima alata za obradu drva, slaže se pretpostavka o načinu njihove izrade i spajanja,

Romanesque backs of choir benches from the Split Cathedral originally stood in the sanctuary, in front of the altar as simple benches or were, according to a different hypothesis, part of the altar rail. In mid-15th century they were incorporated into a more lavish construction that stood in the middle of the cathedral, flanked by railings with lions, a composition probably envisaged by Ivan Budislavić. The benches were moved to a newly built choir behind the altar in 1615. Their basic shape was changed two times, depending on the changes in opinion as to their original position. The benches were restored at the beginning of the 20th century (on the order of the Central Committee), and then in 1962, when five segments were dismantled since they had no place in the new composition. Only one, with a depiction of a deer, has been preserved and exhibited in the Treasury. Based on tool marks, assumptions about their construction, as-



ali i ritma postupne zamjene izvornog oslika povijesnim toniranim premazima.

sembly, and gradual replacement of the original painted layer with historical toned coatings started to crystallise.

Žana Matulić Bilač

Slikano raspelo iz crkve sv. Luke u Splitu (13. stoljeće)
Painted crucifix from the Church of St. Luke in Split (13th century)

Crkva Sv. Duha, Split, raspelo iz crkve sv. Luke, oslikano drvo topole (*Populus alba*), željezni čavli, dim.: 170 x 126 x 6 cm
Church of the Holy Spirit, Split, crucifix from the Church of St. Luke, painted poplar tree (*Populus alba*), iron nails, dim.: 170 x 126 x 6 cm

Slikano raspelo porijeklom iz velovaroške crkve sv. Luke jedno je od tek tri sačuvana iz 13. stoljeća u Splitu te je posljednje objelodanjeno (G. Gamulin, 1983.) od ukupno tek desetak djela u drvu splitske romaničke umjetnosti. Slikanoga sloja, koji nosi niz specifičnih odlika slikarskih tehnika, preostalo je na manje od 50% površine (dijelom dopunjenog u 17./18. stoljeću). No, njegova izvorna konstrukcija najvećim je dijelom sačuvana, pa tako i dragocjeni tragovi obrade drva.

Painted crucifix from the Church of St. Luke in Veli Varoš is one of just three such objects preserved from the 13th century in Split, and the last to be discovered (G. Gamulin, 1983), from a total of around ten wooden items of Romanesque art form Split. Less than 50% of the painted layer remains (partially repainted in the 17th/18th century), displaying a series of specific features of painting techniques. However, its original construction is mostly preserved, including precious marks of wood processing.



Smiljan Gluščević

Rijetke drvodjeljske alatke rimskog doba i stela (1. - 4. stoljeće)

Rare Roman woodworking tools and a stele (1st – 4th century)

Arheološki muzej u Splitu (AMS) / AMS, šestar, bronca, dim.: 11 x 1,2 cm, inv. br.: H 4195, Tilurij / AMS, dljeto za drvo, željezo, dim.: 15,5 x 2,7cm, inv. br.: H 5859, nepoznati dalmatinski lokalitet / AMS, turpija za drvo, željezo, dim.: 30,3 x 3,1 cm, inv. br.: H 5898, nepoznati dalmatinski lokalitet / AMS, dljeto za drvo, željezo, dim.: 9,8 x 2cm, inv. br.: H 5901, nepoznati dalmatinski lokalitet / AMS, nož za blanju, željezo, dim.: 12,2 x 5,3 x 0,9 cm, inv. br.: 72742 nepoznati dalmatinski lokalitet / AMS, stela s prikazom drvodjeljskog alata, kamen, dim.: 70 x 25,5 x 9 cm, inv. br.: AMS-A-877, Salona / Arheološka muzejska zbirka Baška Voda, testa, željezo, dim.: 28 x 11 x 6 cm, inv. br.: 066, Gradina, Baška Voda

Split Archaeological Museum (AMS) / AMS, calliper, bronze, dim.: 11 x 1.2 cm, inv. no.: H 4195, *Tilurium* / AMS, wood chisel, iron, dim.: 15.5 x 2.7cm, inv. no.: H 5859, unknown site in Dalmatia / AMS, wood file, iron, dim.: 30.3 x 3.1 cm, inv. no.: H 5898, unknown site in Dalmatia / AMS, wood chisel, iron, dim.: 9.8 x 2 cm, inv. no.: H 5901, unknown site in Dalmatia / AMS, drawing knife, iron, dim.: 12.2 x 5.3 x 0.9 cm, inv. no.: 72742, unknown site in Dalmatia / AMS, stele with depiction of woodworking tools, stone, dim.: 70 x 25.5 x 9 cm, inv. no.: AMS-A-877, Salona / Baška Voda Archaeological Museum Collection, adze, iron, dim.: 28 x 11 x 6 cm, inv. no.: 066, Gradina, Baška Voda

U dalmatinskim muzejima nalazi se niz alatki koje su se upotrebljavale u drvodjelstvu. Među njima prevladavaju različiti tipovi sjekira, svrdala i dljeta. Neke alatke prikazane su i na nadgrobnim spomenicima (Knin, Salona). Jedini komplet alatki u arheološkom kontekstu pronađen je na nekropoli Relja u Zadru. Među alatkama nalazimo i nekoliko iznimno rijetkih i u europskom kontekstu, poput turpija, strugača i dijelova listova pila. Jedan od najrjeđih nalaza su ostaci stolarske pile koju i u antici, ali i poslije, nalazimo prikazanu na različitim spomenicima ili dokumentima. Osam ulomaka listova pila nađeno je na različitim lokacijama tijekom recentnih istraživanja u Burnu, što potvrđuje važnost drvodjelaca među obrtnicima povezanim s rimskom vojskom na tako velikoj aglomeraciji kao što je vojni logor. Unikatan je, i u rimskom svijetu vrlo rijedak, široki list blanje ili tesle, nađen u skupnom nalazu u Baškoj Vodi.

Dalmatian museums hold numerous tools used for woodworking. The most prevalent amongst them are various axes, augers, and chisels. Some tools are depicted on funerary monuments (Knin, Salona). The only tool set found in an archaeological context was excavated in Relja. Furthermore, we can find several types of tools, rare even in Europe, such as files, scrapers, and fragments of saw blades, in museum collections. One of the rarest finds is a carpentry saw, depicted during the Roman period and later on various monuments or documents. Eight fragments of saw blades were found on different locations during recent excavations at *Burnum*, confirming the importance of woodworkers connected with the Roman army stationed in a large military camp. A unique and rare Roman find is a blade of a drawing knife or adze, found in a group find in Baška Voda.



Smiljan Gluščević

Rimski kovački alat i čavli (1. - 4. stoljeće) Roman blacksmithing tools and nails (1st – 4th century)

Arheološki muzej u Splitu (AMS) / AMS, mlat, čekić, željezo, dim.: 6,7 x 18,6 cm, inv. br.: H 4263, Salona / AMS, kliješta, željezo, dim.: 23,9 cm, inv. br.: H 4344, Ogorje / AMS, kovačka kliješta, željezo, dim.: 18,2 x 6 cm, inv. br.: H 5893, nepoznati dalmatinski lokalitet / AMS, nakovanj, željezo, dim.: 23,5 x 28,8 cm, inv. br.: H 4546, Salona / AMS, čavao, željezo, dim.: 9,3 x 1,6 cm, inv. br.: 53992, Naronas / AMS, čavao, bronca, dim.: 11,1 x 2,2 cm, inv. br.: 65806, nepoznati dalmatinski lokalitet

Split Archaeological Museum (AMS) / AMS, hammerhead, hammer, iron, dim.: 6.7 x 18.6 cm, inv. no.: H 4263, Salona / AMS, pliers, iron, dim.: 23.9 cm, inv. no.: H 4344, Ogorje / AMS, blacksmithing pliers, iron, dim.: 18.2 x 6 cm, inv. no.: H 5893, unknown site in Dalmatia / AMS, anvil, iron, dim.: 23.5 x 28.8 cm, inv. no.: H 4546, Salona / AMS, nail, iron, dim.: 9.3 x 1.6 cm, inv. no.: 53992, Naronas / AMS, nail, bronze, dim.: 11.1 x 2.2 cm, inv. no.: 65806, unknown site in Dalmatia



Mnogobrojne alatke, oprema, okovi, čavli i sl. iz rimskog doba, potrebni za obavljanje različitih zanata i izradu proizvoda, kovani su od željeza. Takav je i sam kovački alat. Najčešće nalazimo čekiće i različite tipove kliješta potrebne za pridržavanje predmeta koji se kuje. Rijetki su nalazi nakovnja kao neizostavnog dijela kovačkog procesa.

