



## Na završetku desetljeća obnove Peristila

Konzervatorsko-restauratorski radovi na Peristilu Dioklecijanove palače predstavljaju bez sumnje po mnogo čemu najznačajniji projekt u sklopu obnove povijesne jezgre Splita u novijem razdoblju. Peristil je središte i najrepresentativniji dio carske palače, ali i srce grada koji se iz nje iznjedrio. Taj trg na kojem se najbolje vide povijesni slojevi nastanka i razvitka grada postao je njegov svojevrsni simbol i najveća turistička atrakcija. On je najljepša scenografija za kulturne priredbe, ali i pozornica gradskog života.

U sedamnaest stoljeća svoje povijesti nebrojeno puta njegova je arhitektura pregradljivana, obogaćivana novim stilovima i značajnim sadržajima vjerskoga i svjetovnog karaktera. Čudesno je kako je nakon svih tih zahvata antička arhitektura s granitnim i mramornim stupovima, korintskim kapitelima, lukovima i vijencima ostala gotovo u potpunosti sačuvana, ali napačena oštećivanjima i prekrivena višestoljetnom prljavštinom.

U posljednjih dvjestotinjak godina na Peristilu su se nizali brojni konzervatorski i restauratorski zahvati različite razine i učinka, što pokazuje da je Peristil odvijek bio u žizi stručne, ali i široke javnosti. Tim parcijalnim zahvatima rješavali su se pojedini problemi, a ponekad i stvarali novi.

Na početku trećega tisućljeća konačno smo svjedoci opsežnog projekta kojim se po prvi put sagledava taj prostor u cjelini. Potaknut inicijalnim sredstvima donacija World Monuments Fund-a, uz dodatnu finansijsku potporu Ministarstva kulture RH, zahvat je najvećim dijelom financiran Gradom Split. U početku zamislio je čišćenje antičke kamene arhitekture, preraštao je u složen konzervatorski i restauratorski posao koji je obuhvatiti sve segmente, od sanacije temelja i konstrukcije, preko čišćenja i konzervacije kamena, žbuke i ostalih materijala do krajnje prezentacije toga slojevitog spomenika.

Obzirom na važnost Peristila koji je najznačajniji dio splitske povijesne jezgre upisane na Listu svjetske kulturne baštine, te obzirom na složenost konzervatorskih problema i uključivanje brojnih domaćih i stranih stručnjaka i institucija, njegova obnova predstavlja jedan od najznačajnijih konzervatorsko-restauratorskih zahvata u Hrvatskoj. To je i izvrsna prigoda da se mladi stručnjaci usavrše u najsvremenijim konzervatorskim i restauratorskim postupcima.

## At the end of a Decade of the Peristyle Restoration

The conservation and restoration work on the Peristyle of Diocletian's Palace has been in many ways the most important project in recent period within the scope of renovation of the historical core of the town of Split. The Peristyle is the centre and the most impressive part of the imperial palace, and also the heart of the town which has grown around it. The square, which reflects historical layers of the creation and development of the town, has become its symbol and its main tourist attraction. It serves as the most attractive backdrop for cultural events, and a stage at which public life evolves.

During the seventeen centuries of its history, the architecture of the Peristyle has been altered many times, enriched with new styles and important elements, both religious and secular in character. Amazingly, in spite of all the interventions, the ancient architecture with its granite and marble columns, Corinthian capitals, arches and cornices, has been preserved almost completely, though nonetheless damaged and covered with centuries of grime.

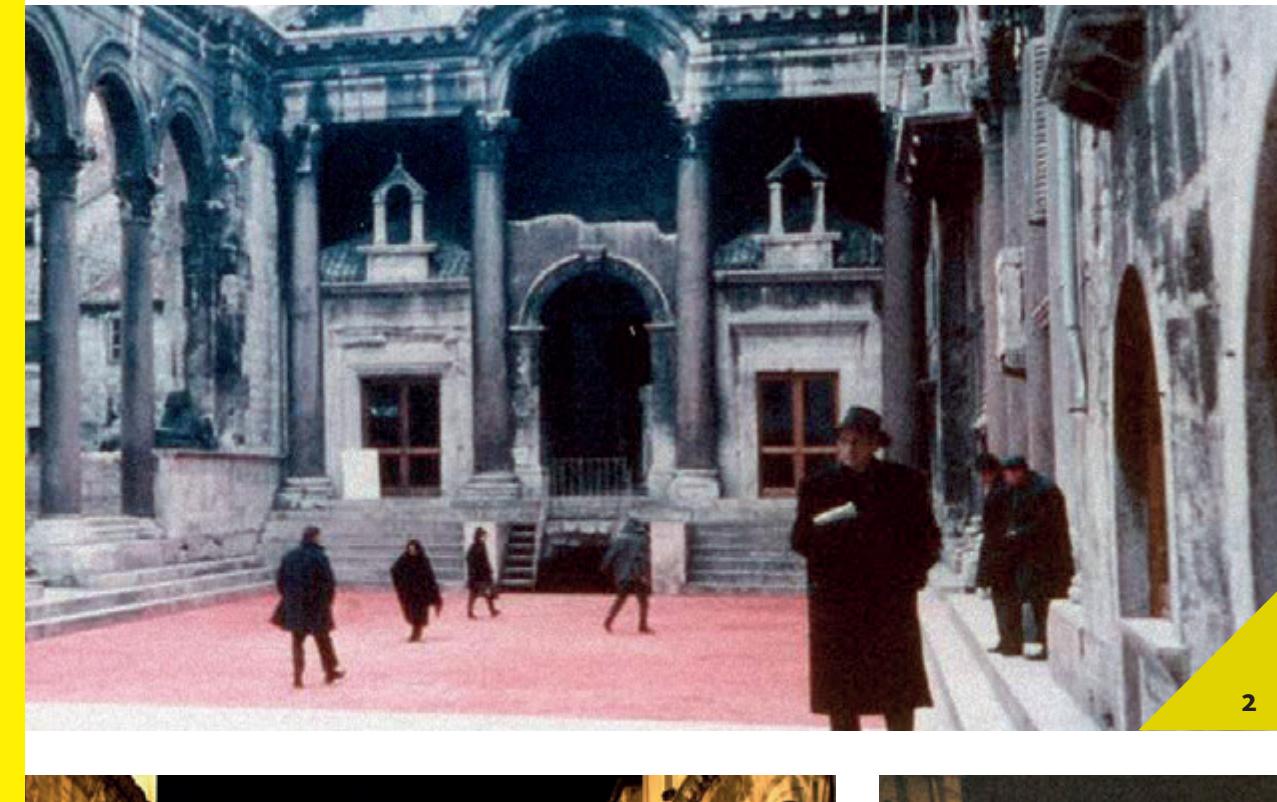
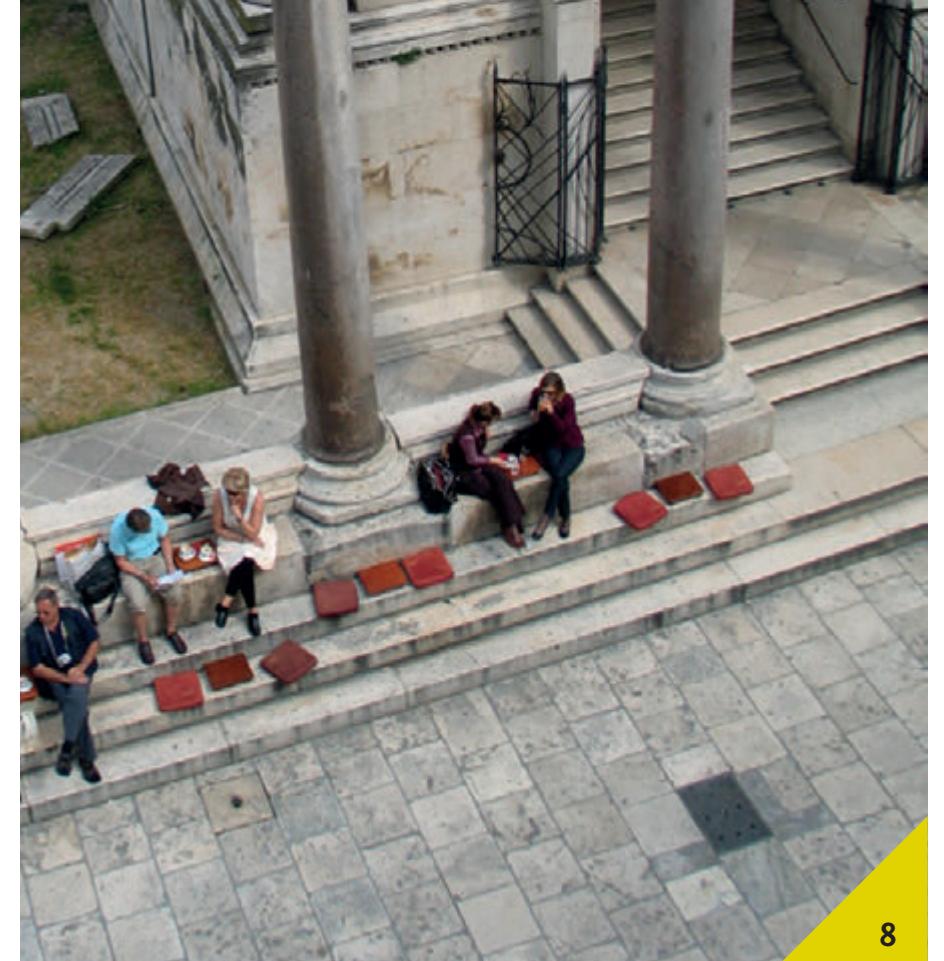
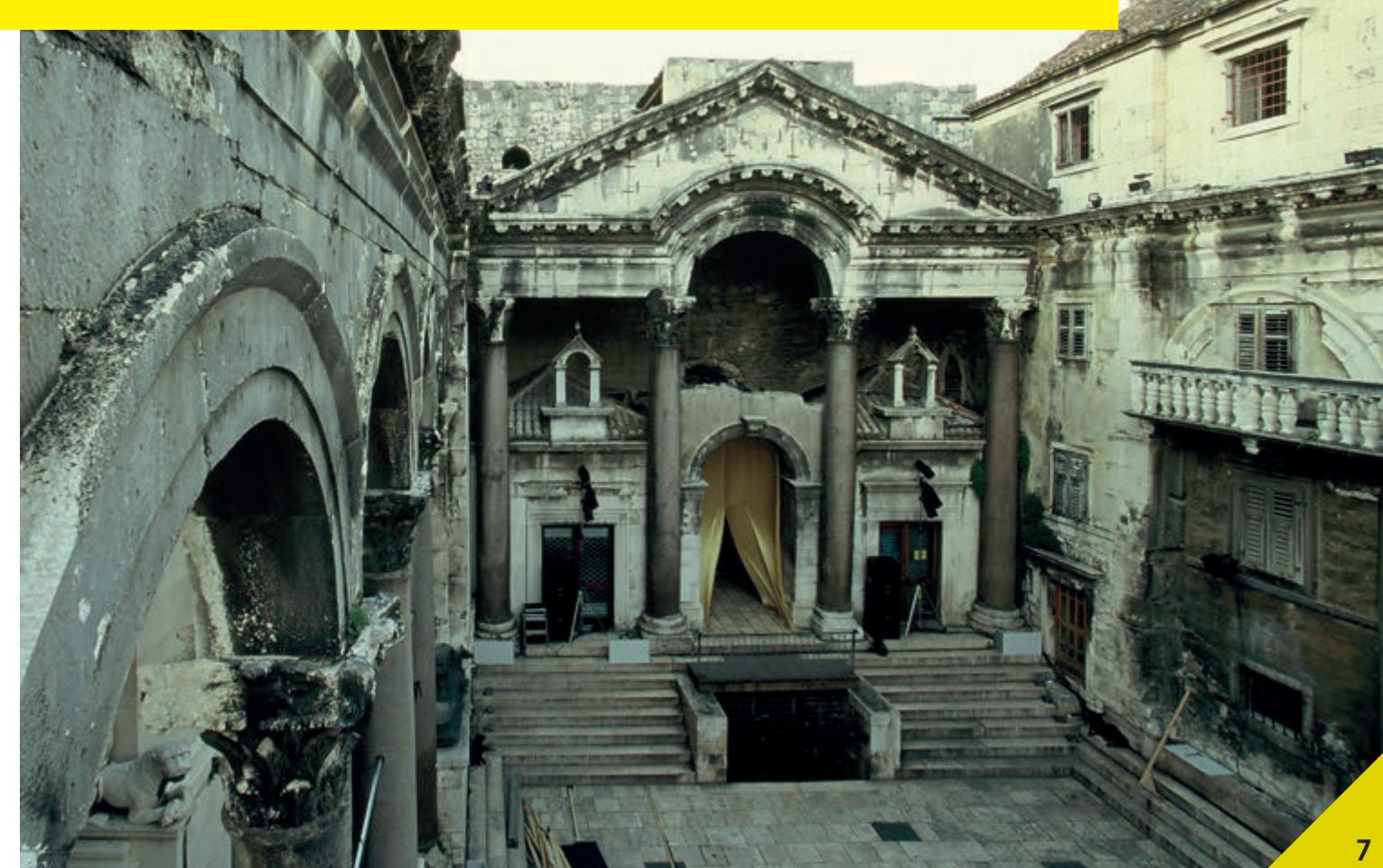
Over the past two hundred years, the Peristyle has seen numerous conservation and restoration interventions of various scopes and outcomes, indicating that the Peristyle has always attracted attention of experts, and of the general public. Such partial interventions resolved specific problems, but sometimes also resulted in the creation of new ones.

At the beginning of the third millennium, we have finally witnessed a comprehensive project which, for the first time, encompassed the complex in its entirety. The work was stimulated by initial grant of the World Monuments Fund, and additional financial support of the Ministry of Culture of the Republic of Croatia, while most of the funding was provided by the City of Split. The project, at first envisaged as the cleaning of the ancient stone architecture, has turned into a complex conservation and restoration endeavour, encompassing all the aspects; from the rehabilitation of the foundations and structure, through the cleaning and conservation of stone, plaster and other materials, to the final presentation of this multi-layered monument.

In view of the importance of the Peristyle as the most important element of the historical core of Split, inscribed on the UNESCO World Heritage List, and in view of the complexity of conservation issues and the involvement of a large number of Croatian and foreign experts and institutions, its renovation has been one of the most important conservation and restoration campaigns in Croatia. In addition, it has provided an excellent opportunity for the professional development of young experts in state-of-the-art conservation and restoration procedures.

1. PREPOSTAVLJENI IZVORNI IZGLJED PERISTILA DIOCLECIJANOVOJ PALAČE PREMA GEORGU NIEMANNU (1910.); 2, 3, 4. „CRVENI PERISTIL“, URBANA INTERVENCIJA U DIOCLECIJANOVOJ PALAČI, 11.01.1968.; 5. PERISTIL, 2003. GODINE; 6. PERISTIL, DEVODESETIH GODINA PROŠLOG STOLJEĆA; 7. PERISTILE PRVE POČETKA KONZERVATORSKO-RESTAURATORSKOG ZAHVATA; 8. DIO ISTOČNE KOLONADE PERISTILA; 9. „ŽUTI PERISTIL“, URBANA INTERVENCIJA U DIOCLECIJANOVOJ PALAČI, 19.11.2009.

1. THE ORIGINAL VIEW OF THE PERISTYLE, DIOCLETIAN'S PALACE, ACCORDING TO GEORGE NIEMANN (1910.); 2, 3, 4. „RED PERISTYLE“, AN URBAN INTERVENTION IN DIOCLETIAN'S PALACE, 11.01.1968.; 5. PERISTYLE, 2003.; 6. PERISTYLE IN THE 1990S; 7. PERISTYLE BEFORE CONSERVATION-RESTORATION INTERVENTION; 8. PART OF THE EASTERN COLONNADE; 9. „YELLOW PERISTYLE“, AN URBAN INTERVENTION IN DIOCLETIAN'S PALACE, 19.11.2009.



## Dioklecijanova palača

Nakon dvadeset i jedne godine vladanja, 1. svibnja 305. godine rimski car Gaj Aurelije Valerije Dioklecijan abdicira i povlači se u raskošno boravište koje je pripremio za svoju mirovinu – Palaču čija je izgradnja započela desetak godina ranije u sredini najeveće uvalе Marjanskog poluotoka, nedaleko od Salone uz koju povijesni izvori vezuju carevo porijeklo. Monumentalna rezidencija umirovljenog vladara posjeduje sve bitne elemente antičkoga grada, vojnog logora i raskošne rimske vile kasnog tipa te kao takva predstavlja možda i najblistaviji primjer ostvarenja ideje palače-kastruma na pragu kasne antike.

Premda izgrađena na geografski iznimno važnom položaju, u sredini uvale s morske strane dobro zaštićena otocima, a s kopnene planinama, Palača se nalazila na samoj periferiji salonitanskog agera gdje joj je prijetila opasnost od u to vrijeme učestalih prodora barbarских plemena. Carevi su arhitekti stoga morali razraditi dobar obrambeni sustav. Sa osnovnim tlocrtnim pravokutnikom, organizacijom unutrašnjeg prostora i osobito načinom oblikovanja kopnenih zidova, palača podsjeća na rimske logore. Arhitektonski koncept njezina južnog dijela i arhitektura pročelja okrenutog moru, međutim, otkrivači pjezinu glavnu funkciju raskošan i udoban carev stan. No, građevni program koji je Dioklecijan postavio pred svoje arhitekte imao je još jednu važnu stavku: osigurati sadrževe vezane uz careve kultne potrebe te potrebe dvorskog protokola i ceremonijala. Dioklecijan je, naime, za vrijeme svoje vladavine formirao novi, teokratski ceremonijal slavljenja cara po uzoru na orijentalne absolutističke tradicije. U pažljivo scenski izrežanim obredu divinizirana ličnost vladara se pojavljivala pred podannicima. Oni su mu klečeći ljubili skute ili se klanjali prostiranjem cijelog tijela po podu. Obred se u Palači odvijao u velikoj "otvorenoj dvorani" u produžetku Carda.

Dioklecijan umire vjerojatno 316. godine. Nakon njegove smrti palača se postupno transformira, a naseljavanjem stanovništva, osobito nakon pada Salone, započinje njezina pretvorba u grad. Građevine podignute u razdoblju srednjeg vijeka, između sedmog i petnaestog stoljeća, palači su dale gradsku strukturu koju je ona zadržala do današnjih dana. Graditeljske promjene koje su se dogadale unutar zidina Palače, temeljene na spontanom promišljanju o urbanizmu i gradogradnji, nisu mimošte ni kolonade Peristila. Usprkos intervencijama koje su tijekom stoljeća poduzimane unutar njega, stupovi Peristila sa svojim oblikovnim elementima najvećim dijelom ipak sačuvano u svom izvornom obliku. Rekonstrukciju izgleda Palače kroz različita razdoblja omogućila je stoljeća istraživanja njezinih ostataka. Skice i crteži stranih putnika i istraživača, čiji je zanimanje ona odvukle pobudivala, pružaju dragocjen zapis o tome kako je grad prema svojim potrebama mijenjao antičku strukturu. Istraživanje započinjeno s Andreom Palladiom u šesnaestom stoljeću, a nastavljaju se s Antoniom Canalettom i Johannom Bernhardom Fisher von Erlachom. Među arheologima, arhitektima i povjesničarima koji su se u narednim stoljećima bavili ovom problematikom nalazimo brojna velika imena: Charles-Louis Clérisseau, Joseph de Lavallée, Louis François Cassas, Robert Adam, Ernest Hébrard, Jacques Zeiller, Georg Niemann, Eynar Dygge.