Numerous tools, equipment, irons, nails etc. from the Roman period, used in different professions for creating various products, were forged out of iron. Such is the case with blacksmithing tools. Most common finds include hammers and different types of pliers for holding forging items. Anvils are rarely found, even though they are an indispensable blacksmithing tool.

Smiljan Gluščević

Komplet rimskog drvodjeljskog alata s Relje u Zadru, grob 555 (4. - 5. stoljeće)

Set of Roman woodworking tools from Relja in Zadar, grave 555 (4th – 5th century)

Arheološki muzej Zadar (AMZ) / AMZ, sjekira, željezo, dim.: 16,3 x 16,3 cm, inv. br.: 538 ZDR-A27911, Relja, Zadar / AMZ, sjekira, čekić, željezo, dim.: 24,7 cm, inv. br.: 538 ZDR-A27912, Relja, Zadar / AMZ, svrdlo, željezo, dim.: 30,7 x 1,5 cm, inv. br.: 538 ZDR-A27913, Relja, Zadar / AMZ, svrdlo, željezo, dim.: 10,7 x 0,7 cm, inv. br.: 538 ZDR-A27914, Relja, Zadar / AMZ, strugač, željezo, dim.: 17x 4,3 cm, inv. br.: 538 ZDR-A27915, Relja, Zadar / AMZ, dlijeto, željezo, dim.: 26,2 x 1 cm, inv. br.: 538 ZDR-A27916, Relja, Zadar / AMZ, dlijeto, željezo, dim.: 21,5 x 2,2 cm, inv. br.: 538 ZDR-A27917, Relja, Zadar / AMZ, turpija, željezo, dim.: 22,2 x 3,5 cm, inv. br.: 538 ZDR-A27918, Relja, Zadar

Archaeological Museum in Zadar (AMZ) / AMZ, axe, iron, dim.: 16.3 x 16.3 cm, inv. no.: 538 ZDR-A27911, Relja, Zadar / AMZ, axe, hammer, iron, dim.: 24.7 cm, inv. no.: 538 ZDR-A27912, Relja, Zadar / AMZ, auger, iron, dim.: 30.7 x 1.5 cm, inv. no.: 538 ZDR-A27913, Relja, Zadar / AMZ, auger, iron, dim.: 10.7 x 0.7 cm, inv. no.: 538 ZDR-A27914, Relja, Zadar / AMZ, scrapper, iron, dim.: 17 x 4.3 cm, inv. no.: 538 ZDR-A27915, Relja, Zadar / AMZ, chisel, iron, dim.: 26.2 x 1 cm, inv. no.: 538 ZDR-A27916, Relja, Zadar / AMZ, chisel, iron, dim.: 21.5 x 2.2 cm, inv. no.: 538 ZDR-A27917, Relja, Zadar / AMZ, file, iron, dim.: 22.2 x 3.5 cm, inv. no.: 538 ZDR-A27918, Relja, Zadar

Istraživanjem na nekropoli iz rimskog doba na Relji u Zadru unutar groba 555 pronađen je komplet drvodjeljskog alata, jedini takav nalaz u Hrvatskoj. Osim vrha koplja, pronađeno je osam alatki koje možemo bez sumnje povezati s drvodjeljskim zanatom. Osim dviju tipološki različitih sjekira, pronađena su i dva svrdla, dva dlijeta, turpija za željezo i strugač. Vjerojatno je pokojnik bio pripadnik neke vojne jedinice koja je potkraj 4. i početkom 5. stoljeća boravila u Jaderu ili okolici.

During the excavation of a Roman cemetery in Relja, a set of woodworking tools was found in grave 555, the only such find in Croatia. Apart from a spear head, eight other tools were found that can be, without any doubt, linked to the woodworking profession. The set consists of two typologically different axes, two augers, two chisels, a file for iron, and a scrapper. It can be assumed that the deceased was a member of a military unit stationed at the turn of the 5th century in Jader, or its surroundings.



Tonči Burić, Ante Jurčević

Srednjovjekovni alati za obradu drva i vanjski okov brave (13. stoljeće)

Medieval woodworking tools and outer frame of a lock (13th century)

Muzej hrvatskih arheoloških spomenika (MHAS) / MHAS, ravno dlijeto, željezo, dim.: 13 x 3 x 0,4 cm, inv. br.: 5641, Bribir kod Skradina / MHAS, ravno dlijeto, željezo, dim.: 19 x 2 x 2,5 cm, inv. br.: 6681, Bribir kod Skradina / MHAS, zaobljeno dlijeto, željezo, dim.: 16 x 2,3 x 2,5 cm, inv. br.: 7282, nepoznati dalmatinski lokalitet / MHAS, tesla, željezo, dim.: 18 x 5,5 x 4 cm, inv. br.: 9085, Vrpolje kod Knina / MHAS, bradva plankaća, željezo, dim.: 14,9 x 10,3 x 2,5 cm, inv. br.: 6678, Bribir kod Skradina / MHAS, 16 segmenata okova brave, željezo, dim.: najveći segment: 16,5 x 5 cm / najmanji segment: 4 x 0,5 cm, inv. br.: 10768-10783, Ostrog Balavan

Museum of Croatian Archaeological Monuments (MHAS) / MHAS, straight chisel, iron, dim.: 13 x 3 x 0.4 cm, inv. no.: 5641, Bribir near Skradin / MHAS, straight chisel, iron, dim.: 19 x 2 x 2.5 cm, inv. no.: 6681, Bribir near Skradin / MHAS, curved chisel, iron, dim.: 16 x 2.3 x 2.5 cm, inv. no.: 7282, unknown site in Dalmatia / MHAS, adze, iron, dim.: 18 x 5.5 x 4 cm, inv. no.: 9085, Vrpolje near Knin / MHAS, woodworking axe, iron, dim.: 14.9 x 10.3 x 2.5 cm, inv. no.: 6678, Bribir near Skradin / MHAS, 16 lock frame segments, iron, dim.: largest segment: 16.5 x 5 cm / smallest segment: 4 x 0.5 cm, inv. no.: 10768-10783, Ostrog Balavan

Među ostacima brave pronađenim na lokalitetu Balavan u Kaštel Lukšiću najbolje je očuvan okov. Ti su nalazi otkriveni unutar branič-kule, koja je stajala u utvrdi (*castrum*) Ostrog, poznatoj po ratu koji su protiv Ostroga povelili Splitskani i Trogirani. Sukob je opširno opisao Toma Arhiđakon u XXIX. poglavlju svoje knjige *Historia salonitana*. Taj povijesni čin iz 1226. godine olakšava nam datiranje nalaza na utvrdi, jer nema mlađih nalaza koji bi se mogli datirati od 13. stoljeća nadalje. Sloj je vrlo tanak i s malo nalaza, što potvrđuje vjerodostojnost Tomine vijesti. Stoga i taj veoma rijedak nalaz brave možemo na temelju arheološke stratigrafije datirati u prvu četvrtinu 13. stoljeća, premda su se slični oblici okova koristili do kraja srednjega vijeka. To je posebice važno zato što tu kategoriju nalaza naša arheologija gotovo i ne poznaje, pa je ostroška brava čvrst reper za komparaciju s budućim takvim nalazima.

Among the remnants of a lock found at Balavan in Kaštel Lukšić, fragments of a lock frame are best preserved. They were found within the defence tower in *castrum* Ostrog, known because of the war led against the Ostrogoths by Split and Trogir. The conflict was described by Thomas the Archdeacon in Chapter XXIX of *Historia salonitana*. That historical event from 1226 enabled the dating of the finds since there are no later finds that could be dated later than the 13th century. The cultural layer is very thin and contained few finds, confirming the authenticity of Thomas' report. Therefore, based on archaeological stratigraphy, it is possible to date this rare find of a lock in the first quarter of the 13th century, even though similar designs of lock frames remained in use until the end of the medieval period. This is especially important because this type of find is almost unknown in Croatian archaeology, making it a reference for comparing future finds of this type.

T

Danko Zelić

Matrikula Bratovštine sv. Andrije apostola / sv. Josipa (13. stoljeće) Matricula of the Ragusan Confraternity of St. Andrew / St. Joseph (13th century)

Arhiv Dubrovačke biskupije, kodeks, pergamena, dim.: 26,2 x 19,6 x 4,7 cm, 106 listova (212 stranica), signatura 32
Dubrovnik Diocesan Archives, codex, parchment, dim.: 26.2 x 19.6 x 4.7 cm, (106 sheets, 212 pages), signature shelf mark 32

Matrikula Bratovštine sv. Andrije apostola (sv. Josipa) nastala je po svemu sudeći u trećem desetljeću 14. stoljeća, a u njoj sačuvani zapisi po vremenu postanka sežu od 1266., kad je bratovština osnovana, preko 1388., kad je reformirana, do 1801. godine. U prvim desetljećima 15. stoljeća Bratovština sv. Andrije je postupno postala strukovnom udrugom *maranguna*. U njezino su članstvo, bez obzira na podrijetlo i status, bili dužni pristupiti svi dubrovački drvodjelci – *li maestri che lavorassero l' arte nostra tanto cittadini quanto forestieri, tanto marangoni de case, quanto de navi, navili, remeri, bottari, barilari, tornitori, schatolari, et tutti quelli che lavorassero de asia, de laora o sega, over piagnia* – tj. majstori zaposleni na gradnji kuća (tesari i stolari), graditelji brodova i brodica, veslari, bačvari, tokari, škrinjari, ukratko, „svi koji rade sjekirom, dlijetom, pilom ili blanjom“. Na mnogim listovima matrikule, uz tekstualne se zapise nalaze i stilizirani cr-

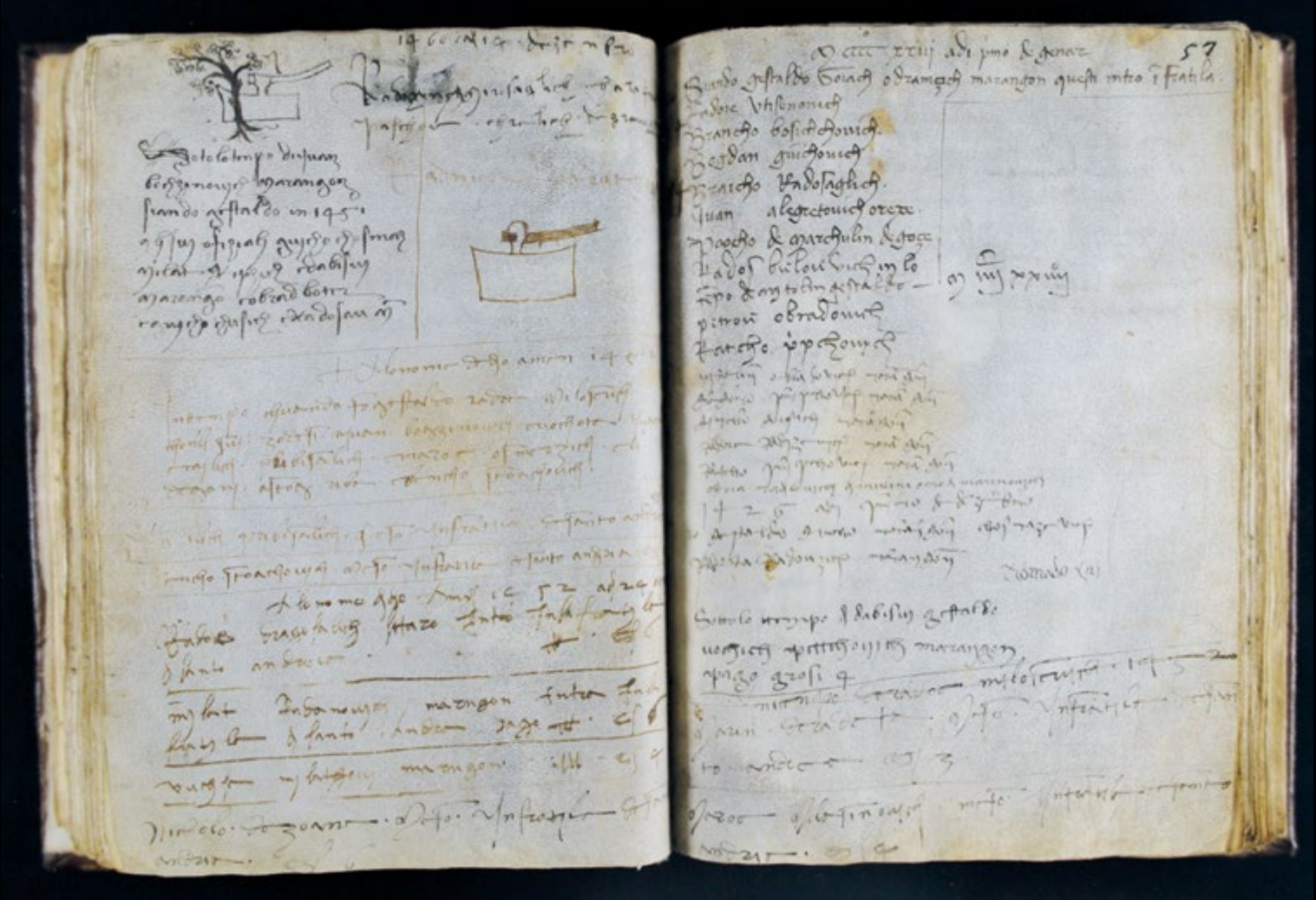
Created in the third decade of the 14th century, the *matricula* of the Ragusan Confraternity of St. Andrew (St. Joseph) contains writings dated to the period between 1266, when it was founded as a lay confraternity (*una fratilla spirituale*), and 1801. In the course of the first half of the 15th century, the confraternity gradually evolved to become a trade guild of Ragusan *marangoni*. Regardless of their origin and status, all woodworkers (*tanto marangoni de case, quanto de navi, navili, remeri, bottari, barilari, tornitori, schatolari*) or, more generally, "all working with axe, chisel, saw or plane" (*et tutti quelli che lavorassero de asia, de laora o sega, over piagnia*) were required to join. Many pages of the *matricula* feature stylized drawings of different woodworking tools. The most conspicuous among them are axes, obviously the main emblem of the confraternity. Turning the pages of the codex, one finds 35 depictions of axes (some of them with initials of

teži različitih drvodjeljskih alata. Najbrojnije su sjekire, očito glavni vizualni znak bratovštine: ukupno ih je, listajući stranice kodeksa, čak 35 (nekoliko ih na oštirci ima zapisane inicijale gastalda). Pet crteža prikazuje blanje, a na dva mjesta nacrtani su kompleti drvodjeljskog alata – sjekira, šestar, dlijeto, turpija i bat te blanja, šestar, turpija i kutnik.

Matrikula Bratovštine sv. Andrije (sv. Josipa) prvorazredno je svjedočanstvo njezine povijesti i jedinstveno vrelo podataka o njezinu karitativnom, društvenom i strukovnom značenju te ulozi u životu Grada. Statut, dokumenti, popisi bratima i zapisi nastali tijekom pet i pol stoljeća, svojevrсна su kronika najdugovječnije, isprva nabožne, a potom i strukovne, bratovštine „ispod“ Republike koju će udruga dubrovačkih drvodjelaca pod zaštitom sv. Josipa, potrajavši sve do prvih desetljeća 20. stoljeća, nadživjeti cijelo jedno stoljeće.

officials). Furthermore, there are five drawings of a wood plane and two sets of tools. One set consists of an axe, compass, chisel, rasp and maul, while the other has a wood plane, compass, rasp, and a square.