## Diocletian's Palace

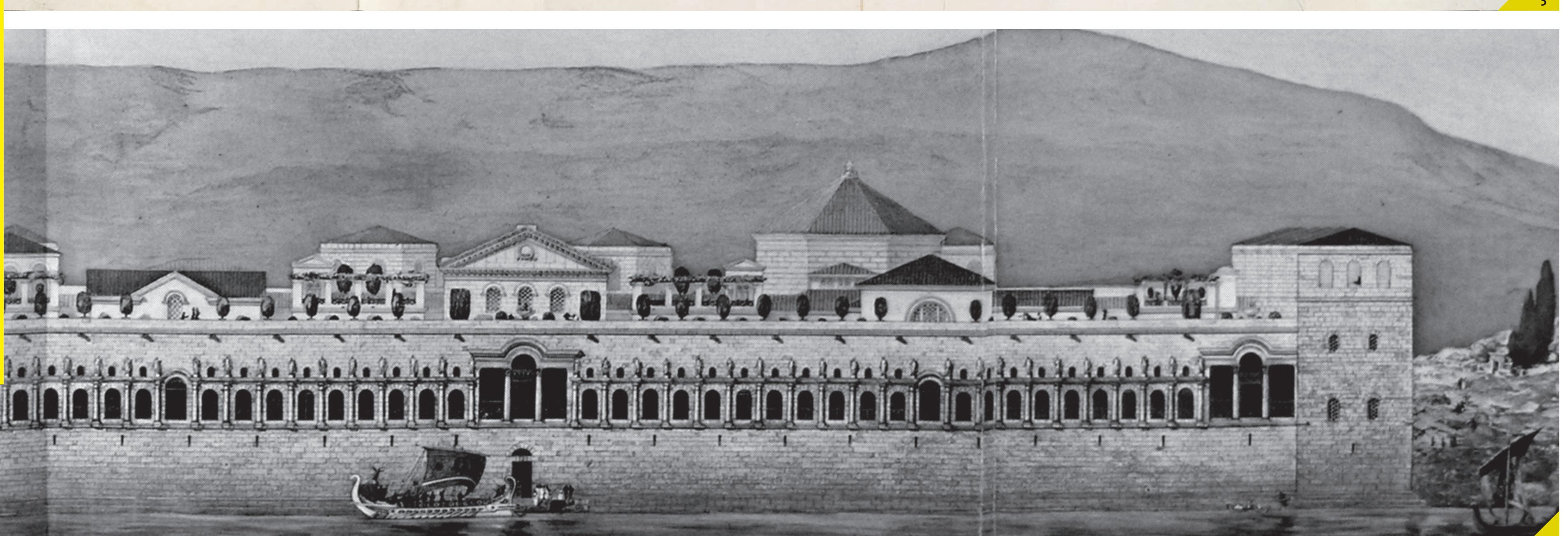
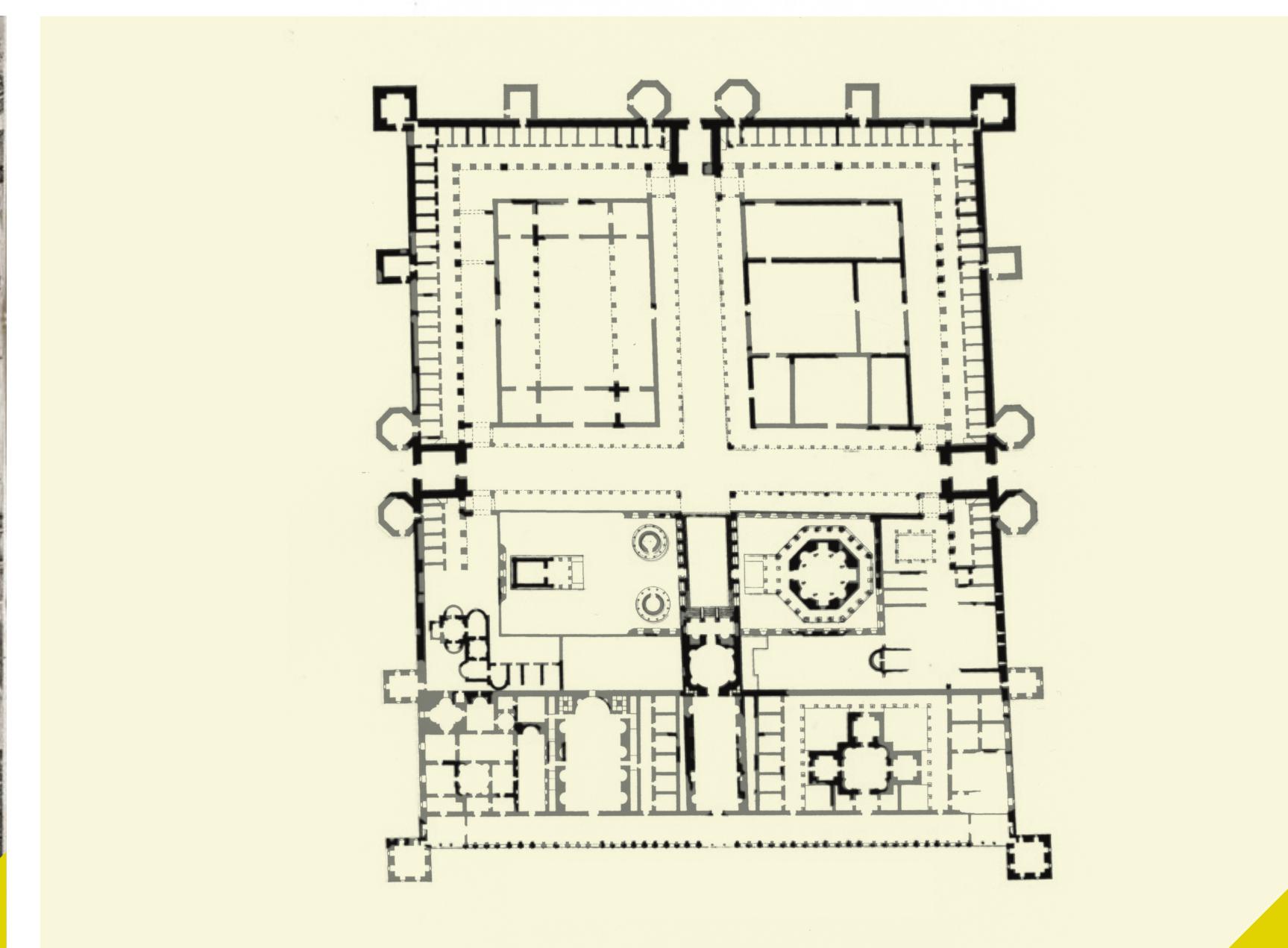
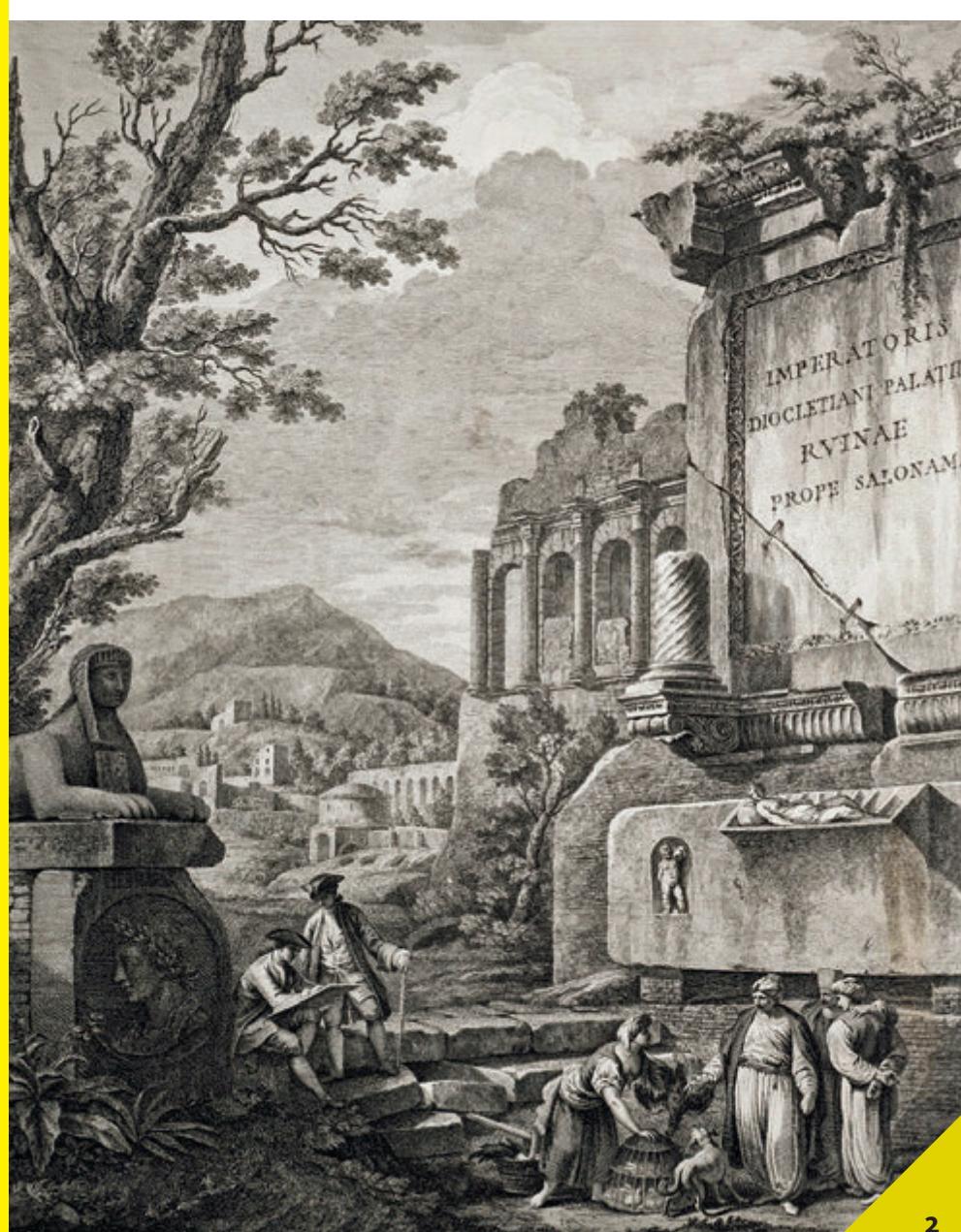
Roman Emperor Diocletian - Gaius Aurelius Valerius Diocletianus, after twenty-one year period of his reign, on May 1, 305 abdicated from the throne and retreated to the luxurious residence he had previously prepared for his retirement – palace, the construction of which was initiated some ten years before his abdication, in the midst of the greatest bay of Marjan peninsula, close to Salona, which is according to historical data, linked to the Emperor's origin. The monumental residence of the retired sovereign has all the essential elements of the ancient town, military camp and luxurious late Roman villa, therefore maybe presenting the prime example of the realisation of the concept palace-castrum at the eve of late ancient age.

Although it was constructed in the place with exceptional geo-strategic importance, in the midst of the bay, well protected by islands from the seaside, and by mountains from the coast, the palace was at the very outskirts of the Salonian public land, consequently threatened by the penetrations of the barbarian tribes, occurring rather often in those days. The Emperor's architects therefore had to project and develop efficient defence system of the palace. The palace, due to its basic layout rectangular form, organisation of the inner space and particularly the way of modelling the land walls, resembles the Roman camps. However, the architectural concept of its southern part and the architecture of the facade facing the sea reveal its main purpose: the Emperor's luxurious and comfortable apartment. The brief that Diocletian gave his architects contained another important item: the provision of features related to the imperial cult and to court protocol and ceremony. During his rule, Diocletian had formed a new, theocratic ceremonial of glorification of the emperor similar to those practiced in the oriental absolutistic tradition. The divinised person of the ruler would appear in front of his subjects in a carefully staged rite. Kneeling, they would kiss the hem of his robe or prostrate themselves in front of him. This rite went on in the Palace in the great "open hall" at the extension of the Cardo.

Diocletian probably died in the year 316. After his death, the Palace was gradually transformed, and due to being inhabited by the surrounding population, particularly after the fall of Salona, initiated the process of its transformation into the city. The buildings constructed in Middle Ages, between the 7th and 15th century have given to the Palace the city structure, which it has managed to preserve until nowadays. The architectural changes that went on within the walls of the city based on ad hoc considerations about urbanism and city development did not bypass the colonnade of the Peristyle. In spite of interventions that were undertaken inside it during the centuries, the colonnade of the Peristyle is, together with its formal elements, mostly preserved in its original form. The research of the Palace remnants, undertaken in the centuries of its history has enabled the reconstruction of the view of the Palace through the different periods. The drawings and designs of the foreign travellers and researchers, who have always been interested in the Palace, provide the precious written document on how the city has, in conformity with its needs, been changing the ancient structure. The research started with Andrea Palladio in the 16th century, and continued with Antonio Canaleto and Johan Bernhard Fisher von Erlachom. Numerous distinguished and renowned names can be found in the list of the archaeologists, architects and historians, who were dealing with these issues in the centuries to come: Charles-Louis Clérisseau, J. Lavallée, LouisFrançois Cassas, Robert Adam, Ernest Hébrard, Jacques Zeiller, Georg Niemann, Eynar Dygge...

1. POGLED NA ŽELJEZNA VRATA, R. ADAM, 1764.; 2. CAPRICCO S RUŠEVINAMA DIOKLECIJANOVE PALAČE U SPLITU, R. ADAM, 1764.; 3. TLOCRT DIOKLECIJANOVE PALAČE, PREMA J. MARASOVIĆU; 4. KARTA SPLITA S OKOLICOM, R. ADAM, 1764.; 5. POPREĆNI PRESEK PALACE, R. ADAM, 1764.; 6. REKONSTRUKCIJA JUŽNOG PROČELJA PALACE, E. HÉBRARD, 1912.

1. VIEW OF THE PORTA FERREA, R. ADAM, 1764; 2. CAPRICCO WITH RUINS OF DIOCLETIAN'S PALACE AT SPLIT, R. ADAM, 1764; 3. PLAN OF DIOCLETIAN'S PALACE, J. MARASOVIĆ; 4. MAP OF SPLIT WITH SURROUNDINGS, R. ADAM, 1764; 5. CROSS SECTION OF THE PALACE, R. ADAM, 1764; 6. RECONSTRUCTION OF THE SOUTH FAÇADE OF THE PALACE, E. HÉBRARD, 1912.



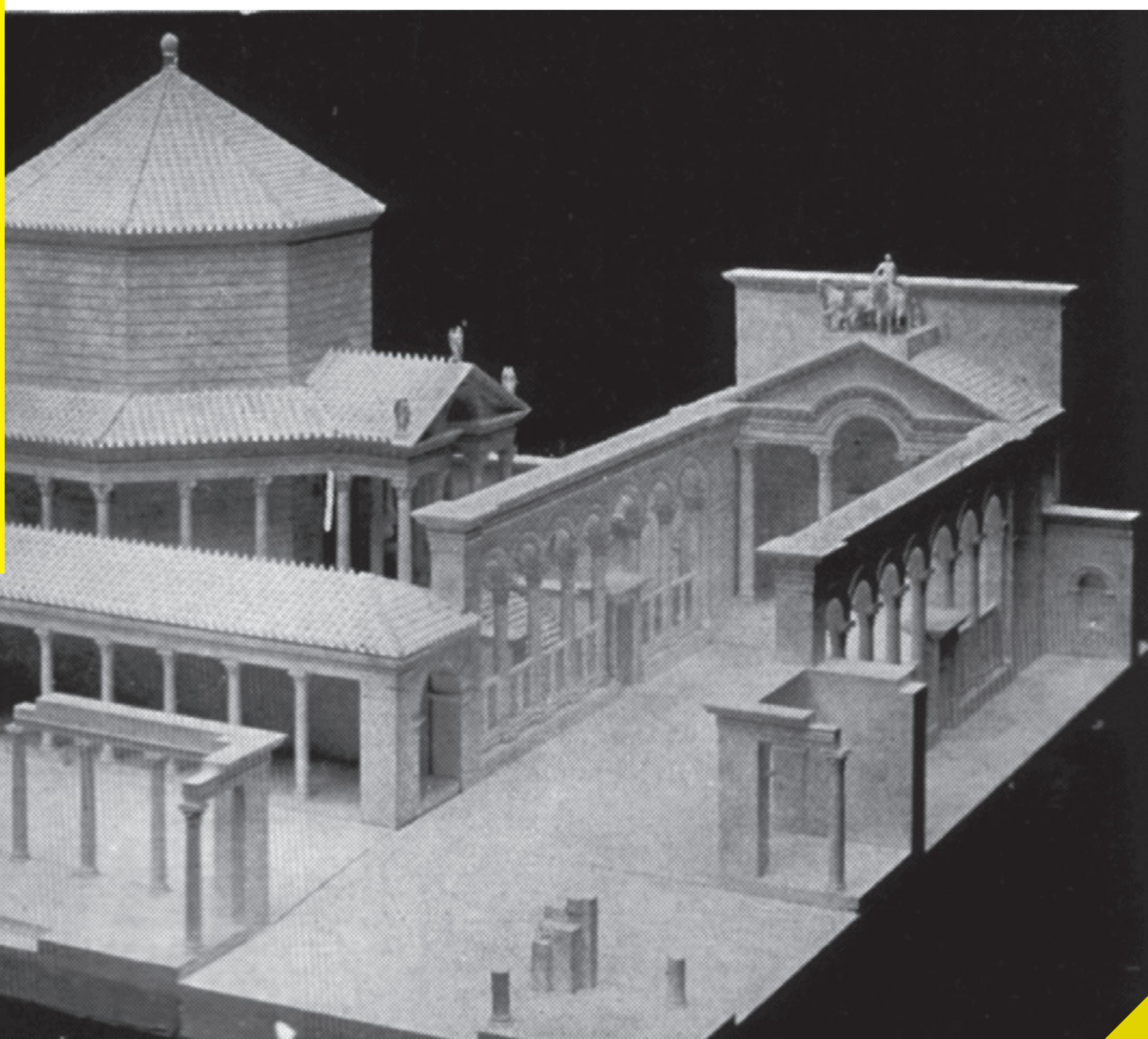
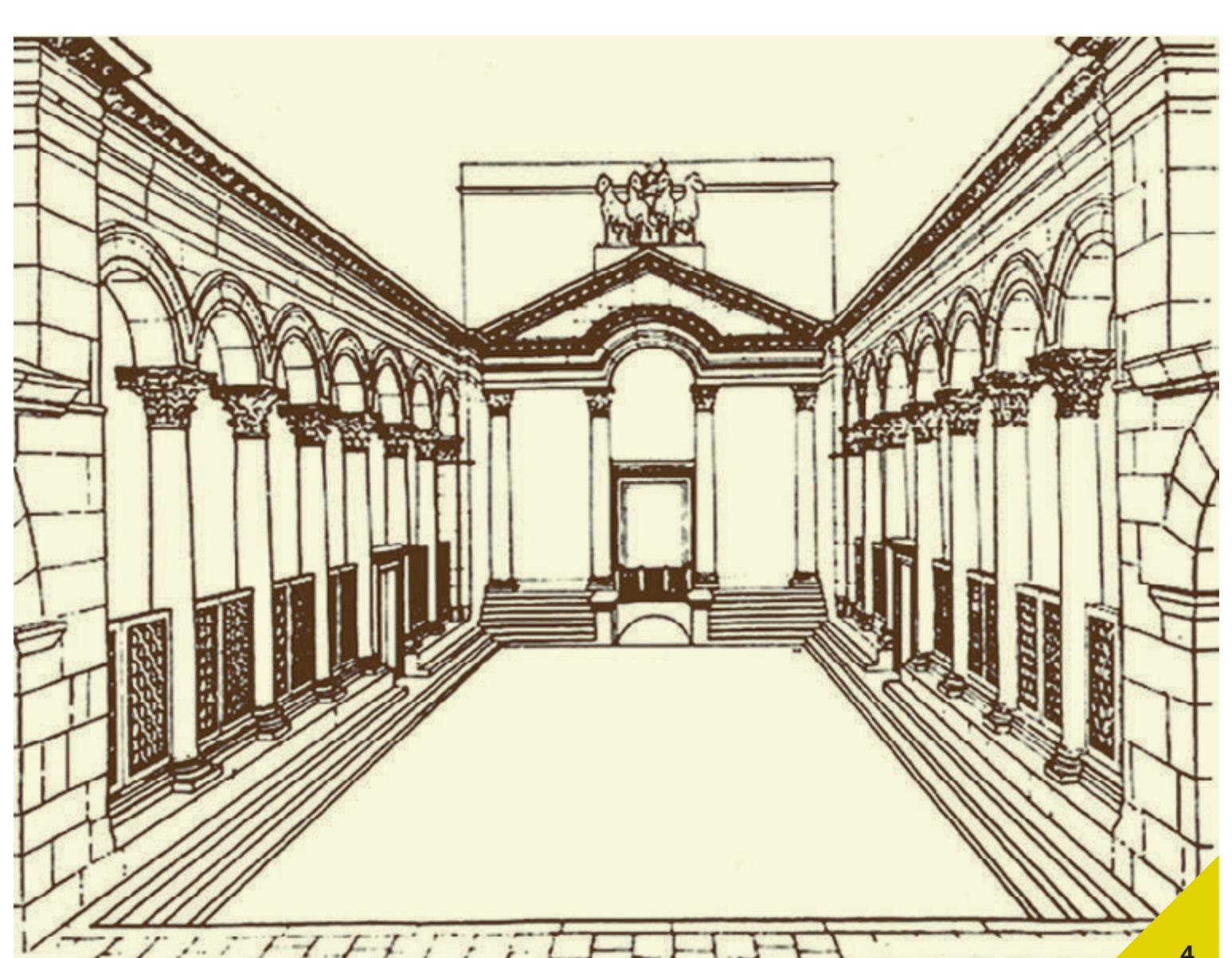


## Povijest Peristila

Peristil predstavlja monumentalno predvorje za pristup kulnim građevinama – carevu mauzoleju i hramovima – na istočnoj i zapadnoj strani te svećani ulaz u carev stan na južnoj strani. To je pravokutni prostor dug 27 i širok 13,50 m, obrubljen stepenicama i sa tri strane uokviren stupovima. Kolonade sa istočne i zapadne strane sastoje se od po šest stupova s korintskim kapitelima. Stupovi na Peristilu povezani su polukružnim lukovima, dok su oni uz trjemove Decumanusa povezani ravnim arhitravom. Lukovi nose visoki profilirani vjenec. Stupovi su izrađeni od vapnenca, mramora i ružičastoga granita. Izvorno su se između njih nalazile kamene tranzene koje su ogradivale prostor mauzoleja i hramova. Među stupovima koji uokviruju prilaz kulnim građevinama nalazili su kameni portali. Istočnu i zapadnu stranu Peristila u jedinstvenu arhitektonsku cjelinu spaja Prothyron – uzdignuti prostor pred ulazom dvoranom careva stana. Četiri stupu od ružičastoga granita nose trokutni zatav s polukružnim lukom u sredini. Na samom vrhu nalazi se platforma na kojoj je možda stajala monumentalna skulpturalna kompozicija četveroprega konja. Prothyron predstavlja najupečatljiviji naglasak čitavog prostora i veličanstven arhitektonski okvir u kojem se car pojavljivao pred svojim podanicima. Primjena lukova na Peristilu odaje utjecaj sirijske arhitekture, što arhitektonsko rješenje carskog trga čini jedinstvenim na ovim prostorima.

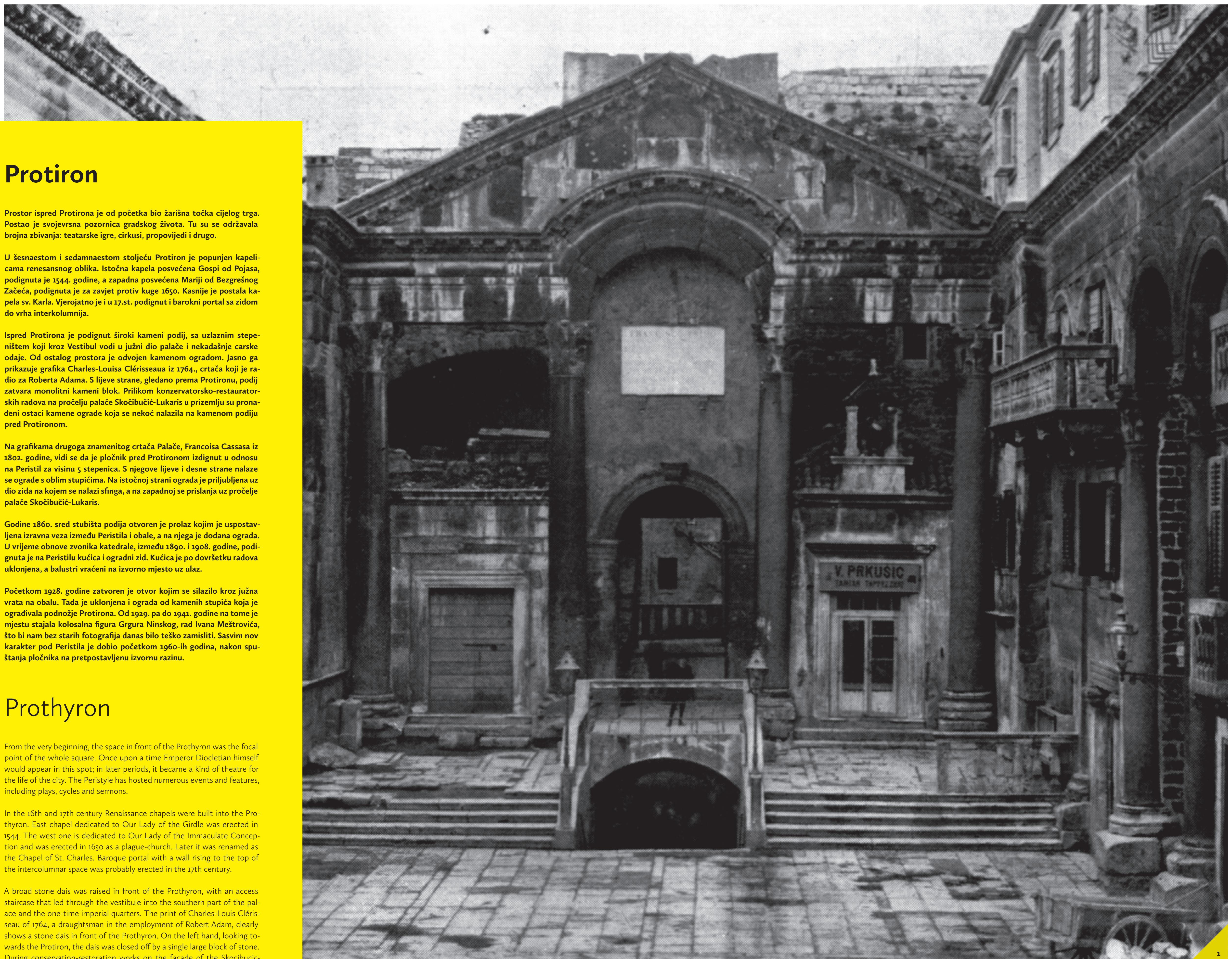
## The History of the Peristyle

The Peristyle is a monumental antechamber for access to the cult buildings – the emperor's mausoleum and temples – on the eastern and western side, and the grand entrance into the emperor's living quarters on the south. It has the rectangular form, 27 m long and 13,50 m wide, edged with stairs and framed with columns at three sides. The east and west side colonnades consist of six columns each, enriched with Corinthian capitals. The columns on the Peristyle are connected up with semicircular arches, while those along the porticos of the Decumanus are joined with a straight architrave. The arches in turn bear a high, moulded cornice. The columns are made out of limestone, marble and pink granite. Originally, the stone latticed fences (transennae) were placed between the columns, thus enclosing the area with mausoleum and temples. Among the columns that frame the approach to the cult buildings there were once portals. The east and west side of the Peristyle are linked into the unique architectonic composition by Prothyron – elevated space in front of Vestibule of the Emperor's apartment. Four pink columns carry the triangle gable with semi-circular arch in the middle, with the platform on the top, which most probably originally was the podium for the monumental sculpture – composition of four-horse carriage. Prothyron mostly emphasizes the entire area and presents the magnificient architectonic frame, where the Emperor used to appear in front of his subjects. The use of arches in the Peristyle reveals the influence of Syrian architecture, which makes the architectural handling of the imperial square unique for this part of the world.



1. PERISTIL, SREDINA 20. ST.; 2. REKONSTRUKCIJA PERISTILA I DIOCLECIJANOVOG MAUZOLEJA, G. NIEMANN, 1910.; 3. MODEL PERISTILA I DIOCLECIJANOVOG MAUZOLEJA, G. NIEMANN, 1910.; 4, 5, 6. REKONSTRUKCIJA PERISTILA PO GRAĐEVINSKIM FAZAMA: (4) ANTIKA, (5) SREDNJI VJEK, (6) KRAJ 17. STOLJEĆA. AUTOR: J. MARASOVIĆ, CRTAO: D. RADOVNIKOVIC

1. PERISTYL, MIDDLE OF 20. CENTURY; 2. RECONSTRUCTION OF THE PERISTYLE AND DIOCLETIAN MAUSOLEUM, G. NIEMANN, 1910.; 3. MODEL OF THE PERISTYLE AND DIOCLETIAN MAUSOLEUM, G. NIEMANN, 1910.; 4, 5, 6. RECONSTRUCTION OF THE PERISTYLE BY BUILDING PHASES: (4) ANTIQUITY, (5) MIDDLE AGES, (6) END OF THE 17TH CENTURY. AUTHOR: J. MARASOVIĆ, DRAWN BY D. RADOVNIKOVIC



## Protiron

Prostor ispred Protirona je od početka bio žarišna točka cijelog trga. Postao je svojevrsna pozornica gradskog života. Tu su se održavala brojna zbijanja: teatarske igre, cirkusi, propovijedi i drugo.