In addition to being a first-rate testimony of its past, *Matricula* of St. Andrew (St. Joseph) confraternity is an invaluable source of information concerning its charitable, social and economic significance in the life of medieval Dubrovnik. The confraternity statutes and ordinances, lists of members, as well as diverse records added during more than five and a half centuries, are indeed a vivid chronicle of the longest lived of all Ragusan trade guilds, one that outlasted the Dubrovnik Republic for more than a century. It ceased to exist at the beginning of the 20th century.



Roko Markovina

Izbor kalafatskog alata radionice Depolo u Korčuli (18. - 20. stoljeće) Selection of caulking tools from the Depolo workshop in Korčula (18th - 20th century)

Korčula, Zbirka Mihovila Depola, alati: bavul, macola, padela za kalafatavanje, viola, lito, klišta, paštariola, drvo, željezo
Korčula, Mihovil Depolo Collection, tools: chest, caulking mallet, caulking iron, viol, chisel, pliers, *paštariola*, wood, iron



Korčulanska kalafatska obitelj Depolo baštini više od tristo godina kontinuirane tradicije izrade drvenih brodova te stotine alata i njihova nazivlja. Od sačuvanih alata (macola, padela za kalafatavanje, dlijeta za šuperenje, raznih svrdla, rašpi, lita, koraća, šegaca, škvadra cota i dr.) predstavljen je izbor koji na najizravniji način predočava još živ duh radionice i tradicijskog kalafatanja.

For more than three centuries, the caulker family Depolo kept the tradition of wooden shipbuilding and collected hundreds of tools and their names. Out of the entire tool collection (caulking mallets, caulking irons, chisels for opening, various auges, files, chisels, saws, protractors, etc.) presented here is a selection that illustrates the still living spirit of the workshop and traditional caulking.



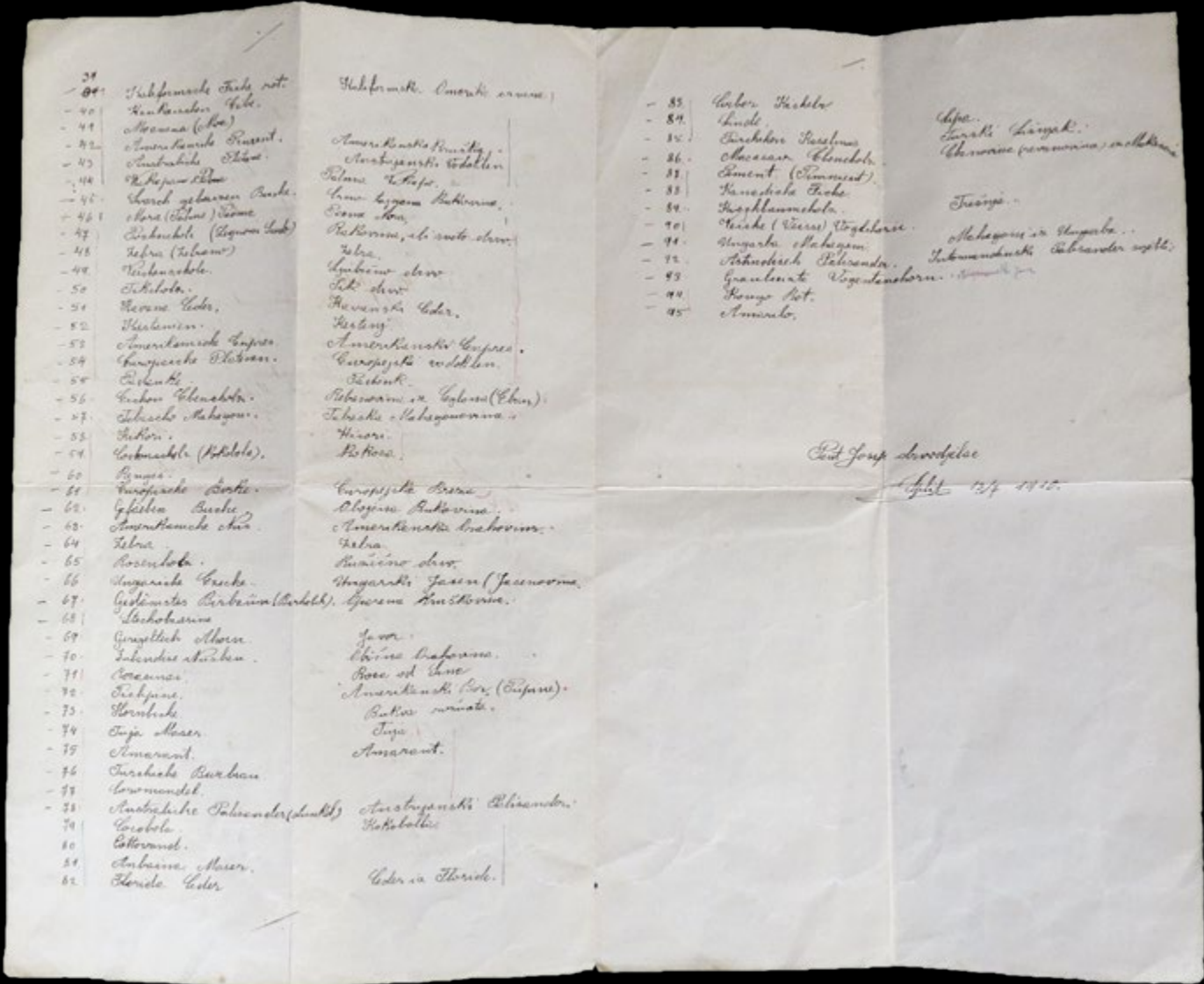
Jelena Trajković

Ksiloteka Josipa Pauta, splitskog tradicijskog drvodjelje (1910.) Xylotheque of Josip Paut, traditional woodworker from Split (1910)

Muzej grada Splita, dvije drvene kutije, drvo, papir, dim.: 11 x 64 x 7,5 cm, inv. br.: MGS-4983
Split City Museum, two wooden boxes, wood, paper, dim.: 11 x 64 x 7.5 cm, inv. no.: MGS-4983

Zbirka sadrži dvije drvene kutije s ukupno 197 daščica te njihov rukopisni popis s trgovačkim nazivima na njemačkom i hrvatskom jeziku na tri lišta, potpisanom i datiranom u 1910. godinu. Kutije sadrže uzorke domaće i strane vrste drva, uglavnom iz Južne i Sjeverne Amerike te iz Afrike. Trgovački naziv drva ne određuje uvijek jasno i točno vrstu drveta, nego često označava skupinu više vrsta drva, a botanička pripadnost daščica nije ustanovljena.

The collection contains two wooden boxes with a total of 197 wooden slats and a handwritten list on three pages with their commercial names in German and Croatian, signed and dated in 1910. The boxes contain samples of local and imported wood, mostly from North and South America, and Africa. Commercial names of types of wood do not necessarily define a specific wood species; it often marks a group of several kinds of wood. Slat





Neli Ružić

Neli Ružić, Iza vrata (2018.)

Neli Ružić, Behind the Door (2018)

Videoinstalacija, HD 1080p, loop, snimatelj: Boris Poljak / Umjetnička knjiga, papir, dim: 38 x 21 cm, grafičko oblikovanje: Nikola Križanac / Objekt *Transformator izgubljene energije*, drvo, staklo, prašina, dim.: 14,5 x 14,5 x 120 cm

Video installation, HD 1080p, loop, recorded by: Boris Poljak / Art book, paper, size: 38 x 21 cm, graphic design: Nikola Križanac / Object *Transformer of Lost Energy*, wood, glass, dust, dim.: 14.5 x 14.5 x 120 cm

Instalacija *Iza vrata* sastoji se od *Transformatora izgubljene energije*, vitrine s prašinom na podlozi koja se gotovo neprimjetno pomiče. Drugi segment je umjetnička knjiga u kojoj su fotografije nastale u različitim restauratorskim procesima analize materijala. Postupci dokumentacije jedna su od poveznica između znanstvenog, restauratorskog i umjetničkog istraživanja. Treći dio je videoinstalacija sa snimkama čestica prašine u prostoru katedrale vidljivih samo pri posebnim uvjetima.

The *Behind the Door* installation consists of the *Transformer of lost energy*, a showcase with dust on a barely moving base. The second segment is an art book with photographs taken during different restoration processes of material analysis. Documentation is one of the links between the scientific, restoration, and art research. The third part is a video installation with recordings of dust particles in the cathedral visible only under specific conditions.



Životopisi izlagača
Presenter's Biographies



Smiljan Gluščević is a museum and scientific advisor, born in 1952. He graduated with a degree in Archaeology and History from the Faculty of Letters in Zadar. He spent his entire professional career at the Archaeological Museum in Zadar (1979 – 2017), and he was a lecturer at the University of Zadar. He is the first person in Croatia employed as a professional underwater archaeologist. Mr. Gluščević participated on numerous underwater research projects, including Grebeni near Silba Island and the Roman port in Zaton. He was the supervisor of the largest international research project at the site where the statue of Apoxymenos was found. Apart from underwater archaeological research, he worked on numerous land sites. He also led the research of the largest Roman necropolis at Relja in Zadar. He participated on numerous symposiums, conferences, colloquia, and consultations at home and abroad, and his bibliography contains 160 titles.

Smiljan Gluščević, PhD / Bana Josipa Jelačića 22A / HR-23000 Zadar / sgluscevic52@gmail.com

Charles Indekeu worked as a freelance wood restorer for several museums in Belgium, France and Luxemburg since 1982. Since 2000, he has been the head of Wood conservation at the Academy of Fine Arts in Antwerp. In 2013, he joined the University of Antwerp as a senior lecturer on wood conservation and microscopy. He co-organised the ELinC programme http://org.kikirpa.be/elinc/, was published in the publication Between Carpentry and Joinery http://www.kikirpa.be/EN/44/70/Publications.htm, promotes the study of wood conservation, holds lectures in Belgium, an abroad, on organs, clocks, Renaissance furniture of Flanders etc.

Charles Indekeu / University of Antwerp / Prinsstraat 13 BE-2000 Antwerp / charles.indekeu@proximus.be

Ines Krajcar Bronić, PhD in Physics (1993, University of Zagreb, Croatia), works at Ruđer Bošković Institute, Zagreb, since 2009 as senior scientist -tenure position. Currently, she is the head of Laboratory for Low-level Radioactivities. She has published 68 papers in SCI/CC journals, 16 papers in other journals, 9 book chapters, 3 monographs, and edited 9 proceedings (total citations (WOS) 620, h-index 14). She is currently researching application of isotope data (3H, 14C, 2H, 13C, 18O) in interdisciplinary research fields. She is the coordinator of FP6 AMS-14C project Preparation of carbon samples for 14C dating by the AMS technique, and the director of two IAEA Training Courses on Dating Techniques (2008, 2013).

Ines Krajcar Bronić, PhD / Ruđer Bošković Institute / Division of Experimental Physics / Laboratory for Low-level Radioactivities / Bijenička cesta 54 / HR-10 000 Zagreb / krajcar@irb.hr

Jurica Matijević was born in 1967 in Split. He graduated from the Academy of Fine Arts, University of Zagreb, in 1997. During his studies, he gravitated towards conservation and restoration. From 1995 to 1997 he worked as an external associate for the Regional Institute for the Protection of Cultural Monuments in Split, and from 1997 to 1999 he was a freelance conservator-restorer. From 1999 to 2001, he was in the UK for professional training. He has been working for the Conservation-Restoration Department of the Arts Academy in Split since 2001. He teaches courses related to conservation and restoration of easel paintings and

Smiljan Gluščević, muzejski i znanstveni savjetnik, rođen je 1952. godine. Na Filozofskom fakultetu u Zadru diplomirao je arheologiju i povijest. Cijeli radni vijek proveo je u Arheološkom muzeju Zadar (1979.-2017.). Predavao je na Sveučilištu u Zadru. Prvi je u Hrvatskoj zaposlen na radnom mjestu podvodnog arheologa. Sudjelovao je u mnogobrojnim podvodnim istraživanjima. Ističu se ona na Grebenima kod otoka Silbe i u antičkoj luci u Zatonu. Vodio je do sada najveće međunarodno istraživanje na lokaciji na kojoj je nađen kip Apoksiomena. Osim na podmorskim, radi i na mnogobrojnim kopnenim istraživanjima. Posebno mjesto zauzima rukovođenje istraživanjima najveće rimske nekropole na Relji u Zadru. Sudionik je velikog broja simpozija, kongresa, kolokvija ili savjetovanja u zemlji i u inozemstvu, a u njegovoj se bibliografiji nalazi 160 naslova.

dr. sc. Smiljan Gluščević / Bana Josipa Jelačića 22A / HR-23000 Zadar / sgluscevic52@gmail.com

Charles Indekeu je od 1982. godine radio kao vanjski suradnik-restaurator za drvo u nekoliko muzeja u Belgiji, Francuskoj i Luksemburgu. Od 2000. godine vodi Katedru za restauriranje drveta na Akademiji likovnih umjetnosti u Antwerpenu. Od 2013. godine radi kao viši predavač (restauriranje drveta i mikroskopija) na Sveučilištu u Antwerpenu. Sudjelovao je u izradi ELinC programa (http://org.kikirpa.be/elinc/), objavio je članak u zborniku radova Between Carpentry and Joinery (http://www.kikirpa.be/EN/44/70/Publications.htm), promiče istraživanje restauriranja drveta te drži predavanja u Belgiji i inozemstvu o restauriranju orgulja, satova, renesansnog namještaja iz Flandrije i dr.

Charles Indekeu / Sveučilište u Antwerpenu / Prinsstraat 13 BE-2000 Antwerp / charles.indekeu@proximus.be

Ines Krajcar Bronić doktorirala je 1993. godine fiziku na Prirodoslovno-matematičkom fakultetu Sveučilišta u Zagrebu. Zaposlena je na Institutu Ruđer Bošković. Znanstvena je savjetnica u trajnom zvanju i voditeljica Laboratorija za mjerenje niskih radioaktivnosti. Objavila je 68 radova u SCI/CC i 16 radova u ostalim časopisima, devet poglavlja u knjigama i tri monografije, a uređuje devet zbornika. Radovi su citirani 620 puta (WOS), h-index je 14. Područje interesa: primjene izotopa (3H, 14C, 2H, 13C, 18O) u interdisciplinarnim istraživanjima. Koordinatorica je projekta FP6 AMS-14C Priprema uzoraka za datiranje 14C metodom i AMS tehnikom. Voditeljica je dviju radionica o metodama određivanja starosti (IAEA 2008, 2013).

dr. sc. Ines Krajcar Bronić / Institut Ruđer Bošković / Zavod za eksperimentalnu fiziku / Laboratorij za mjerenje niskih radioaktivnosti / Bijenička cesta 54 / HR-10 000 Zagreb / krajcar@irb.hr

Jurica Matijević rođen je 1967. u Splitu. Na Akademiji likovnih umjetnosti Sveučilišta u Zagrebu diplomirao je 1997. slikarstvo. Tijekom studija usmjerava se prema konzerviranju i restauriranju. Od 1995. do 1997. godine radio je kao vanjski suradnik Regionalnog zavoda za zaštitu spomenika kulture u Splitu, a od 1997. do 1999. godine obavljao je konzervatorsko-restauratorske poslove samostalno. Od 1999. do 2001. godine bio je na stručnom usavršavanju u Velikoj Britaniji. Na Odsjeku za konzervaciju-restauraciju Umjetničke akademije u Splitu zaposlen je od 2001. godine. Predaje kolegije vezane za konzerviranje i restauriranje štafelajnih slika i polikromiranog drva. Posebno područje njegova interesa

Josip Belamarić graduated Art History and Musicology at the University of Zagreb, where he also received his MA and PhD degrees. Since 1979, he was employed by the Monument Protection Service in Split, and, from 1991 to 2009, he was the head of the Regional Office for Monument Protection in Split (today Conservation Department of the Ministry of Culture). Since 2010, he has been working at the Institute of Art History, as the head of the Cvito Fisković Center in Split. He is a full professor at the Department of Art History of the Faculty of Humanities and Social Sciences in Split. He has published several books, and a series of articles and studies on historical urbanism and Medieval and Renaissance art of Dalmatian cities (http://www.ipu.hr/suradnici/znanstvenici/62/Josko-Belamarić). Among his many acknowledgments, the most recent one was a visiting professorship at the Villa I Tatti (The Harvard University Center for Italian Renaissance Studies) in Florence (2016), and as a Getty Research Scholar in Los Angeles (2017/2018).