U šesnaestom i sedamaestom stoljeću Protiron je popunjeno kapelicama renesansnog oblika. Istočna kapela posvećena Gospi od Pojsa, podignuta je 1544. godine, a zapadna posvećena Mariji od Bezgrešnog Začeća, podignuta je za zajvet protiv kuge 1650. Kasnije je postala kapela sv. Karla. Vjerojatno je u 17. st. podignut i barokni portal sa zidom do vrha interkolumnija.

Ispred Protirona je podignut široki kameni podij, sa uzlaznim stepeništem koji kroz Vestibul vodi u južni dio palace i nekadašnje carske odaje. Od ostalog prostora je odvojen kamenom ogradom. Jasno ga prikazuje grafika Charles-Louis Clérisseau iz 1764., crtača koji je radio za Roberta Adama. S lijeve strane, gledano prema Protironu, podij zatvara monolitni kameni blok. Prilikom konzervatorsko-restauratorskih radova na pročelju palace Skočibučić-Lukaris u prizemlju su pronađeni ostaci kamene ograde koja se nekoć nalazila na kamenom podiju pred Protironom.

Na grafikama drugoga znamenitog crtača Palače, Francois Cassasa iz 1802. godine, vidi se da je pločnik pred Protironom izdignut u odnosu na Peristil za visinu i stepenica. S njegove lijeve i desne strane nalaze se ograde s oblim stupićima. Na istočnoj strani ograde je prijavljena uz dio zida na kojem se nalazi sfinga, a na zapadnoj se prislanja uz pročelje palace Skočibučić-Lukaris.

Godine 1860. sred stubišta podija otvoren je prolaz kojim je uspostavljena izravna veza između Peristila i obale, a na njega je dodana ograda. U vrijeme obnova zvonika katedrale, između 1890. i 1908. godine, podignuta je na Peristilu kućica i ogradići zid. Kućica je po dovršetku radova uklonjena, a balustri vraćeni na izvorno mjesto uz ulaz.

Početkom 1928. godine zatvoren je otvor koji se silazio kroz južna vrata na obalu. Tada je uklonjena i ograda od kamenih stupića koja je ogradila podnožje Protirona. Od 1929. pa do 1941. godine na tome je mjestu stajala kolosalna figura Grgora Ninskog, rad Ivana Meštrovića, što bi nam bez starih fotografija danas bilo teško zamisliti. Savsim nov karakter pod Peristil je dobio početkom 1960.-ih godina, nakon spuštanja pločnika na pretpostavljenu izvornu razinu.

## Prothyron

From the very beginning, the space in front of the Prothyron was the focal point of the whole square. Once upon a time Emperor Diocletian himself would appear in this spot; in later periods, it became a kind of theatre for the life of the city. The Peristyle has hosted numerous events and features, including plays, cycles and sermons.

In the 16th and 17th century Renaissance chapels were built into the Prothyron. East chapel dedicated to Our Lady of the Girdle was erected in 1544. The west one is dedicated to Our Lady of the Immaculate Conception and was erected in 1650 as a plague-church. Later it was renamed as the Chapel of St. Charles. Baroque portal with a wall rising to the top of the intercolumnar space was probably erected in the 17th century.

A broad stone dais was raised in front of the Prothyron, with an access staircase that led through the vestibule into the southern part of the palace and the one-time imperial quarters. The print of Charles-Louis Clérisseau of 1764, a draughtsman in the employment of Robert Adam, clearly shows a stone dais in front of the Prothyron. On the left hand, looking towards the Protiron, the dais was closed off by a single large block of stone. During conservation-restoration works on the façade of the Skočibučić-Lukaris Palace, the remains of the stone balustrade that had once been placed on the stone dais in front of the Prothyron were found.

In the prints of the other celebrated draughtsmen of the Palace, Francois Cassas, of 1802, it can be seen that the paving in front of the Prothyron was five steps higher in level than the Peristyle. To the left and right were railings with little rounded columns. On the eastern side, the rail was fitted against part of the wall on which there was a sphinx, and on the western it abutted onto the façade of the Skočibučić-Lukaris Palace.

In 1860 in the middle of the dais staircase a covered passage was opened up that established a direct link between the Peristyle and seafront; later a railing was added to it. At the time of the renovation of the cathedral bell tower (1890-1908) a little building with an enclosing wall was set up on the Peristyle. The small building was removed after the end of the works, and the balusters restored to their original place alongside the entry.

At the beginning of 1928 the aperture giving access through the south gate to the waterfront was closed. At that time the railing of stone pillars that shut off the foot of the Prothyron was also removed. From 1929 until 1941 the colossal figure of Gregory of Nin by Ivan Meštrović stood on this site, which would be almost impossible to imagine without the evidence of the old photographs. The floor of the Peristyle obtained a completely new character at the beginning of the 1960s, after the lowering of the pavement to the hypothesised original level.



1. PROTHYRON SA KAMENIM PODIJEM I PROLAZOM DO OBALE, POČETAK 20. ST.; 2. MONUMENTALNA SKULPTURA GRGORIJA NINSKOG, RAD IVANA MEŠTROVIĆA, NA PERISTILU 1929-1941; 3. PROTHYRON TIJEKOM OBNOVE ZVONIKA, 1890-1908; 4. KAMENI PODIJ NA PROTIRONU I PROLAZ DO OBALE, 19. ST.; 5. SPUŠTANJE PODA PERISTILA NA PRETPOSTAVLJENU IZVRNU RAZINU, 1959-1961 (URBS); 6. PERISTIL, POČ. 20. ST.; 7. OSTACI KAMENE OGRADE U PRIZEMLJU PALACE SKOČIBUČIĆ-LUKARIS; 8. PERISTIL 1764., C. L. CLÉRISSEAU

1. PROTHYRON WITH BROAD STONE DAIS AND A COVERED PASSAGE TO THE SEAFRONT, EARLY 20TH CENTURY; 2. COLOSSAL FIGURE OF GREGORY OF NIN BY IVAN MEŠTROVIĆ, ON THE PERISTYLE 1929-1941; 3. PROTHYRON DURING BELLTOWER RENEWAL, 1890-1908; 4. STONE DAIS ON THE PROTHYRON AND A COVERED PASSAGE TO THE SEAFRONT, 19TH CENTURY; 5. LOWERING OF THE PAVEMENT TO THE HYPOTHESISED ORIGINAL LEVEL, 1959-1961 (URBS); 6. PERISTYLE, BEGINNING OF THE 20TH CENTURY; 7. THE REMAINS OF THE STONE BALUSTRADE ON THE GROUND FLOOR OF THE PALACE SKOČIBUČIĆ-LUKARIS; 8. PERISTYLE, 1764., C. L. CLÉRISSEAU



## Zapadna kolonada

Tijekom sedamnaest stoljeća kontinuiranog življenja u Palači zapadna kolonada Peristila uklopljena je u strukturu građevina iz kasnijih razdoblja. Romaničke, gotičke, renesansne i barokne zgrade čvrsto su se sljubile s antičkim stupovima pa je kolonada danas vidljiva samo s istočne strane. Njezin sjeverni dio je uzidan u istočno pročelje palače koja pokazuje izuzetnu povijesnu slojevitost, a vezuje se uz obitelji Cipci i Grisogono. Južni dio kolonade je uklopljen u istočno pročelje palače Skočibušić-Lukarić.

U prostoru koji je danas definiran ulicom Ilirske akademije na južnoj, Vestibulom i Peristilom na istočnoj, ulicom Kraj Sv. Ivana na sjevernoj te unutarnjim dvorištem na zapadnoj strani, nalazi se sklop građevina sastavljen od dva dijela: dviju kuća na jugu i srednjovjekovne palače na sjeveru. U temeljima ovih zgrada nalaze se ostaci okruglog antičkog hrama posvećenog božici Kibeli, pandan hramu božice Venere koji se nalazi nešto sjevernije. U kripti Kibelinga hrama pronađen je zatvor oltarne ograde predromaničke crkve. Kao ni mnoge druge građevine u Splitu i na Peristilu, ni palača Skočibušić-Lukarić nije cijelovito projektirana od jednog arhitekta i tako izvedena, već je nastala spajanjem i dogradnjem nekoliko zgrada kroz različite epohе.

Već u najranijoj fazi izgradnje, u romaniči, pročelje sklopa "ugnjedzilo se" među peristilskim stupovima. Na njemu se u dekorativnim elementima manifestiraju različite kasnija stilска razdoblja. Pojasni vijenac između prizemja i prvog kata palače Skočibušić-Lukarić, koji se proteže sve do najzapadnijeg stupa Protirona, tipičan je za razdoblje romanike. Dva velika pravokutna prozora na prvom katu i monumentalni portal u prizemlju pripadaju razdoblju renesanse. Balkon na drugom katu palače pokazuje odlike baroka. Kapiteli pilastera i prvog stupa kolonade teško su oštećeni prilikom gradnje balkona. Za utvrđivanje kronologije promjena koju se desavaju na ovom prostoru u određenoj nam mjeri može pomoći jedan Cassas crtež s kraja osamnaestoga stoljeća.

Na trećem katu palače, onom koji se diže nad vijencem kolonade, vide se tri romaničke bifore polukružnog završetka. U pregradnji koju datiramo u razdoblje poslijepo nastanka crteža, dakle u devetnaesto stoljeće, pročelje trećeg kata izvedeno je u pravilnim klesancima te su postavljeni novi prozori. Žbuka na pročelju vjerojatno potječe iz ovog razdoblja, a nanesena je kako bi se nepravilna struktura zida u donjem dijelu građevine prikrila i uskladila s pravilnim rasterom klesanaca na trećem katu palače.

## The West Colonnade

During the seventeen century in which life has gone on in the palace without interruption, the western colonnade of the Peristyle has been incorporated into the structure of buildings from later periods. Romanesque, Gothic, Renaissance and Baroque buildings have become as one with the Roman period columns, and this colonnade is today visible only from the eastern side.

The northern part of the colonnade has been incorporated into the eastern elevation of a palace that displays a remarkable historical complexity, a palace connected with the Cipci and Grisogono families. The southern end of the colonnade, on the other hand, is incorporated into the eastern façade of the Skočibušić-Lukarić Palace. In the space that is defined today by Ilirska akademije Street on the southern, the Vestibule and Peristyle on the eastern, and Kraj Sv. Ivan Street on the northern, as well as the inner courtyard on the western side, lies a set of buildings composed of two parts: two houses in the south and medieval palaces on the north. The foundations of these buildings contain the remains of a round Antique period temple dedicated to the Roman goddess Cybele, matching the temple of Venus that lies a little to the north. The gable of an altar screen of a pre-Romanesque church has been found in the crypt of the temple of Cybele. Like many other buildings in Split and in the area of the Peristyle, the Skočibušić-Lukarić Palace too was not designed by a single architect and built in a single campaign, but was created by the annexation and extension of several buildings through the epochs.

In the earliest phase of the development, the Romanesque, the façade of the complex "made its nest" among the columns of the Peristyle. Diverse later stylistic periods are manifested on it in the decorative elements. The string course between the ground floor and the first floor of the Skočibušić-Lukarić Palace, which extends all the way to the western-most column of the Protiron, is typical of the Romanesque. Two large rectangular windows on the first floor and the monumental portal in the ground floor belong to the Renaissance. The balcony on the second floor however shows features of the Baroque. The capitals of the pilasters and of the first column of the colonnade were seriously damaged while the balcony was being built. In order to fix the chronology of changes that happened in this space, we can look at a Cassas drawing from the end of the 18th century.

It shows that on the third floor of the palace, which rises above the cornice of the colonnade, there were at that time three Romanesque double-light mullioned windows with round arches. In the remodelling of the third floor of the palace above the cornice of the colonnade, at a time postdating the drawing (during the nineteenth century, then), the façade was rebuilt in ashlar and new windows were put in. The plaster on the façade probably derives from this period. It was applied so as to conceal the irregular structure of the wall in the lower part of the building and harmonise it with the regular grid of ashlers on the third floor of the palace.



1. POGLED NA PERISTIL L. F.CASSAS, 1802.; 2, 3. PALAČA SKOČIBUŠIĆ-LUKARIĆ, 2004.; 4, 5, 6. DETALJI S PALAČE SKOČIBUŠIĆ-LUKARIĆ, 2004.

1. VIEW OF PERISTYLE, L. F. CASSAS, 1802; 2, 3. PALACE SKOČIBUŠIĆ-LUKARIĆ, 2004; 4, 5, 6. DETAILS FROM THE SKOČIBUŠIĆ-LUKARIĆ PALACE, 2004.



## Zapadna kolonada

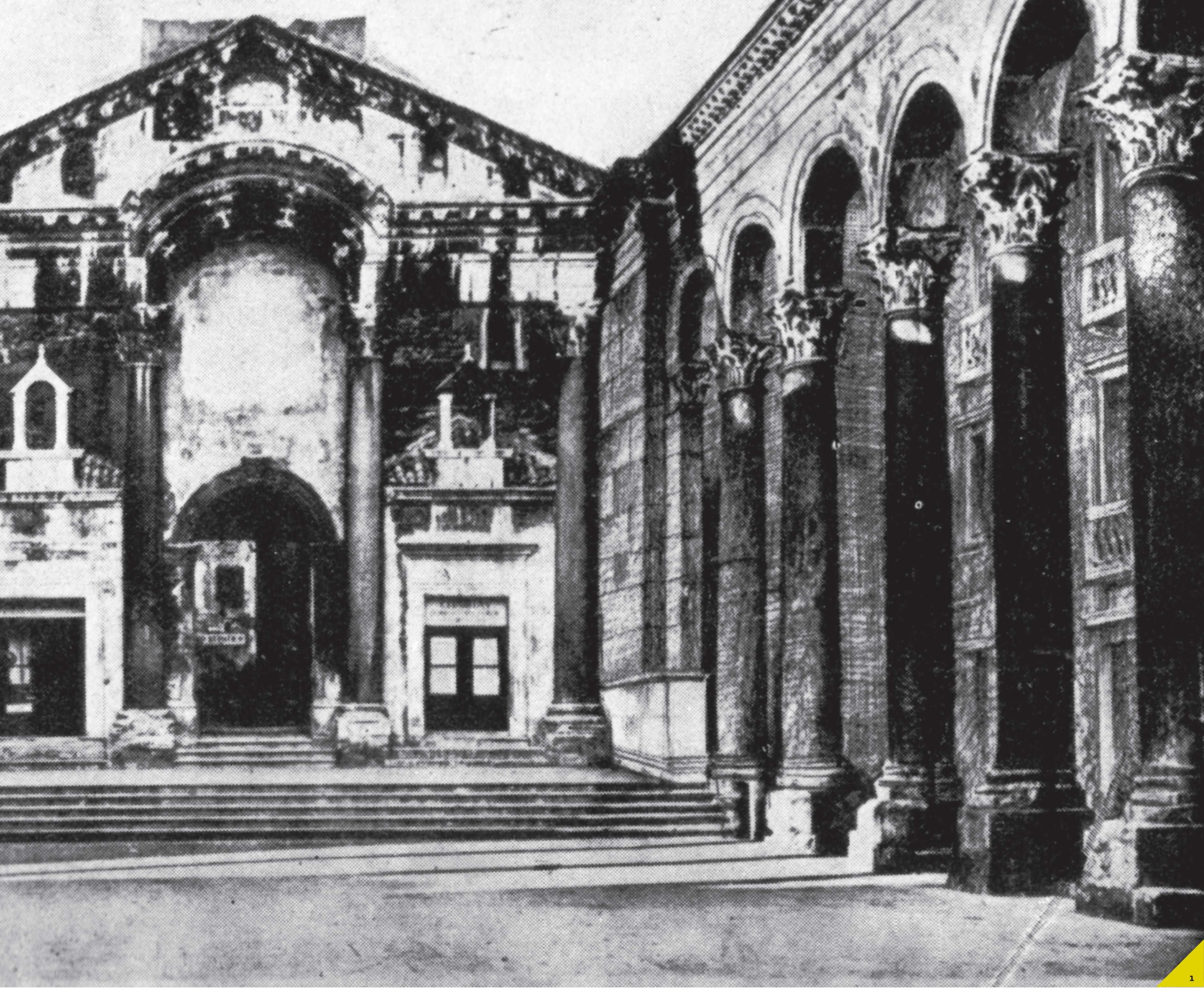
U sjeverni dio zapadne kolonade Peristila ugrađeno je istočno pročelje palače koja pokazuje izuzetnu povijesnu slojevitost, a vezuje se uz obitelji Cipci i Grisogono. Na njemu se pokazuje inverzija vremenskog slijeda, karakteristična za splitske prilike: na vrhu, iznad završnog vijenca rimskih kolonada u 16. stoljeću je nadograđen kat u renesansnom stilu, koji je rekonstruiran 1982. godine na temelju Cassasovog crteža i ostataka pronadjenih na licu mjeseta. Ispod rimskih arkada lijeva polovica nekadašnjeg srednjovjekovnog pročelja pregrađena je u baroknom stilu, dok je desna strana tek u 19. stoljeću dograđena u istom stilu, čime je postignuta simetrija. U unutrašnjosti su u spomenutim radovima rekonstrukcije pronadjeni ostaci kružne antičke građevine, možda Venerinog hrama, kao i srednjovjekovno dvorište s ložom koji su prezentirani u sklopu Luxora, jedne od najstarijih splitskih kavana.

Činjenica da su ostaci carske palače preživjeli sve te gradnje, pregradnje i rušenja jasno govori o tome koliko je arhitektura Peristila bila cijenjena i "nedodirljiva". Ideje o "čišćenju" antičkih građevina u Palači od kasnijih slojeva osobito su snažno zaživjele u devetnaestom stoljeću, ali sejavljuju i kroz gotovo čitavo dvadeseto stoljeće. Još je tijekom Drugog svjetskog rata Povjerenstvo talijanskih akademika predlagalo da se pročelja palača ugrađenih u kolonadu premjesti prema zapadu kako bi se oslobođila rimska struktura sa svih strana.

## The West Colonnade

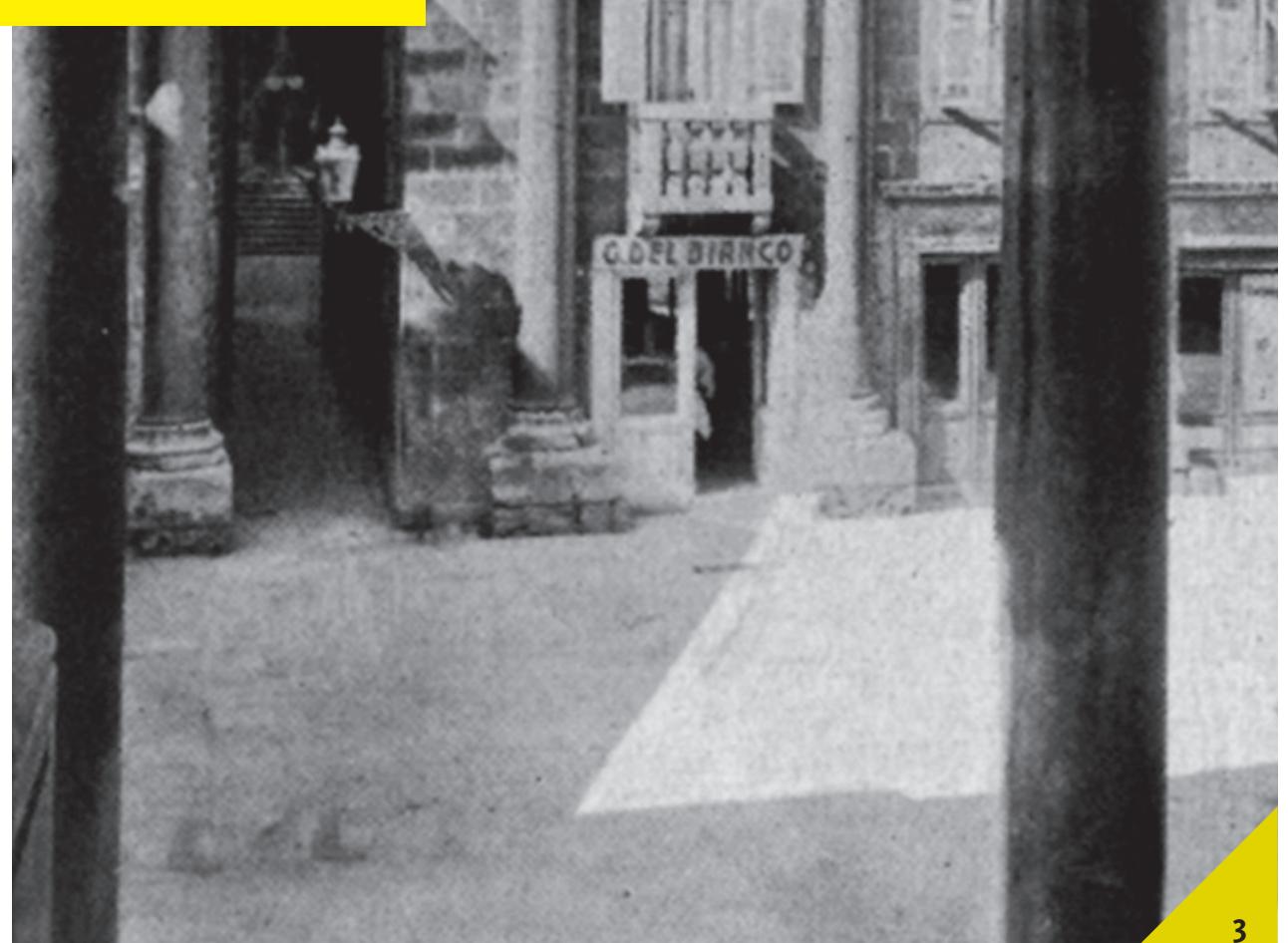
East façade of the palace associated with Cipci and Grisogono families, showing exceptional historical layers, was incorporated into the north part of the west colonnade of the Peristyle. The façade reveals inversion in chronology characteristic of Split: the top floor has been constructed above the colonnade in the 16th century in the Renaissance style, reconstructed in 1982 after a drawing by Cassas and the remains found in situ. Under the Roman arches the left section of medieval façade has been rebuilt in the Baroque style, while the right section was added in the 19th century using the same style, thus creating symmetry. Remains of a circular ancient building, possibly a temple of Venus, as well as a medieval courtyard with loggia were found in the interior during the same reconstruction and are presented today within Luxor, one of the oldest cafés in Split.

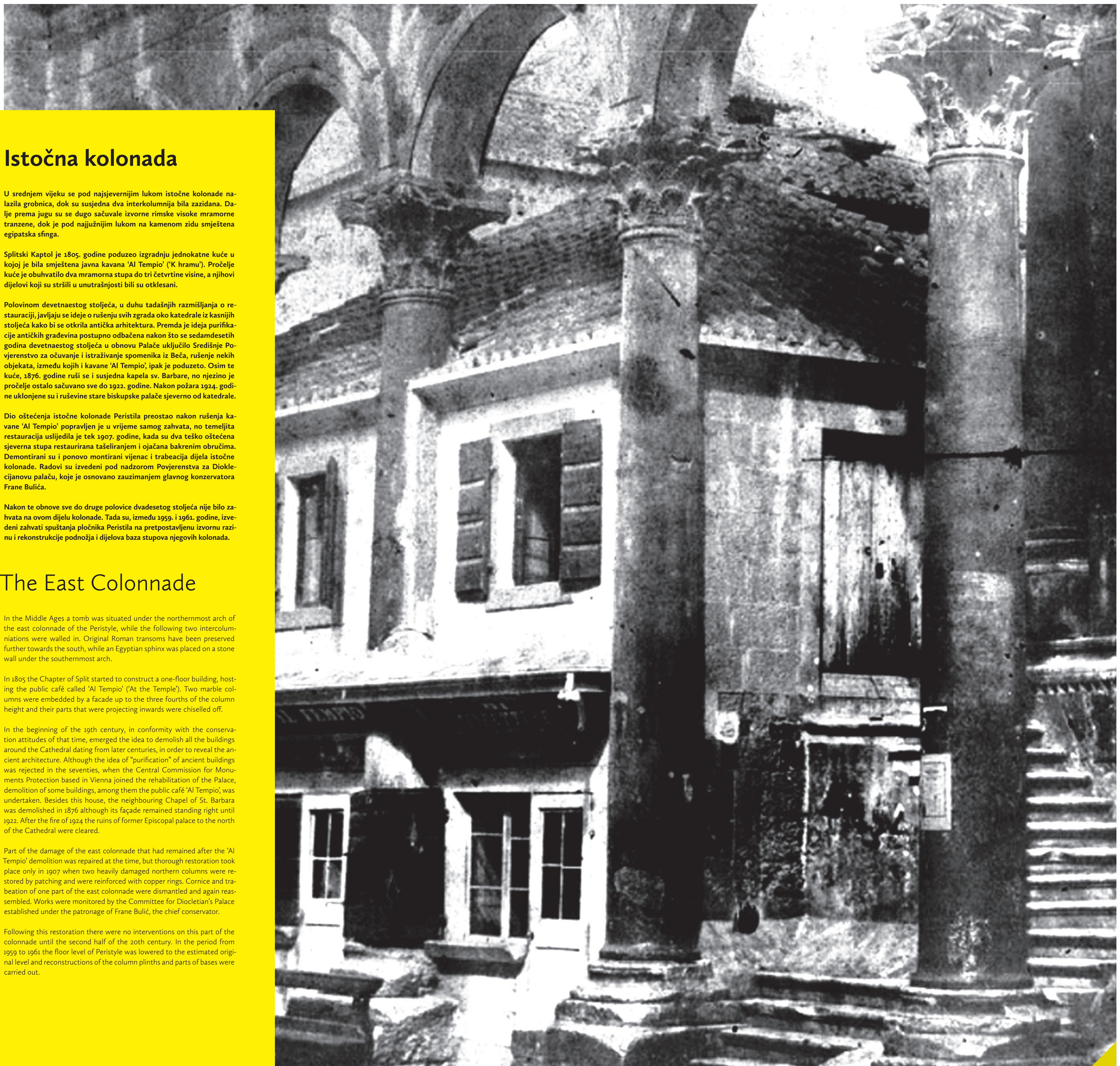
The fact that the remains of the imperial palace have survived all of the building, rebuilding and demolition works clearly shows the appreciation and the aura of „untouchability“ of the architecture of Peristyle. The 19th century was dominated by the ideas of „purification“ of ancient buildings from later constructions that have lived on through the 20th century. As late as during World War II a commission of Italian academicians proposed that the façades of the buildings incorporated into the colonnade should be moved westward in order to free the Roman structure on all sides.