Josip Belamarić, PhD / Institute of Art History – Cvito Fisković Centre / Kružičeva 4 / HR-21 000 Split / josipbelam@gmail.com

Franko Ćorić was born in 1976. He graduated with a degree in Art History and German from the Faculty of Humanities and Social Sciences of the University of Zagreb. From 2004, he has been working at the Chair for the Protection of Cultural Heritage at the Department of History of Art of the Faculty of Humanities and Social Sciences in Zagreb. In 2010, he defended his doctoral thesis on the Imperial and Royal Central Commission and its work in Croatia. For archival and library research, he received the Ernst Mach Scholarship (2007) and the Richard Plaschke Scholarship (2011/2012) of the OeAD. His primary research interests are historical and contemporary theories and practices in conservation. He is fluent in German and English, and has a passive knowledge of Italian and Portuguese. In 2016, he became the editor in chief of The Preservation of Cultural Heritage in Croatia Annual journal.

Franko Ćorić, PhD / Faculty of Humanities and Social Sciences of the University of Zagreb / Department of History of Art / Chair for the Protection of Cultural Heritage / HR-10 000 Zagreb / fcoric@ffzg.hr

Zoraida Demori Staničić earned a degree in Art History and English from the Faculty of Humanities and Social Sciences, University of Zagreb, and the Faculty of Foreign Trade. She graduated from the Faculty of Humanities and Social Sciences in Zagreb and received a PhD in Art History. She worked at the Conservation Department in Split and Croatian Conservation Institute. She retired in 2017. Since 1980, she was involved in scientific projects of the Institute of Art History and the Department of History of Art at the Faculty of Humanities and Social Sciences in Zagreb. She participated in the formation of the Conservation-Restoration Department at the Arts Academy in Split, where she also taught. She is currently working at the Faculty of Humanities in Mostar. She worked on the Croatian Encyclopaedia, Croatian Encyclopaedia of Art and Croatian Lexicon. She gave lectures at numerous scientific and professional conferences in Croatia and abroad.

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Josip Belamarić završio je interfakultetski studij povijesti umjetnosti i muzikologije na Sveučilištu u Zagrebu, gdje je potom magistrirao i doktorirao. Od 1979. godine bio je zaposlenik službe za zaštitu spomenika kulture u Splitu, a od 1991. do 2009. godine na dužnosti ravnatelja Regionalnog zavoda za zaštitu spomenika kulture (danas Konzervatorski odjel Ministarstva kulture RH) u Splitu. Od 2010. godine zaposlen je na Institutu za povijest umjetnosti, kao voditelj Centra Cvito Fisković u Splitu. Redoviti je profesor na Odsjeku za povijest umjetnosti splitskog Filozofskog fakulteta. Objavio je više knjiga te niz priloga i studija o povijesnom urbanizmu, odnosno o srednjovjekovnoj i renesansnoj umjetnosti na hrvatskoj obali (http://www.ipu.hr/suradnici/znanstvenici/62/Josko-Belamarić). Među priznanjima koja je stekao za svoj rad, najrecentnije je dobio kao gostujući profesor na Villa I Tatti (The Harvard University Center for Italian Renaissance Studies) u Firenci (2016.) te kao *Getty Research Scholar* u Los Angelesu (2017./2018.).

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Franko Ćorić rođen je 1976. godine. Na Filozofskom fakultetu Sveučilišta u Zagrebu 2001. godine diplomirao je povijest umjetnosti i germanistiku, a od 2004. godine zaposlen je na Katedri za zaštitu kulturne baštine Odsjeka za povijesti umjetnosti istoga fakulteta. Doktorski rad o C. kr. Središnjem povjerenstvu i njegovu djelovanju u hrvatskim zemljama obranio je 2010. godine. Za rad na arhivskoj i bibliotečnoj građi dobio je stipendije Ernsta Macha (2007.) i Richarda Plaschke (2011./2012.) ŐAD-a. Glavni znanstveni interesi su mu povijesne te suvremene teorije i prakse konzerviranja. Govori i piše njemački i engleski, a služi se i talijanskim i portugalskim jezikom. Od 2016. godine glavni je urednik časopisa Godišnjak zaštite spomenika kulture Hrvatske.

dr. sc. Franko Ćorić / Filozofski fakultet Sveučilišta u Zagrebu / Odsjek za povijest umjetnosti / Katedra za zaštitu kulturne baštine / HR-10 000 Zagreb / fcoric@ffzg.hr

Zoraida Demori Staničić diplomirala je povijest umjetnosti i engleski jezika na Filozofskom fakultetu Sveučilišta u Zagrebu i na Fakultetu vanjske trgovine. Na Filozofskom fakultetu u Zagrebu magistrirala je i doktorirala povijest umjetnosti. Bila je zaposlena na Konzervatorskom odjelu u Splitu i u Hrvatskom restauratorskom zavodu. Umirovljena je 2017. godine. Od 1980. uključena je u znanstvene projekte Instituta za povijest umjetnosti i Odsjeka za povijest umjetnosti Filozofskog fakulteta u Zagrebu. Sudjelovala je u osnivanju Odsjeka za konzervaciju-restauraciju Umjetničke akademije u Splitu, na kojem je predavala. Trenutačno djeluje na Filozofskom fakultetu u Mostaru. Suradnica je Hrvatske enciklopedije, Likovne enciklopedije Hrvatske i Hrvatskog leksikona. Izlagala je na brojnim znanstvenim i stručnim skupovima u zemlji i inozemstvu.

dr. sc. Zoraida Demori Staničić / Viška 4 / HR-21000 Split / zdemoristanic@gmail.com

su rekonstrukcije starih slikarskih i kiparskih tehnologija te proučavanje starih pisanih izvora o umjetničkim tehnologijama.

Jurica Matijević / Umjetnička akademija Sveučilišta u Splitu / Odsjek za konzervaciju-restauraciju / Glagoljaška bb / HR-21 000 Split / jurica.matijevic@st.t-com.hr

Žana Matulić Bilač je konzervatorica-restauratorica savjetnica u Hrvatskom restauratorskom zavodu i izvanredna profesorica na Odsjeku za konzervaciju-restauraciju Umjetničke akademije Sveučilišta u Splitu. Restaurirala je više od stotinu djela slikarstva na platnu i drvu te djela polikromirane drvene plastike. Među inim, voditeljica je konzervatorsko-restauratorskih radova i istraživačkog projekta Buvininih vratnica, stručne skupine za obnovu glavnoga oltara i oltara sv. Dujma u splitskoj katedrali, radova na korskim klupama trogirске katedrale te istraživanja i radova na ikoni splitske *Gospe od Žnjana*, jednoga od najintrigantnijih djela naše srednjovjekovne umjetnosti. Od 1997. godine vodi programe preventivnog konzerviranja, obrađujući niz sakralnih zbirki i inventara. Angažirana je u promišljanju suvremenih aspekata zaštite spomenika, organizira izlaganja, izlaže i piše multidisciplinarne studije o djelima na kojima radi.

Žana Matulić Bilač / Hrvatski restauratorski zavod / Restauratorski odjel Split / Porinova 2A / HR-21 000 Split / zmatulic@h-r-z.hr

Miona Miliša rođena je 1982. godine u Splitu. Godine 2005. diplomirala je na Umjetničkoj akademiji Sveučilišta u Splitu i stekla zvanje dipl. restaurator-konzervator. U Zadru je 2013. godine završila poslijediplomski doktorski studij Arheologija istočnog Jadrana (smjer: srednjovjekovna arheologija). Od 2006. godine zaposlena je na Umjetničkoj akademiji u Splitu, gdje predaje na Odsjeku konzervacije i restauracije. U zvanje predavača izabrana je 2012. godine, a 2017. u zvanje docenta. Dosad je objavila desetak znanstvenih i stručnih radova, sudjelovala na desetak znanstvenih i stručnih skupova te na dvadesetak stručnih restauratorskih projekata. Uzimanjem uzoraka ostataka izvorne boje na kamenoj skulpturi bavi se od 2012. godine u sklopu suradnje s muzejima u kojima se nalaze spomenici.

dr. sc. Miona Miliša / Umjetnička akademija Sveučilišta u Splitu / Odsjek za konzervaciju-restauraciju / Fausta Vrančića 17 / HR-21 000 Split / mionamilisa@yahoo.co.uk

Laura Speranza diplomirala je povijest umjetnosti na Sveučilištu u Firenci. Radila je kao kustosica u Arezzu, vodila dva državna muzeja i mnoge konzervatorske projekte. Od 2000. godine radi za institut Opificio delle Pietre Dure u Firenci, gdje je voditeljica triju konzervatorskih odjela: drvene skulpture, bronce, keramike i plastike. Među mnogim projektima vodila je i konzervatorsko-restauratorske radove na polikromiranim drvenim skulpturama Donatella, Brunelleschija, Benedetta da Maiana i Grinlinga Gibbona. Urednica je nekoliko publikacija. Često sudjeluje na stručnim konferencijama, posebno onima s područja konzervatorsko-restauratorske struke.

Laura Speranza / Opificio delle Pietre Dure e Laboratori di Restauro / Via Alfani, 78 / Fortezza da Basso / Viale F. Strozzi, 1 / IT-50129 Firenze / laura.speranza@beniculturali.it

polychrome wood. His area of interest is the reconstruction of old painting and sculpting techniques, as well as the study of written sources that deal with art techniques.

Jurica Matijević / Arts Academy of the University of Split / Department of Conservation-Restoration / Glagoljaška bb / HR-21 000 Split / jurica.matijevic@st.t-com.hr

Žana Matulić Bilač is a consultant conservator-restorer at the Croatian Conservation Institute. She is also an associate professor at the Department for Conservation-Restoration of the Arts Academy in Split. She has worked on more than a hundred paintings on canvas and wood, and polychrome wooden sculptures. Amongst other projects, she supervised the conservation and research on The Doors of Andrija Buvina project, an expert group for the restoration of the main altar and altar of St. Domnius in the Split Cathedral, work on choir benches from the Trogir Cathedral, and research and conservation of the *Our Lady of Žnjan* icon from Split, one of the most intriguing pieces of Croatian medieval art. From 1997, she has supervised preventive conservation projects, working on a series of sacral collections and inventories. She is passionate about contemporary protection of monuments and is actively involved in presenting, exhibiting and writing multidisciplinary studies about her work.

Žana Matulić Bilač / Croatian Conservation Institute / Split Department for Conservation / Porinova 2A / HR-21 000 Split / zmatulic@h-r-z.hr

Miona Miliša was born in 1982 in Split. In 2005, she graduated from the Arts Academy of the University of Split with a degree in Conservation-restoration. In 2013, she finished the postgraduate doctoral programme Archaeology of the Eastern Adriatic (medieval archaeology). Since 2006, she has been employed at the Arts Academy in Split where she teaches at the Conservation-Restoration Department. She became a lecturer in 2012 and a professor in 2017. So far, she has published about ten research and professional papers, participated in around ten scientific and professional conferences and about twenty restoration projects. Since 2012, she has been collecting paint samples from wooden sculptures in cooperation with museums where the monuments are located.

Miona Miliša, PhD / Arts Academy of the University of Split / Department of Conservation-Restoration / Fausta Vrančića 17 / HR-21 000 Split / mionamilisa@yahoo.co.uk

Laura Speranza graduated and specialized in Art History at the University of Florence. She was appointed at the Superintendency of Arezzo where she organised exhibitions, directed two state museums and led many restoration projects. Since 2000, she has been with the Opificio delle Pietre Dure Institute in Florence, where she is the head of three Restoration Departments: Wooden Sculptures, Bronze, Ceramic and Plastic Materials. Among many projects, she led the restoration of important polychrome wooden sculptures by Donatello, Brunelleschi, Benedetto da Maiano and Grinling Gibbons. She edits publications and participates in conferences specialising in conservation.

Laura Speranza / Opificio delle Pietre Dure and Restoration Laboratory / Via Alfani, 78 / Fortezza da Basso / Viale F. Strozzi, 1 / IT-50129 Florence / laura.speranza@beniculturali.it

Ivana Svedružić Šeparović diplomirala je povijest umjetnosti i arheologiju na Filozofskom fakultetu Sveučilišta u Zagrebu. Od 1994. do 2017. godine bila je zaposlena na mjestu višeg savjetnika za pokretna kulturna dobra na Konzervatorskom odjelu Ministarstva kulture RH u Splitu, te na Odsjeku za konzervaciju i restauraciju Umjetničke akademije u Splitu, gdje predaje kolegij „Etika i estetika u restauraciji”. Od 2017. godine zaposlena je u Hrvatskom restauratorskom zavodu na radnom mjestu pročelnice Službe za odjele izvan Zagreba II. Od 2016. godine doktorandica je na Odsjeku za povijest umjetnosti Filozofskog fakulteta u Zagrebu s temom liturgijskog ruha 19. stoljeća Franjevačke provincije Presvetog Otkupitelja. Sudjelovala je na više znanstvenih skupova te je autorica nekoliko znanstvenih radova na temu urbanizma i pokretnih kulturnih dobara.

Ivana Svedružić Šeparović / Hrvatski restauratorski zavod / Restauratorski odjel Split / Porinova 2a / HR-21000 Split / isseparovic@h-r-z.hr

Jelena Trajković stekla je svoje stručno (1984.) i znanstveno (mr. sc. 1993. godine i dr. sc. 1998. godine) zvanje na Drvno-tehnološkom odsjeku Šumarskog fakulteta, gdje predaje od 1985. godine. Od 2014. godine je predstojnica Zavoda za znanost o drvu, gdje je smještena ksiloteka s približno 3000 daščica iz različitih krajeva svijeta. Godine 1994. završila je International Course on Wood Conservation Technology u organizaciji norveškoga Institute of Technology iz Trondheima. Drži predavanja o anatomiji drva na makroskopskoj, mikroskopskoj i submikroskopskoj razini. Također proučava fizička svojstva modificiranog drva te anatomiju drva različitih klonova topole, a analizirala je i identificirala stotine uzoraka drva različitog izvora.

dr. sc. Jelena Trajković / Šumarski fakultet / Zavod za znanost o drvu / Svetošimunska cesta 25 / HR-10 000 Zagreb / jtrajkovic@sumfak.hr

Regina Urbanek diplomirala je restauriranje na Visokoj školi za primijenjene umjetnosti u Beču 1986. godine. Od 1986. do 1989. godine radi kao restauratorica u restauratorskim radionicama Muzeja povijesti umjetnosti u Beču te predaje na bečkoj Akademiji likovnih umjetnosti. Od 1989. godine radi u Kölnu kao samostalna restauratorica i povremena predavačica na tamošnjem Tehničkom veleučilištu. Doktorski rad na temu Zlatna komora sv. Uršule u Kölnu obranila je 2007. godine na Sveučilištu u Bonnu. Od 2007. godine predaje na Tehničkom sveučilištu u Kölnu, a zanimaju je ključni aspekti polikromije, zaštita kulturne baštine i lasersko čišćenje.

dr. sc. Regina Urbanek / Technische Hochschule Köln / Cologne Institute of Conservation Sciences / Ubierring 40 DE-50678 Köln / regina.urbanek@th-koeln.de

Marisol Valenzuela zaposlena je kao konzervator-restaurator na Istituto Superiore per la Conservazione e il Restauro u Rimu. Od 1998. godine voditeljica je Laboratorija za konzerviranje drvenih polikromiranih predmeta. Predaje na diplomskim studijima te provodi istraživanja i savjetovanja u zemlji i inozemstvu. Radila je na brojnim spomenicima te je surađivala s nizom institucija diljem svijeta (Zabranjeni grad u Pekingu, 2004.; kompleks palača i vrtova planinskog ljetnikovca u Chengedeu, 2007.; Arheološki muzej u Kairu, 2008.-2009.; Izalco u El Salvadoru, 2011.;

Ivana Svedružić Šeparović earned a degree in Art History and Archaeology at the Faculty of Humanities and Social Sciences, University of Zagreb. From 1994 to 2017, she worked as a Senior Advisor for Movable Cultural Goods at the Split Conservation Department of the Croatian Ministry of Culture, and at the Conservation-Restoration Department of the Arts Academy in Split where she taught the course Ethics and Aesthetics in Restoration. Since 2017, she has been working at the Croatian Conservation Institute as Head of the Division for Branch Departments II. In 2016, she became a doctoral candidate at the Department of History of Art at the Faculty of Humanities and Social Sciences, University of Zagreb, working on liturgical vestments from the Franciscan Province of the Most Holy Redeemer in the 19th century. She has taken part in several scientific conferences and is the author of several scientific papers on urbanism and movable cultural goods.