1. PRIJEDLOG POVJERENSTVA TALIJANSKIH AKADEMIIKA ZA „OSLOBADANJE“ PERISTILSKIH STUPOVA, 1942.; 2. GRB OBITELJI GRISOGONO; 3. POGLED NA ZAPADNU KOLONADU PERISTILA, POČ. 20. ST.; 4. SIEVERNI DIO ZAPADNE KOLONADE

1. PROPOSAL BY THE COMMISSION OF ITALIAN ACADEMIICS TO FREE THE PERISTYLE'S ARCHES, 1942.; 2. COAT OF ARMS OF THE GRISOGONO FAMILY; 3. VIEW OF THE WEST COLONNADE OF THE PERISTYLE, BEGINNING OF THE 20TH CENTURY; 4. NORTH PART OF THE WESTERN COLONNADE





## Istočna kolonada

U srednjem vijeku se pod najsjevernijim lukom istočne kolonade nalazila grobnica, dok su susjedna dva interkolumnija bila zazidana. Daje prema jugu su se dugo sačuvale izvorne rimske visoke mramorne tranzene, dok je pod najjužnijim lukom na kamenom zidu smještena egipatska sfinga.

Splitski Kaptol je 1805. godine poduzeo izgradnju jednokatne kuće u kojoj je bila smještena javna kavarna 'Al Tempio' ('K hramu'). Pročelje kuće je obuhvatilo dva mramorna stupa do tri četvrtine visine, a njihovi dijelovi koji su stršili u unutrašnjosti bili su otklesani.

Polovinom devetnaestog stoljeća, u duhu tadašnjih razmišljanja o restauraciji, javljaju se ideje o rušenju svih zgrada oko katedrale iz kasnjih stoljeća kako bi se otkrila antička arhitektura. Premda je ideja purifikacije antičkih građevina postupno odgađena nakon što se sedamdesetih godina devetnaestog stoljeća u obnovu Palače uključilo Središnje Pojverenstvo za očuvanje i istraživanje spomenika iz Beča, rušenje nekih objekata, između kojih i kavane 'Al Tempio', ipak je poduzeto. Osim te kuće, 1876. godine ruši se i susjedna kapela sv. Barbare, no njezino je pročelje ostalo sačuvano sve do 1922. godine. Nakon požara 1924. godine uklonjene su i ruševine stare biskupske palače sjeverno od katedrale.

Dio oštećenja istočne kolonade Peristila preostao nakon rušenja kavane 'Al Tempio' popravljen je u vrijeme samog zahvata, no temeljita restauracija uslijedila je tek 1907. godine, kada su dva teško oštećena sjeverna stupa restaurirana tašeljiranjem i ojačana bakrenim obrucima. Demontirani su i ponovo montirani vjenac i trabeacija dijela istočne kolonade. Radovi su izvedeni pod nadzorom Pojverenstva za Dioklecijanovu palaču, koje je osnovano zaузimanjem glavnog konzervatora Frane Bulića.

Nakon te obnove sve do druge polovice dvadesetog stoljeća nije bilo zahtva na ovom dijelu kolonade. Tada su, između 1959. i 1961. godine, izvedeni zahvati spuštanja pločnica Peristila na pretpostavljenu izvornu razinu i rekonstrukcije podnožja i dijelova baza stupova njegovih kolonada.

## The East Colonnade

In the Middle Ages a tomb was situated under the northernmost arch of the east colonnade of the Peristyle, while the following two intercoloniations were walled in. Original Roman transoms have been preserved further towards the south, while an Egyptian sphinx was placed on a stone wall under the southernmost arch.

In 1805 the Chapter of Split started to construct a one-floor building, hosting the public café called 'Al Tempio' ('At the Temple'). Two marble columns were embedded by a facade up to the three fourths of the column height and their parts that were projecting inwards were chiselled off.

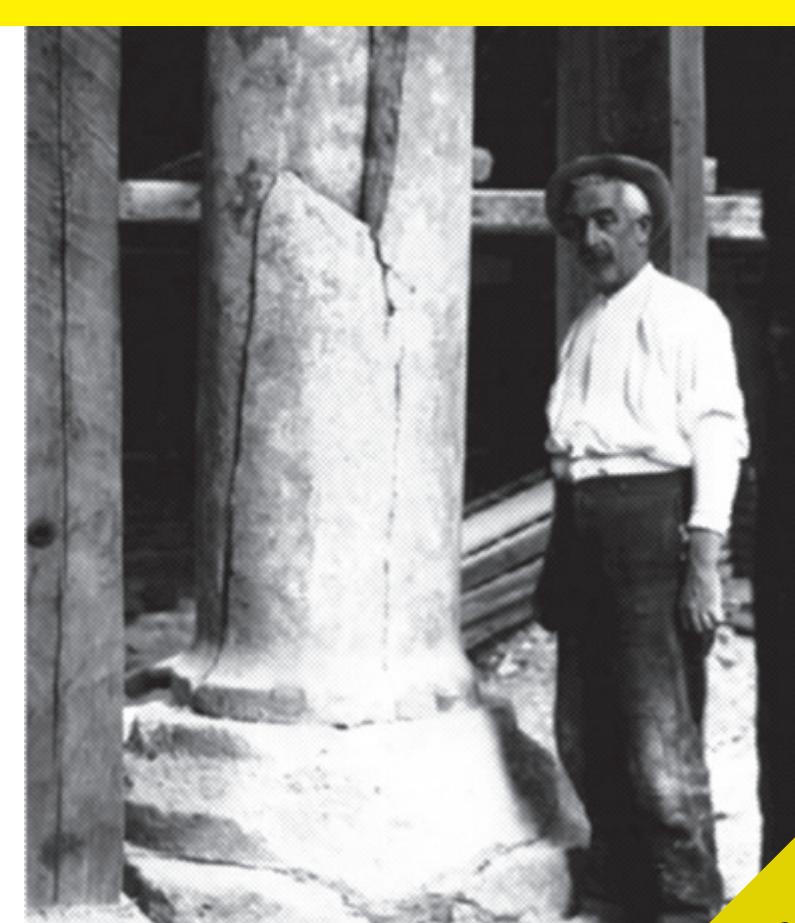
In the beginning of the 19th century, in conformity with the conservation attitudes of that time, emerged the idea to demolish all the buildings around the Cathedral dating from later centuries, in order to reveal the ancient architecture. Although the idea of "purification" of ancient buildings was rejected in the seventies, when the Central Commission for Monuments Protection based in Vienna joined the rehabilitation of the Palace, demolition of some buildings, among them the public café 'Al Tempio', was undertaken. Besides this house, the neighbouring Chapel of St. Barbara was demolished in 1876 although its façade remained standing right until 1922. After the fire of 1924 the ruins of former Episcopal palace to the north of the Cathedral were cleared.

Part of the damage of the east colonnade that had remained after the 'Al Tempio' demolition was repaired at the time, but thorough restoration took place only in 1907 when two heavily damaged northern columns were restored by patching and were reinforced with copper rings. Cornice and trabeation of one part of the east colonnade were dismantled and again reassembled. Works were monitored by the Committee for Diocletian's Palace established under the patronage of Frane Bulić, the chief conservator.

Following this restoration there were no interventions on this part of the colonnade until the second half of the 20th century. In the period from 1959 to 1961 the floor level of Peristyle was lowered to the estimated original level and reconstructions of the column plinths and parts of bases were carried out.

1. KAVANA 'AL TEMPIO' UNUTAR SJEVERNOG DIJELA ISTOČNE KOLONADE PERISTILA, PRIJE 1876.; 2, 3. SJEVERNI DIO ISTOČNE KOLONADE PERISTILA 1907., (2) DEMONTAŽA GORNJEG DIJELA KOLONADE.; (3) RESTAURACIJA DRUGOG STUPA; 4. POGLED PREMA KATEDRALI SV. DUJMA, PRIJE 1876.; 5, 6. DETALJI ISTOČNE KOLONADE, SREDINA 20. ST.

1. THE AL TEMPPIO CAFÉ INSIDE THE NORTHERN PART OF THE EASTERN COLONNADE OF THE PERISTYLE, BEFORE 1876.; 2. THE NORTHERN PART OF THE EASTERN COLONNADE OF THE PERISTYLE IN 1907, DISASSEMBLY OF THE UPPER PART OF THE COLONNADE.; 3. THE NORTHERN PART OF THE EASTERN COLONNADE OF THE PERISTYLE IN 1907, THE RESTORATION OF THE SECOND COLUMN.; 4. VIEW TOWARDS CATHEDRAL OF ST. DOMINIC, BEFORE 1876.; 5, 6. DETAILS OF THE EAST COLONNADE, MID 20TH CENTURY



## Crkva Sv. Roka

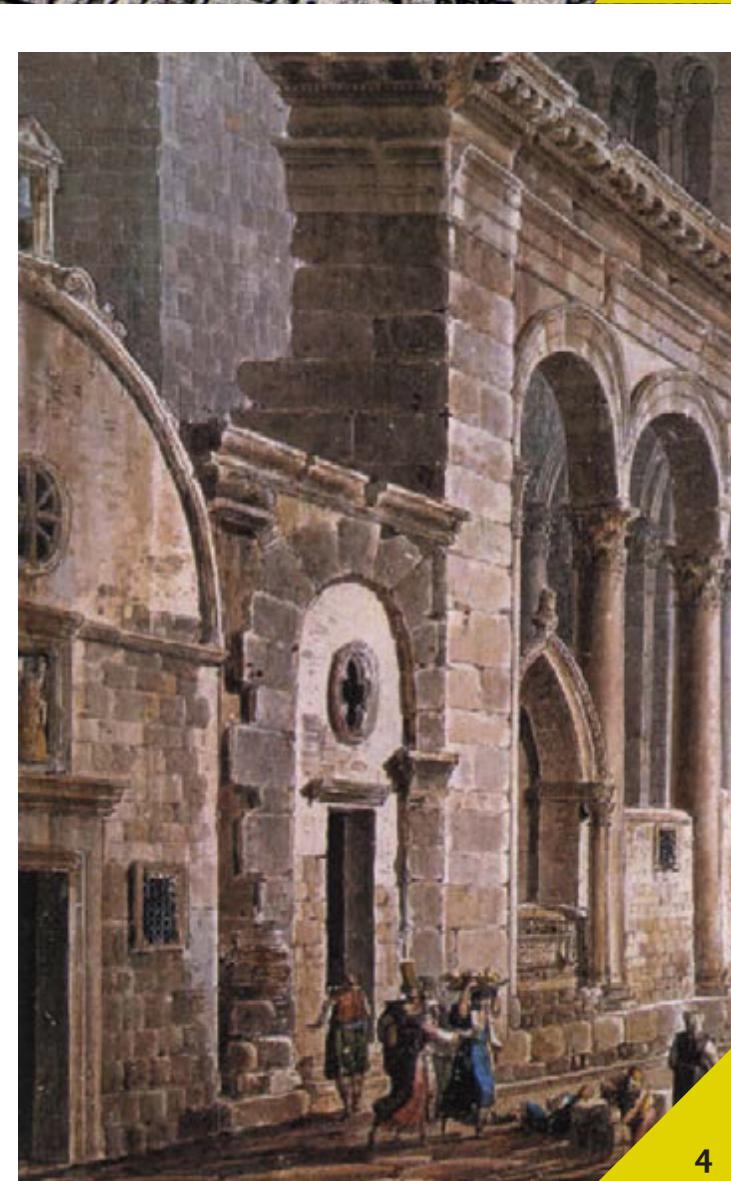
Crkva sv. Roka smjestila se u sjeveroistočnom dijelu splitskog Peristila, na samom križisu nekadašnjeg carda i decumanusa, glavnih ulica Dioklecijanove palače. Izgrađena je na mjestu srednjovjekovnih kuća, zaščavajući dio njihovih zidova, što se jasno vidi na sjevernom pročelju gdje su sačuvani romanički otvori. Njezino zapadno pročelje građeno je fino klesanim kamenom u skladnim proporcijama i u renesansnim oblicima 1516. godine, kako svjedoči natpis na frizu iznad nadvratnika ulaznog portala. Gradnju crkve potpmogao je najveći splitski humanistički književnik Marko Marulić. Pročelje je prisljeno uz ugao pilon i završni luk istočne kolonade Peristila, kroz koji se izvorno pristupalo u trijem decumanusa. Ranije je unutar tog luka bilo ugradeno pročelje crkve sv. Barbare (izvorno posvećene sv. Fabijanu i Sebastijanu). Crkve su imale zajednički srednji zid koji je bio rastvoren dvama lukovima, vidljivim na današnjem južnom pročelju crkve sv. Roka. Obje crkve bile su posvećene svetim zaštitnicima od zaraznih bolesti, pa su u pločniku crkve sv. Roka sačuvana grobne ploče s natpisom o pestem koje pokrivaju grobnice umrlih od kuge.

Nakon rušenja crkve sv. Barbare i izgorjele biskupske palače, crkva sv. Roka ostala je usamjena, definirajući sjeveroistočni ugao katedralnog trga. Već je ranije zgubila sakralnu funkciju, pa je u njoj početkom 20. stoljeća otvoreno turistički ured, a ta je namjena sačuvana do danas.

## The Church of St. Roch

The Church of St. Roch occupies the north-east section of Peristyle, the very intersection of former cardo and decumanus, the main streets of Diocletian's Palace. It was built at the site of medieval houses, keeping parts of their walls. This can clearly be seen on the north facade where Romanesque openings have been preserved. Its west facade has been built in finely carved stone, harmonious proportions and Renaissance forms in 1516, as stated by the inscription on the frieze over the lintel of the entrance portal. The construction of the church was supported by the greatest Humanist writer in Split – Marko Marulić. The church front adjoins the corner pillar and final arch of the east colonnade of Peristyle that originally provided access to the decumanus porch. Previously, that arch housed the front of the Church of St. Barbara (originally dedicated to St. Fabian and St. Sebastian). The churches had shared a central wall opened up by two arches, visible on present south facade of St. Roch. Both churches were dedicated to the protector saints against contagious diseases, so the pavement of St. Roch holds tombstones with the ob pestem inscription that cover tombs of plague victims.

After the Church of St. Barbara had been demolished and Episcopal palace burnt, the Church of St. Roch remained exposed, defining the north-east corner of the cathedral square. It no longer served as a church, so at the beginning of the 20th century it housed a tourist office, as it still does.



1. CRKVA SV. ROKA I KAPELA SV. BARBARE, PRIJE 1907.; 2. KATASTARSKI SNIMAK, 1831.; 3. SPOJ CRKVICE SV. ROKA I LUKA TRIJEMA DECUUMANUSA, 21. STOLJEĆE ; 4. PERISTIL, L.F. CASSAS, 1802.; 5. CRKVA SV. ROKA I KAPELA SV. BARBARE, 1924.

1. CHURCHES OF ST. ROCH AND OF ST. BARBARA, BEFORE 1907; 2. CADASTRAL SURVEY, 1831.; 3. CONNECTION BETWEEN THE CHURCH OF ST. ROCH AND THE ARCH OF THE DECUUMANUS PORTICO, 21TH CENTURY; 4. PERISTYLE, L.F. CASSAS, 1802.; 5. CHURCHES OF ST. ROCH AND OF ST. BARBARA, 1924.



## Sfinga

Istočna kolonada ne pokazuje povijesnu slojevitost kao zapadna, a njen južni dio kroz povijest je pretrpio manje pregradnji nego sjeverni. Međutim, tu je sačuvan niski zid na kojemu se smjestila skulptura egiptanske sfinge – prepoznatljiv simbol Peristila i Splita.

Egipatske skulpture su dio izvornog uređenja Dioklecijanove palače, a većina ih je samo djelomično očuvana. U staroj gradskoj jezgri i splitskim muzejima pronadeno je i sačuvano svega 12 egipatskih sfingi, odnosno njihovih ulomaka. Najlepša i najveća, jedina sačuvana u cijelosti, jest upravo sfinga u jugoistočnom kutu Peristila koja datira iz vremena Tuthmosisa III. Nekoliko znatnih oštećenja na glavi i velika pukotina koja je prepolovila tijelo sfinge nastali su davno, prema predaji, padom kamenja gornjih katova zvonika prilikom udara groma. Moguće je da su oštećenja nastala u obraćunu kršćanstva s poganskim ostacima, kao što su temeljito oštećene sve ostale do sada pronađene sfinge.

U okviru projekta obnove Peristila razmotreno je pitanje zaštite, restauracije i prezentacije granitne sfinge. Skulptura je očišćena od naslaga prijavštine i ptičjeg izmeta koji izrazito agresivno djeluje po strukturu kamena. Restauracija okolnog arhitektonskog sklopa posredno je poboljšala i stanje sfinge, jer je na kapitele i vijence iznad nje postavljena zaštita od ptica koja je sprječila daljnje nakupljanje nebriga gradana i posjetitelja te povremeni vandalizam. Osim toga, zagadenje atmosfere uzrokuje ubrzano propadanje površine kamena koje je vidljivo usporedljivo s fotografijama s početka 20. stoljeća na kojima se mnogo jasnije nego danas raspoznaže friz plitkoreliefnih hijeroglifa na bazi sfinge. Delikatno pitanje vezano uz dugoročnu zaštitu skulpture i njezino eventualno premještanje u jedan od splitskih muzeja (ili neki drugi namjenski prostor) traži pažljivo promišljanje i objektivnu procjenu temeljenu na čvrstim pokazateljima. Pri donošenju konačne odluke o daljnjoj sudbini sfinge treba uzeti u obzir stav struke ali i gradana Splita.

U međuvremenu, za potrebe prezentacije i praćenja stanja skulpture izrađen je odjev s sfinge. Mnogo bolje nego na izvornoj skulpturi, gdje sjene zbog tamne boje kamena nisu tako izrazite, na odjelu od svjetlog materijala uočavaju se najsjajniji detalji površine kao što su oštećenja i spomenuti reljefi, ali su po prvi puta započeni i hijeroglifi na prednjoj strani koji su na izvornom mjestu zaklonjeni susjednim stupom kolonade. Ankh-det ili „vjekan života“, kako je hijeroglif na novootkrivenome reljefu protumačio egipatolog Igor Uranić, simbolična je poveznica s dugovječnošću skulpture koja je znatno starija od Peristila.

## The Sphinx

The east colonnade does not reveal as many historic layers as the west one and its south part did not undergo as many reconstructions as the north one. However, a low stone wall was preserved with the Egyptian sphinx placed upon it – a recognizable symbol of Peristyle and Split.

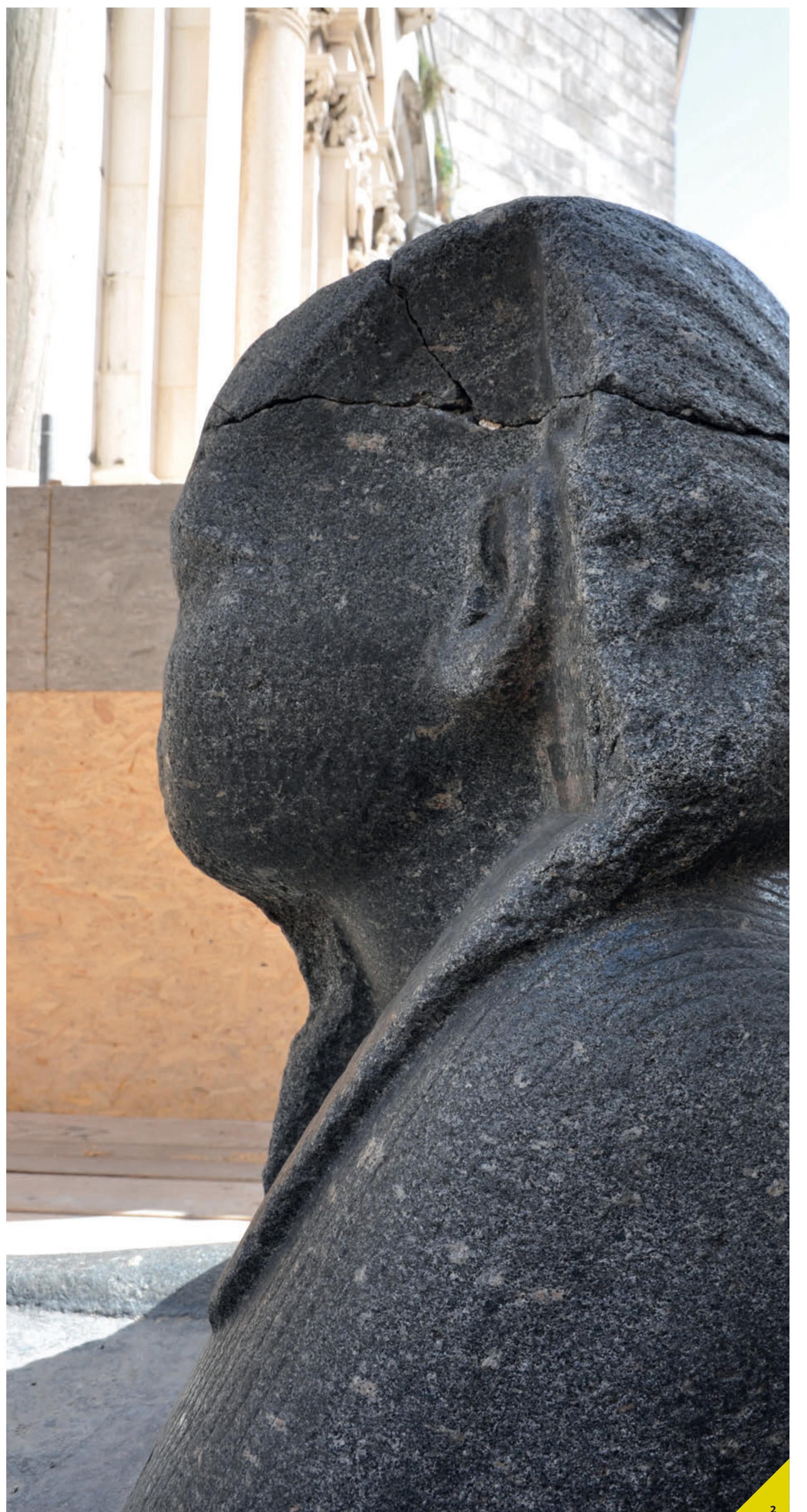
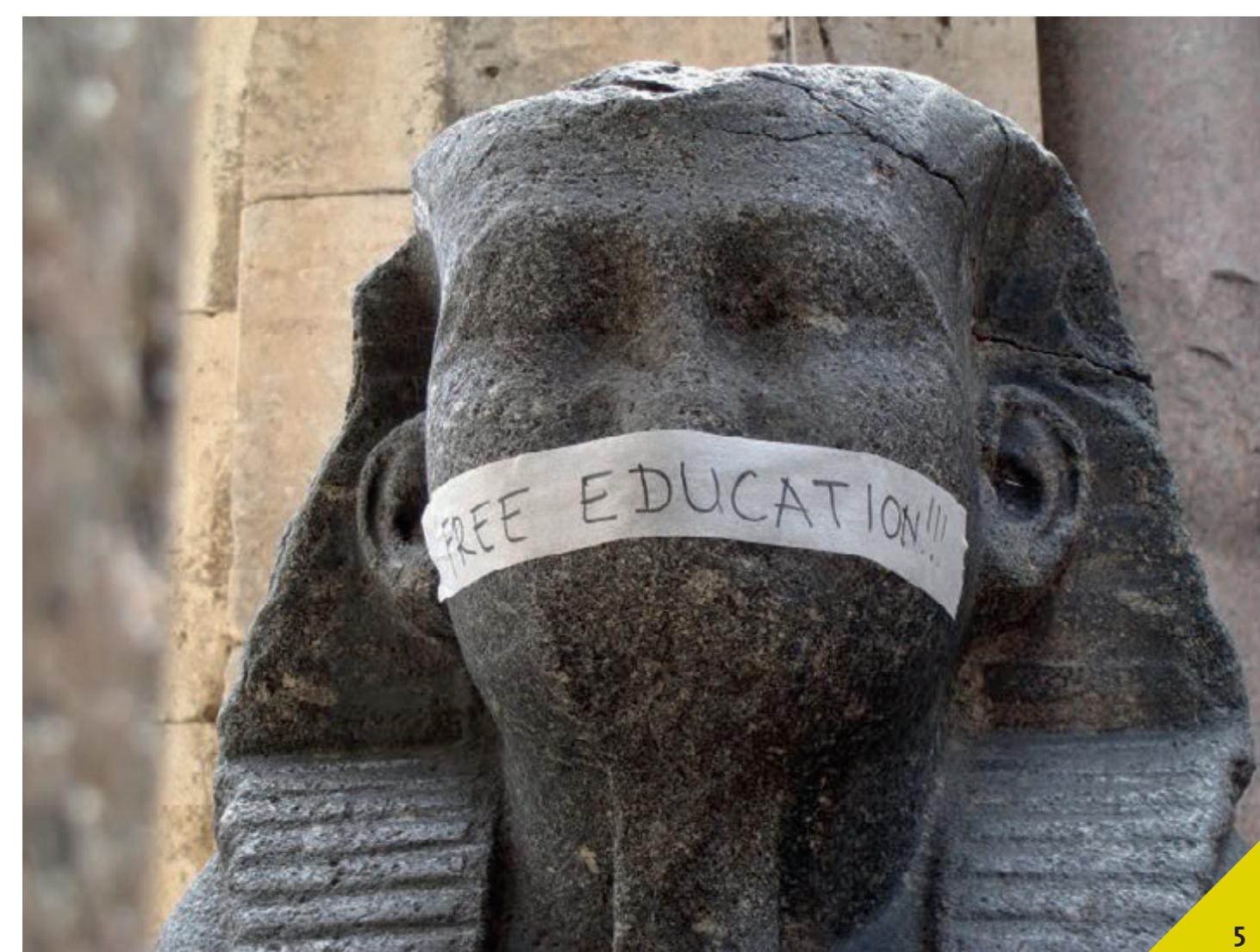
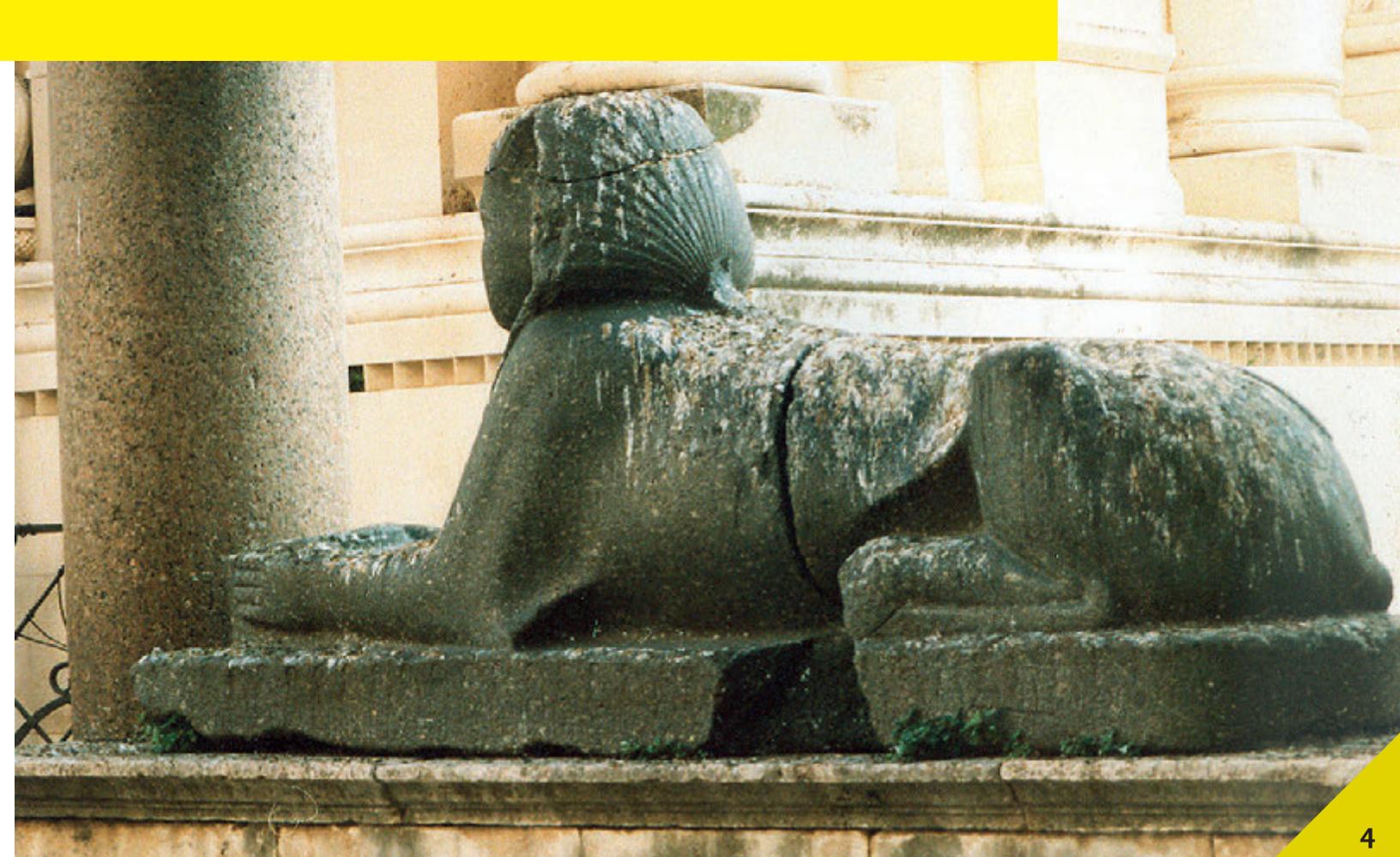
Egyptian sculptures belong to the original decoration of Diocletian's Palace, with most of them being only partially preserved. Merely 12 Egyptian sphinxes, or to be more precise their fragments, have been found within the old city core and in museums in Split. The largest and most beautiful, the only one completely preserved, is this sphinx placed in the south-east corner of Peristyle dating from the reign of Thutmose III. According to oral tradition, several significant damages on its head and a large fissure that has split its body in half have been created a long time ago by rocks that fell from the top floors of the bell tower as it was struck by lightning. It is also possible that damages were made as a part of Christian retaliation against pagan remains, the same way as other discovered sphinxes had been thoroughly damaged.

Within the project of conservation-restoration works of Peristyle the question of conservation, restoration and presentation of the sphinx was considered. The sculpture has been cleaned of dirt and bird droppings that aggressively affect the stone structure. Restoration of the surrounding architectural structure has indirectly improved the state of the sphinx because the bird control systems have been installed on capitals and cornice thus preventing further soiling. However, negligent citizens and visitors, as well as occasional vandalism, represent the biggest threat to the sculpture today. Furthermore, air pollution accelerates deterioration of stone surface that can easily be perceived if we compare the present state to the one from the photographs dating from the early 20th century. A low-relief frieze of hieroglyphs on the base of the sphinx could at that time be more easily perceived than today. Delicate question of long-term protection and the possibility of its dislocation to one of the museums in Split (or other allocated venue) demands thorough consideration and objective evaluation based on strong indicators. Expert opinion as well as the opinion of the citizens of Split should be considered while reaching the final decision about the future fate of the sphinx.

Meanwhile, a cast of the sphinx has been created for the needs of presentation and monitoring. The cast, created in light material shows much better surface details than the original dark stone. In addition to the aforementioned damages and reliefs, for the first time hieroglyphs on the front side have been detected, originally hidden by the adjacent column. Ankh-det or „the eternal life“ is how the newly discovered relief was interpreted by Igor Uranić, an Egyptologist. It can also be symbolically related to sculpture's own longevity, being considerably older than Peristyle itself.

1, 2. SFINGA NA PERISTILU TIJEKOM KONZERVATORSKO-RESTAURATORSKOG ZAHVATA; 3. SFINGA NAKON KONZERVATORSKO-RESTAURATORSKOG ZAHVATA; 4. SFINGA POKRIVENA GOLOBLJIM IZMETOM, POKAZATELJ NEBRIGE, POČ. 20. ST.; 5. INTERVENCIJA NA SFINGI PRILIKOM PERFORMANSA „SV. DUJE ZA BESPLATNO OBRAZOVANJE“, 16.05.2009.; 6. SFINGA PRIJE KONZERVATORSKO-RESTAURATORSKOG ZAHVATA

1. THE PERISTYLE SPHINX DURING CONSERVATION-RESTORATION TREATMENT; 2. THE SPHINX AFTER CONSERVATION-RESTORATION TREATMENT; 3. THE SPHINX COVERED WITH PIGEON DROPPINGS, INDICATOR OF NEGLECT AT THE BEGINNING OF THE 20TH CENTURY; 5. THE SPHINX DURING PERFORMANCE "ST. DOMNIO FOR FREE EDUCATION", 16.05.2009.; 6. THE SPHINX BEFORE CONSERVATION-RESTORATION TREATMENT





## Izrada odljeva sfinge

Sfinga sa Peristila je izuzetno složena za uzimanje otiska zbog njezinog razvedenog volumena cije duboko zavučene šupljine otežavaju izvlačenje kalupa. Kalup se sastoji od silikonske gume "Alpa-Sil MF-3" koja ima izvanredna mehanička svojstva, te dvostrukne gipsane kape. Tekuća guma je četkom nanesena na sfingu nakon izoliranja njezinene površine pH neutralnom sapunicom kako bi se olakšalo odvajanje silikonskog kalupa. Nakon ovog prvog sloja, u silikonsku gumu je dodan uglašivač pomoću kojeg je ona postala pastozna pa se mogla nanositi drvenom špatulom.

Nakon toga su od gipsa izradene "štikle", umetci koji ispunjavaju prostor dubokih rupa kako bi se kalup mogao nesmetano skinuti. U istu svrhu je cijela površina i gume i gipsanih umetaka izolirana sapunicom kako se gipsana kapa ne bi na njih zalijepila.

Metalne kopče, koje su prethodno ugradene u silikonski kalup i u gipsane umetke, izolirane su glinom kako bi se gipsana masa mogla nanositi bez mogućnosti spajanja. Nakon nanošenja prvog sloja gipsa, u gips je ubaćena kudelja koja je učvrštila gipsanu kapu. Obje polovice gipsane kape su učvršćene drvenim letvama koje omogućuju siguran transport i manipuliranje.

Gipsane kape su nakon sušenja odvojene od silikonskog kalupa, a sam kalup je poput gummene rukavice skinut sa sfinge. Nakon transporta, u radionici Hrvatskog restauratorskog zavoda, gipsane kape su ponovno spojene, a gipsani umetci su preko svojih kopči žicom privezane uz kapu. Silikonski kalup je tada umetnut i žicom učvršćen za gipsane kape. Vanjski sloj replike sfinge je izrađen od "Acrylstar prima" materijala koji se sastoji od akrilne smole na vodenoj bazi i mineralnih kristala. Unutrašnji sloj je izvezen od gipsa te dodatno učvršćen drvenom konstrukcijom. Nakon sušenja, kape su razdvojene, silikonski kalup je skinut, a replika sfinge ugledala je svjetlo dana. Korištenje kvalitetne silikonske gume omogućilo je vjerno prenošenje najsitnijih detalja s površine sfinge na odljev.

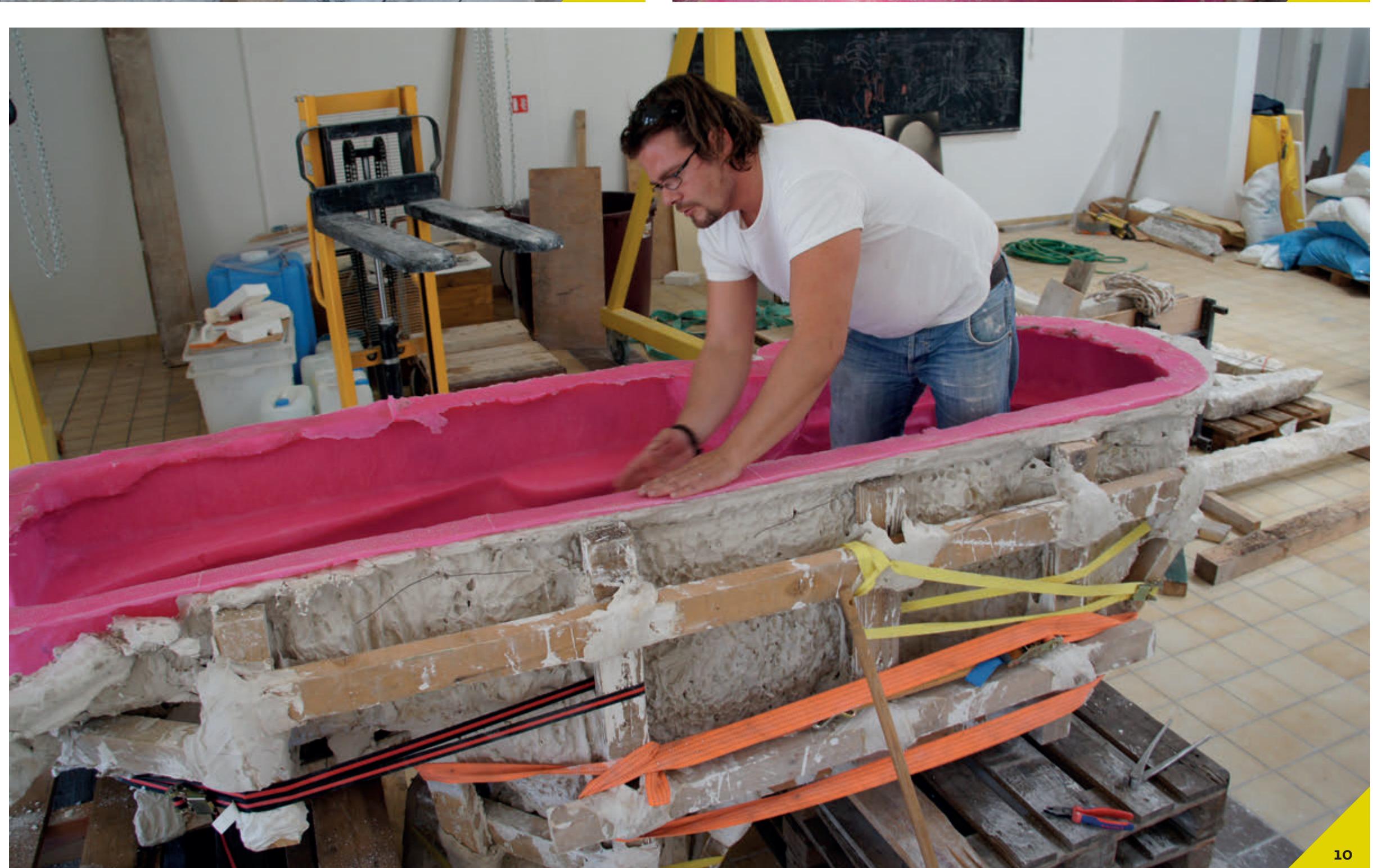
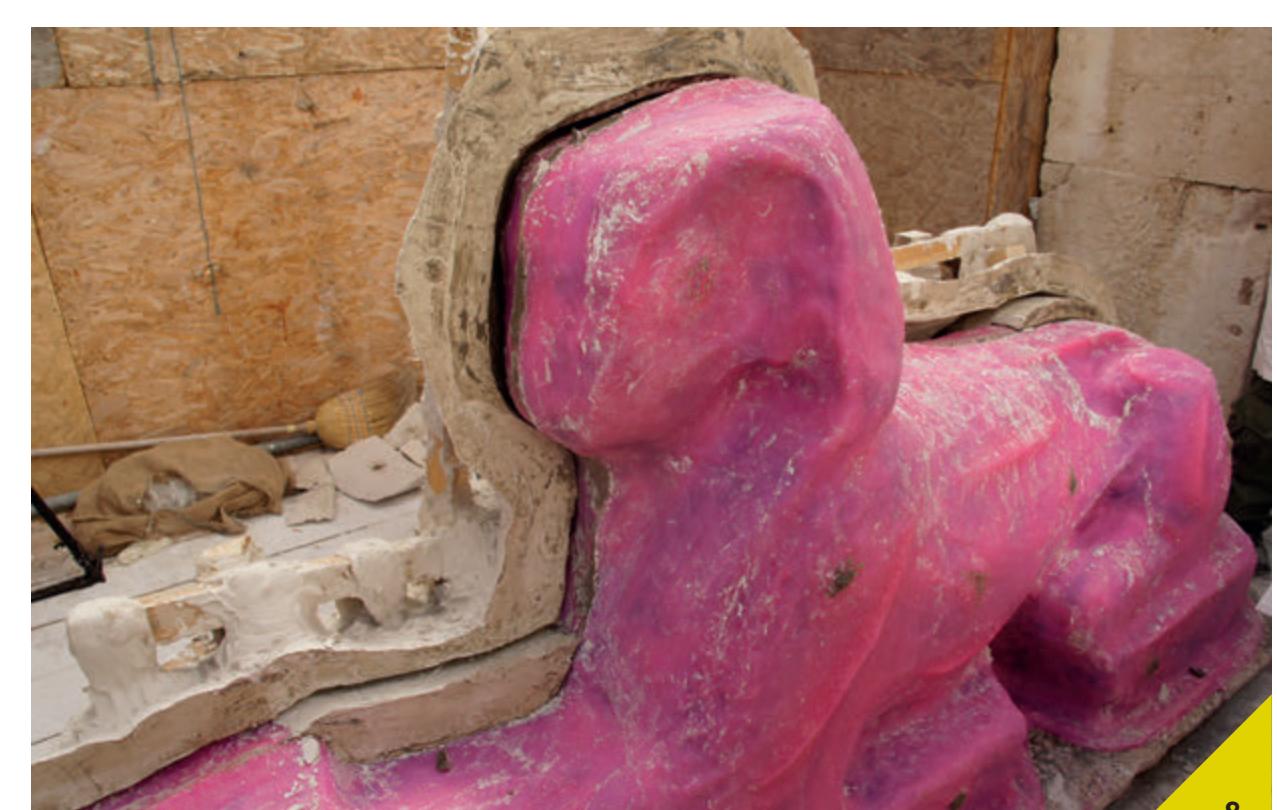
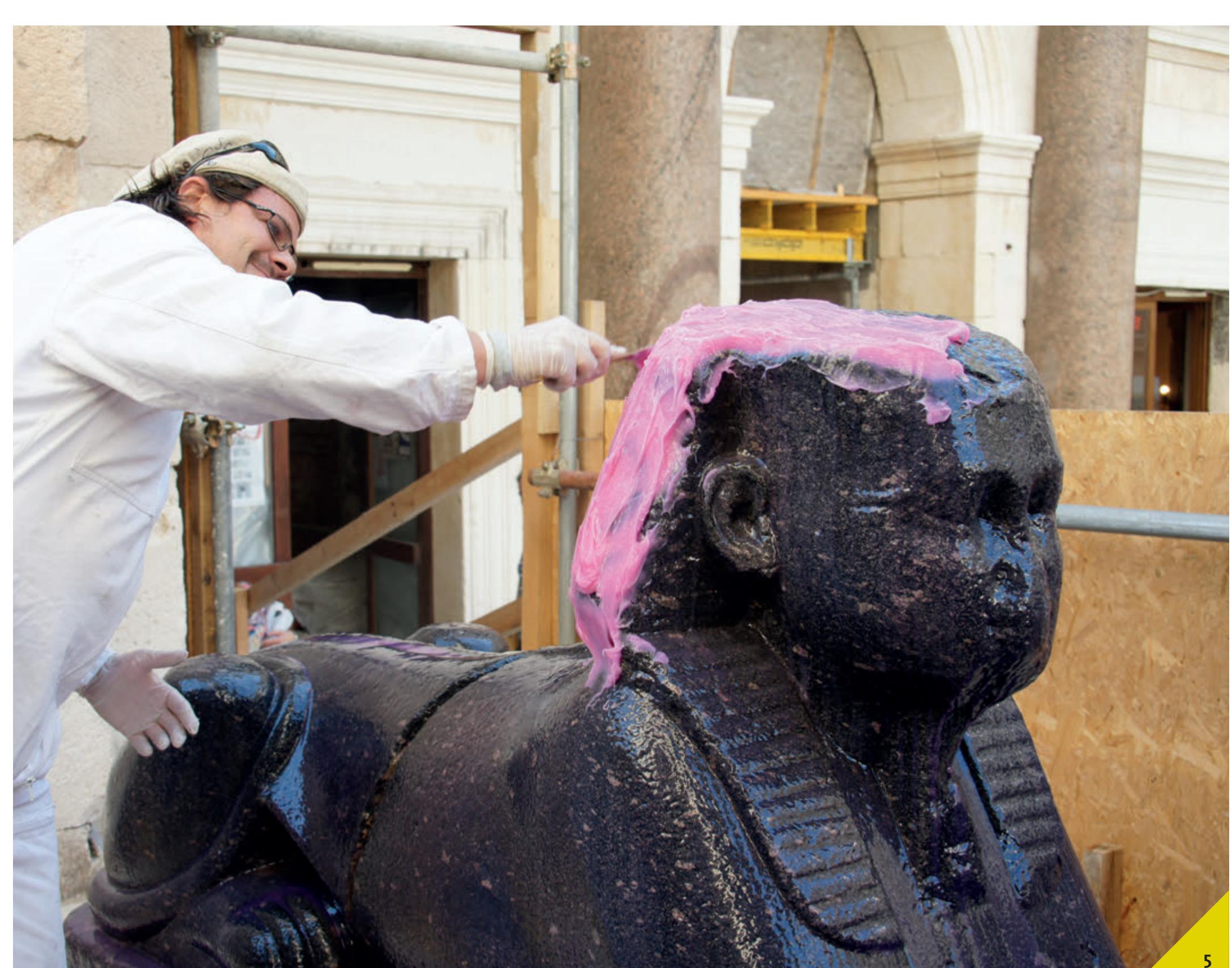
## Casting of the Sphinx

The Peristyle sphinx is exceptionally complex to cast due to its elaborate volume with deeply indented hollows that make the casting difficult. Mould is created out of silicone rubber "Alpa-Sil MF-3" with outstanding mechanical characteristics and a bipartite plaster jacket. Previous to applying liquid rubber with a brush, the surface of the sphinx had been isolated with pH neutral lather to facilitate the separation of silicone mould. After the first coat, a thickener was added to silicone rubber which became pasty and could be applied with a wooden spatula.

Afterwards, plaster fillers were made to fill the areas of deep hollows, so that the mould could be easily removed. For the same reason, the whole surface of rubber and plaster fillers was isolated with lather so that the plaster jacket would not stick to it.

Metal clasps previously inserted in silicone mould and plaster fillers, have been isolated with clay so that plaster could be applied without the possibility of fusion. After applying the first layer of plaster, hemp fibres were added that made the plaster jacket stronger. Both parts of the plaster jacket have been reinforced with wooden bars to secure its transport and handling.

When the plaster jackets were dry, they were separated from the silicone mould which was then removed from the sphinx like a rubber glove. After the transport to the workshop of the Croatian Conservation Institute, plaster jackets were reassembled again and plaster fillers were connected to them through their clasps with a wire. Silicon mould was inserted and attached with a wire to the jackets. The outer layer of the sphinx's replica was made of "Acrylstar" material that consists of water-based acrylic resin and mineral crystals. The inner layer was made of plaster, further reinforced with wooden construction. After drying the jackets were separated, silicone mould removed and the replica of the sphinx first saw the light of the day. Working with high-quality silicon rubber has enabled faithful reproduction of the tiniest details from the surface of the sphinx.