Ivana Svedružić Šeparović / Croatian Conservation Institute / Split Department for Conservation / Porinova 2a / HR-21000 Split / isseparovic@h-r-z.hr

Jelena Trajković obtained her professional (1984) and scientific (MSc in 1993 and PhD in 1998) education at the Wood Technology Section of the Faculty of Forestry, where she has been teaching since 1985. In 1994, she successfully completed the International Course on Wood Conservation Technology programme organised by the Norwegian Institute of Science and Technology in Trondheim. She gives lectures on wood anatomy at a macroscopic, microscopic and sub microscopic level. She also studies physical properties of modified wood, and wood anatomy of different poplar clones. Over the years, she has analysed and identified hundreds of wood samples of different origin. Since 2014, Jelena Trajković has been the head of the Department of Wood Science where the collection of approximately 3000 wood samples (*xylarium*) from all over the world is located.

Jelena Trajković, PhD / Faculty of Forestry of the University of Zagreb / Department for Wood Science / Svetošimunska cesta 25 / HR-10 000 Zagreb / jtrajkovic@sumfak.hr

Regina Urbanek studied restoration and conservation at the University of Applied Arts Vienna, until 1986. Between 1986 and 1989, She worked as a restorer at the Kunsthistorisches Museum in Vienna, and held a lectureship at the Academy of Fine Arts Vienna. From 1989 until 2007, she worked as a freelancer in Cologne, and as a lecturer at the University of Applied Sciences. In 2007, she received her doctorate at the University of Bonn, with the thesis The Golden Chamber of St. Ursula in Cologne. Since the winter semester 2007/08, she has held a professorship at the Technical University of Cologne, focusing on polychromy, cultural heritage preservation and laser cleaning.

Regina Urbanek, PhD / University of Applied Sciences / Cologne Institute of Conservation Sciences / Ubierring 40 DE-50678 Cologne / regina.urbanek@th-koeln.de

Marisol Valenzuela is a conservator-restorer at the ISCR, Istituto Superiore per la Conservazione e il Restauro, Rome, Italy. In 1998, she became the Director of the Wooden Polychrome Artefacts Conservation Laboratory. She teaches master's degree courses and she carries out

Zemaljski muzej u Sarajevu, 2017.). Od 1991. do 1994. godine radila je u Nacionalnom arheološkom parku Pompeji.

Marisol Valenzuela / Istituto Superiore per la Conservazione ed il Restauro / Via di San Michele, 23 / IT-00153 Roma / marisol.valenzuela@beniculturali.it

Pavuša Vežić redoviti je profesor u mirovini. Rođen je u Makarskoj 1947. godine. Srednju školu pohađao je u Rijeci, a studirao u Zadru. Bio je konzervator na Zavodu za zaštitu spomenika kulture (od 1968. do 1999. godine) i predavač na Odjelu za povijest umjetnosti Filozofskoga fakulteta, poslije Sveučilišta, u Zadru (do 2017. godine). Bavio se istraživanjem, zaštitom i prezentiranjem te znanstvenom obradom povijesne arhitekture u Dalmaciji, osobito u Zadru, a posebno ranokršćanskim i predromaničkim građevinama. Važna tema bila mu je rotonda crkve sv. Donata u Zadru te njezina kamena i drvena plastika. Na tu je temu magistrirao 1992. godine i objavio zasebnu monografiju 2002. godine.

dr. sc. Pavuša Vežić / Ulica Špire Brusine 11 / HR-20 000 Zadar / pavusa.vezic1@zd.t-com.hr

Danko Zelić je povjesničar umjetnosti, znanstveni savjetnik na Institutu za povijest umjetnosti u Zagrebu. U svojstvu naslovnog docenta predaje na Odjelu za povijest umjetnosti Sveučilišta u Zadru. Bavi se urbanom te arhitektonsko-urbanističkom poviješću srednjovjekovnih gradova hrvatske obale, poglavito Šibenika, Trogira i Dubrovnika, s ishodištem u izučavanju primarne arhivske građe, mahom dokumentarnih izvora od 15. do 17. stoljeća, pisanih latinskim i talijanskim jezikom. Objavio je dvije knjige s integralnim tekstovima kasnosrednjovjekovnih i ranonovovjekovnih registara nekretnina – dubrovačke komune i dubrovačkih katedralnih rizničara.

dr. sc. Danko Zelić Institut za povijest umjetnosti / Ulica grada Vukovara 68 / HR-10000 Zagreb / danko@ipu.hr

research and consults in Italy and abroad. She has worked on numerous monuments and cooperated with many institutions around the world (the Forbidden City in Beijing, 2004, the Chengde Mountain Resort in Hebei province, 2007, Archaeological Museum of Cairo, 2008-2009, Izalco in El Salvador, 2011, the National Museum of Sarajevo, 2017). Previously, she worked at the Archaeological Site of Pompeii (1991/94).

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Pavuša Vežić is a retired tenured professor, born in Makarska in 1947. He attended high school in Rijeka and studied in Zadar. He worked as a conservator at the Institute for the Protection of Cultural Monuments (1968 – 1999), and then as a lecturer at the Department of Art History of the University of Zadar (until 2017). He did research, protection and presentation, and scientific analysis of historical architecture in Dalmatia, particularly in Zadar, with a special focus on early Christian and pre-Romanesque buildings. The rotunda in the Church of St. Donatus in Zadar and its stone and wooden sculptural elements were the topic of his 1992 Master's thesis and were published as a monograph in 2002.

Pavuša Vežić, PhD / Ulica Špire Brusine 11 / HR-20 000 Zadar / pavusa.vezic1@zd.t-com.hr

Danko Zelić is a senior research adviser at the Institute of Art History in Zagreb, and adjunct professor at the Department of Art History, University of Zadar. His research focuses on the history of urban architecture and urban development of medieval towns in Croatia, in particular Šibenik, Trogir and Dubrovnik, with an emphasis on the study, editing and publishing of source material – 14th to 17th century texts written in Latin and vernacular Italian. He has published two books with texts from the medieval and early modern property registers of the Dubrovnik Commune and Dubrovnik Cathedral Treasury.

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Izložba / Exhibition

Split, Galerija umjetnina, 8. 5. – 8. 6. 2018. / Split, Museum of Fine Arts, May 8th – June 8th 2018

Skup / Conference

Split, Galerija umjetnina, 8. 5. 2018. / Split, Museum of Fine Arts, May 8th 2018

Organizacija izložbe i skupa / Exhibition and conference organisation:

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Znanstveni savjenik / Scientific advisor:

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3D animacija / 3D animation:

Mladen Čulić

Računalna rekonstrukcija polikromije vratnica / Computer reconstruction of the door's polychromy:

Mladen Čulić

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Izložba i skup ostvareni su sredstvima Ministarstva kulture RH, Grada Splita, Splitsko-dalmatinske županije, Zaklade Hrvatske akademije znanosti i umjetnosti, Turističke zajednice grada Splita i Hrvatskoga restauratorskog zavoda. / The exhibition and conference are funded by the Ministry of Culture of the Republic of Croatia, City of Split, Split-Dalmatia County, Foundation of the Croatian Academy of Sciences and Arts, Tourist Board of Split, and the Croatian Conservation Institute.



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