1, 2, 3. ODLJEV SFINGE SA PERISTILA; 4. PRANJE SPHINXE PRIJE NANOŠENJA SILIKONSKE GUME ZA UZIMANJE OTISKA; 5, 6. NANOŠENJE SILIKONSKIE GUME NA SPHINX; 7, 8. IZRADA GIPSANE KAPE; 9. SILIKONSKA GUMA NAKON UKLANJANJA SA SPHINXE; 10. UMETANJE SILIKONSKOG KALUPA U GIPSANU KAPU PRIJE LIJEVANJA ODLJEVA SFINGE

1, 2, 3. REPLICA OF THE PERISTYLE SPHINX; 4. WASHING THE SPHINX BEFORE APPLYING SILICONE RUBBER; 5, 6. APPLYING SILICONE RUBBER ON TO THE SPHINX; 7, 8. MAKING PLASTER JACKET; 9. SILICONE RUBBER AFTER REMOVAL FROM THE SPHINX; 10. INSERTING SILICON MOULD INTO THE PLASTER JACKET BEFORE CASTING THE SPHINX





## Dinamika projekta obnove

Na inicijativu Službe za staru gradsku jezgru Grada Splita 2003. godine Hrvatski restauratorski zavod započeo je konzervatorsko-restauratorska istraživanja stanja Peristila Dioklecijanove palače u Splitu. Na temelju rezultata istraživanja utvrđena je metodologija radova te je 2004. godine započeta cijelovita obnova Peristila. Zahvat koji je u početku bio zamislen kao čišćenje antičke kamene arhitekture prerasao je u složeni konzervatorsko-restauratorski posao, a pri čemu nije tretirana samo antička arhitektura već su u zahvat ušle sve kasnije interpolacije i elementi arhitekture koji čine kulturno-povijesnu cjelinu Peristila.

S obzirom da je riječ o izrazito složenom i tehnički zahtjevnom projektu s velikom zonom obuhvata, projekt konzervacija-restauracije podijeljen je u šest izvedbenih faza od kojih je svaka odgovara jednom prostornom segmentu.

Prva faza zahvata (2004.-2005) je obuhvatila pilaster i prva dva stupca sjevernog dijela istočne kolonade. Druga faza radova (2006.-2007.) obuhvatila je južni dio zapadne kolonade i pročelje palače Skočibučić-Lukaris. Slijedi treća faza radova (2007.-2008.) koja se odvija na sjevernom dijelu zapadne kolonade i pročelju palače Cipci te na ostacima luka antičkog trijema decumanusa u prizemlju palače Grisogono. Četvrta faza radova (2008.-2010.) obuhvatila je južni dio istočne kolonade, a zbog opsega i konzervatorske problematike podijeljena je u dvije pod-faze. Peta faza radova odvija se na Protriportiku i njegovim interpoliranim dijelovima uključujući sjeverni vanjski zid i portal Vestibula (2010.-2012.). Šesta faza zahvata obuhvatila je crkvu sv. Roka i luk antičkog decumanusa, a zbog proglašenja problema obnove crkve i cijelokupne antičke strukture, odvijala se paralelno s radovima 4. i 5. faze (2009.-2012.). Početkom 2013. godine radovi se odvijaju na ulazu u podrumu i na sačuvanim stupovima trijema decumanusa, čime su, kao i radovima na sfingi i izradom njezina odjeva najavljenе sljedeće faze konzervatorsko-restauratorskog zahvata.

## Dynamics of the Restoration Project

Initiated by the Agency for the Historic Core of Split, in 2003 the Croatian Conservation Institute started the conservation-restoration research of the Peristyle of Diocletian's Palace in Split. Based on the research results methodology was established, and detailed restoration of Peristyle was initiated in 2004. At the beginning, treatment was conceived as cleaning of ancient stone architecture, only to be transformed into an elaborate conservation-restoration work, not only of ancient architecture but it also included all of the later interpolations and architectural elements that create cultural and historic complex of Peristyle.

Due to the complexity of the project, its technical demands and size, conservation-restoration project was divided into six phases, each one related to a certain spatial segment.

The first phase (2004-2005) included a pilaster and first two columns of the north part of the east colonnade. The second phase (2006-2007) included the south part of the west colonnade and the façade of the Skočibučić – Lukaris Palace. This was followed by the third phase (2007-2008) located at the north part of the west colonnade and the façade of the Cipci Palace. It also included the remains of the arch of the ancient decumanus porch on the ground floor of the Grisogono Palace. The fourth phase (2008-2010) included the south part of the east colonnade, but was subdivided into two phases due to its complexity and conservation issues. The fifth phase included the Prothyrion and its interpolated parts, as well as the outer north wall and the Vestibule portal (2010-2012). The sixth phase included the Church of St. Roch and the arch belonging to the porch of the ancient decumanus. Because of the relation of the church restoration with the whole ancient structure, this phase was executed parallel to the works of the 4th and 5th phase (2009-2012). In early 2013, the works on the entrance to the substructures and on the preserved columns of the decumanus porch are carried out. This, together with the works performed on the sphinx and its casting, announces the following phase of the conservation-restoration work.



### FAZE PROJEKTA:

- I Severni dio istočne kolonade
- II Južni dio zapadne kolonade i pročelje palače Skočibučić-Lukaris
- III Severni dio zapadne kolonade s pročeljem palače Grisogono-Cipci i luk antičkog trijema
- IV Južni dio istočne kolonade
- V Protiron, prolaz prema Vestibulu i unutrašnji portal Vestibula
- VI Kapela sv. Roka i luk antičkog trijema

### PROJECT PHASES:

- I The northern part of the eastern colonnade
- II The southern part of the western colonnade and the Skočibučić-Lukaris façade
- III The northern part of the western colonnade and the façade of Grisogono-Cipci Palace, and the remains of the Roman arch
- IV The southern part of the eastern colonnade
- V The Prothyrion, passage to the Vestibule and interior portal of Vestibule
- VI The Chapel of St Roche and the arch of the Roman portico

1. DETALJ UNUTRAŠNJEGL PORTALA VESTIBULA TIJEKOM KONZERVATORSKO-RESTURATORSKOG ZAHVATA; 2. UNUTRAŠNJI PORTAL VESTIBULA TIJEKOM KONZERVATORSKO-RESTURATORSKOG ZAHVATA; 3. LASERSKO ČIŠĆENJE KAMENA; 4. PRVA FAZA KONZERVATORSKO-RESTURATORSKOG ZAHVATA; 5. DRUGA FAZA KONZERVATORSKO-RESTURATORSKOG ZAHVATA; 6. ČETVRTA FAZA KONZERVATORSKO-RESTURATORSKOG ZAHVATA; 7. PETA FAZA KONZERVATORSKO-RESTURATORSKOG ZAHVATA

1. DETAIL OF THE INTERIOR VESTIBULE PORTAL DURING CONSERVATION-RESTORATION TREATMENT; 2. INTERIOR VESTIBULE PORTAL DURING CONSERVATION-RESTORATION TREATMENT; 3. LASER STONE CLEANING; 4. THE FIRST PHASE OF THE CONSERVATION-RESTORATION TREATMENT; 5. SECOND PHASE OF THE CONSERVATION-RESTORATION TREATMENT; 6. FOURTH PHASE OF THE CONSERVATION-RESTORATION TREATMENT; 7. FIFTH PHASE OF THE CONSERVATION-RESTORATION TREATMENT





## Ispitivanje uzroka propadanja, određivanje metodologije i probe materijala

Konzervatorsko-restauratorskim zahvatom na Peristilu Dioklecijanove palače prethodila su opšte dijagnostička ispitivanja i istražni radovi. U tu svrhu je primijenjen čitav niz neinvazivnih i mikrodestruktivnih tehnika ispitivanja i instrumentalnih analiza: termografija, ultrazvuk, magnetoskopija, mjerjenje potencijala korozije, mjerjenje napona u bakrenim klampama, mjerjenje poroznosti i vodoupojnost kame na, mineraloško-petrografska analiza, rendgenska difracijska analiza, spektrometrija emisije rendgenskih zraka potaknuta protonima, FTIR spektroskopija, mikroskopija i kemijske analize materijala.

Na strogo određenim zonomama izvršena su pokusna uklanjanja organskih onečišćenja i crne kore, odsoljavanja kame na, površinske zaštite i uživljivanja kame na, sanacije pukotina te rekonstrukcije nedostajućih dijelova i fuziranje slijubnica.

Konzervatorska istraživanja na Peristilu predvodili su stručnjaci Prirodoslovnog laboratorija Hrvatskog restauratorskog zavoda u suradnji s kolegama iz Opificio delle Pietre Dure iz Firence i SER.CO.TEC-a iz Trsta. Osim in situ, ispitivanja su izvedena i u laboratoriju Hrvatskog restauratorskog zavoda, Opificio delle Pietre Dure, te u laboratorijima Instituta Ruder Bošković, Fakulteta kemijskog inženjerstva i tehnologije i Prirodoslovno-matematičkog fakulteta u Zagrebu. Navedena multidisciplinarna istraživanja poprimaju širi kontekst ispitivanjem počinjanja konstrukcije. Kvaliteta tla i stanje temelja utvrđena su geomehaničkim istraživanjima, nužno popraćenim arheologijom. Ta su ispitivanja izvršena u suradnji s D&Z d.o.o. iz Zadra, Geotehničkim studijom d.o.o. i Građevinskim fakultetom iz Zagreba, uz nadzor Odjela za kopnenu arheologiju Hrvatskog restauratorskog zavoda.

Temeljem osnovnih informacija o vrsti i stanju materijala predviđeni su kompatibilni materijali koji su se koristili prilikom obnove, različite metode čišćenja površine kame na, metodologija uklanjanja soli te zaštita kame na. Utvrđena metodologija i materijali korišteni su u svim fazama obnove uz kontinuirano praćenje rezultata i kontrolne laboratorijske analize. Zbog toga su se u razdoblju od deset godina, koliko je trajao projekt, restauratorski postupci nadopunjivali i usavršavali.

## Analysis of Causes of Decay, Defining the Methodology and Testing of Materials

Elaborate diagnostic testing and research work have preceded the conservation-restoration works at the Peristyle of Diocletian's Palace. The whole series of non-invasive and microdestructive research techniques and instrumental analysis was applied: thermography, ultrasound, magnetoscopy, measurement of corrosion potential, measurement of tension in copper clamps, measurement of stone porosity and water absorption, mineralogical-petrographic analysis, X-ray diffraction analysis, proton-induced X-ray emission spectroscopy, FTIR spectroscopy, microscopy and chemical material analysis.

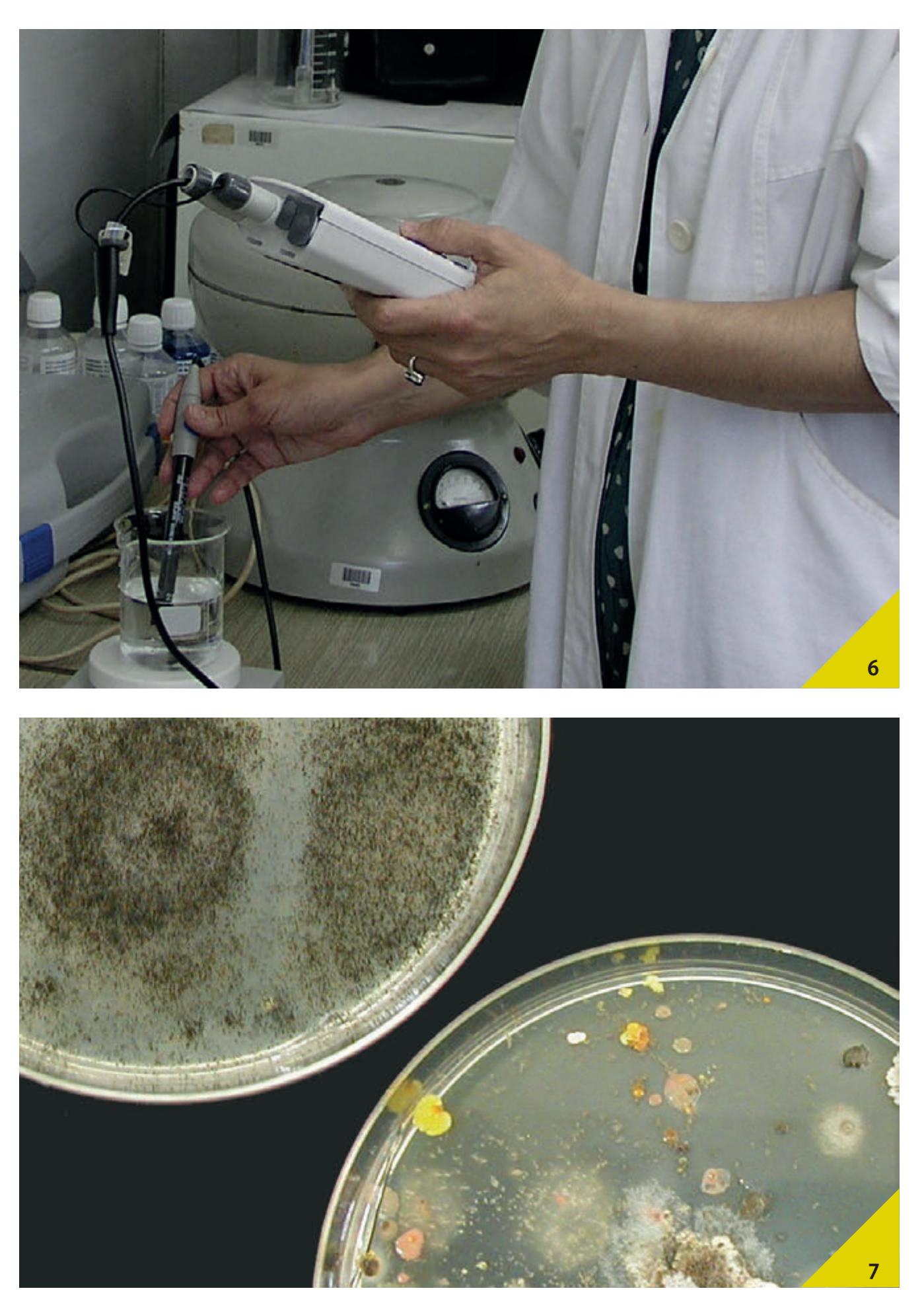
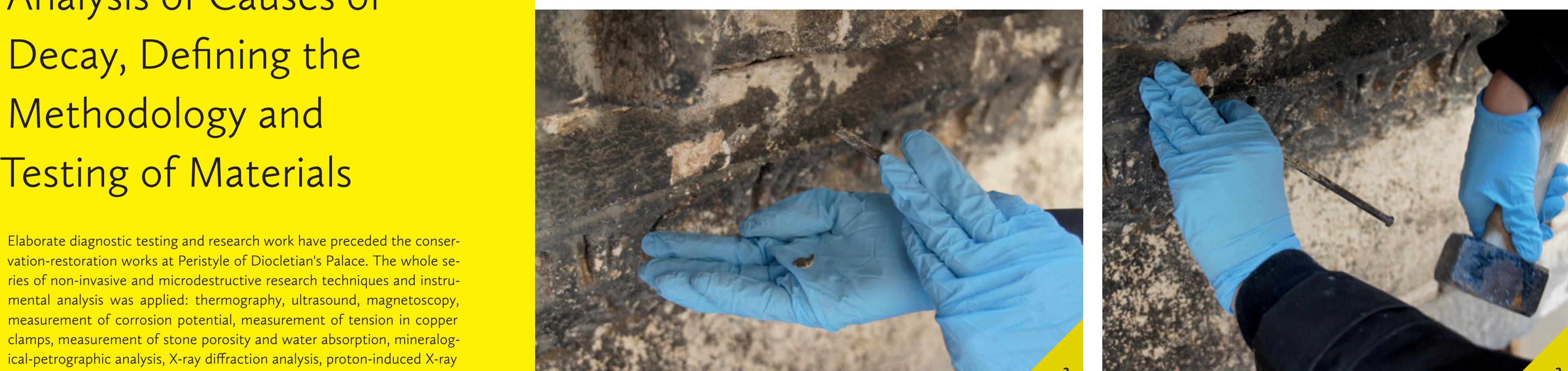
Trial removals of organic dirt and black crust, desalination, surface conservation and consolidation of stone, crack repairs, reconstruction of missing parts and joint filling were conducted in strictly defined areas.

Conservation research of Peristyle was lead by the experts from the National Science Laboratory of the Croatian Conservation Institute in collaboration with the colleagues from the Opificio delle Pietre Dure from Florence and SER.CO.TEC from Trieste. Apart from in situ, research was conducted in the Croatian Conservation Institute Laboratory, Opificio delle Pietre Dure, laboratories of the Ruder Bošković Institute, Faculty of Chemical Engineering and Technology and Faculty of Science in Zagreb. This multidisciplinary research was further expanded by the construction analysis. Soil and foundation stability were tested through geomechanic research with necessary archaeological work. This research was conducted in collaboration with company D&Z from Zadar, Geotechnic Studio and Faculty of Civil Engineering from Zagreb and the supervision of the Department of Archaeology of the Croatian Conservation Institute.

Based on the main information regarding material type and its condition, specific materials were chosen to be used during rehabilitation, methods of stone surface cleaning, desalination and conservation were selected. Chosen methodology and materials were used in all phases of restoration with continuous monitoring and laboratory analysis control. Therefore, during the ten years of the project conservation and restoration procedures have been improved and perfected.

**1, 2, 3, 4. UZIMANJE UZORAKA KAME NA ANALIZIRANJE VRSTE I KOLIĆINE SOLI PRISUTNE U NJEMU;** **5. DRUGI STUP ISTOČNE KOLONADE - PROBE ODSOLJAVANJA I OMEŠAVANJA CRNE KORE;** **6. ISPITIVANJA U PRIRODOSLOVNOM LABORATORIJU HRVATSKOG RESTAURATORSKOG ZAVODA;** **7. ISOLACIJA I IDENTIFIKACIJA MIKROORGANIZAMA SA SKRAME I KAMENA (MIJEŠANA KULTURA BAKTERIJA I PUJESNI);** **8. PROBE ODSOLJAVANJA KAMENA;** **9. PROBE UKLANJANJA SKRAME LASEROM;** **10. DETALJ KAMENA PREKRIVENOG SKRAMOM SA VJENČA ISTOČNE KOLONADE**

**1, 2, 3, 4. SAMPLING STONE TO ANALYZE THE TYPES AND AMOUNT OF SALT PRESENT IN IT;** **5. THE SECOND COLUMN OF THE EASTERN COLONNADE - EXPERIMENTAL DE-SALINATION AND SOFTENING OF BLACK CRUST;** **6. INVESTIGATIONS IN THE NATURAL SCIENCE LABORATORY OF CROATIAN CONSERVATION INSTITUTE;** **7. ISOLATION AND IDENTIFICATION OF MICROORGANISMS FROM THE BLACK CRUST AND STONE SURFACE (MIXED FORMATION OF BACTERIA AND MOLD);** **8. EXPERIMENTAL DESALINATION OF STONE;** **9. LASER CLEANING TESTS - REMOVING BLACK CRUST;** **10. DETAIL OF THE STONE CORNICE OF THE EAST COLONNADE COVERED WITH BLACK CRUST**



# Prirodoslovna istraživanja

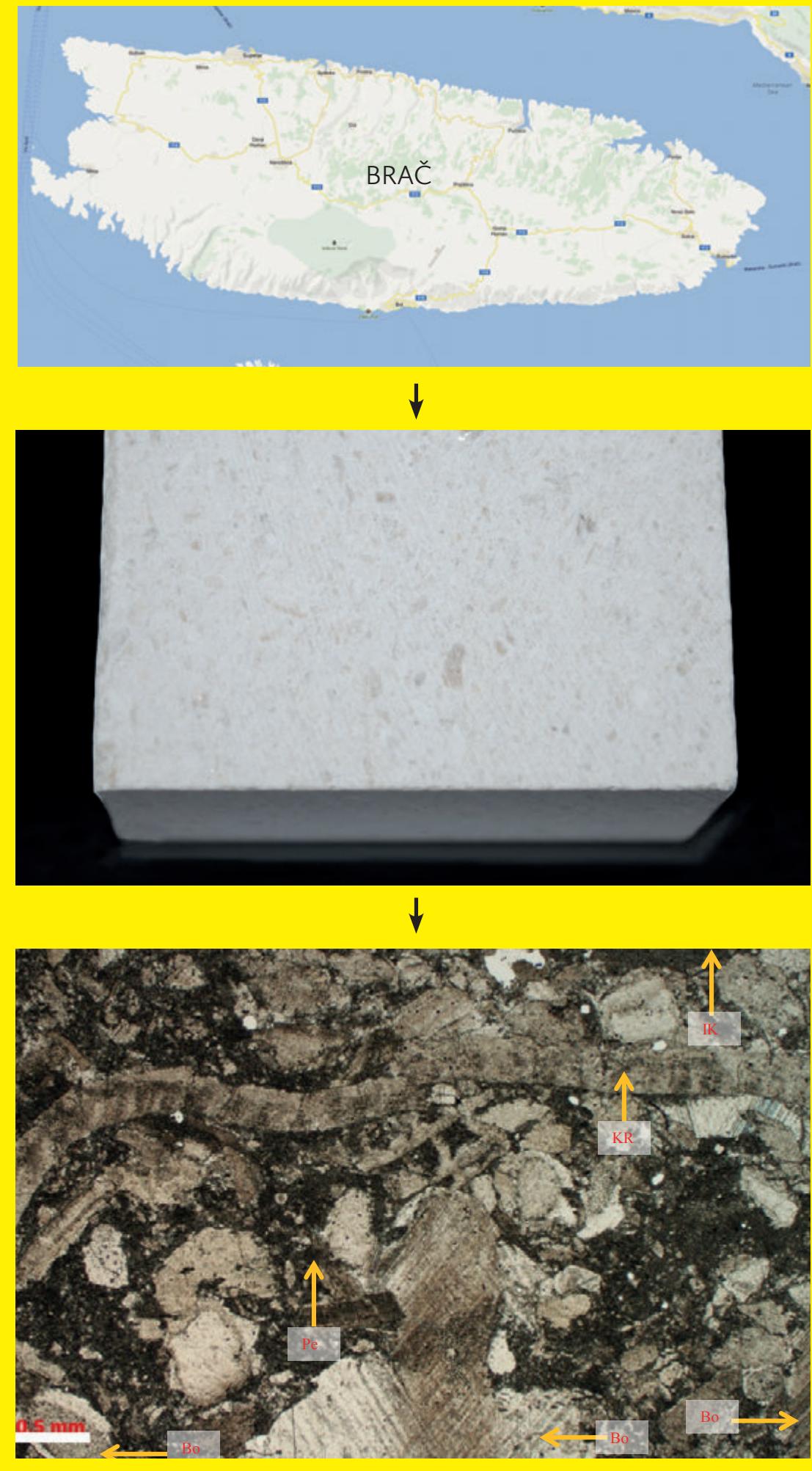
## Laboratory Research

### ODREĐIVANJE VRSTE I PORIJEKLA KAMENA

Mineraloško petrografscom analizom ustanovljeno je da se radi o biomikritnom vapnencu tipa wackestone vrlo sličnom kamenu iz kamenoloma Škrip, Plate i Rasoe s otoka Brača. Crveni stupovi određeni su kao egipatski sienit iz Assuana.

### DETERMING THE TYPE AND ORIGIN OF THE STONE

Through mineralogical petrographic analysis it has been determined that the stone was a biomicrite limestone of wackestone type, very similar to the one originating from the quarries of Škrip, Plate and Rasoe on the island of Brač. Red columns were recognized as an Egyptian sienite from Aswan.

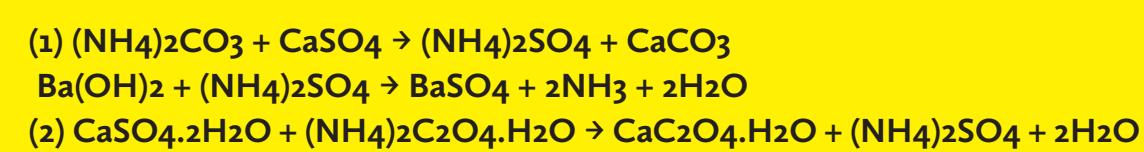


### ŠTETNE SOLI I PROBNA ODSOLJAVANJA

Od stetnih soli dokazano je najviše gipsa u područjima ispod crnih kora. Za neutralizaciju gipsa na temelju izvedenih probi odabранa je metoda amonij/barij (1), te u zadnjoj fazi (protiron) metoda amonijeva oksalata (2).

### HARMFUL SALTS AND EXPERIMENTAL DESALTING

From all proved harmful salts the most present was gypsum in areas below the black crust. For neutralization of gypsum, based on experimental probes method of ammonium / barium (1) was chosen and in the final phase of works (Prothyron) ammonium oxalate method (2).

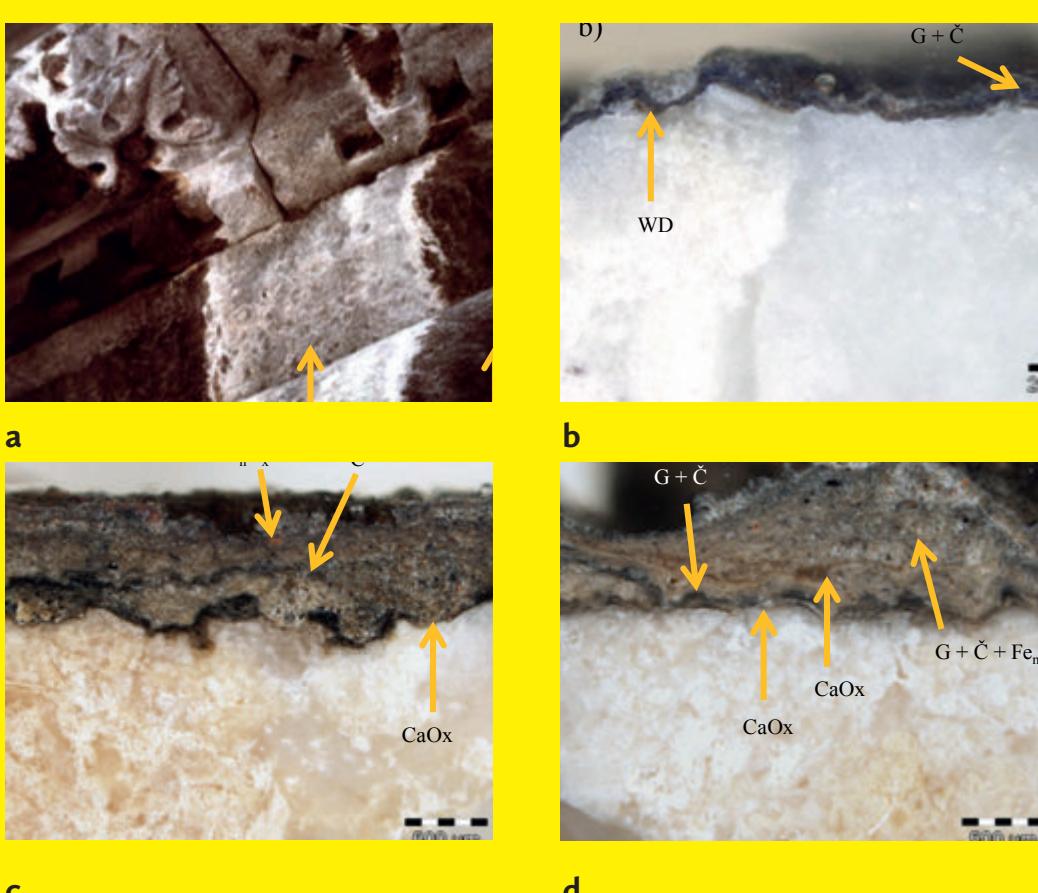


### ODREĐIVANJE SASTAVA KORA NA KAMENU

Crne kore na kamenu sastoje se od gipsa, čade i željeznih oksida te mjestimice kalcijskih oksalata. Štukaste patine sastoje se od kalcijskih oksalata te mjestimice gipsa. Žučkaste patine, koje se ponegdje nađe ispod crnih kora sastoje se od kalcijskih oksalata. Osim mineralnih patina na površini kamena dokazana je prisutnost algi i lisajeva.

### DETERMINATION OF STONE CRUST STRUCTURE

Black crusts on stone are composed of gypsum, soot and iron oxides and sporadic calcium oxalate. Gray patinas are composed of calcium oxalates and sporadic gypsum. Yellowish patinas that sometimes occur under the black crusts consist of calcium oxalates. Besides mineral patinas, algae and moss were found on stone surfaces.



- a) Makroskopski snimak površine kamena  
b) poprečni presjek kore na kamenu – na površini kamena nalazi se tanki sloj kalcijskih oksalata - wedellita (WD) iznad kojeg je crni sloj sastavljen od gipsa (G) te čestica čade (C)  
c) poprečni presjek kore na kamenu – na površini kamena nalazi se tanki sloj kalcijskih oksalata (CaOx) iznad kojeg se izmjenjuju slojevi sastavljeni od gipsa, čestica čade, željeznih oksida (FeOx) te kalcijskih oksalata (CaOx)  
d) poprečni presjek kore na kamenu – na površini kamena nalazi se tanki sloj kalcijskih oksalata iznad kojih se nalazi crni sloj sastavljen od gipsa i čestica čade, željeznih oksida te kalcijskih oksalata
- a) Macroscopic image of the stone surface  
b) cross-section of crust on stone – there is a thin layer of calcium oxalate – wedellite (WD) on the stone surface, with a black layer of gypsum (G) and soot (C) on top  
c) cross-section of crust on stone – there is a thin layer of calcium oxalates (CaOx) on the stone surface, with alternating layers of gypsum, soot particles, iron oxides (FeOx) and calcium oxalates (CaOx)  
d) cross-section of crust on stone – there is a thin layer of calcium oxalate on the stone surface with black layer of gypsum and soot particles on top. Above this, in the right corner of the sample again follows a layer of calcium oxalate and black layer of gypsum and soot, while in the left corner of the sample layers of gypsum, soot particles, iron oxides and calcium oxalates can be seen.



Probe odsoljavanja  
(amonij/barij – lijevo; ionski izmjjenjivač – desno)  
Experimental desalination  
(ammonium/barium – left; ion exchanger – right)



Mjerjenje vodoupojnosti kamena Karstenovim cilindrom  
Measurement of water absorption features of stone by Carsten spouts



Probe odsoljavanja i zaštite amonijevim oksalatom  
(premazivanje – lijevo; pulpa – desno)  
Experimental desalination and protection of stone with ammonium oxalate

### ISTRAŽIVANJE ZAŠTITE KAMENA METODOM AMONIJEVA OKSALATA

Preciznim laserskim čišćenjem restauratori nisu uklanjali prirodne žučkaste patine od kalcijskih oksalata iz razloga što je brojnim znanstvenim istraživanjima u svijetu dokazano da kalcijski oksalati štite kamen podlogu. Temeljem ove spoznaje 90-tih godina u Firenci je osmišljena metoda kojom se pomoću djevljanja amonijeva oksalata na kamen od kalcijske karbonata stvara umjetni bezbojan zaštitni sloj kalcijskih oksalata. Osim zaštite, koja je daleko prirodnija i kompatibilnija od različitih silikonskih proizvoda, amonijev oksalat djeluje i na gips također stvarajući amonijev oksalat čime je ovim sredstvom moguće raditi i odsoljavanju.

U Italiji ova se metoda koristi samo za zaštitu mramornih kipova na nošenjem amonijeva oksalata u pulpi dok znanstvena istraživanja nisu posve jasna o debljinji i homogenosti nastalog sloja na površini različitih vrsta kamenja.

Iz tog razloga krenulo se u istraživanje koje je trebalo odgovoriti na dva ključna pitanja: 1. Da li je moguće postići adekvatan zaštitni sloj drugaćijim načinom nanošenja amonijeva oksalata na kamen od pulpe, iz razloga ekonomski neplativosti pokrivanja ovokle površine s pulpom? 2. Kolika je debljina i kakva je pokrivenost kamena novonastalim slojem kalcijske oksalate?

Nakon brojnih proba i mjerenja u laboratoriju poštujući fizikalno-kemijske zakone same reakcije između kalcijske karbonata i amonijeva oksalata (transport reaknta iz otopine preko granice kamena i otopine u kamen) osmisljen je način premazivanja koji bi trebao stvoriti adekvatnu zaštitu na kamenu.

Da bi se dokazali ovi procesi te na mikro razinu vidjela rasprostranjenost oksalatnog sloja na površini kamena kao i njegovo stvaranje u dubini, bilo je potrebno koristiti izrazito sofisticirane mikro analitičke metode. U sklopu tog projekta rađeno je istraživanje na francuskom nacionalnom sinkrotoru „SOLEIL“ te švicarskom sinkrotoru „Swiss light source“ tehnikama sinkrotorske mikro Fourier transformirane infracrvene spektroskopije (SR-μFT-IR) te sinkrotorske mikro rendgenske difrakcije (SR-μXRD).

Ovime tehnikama ustanovljeno je da na površini kamena Veselje osmisljenom metodom premazivanja, nastaje sloj kalcijske oksalate ekvivalentan deset-satnom tretmanu pulpom, što je prema istraživanjima u Italiji sasvim dovoljno za postizanje učinkovite zaštite. Također je dokazano da novonastali zaštitni sloj metodom premazivanja ima debljinu od oko 30 μm. Nakon toga Protron Peristila uspješno je zaštićen umjetno stvoreni slojem kalcijske oksalate.

### RESEARCH OF STONE CONSERVATION WITH AMMONIUM OXALATE METHOD

While cleaning the stone with precise laser restorers did not clean natural yellowish patinas composed of calcium oxalates due to the fact that numerous scientific surveys have shown that calcium oxalates protect the stone surface. Based on this information, during 1990s in Florence a new method was introduced that creates artificial colourless protective layer of calcium oxalate by treating the stone with ammonium oxalate. Besides conservation which is by far more natural and compatible than various silicon products, ammonium oxalate also effects gypsum, again by creating ammonium oxalate, so it also possible to use it in desalination.

This method is used in Italy only for conservation of marble statues by applying ammonium oxalate in pulp and scientific research is not quite clear on the thickness and homogeneity of the newly created layer on the surface of various types of stone.

For this reason, research was conducted in order to answer two key questions: 1. Was it possible to achieve adequate protective layer with a different mode of applying the ammonium oxalate, besides using pulp which is too expensive to use in such a large area? 2. Which is the thickness and coverage of stone with the new calcium oxalate layer?

After numerous tests and measurements in the laboratory with respect to the physical – chemical laws of reaction of calcium oxalate and ammonium oxalate (transport of reactant from the solution over the border of the stone and solution into the stone) a mode of applying that would create adequate protection of stone was devised.

In order to prove these processes and to perceive on micro level the existence of oxalate layer on the surface of the stone, as well as its creation within the stone, extremely sophisticated micro analytical methods had to be used. Research was conducted within this project in French national Synchrotron "SOLEIL" and Swiss Synchrotron "Swiss light source" with the techniques of synchrotron micro Fourier transform spectroscopy (SR-μFT-IR) and synchrotron micro X-ray diffraction (SR-μXRD).

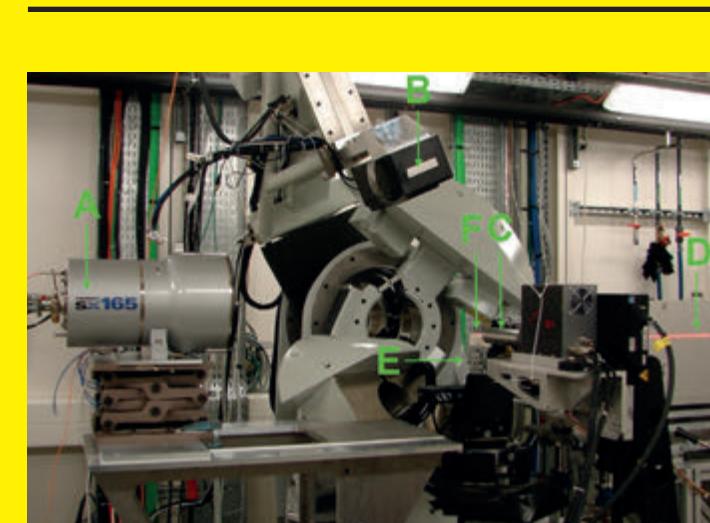
These techniques have established that with the devised applying methods a layer of calcium oxalate is created that is equivalent to a ten-hour pulp treatment which is, according to Italian research, sufficient for the effective conservation. In addition, it has been proven that the newly-created applied layer has the thickness of 30 μm. Following these procedures, the Peristyle Prothyron has successfully been conserved with the artificially created layer of calcium oxalate.

Analiza putem SR-μXRD označena na slici (A - CCD detektor za prikupljanje difrakcijske kute, B - CCD detektor za pozicioniranje kute uzorka, C - XRF detektor za snimanje spektara karakterističnih rendgenskih zraka iz uzorka, D - laser za pozicioniranje visine uzorka, E - goniometar, F - uzorak)



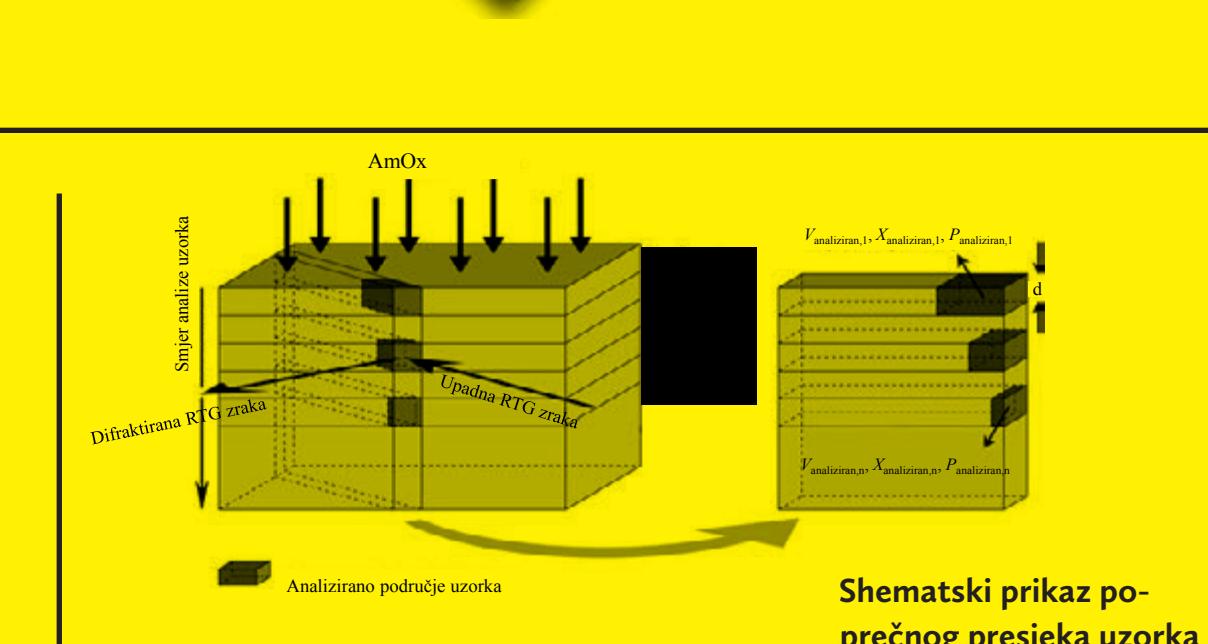
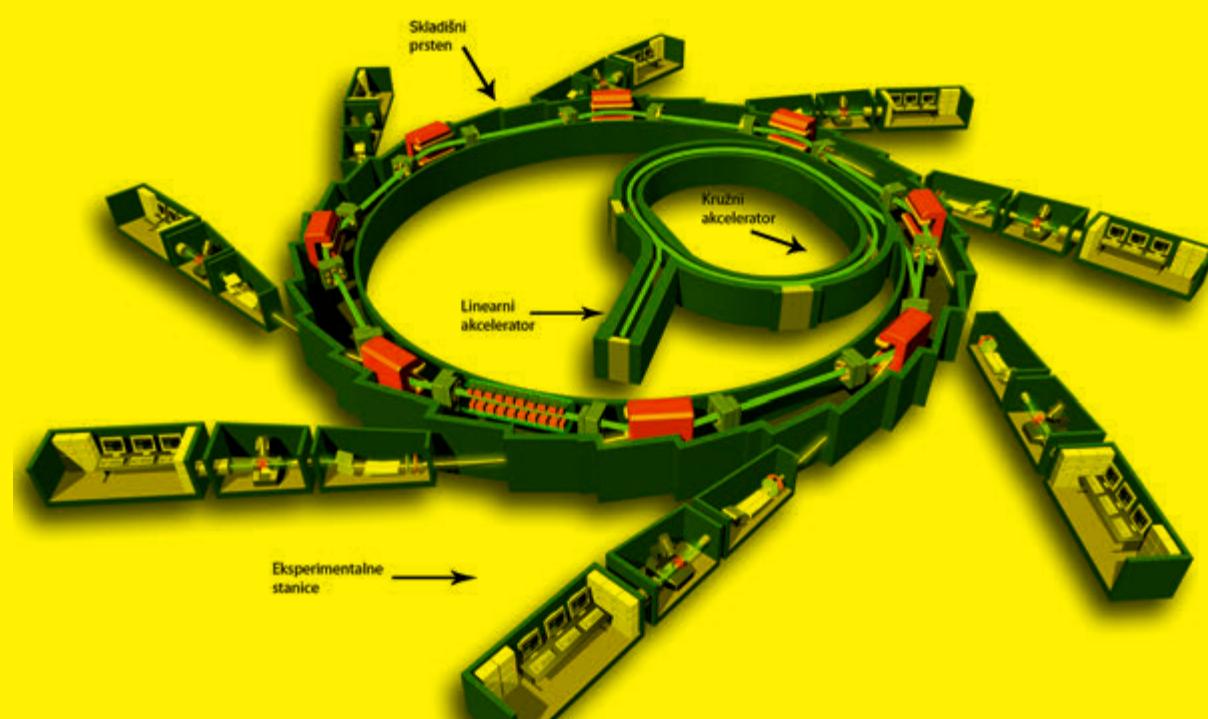
Francuski nacionalni sinkrotor „SOLEIL“  
kraj Pariza pogled iz zraka, shematski prikaz  
postrojenja

French national synchrotron "SOLEIL" near Paris –  
aerial view, schematic representation of the facility



Analiza putem SR-μXRD označena na slici (A - CCD detektor za prikupljanje difrakcijske kute, B - CCD detektor za pozicioniranje kute uzorka, C - XRF detektor za snimanje spektara karakterističnih rendgenskih zraka iz uzorka, D - laser za pozicioniranje visine uzorka, E - goniometar, F - uzorak)

Analysis by SR-μXRD marks on the image (A - CCD detector to collect the diffraction pattern, B - CCD detector positioning angle of the sample, C - XRF detector spectral characteristic x-rays from the sample, D - laser for positioning the height of the sample, E - goniometer, F - sample)



Shematski prikaz po-prednjeg presjeka uzorka pobudjenog rendgenskom zrakom (gore); način obrade dobivenih podataka (dolje)

Schematic representation of the cross section of the sample excited by X-rays (above); data processing scheme (below)

Difrakcijski profil predstavlja niz mješavina mješavina razmaknutih 5 μm. Na tom profilu, upotrijebljene su dvostrukomerni difrakogramska

Spikur

Prilagodba spikura na Pearson VII funkcije

Analizirano područje uzorka

Tretirana površina

Linijski profil predstavlja niz mješavina mješavina razmaknutih 5 μm. Na tom profilu, upotrijebljene su dvostrukomerni difrakogramska

Spikur

Prilagodba spikura na Pearson VII funkcije

Difrakcijski profil područja

Analizirano područje uzorka

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Prilagodba spikura na Pearson VII funkcije

Analizirano područje uzorka

## Uzroci propadanja kamena

Na kamenu Peristila evidentirano je nekoliko glavnih vrsta oštećenja i onečišćenja: biološka onečišćenja, površinske naslage, štetne soli, isprana područja i strukturalna oštećenja.

Više biljke svojim korijenom fizički razaraju kamen. Mikroorganizmi (lišajevi, bakterije, plijesni) metaboličkim procesima oslobađaju anorganske i organske kiseline uzrokujući kemijsku destrukciju kamena.

Tamne naslage (kore) se javljaju na površinama gdje izravno nije dospijevala kiša, a njihova crna boja potječe od čestica čadi. Kod crnih kora na kamenu Peristila čestice ugljika nataložene na kamenu potječu od čadi nastale izgaranjem ugljena u kućnim ložištima i industrijskim pogonima. Svoj doprinos stvaranju crnih cementnih kora na kamenu dala je i cementna industrija u blizini Splita koja tijekom 125 godina svog postojanja kontinuirano onečišćuje zrak taložnom tvari. Na problem crnih kora izravno se nadovezuje problem štetnih topljivih soli koje su u njima prisutne. Razlizavanje i ljuštanje kamena prekrivenog korom posljedica je rasta kristala soli i porama kamena neposredno ispod njegove površine. Kada kristalizacijski tlakovi dosegnu veću vrijednost od čvrstoće kamena, soli počinju razarati njegovu strukturu. Oštećenja kamene plastike Peristila u novije vrijeme su zakrpana cementnim mortom, iz kojega u kamen migriraju soli.

Kiša ima dvojako djelovanje na kamen: udari kišnih kapi mehanički izbijaju slabije vezane čestice iz površine kamena i snizavaju njegov relief, a kako je kišnica obično blago kisela, ona i kemijski razgraduje kamen čija površina postaje izbradzana, a karakteristične šupljine u strukturi kamena nastaju propadanjem fosilnih organizama koji su njegov saštavni dio.

Uzroci mehaničkih oštećenja na kamenu Peristila su različiti: oštećenja zbog pregradnji, pomicanja konstrukcije, bombardiranje u II. svjetskom ratu. Brojna oštećenja su nastala u ekspanziji hrde željeznih elemenata sidrenih u kamen.

## Causes of Stone Deterioration

Several main types of damages and soiling were observed on stone used in Peristyle: biological soiling, surface deposits, harmful salts, weathered areas and structural damages.

Plants physically destroy stone with their roots. Microorganisms (lichen, bacteria, mold) release through their metabolism inorganic and organic acids causing chemical deterioration of stone.

Dark sediments (crusts) appear on surfaces that were not exposed to rain, and their colour derives from the soot particles. Carbon particles found in black crusts on stone in Peristyle derive from the soot created by burning of coal in households and industry. Cement industry located in the vicinity of Split has over the 125 years also contributed to the creation of black cement crusts on stone. The problem of harmful soluble salts present in crusts should also be considered. Splitting and flaking of stone covered in crust is the result of crystal growth in the salts just beneath the surface. When crystallization pressure becomes higher than stone density, salts start destroying the structure. Recently, damages of stone sculptures in Peristyle have been repaired with cement mortar that releases salts into stone.

Rain influences stone in two ways: raindrops mechanically damage loosened particles of stone surface and lower its relief and since rain is usually mildly acidic, it chemically destroys stone as well. Its surface becomes ribbed and characteristic cavities are created from the decay of fossils.

Mechanical damages of stone in Peristyle are caused by various factors: damages caused by reconstructions, shifts in construction, II World War bombardment. Numerous damages were created by the expansion of rust of iron elements inserted in stone.



1, 3, 4. BIOLOŠKI OBRAŠTAJ; 2. POGOTCI GELERA; 5. DETALJ S PORTALA VESTIBULA - SKRAMA NA Površini KAMENA; 6. MACROFOTOGRAFIJA SKRAMA; 7. BIOLoŠKI OBRAŠTAJ NA ISTOČNOJ KOLONADI; 8. ŠUPLJINE U STRUKTURI KAMENA UZROKOVANA PROPADANJEM FOSILNIH ORGANIZAMA; 9. DETALJ KAPITELA - SKRAMA I PAUKOVE MREŽE; 10. PROPADANJE KAMENA UZROKOVANO KOROZIJOM METALA; 11. SKRAMA NA Površini KAPITELA; 12. EROZIJA PovršINE KAMENA UZROKOVANA KİŞOM

1, 3, 4. BIOLOGICAL SOILING; 2. SHRAPNEL HITS; 5. DETAIL FROM VESTIBULUM PORTAL - BLACK CRUST ON THE SURFACE OF STONE; 6. MACROPHOTO OF BLACK CRUST; 7. BIOLOGICAL SOILING ON THE EAST COLONNADE; 8. CAVITIES CREATED FROM THE DECAY OF FOSSILS; 9. DETAIL OF CAPITAL - CRUST AND SPIDER WEB; 10. DAMAGE CREATED BY THE EXPANSION OF RUST OF IRON ELEMENTS; 11. BLACK CRUST ON THE SURFACE OF THE CAPITAL; 12. EROSION OF STONE SURFACE CAUSED BY RAIN





## Dokumentacija

Tijekom konzervatorsko-restauratorskih radova posebna pažnja je usmjerenja na izradu dokumentacije. Sve površine detaljno su pregledane, fotografirane, opisane i grafički dokumentirane. Multidisciplinarni pristup je obuhvatio i povjesna istraživanja kojima je utvrđena točna dатacija pojedinih dijelova Peristila, preinaka i oštećenja. Uz fotografiranje, svi važniji zahvati popraćeni su i video dokumentacijom.

Za arhitektonsko snimanje postojećeg stanja i izvedenih radova korištena je sofisticirana računalna tehnologija u suradnji s tvrtkom Geodata d.o.o. Te su snimke postale podloga za evidentiranje svih oštećenja i unošenje podataka o konzervatorsko-restauratorskim zahvatima i ispitivanjima. Kasnije su poslužile kao osnova za ispitivanja konstrukcije i geotehnička istraživanja, a u budućnosti će koristiti kod praćenja stanja i eventualnih pomaka i oštećenja.

Svi tipovi oštećenja ručno su uneseni na arhitektonске podloge i zatim u obliku šrafura preneseni u računalni crtež. Tako obradeni nacrti jasno prikazuju deformacije konstrukcije (lomove i pomake konstruktivnih elemenata), površinska oštećenja materijala, onečišćenja (crne skrme, biološku kolonizaciju), povjesne intervencije (polozaj i izgled metalnih kopči, klinova, zatega, svrniljaka), te sadašnje restauratorske radove (područja uzorkovanja, probnih radova, područja rekonstruktivnih zahvata).

Laserskim 3D-skeniranjem detaljno su dokumentirani kapiteli stupova i dijelovi vijenca Protirona te polukapitel istočne kolonade (Topomatika d.o.o.), kao i sfinga (Geodata d.o.o.), čime su prikupljeni svi podaci o njihovim dimenzijama, obliku i stanju. Osim toga, načinjeni su odjevi sfinge i jednog kapitela Protirona u prirodnoj veličini, čime je trajno zabilježeno njihovo stanje, što će biti dragocjeno kod budućih zahvata.

## Documentation

During conservation-restoration works special attention was given to documentation. All of the surfaces were carefully examined, photographed, described and graphically documented. Multidisciplinary approach has also included historic studies that have precisely dated several parts of Peristyle, its reconstructions and damages. All of the major interventions were also video documented.

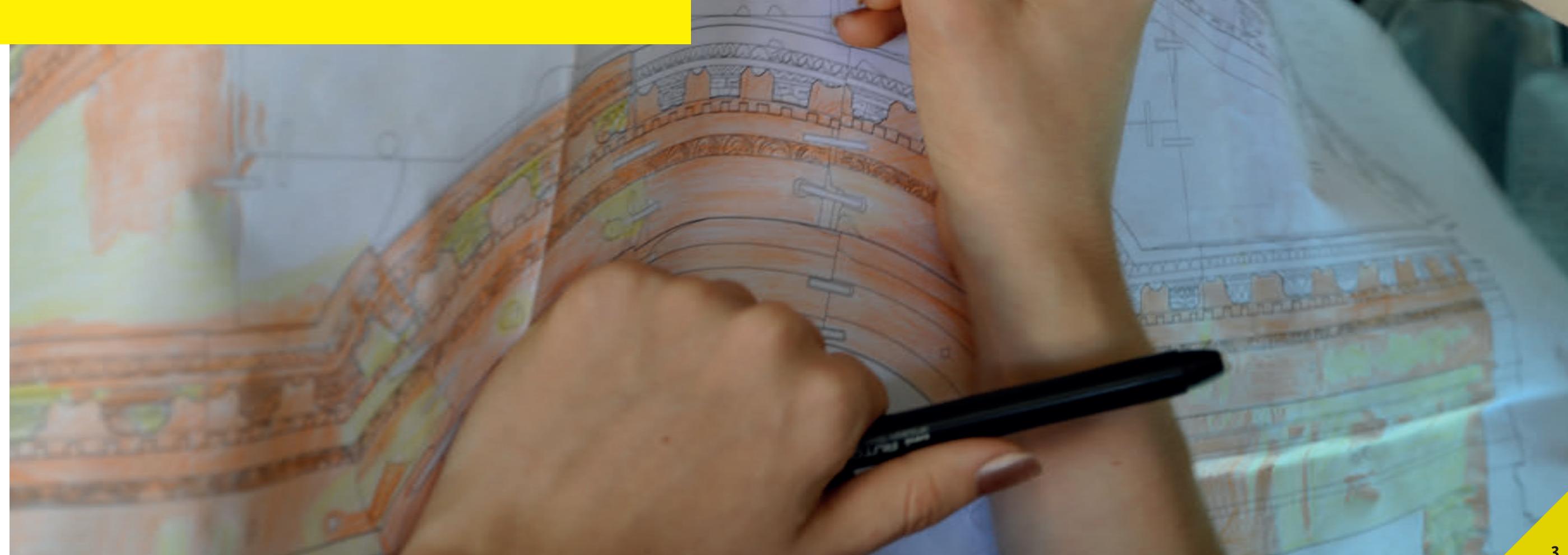
In collaboration with Geodata Ltd., sophisticated computer technology was used for the architectural survey of the existing conditions and performed interventions. These images were used as basis for registering all of the damages and entry of data concerning conservation-restoration interventions and surveys. Later, they were used as a foundation for construction testing and geotechnical research. In future they will be used for monitoring of possible shifts and damages.

All damages were manually inscribed into the architectural surveys and then transferred into a computer draft. Such processed drafts clearly depict deformations of construction (breaks and shifts in constructional elements), material surface damages, pollutions (black crusts, biological colonization), historical interventions (position and outline of metal clasps, pins, anchors, bolts) and present restoration works (areas of sampling, test works, reconstruction areas).

3D laser scanning was used to document column capitals and parts of the Prothyron mouldings, capital of the east colonnade (Topomatika Ltd.) and the sphinx (Geodata Ltd.), thus obtaining all data on their dimensions, form and condition. Also, moulds of the sphinx and one Prothyron capital were made, so that their condition has permanently been documented and should be proven useful in future interventions.

1. VIDEO SNIMANJE PROTIRONA PRIJE KONZERVATORSKO-RESTAURATORSKOG ZAHVATA; 2., 3. UCRTAVANJE OŠTEĆENJA ZATEĆENOG STANJA; 4. 3D SKENIRANJE KAPITELA PROTIRONA

1. VIDEO RECORDING OF THE PROTHYRON BEFORE CONSERVATION-RESTORATION TREATMENT; 2., 3. MAPPING OF THE DAMAGE; 4. 3D SCANNING OF THE CAPITAL FROM THE PROTHYRON



## Sanacija konstrukcije

Peristil Dioklecijanove palače s kasnijim dogradnjama predstavlja vrlo složenu i heterogenu strukturu. Sedamnaest stoljeća rušenja i gradnji ostavilo je tragove na robusnoj rimskoj konstrukciji, ali i na građevinama iz kasnijih razdoblja. Neki od problema na koje smo našli tijekom zahvata konstruktivne sanacije nastali su već u Dioklecijanovo doba zbog izmjena arhitektonске koncepcije Peristila i drastičnih promjena koje su nastupile tijekom gradnje.

U nekoliko navrata konstruktivni problemi na Peristilu su se rješavali parcijalno, pa je tako početkom dvadesetog stoljeća dio istočne kolonade bio demontiran i ponovno montiran, a dva stupna sanirana taščiranjem. Ostrilike u isto vrijeme pokušala se zaustaviti deformacija Prothirona povezivanjem bakrenim kopčama blokova luka i zida nad njim, kao i postavom zatega na dvije razine koje su povezale zid zabata s masom Vestibula.

Tijekom konzervatorsko-restauratorskog zahvata na Peristilu prvi put je u cijelini sagledana problematika konstruktivne stabilnosti. Da bi se dobili podaci o intenzitetu i brzini povećanja deformacija proveden je monitoring kojim se prije, vrijeme i nakon zahvata mjerio pomaci i naponsko stanje u konstrukciji. Mjerenjem napona u bakrenim kopčama na zabatu Prothirona ustanovljeno je da su one pod opterećenjem, odnosno da je zahvat od prije stotinu godina imao učinku. Stanje željeznih trnova na spoju granitnih stupova s bazama i kapitelima ispitano je endoskopskim uvlacenjem u šupljine sonde s kamerom i optičkim vlaknima. Temelji i tlo ispod njih na kritičnim mjestima su istraženi geomehaničkim i arheološkim sondama. Zbog velike heterogenosti konstruktivnog sustava Peristila bilo je neophodno ispitati vlastite frekvencije pojedinih građevina, odnosno sklopova. Svi navedeni podaci poslužili su da se izradi vrlo složen računalni model konstrukcije Peristila, koji se ispitivo osobito na djelovanje horizontalnih sila (zemljotres). Na temelju rezultata tih ispitivanja načinjen je program radova konstruktivne sanacije.

Budući da su deformacije koje je konstrukcija Peristila pretrpjela kroz dugo razdoblje nepovratne, koncepcija sanacije konstrukcije provedena je kroz niz mjera kojima se stanje znatno poboljšalo. Na kritičnim mjestima temelji i zidovi su sanirani prezidavanjem i injektiranjem, a osobito su pažljivo injektirani spojevi kapitelâ sa stupovima i arhitravima, kako bi se rasteretili njihovi rubovi od koncentracije napona do kojih je došlo zbog naginjanja stupova. Najslodeniji zahvati konstruktivne sanacije izvršeni su na Prothironu i crkvi sv. Roka, u kombinaciji tradicionalnih i najsvremениjih tehnika i materijala.

Nakon dovršenja radova konstruktivne sanacije Peristila ponovo su postavljeni instrumenti kojima će se još barem nekoliko godina vršiti monitoring, da bi se ustanovilo koliko je zahvat bio uspješan i da li će biti potrebna ponovna intervencija.

## Structural Strengthening

Peristyle of Diocletian's Palace, together with the buildings from later periods, represents a very complex and heterogeneous structure. Seventeen centuries of demolitions and constructions have left traces in a robust Roman construction, as well as on buildings dating from later periods. Some of the problems we encountered during the rehabilitation of construction were already present in Diocletian's time due to the changes in architectural concept of Peristyle and drastic changes that took place during its construction.

Problems of construction were partially dealt with on several occasions, so at the beginning of the 20th century a part of the east colonnade was disassembled and again reassembled, while two columns were patched. Approximately at the same time, an attempt was made to stop the deformations in Prothyon, stone blocks of the arch and a wall were reinforced with copper clasps. Anchors were set on two levels connecting the pediment wall to the Vestibule.

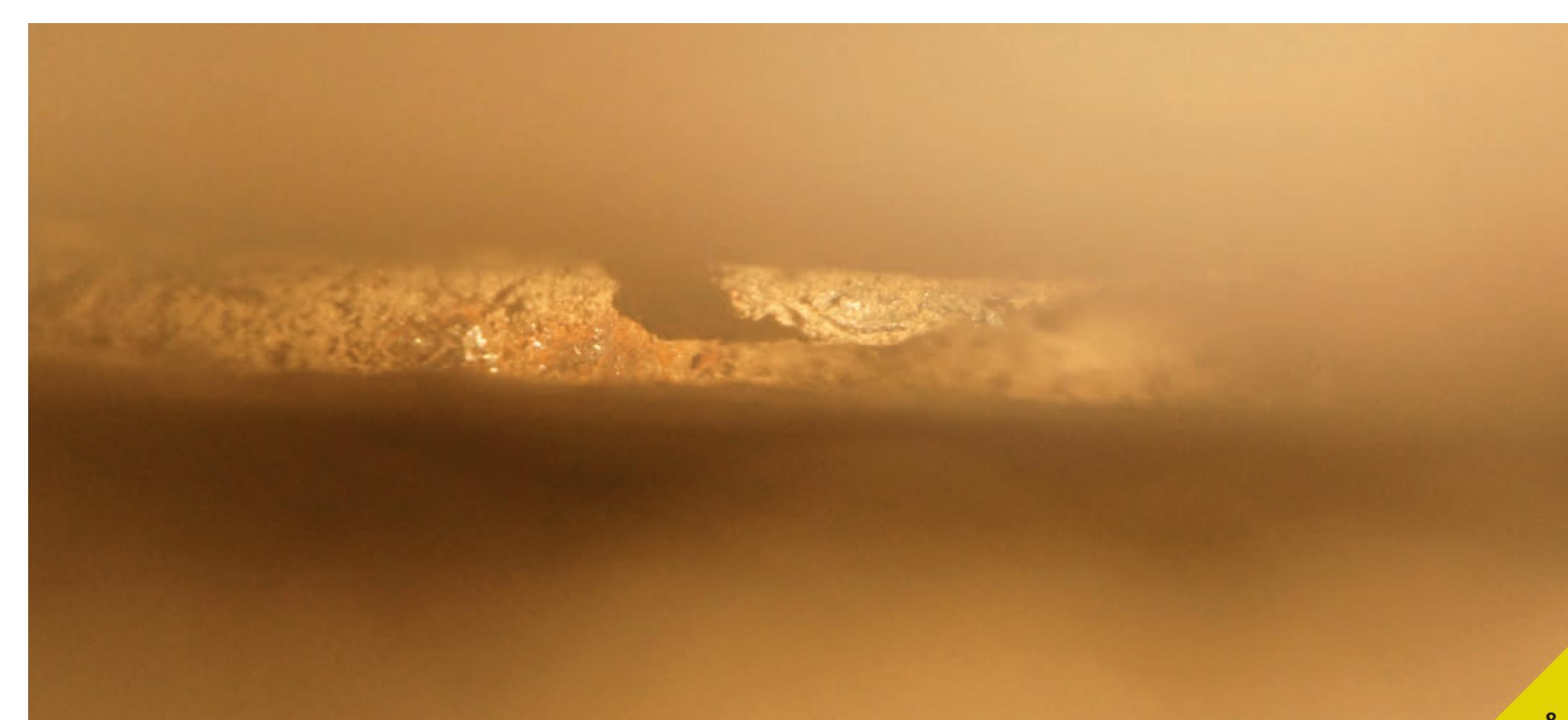
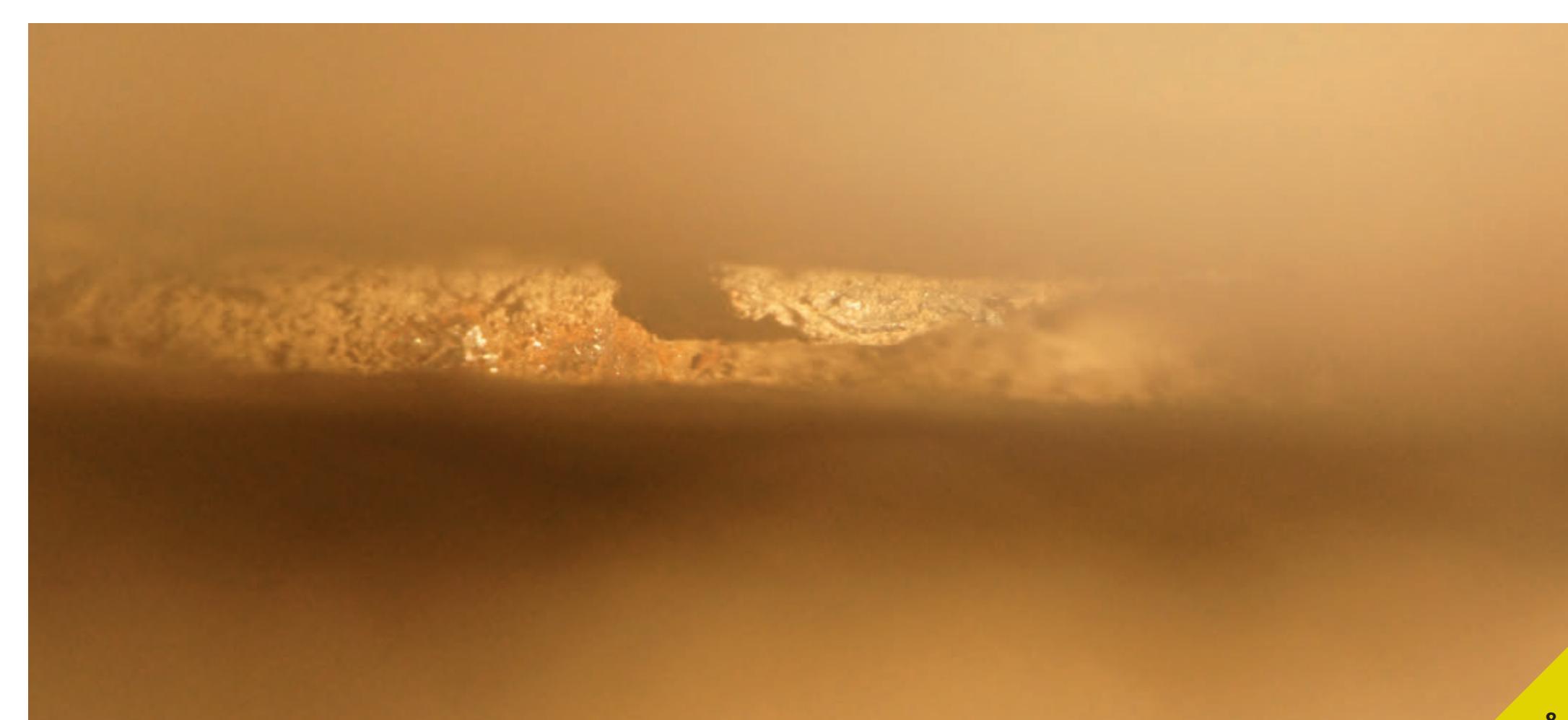
The problem of construction stability was for the first time fully addressed during the conservation- restoration works at Peristyle. To gain information of the intensity and speed of deformation growth, monitoring was conducted. Before, during and after the intervention, shifts and resonance of the construction were measured. Resonance of the copper clasps on the Prothyon pediment has shown that they were carrying weight, so a hundred-year-old intervention was still effective. Condition of iron bolts located between the granite columns and their capitals was examined endoscopically (by inserting a probe with camera and optical fibres). Foundations and ground beneath them were examined in critical areas with geometric and archaeological probes. Because of the heterogeneous construction system of Peristyle it was necessary to examine the resonances of separate buildings or complexes. All of the acquired data was used to create a very complex computer model of the construction of Peristyle that was tested for horizontal thrust (earthquake). Based on the results of these tests, a program of construction rehabilitation was designed.

Since deformations of the construction of Peristyle are irreversible, the concept of construction rehabilitation was based upon numerous treatments that have significantly improved the condition. Critical areas of foundations and walls were reconstructed and injected. Special attention was given to injecting the joints between capitals and columns and lintels, so that the corner areas would suffer less thrust created by the tilting of the columns. The most elaborate treatments were conducted in Prothyon and the Church of St. Roch where traditional and most recent techniques and materials were combined.

After the works of rehabilitation of Peristyle construction had been completed, instruments that will monitor the situation for at least a couple of years have been installed to determine the success of the interventions and to indicate whether another interventions would be needed in the future.

1. MJERENJE NAPONA U BAKRENNIM KLANFAMA NA ZABATU PROTIRONA; 2. BUŠENJE RUPA ZA INJEKTIRANJE ZIDOVA U SVRHU OJAČAVANJE KONSTRUKCIJE; 3, 4, 6. INJEKTIRANJE ZIDOVA U SVRHU OJAČAVANJA KONSTRUKCIJE; 5, 7. ENDOSKOPSKO ISPITIVANJE ŽELJEZNIH TRNOVA NA SPOJU GRANITNOG STUPA PROTIRONA SA KAPITELOM; 8. ŽELJEZNI TRN IZMEĐU GRANITNOG STUPA I KAPITELA NA PROTIRONU – FOTOGRAFIJAN POMOĆU ENDOSKOPA

1. MEASUREMENT OF STRESS IN THE COPPER CLAMPS ON THE PROTHYRON PEDIMENT; 2. DRILLING HOLES FOR GROUTING OF WALLS FOR STRUCTURAL STRENGTHENING; 3, 4, 6. GROUTING OF WALLS FOR STRUCTURAL CONSOLIDATION; 5, 7. ENDOSCOPIC EXAMINATION OF IRON DOWELS LOCATED BETWEEN THE GRANITE COLUMN AND ITS CAPITAL OF THE PROTHYRON; 8. IRON DOWEL BETWEEN THE COLUMN AND ITS CAPITAL, PHOTOGRAPHED USING ENDOSCOPIC TECHNIQUE



## Ljepota klesanih ukrasa

Istraživači Palače već davno su zapazili da su kamenoklesarski radovi na više mjeseta ostali neusklađeni, nedovršeni ili prekinuti tijekom obrade. Na Peristilu su tako zabilježeni nejednaki promjeri i visine stupova, razlike u njihovim medusobnim razmacima, u visinama kapitela i u obliku zubaca na vijencu. Profili baza stupova obrađeni su samo s prednje strane, prema trgu, dok su otvara samo grubo oblikovani. Akantusovi listovi na korintskim kapitelima su različitih oblika, a kapiteli se medusobno razlikuju po visini i obujmu.

Izvođenje konzervatorskih-restauratorskih radova na kamenoj plastici omogućilo je da se iz neposredne blizine promotre, detaljno dokumentiraju i analiziraju svi dekorativni elementi. Prilikom laserskog čišćenja kamena od debelih inkrustacija na površinu su izali novi, do sada samo djelomično prepoznati ikonografski i figuralni elementi. Tako je u jugoistočnom uglu Prothirona na trabeaciji zamijećeno čak pet konzola s antropomorfnim prikazom u nizu. Dvije od njih prikazuju likove čovjeka-bika, simbole blagostanja carske vladavine, slične onima već zapaženim na kamenoj plastici Mauzoleja i Sjevernih vrata.

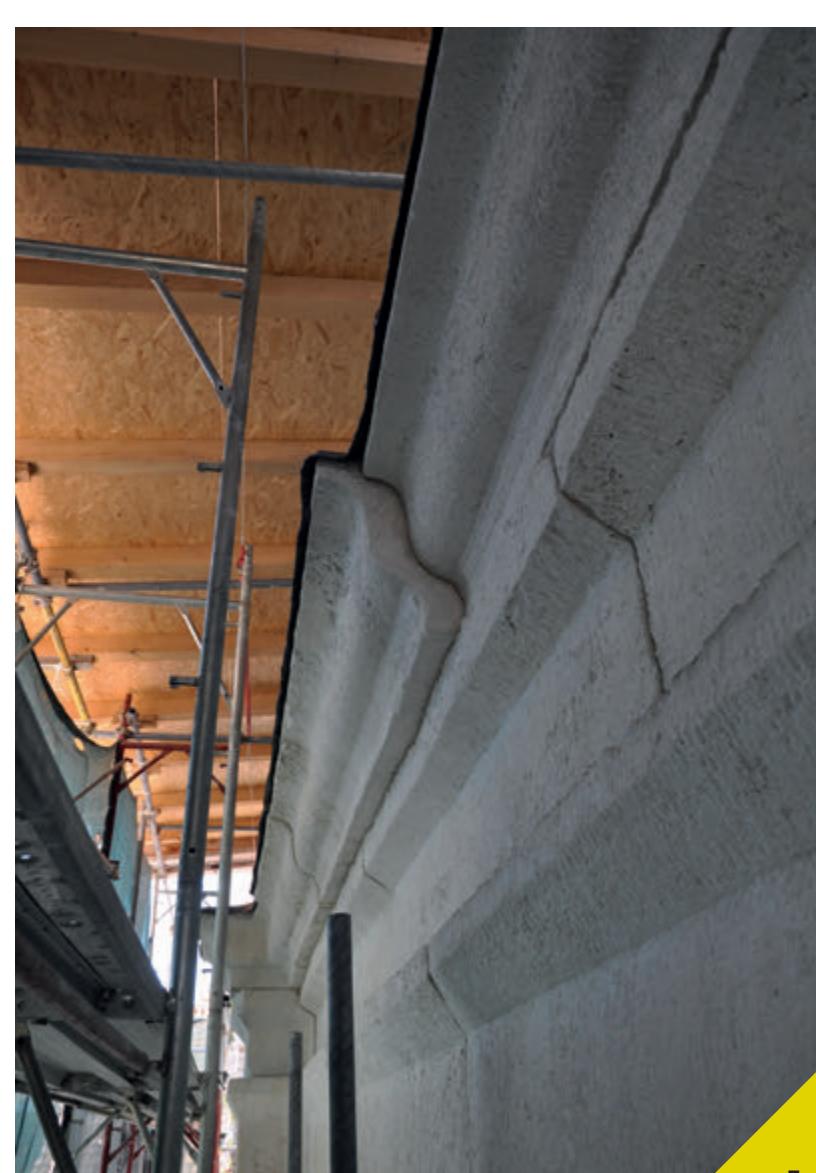
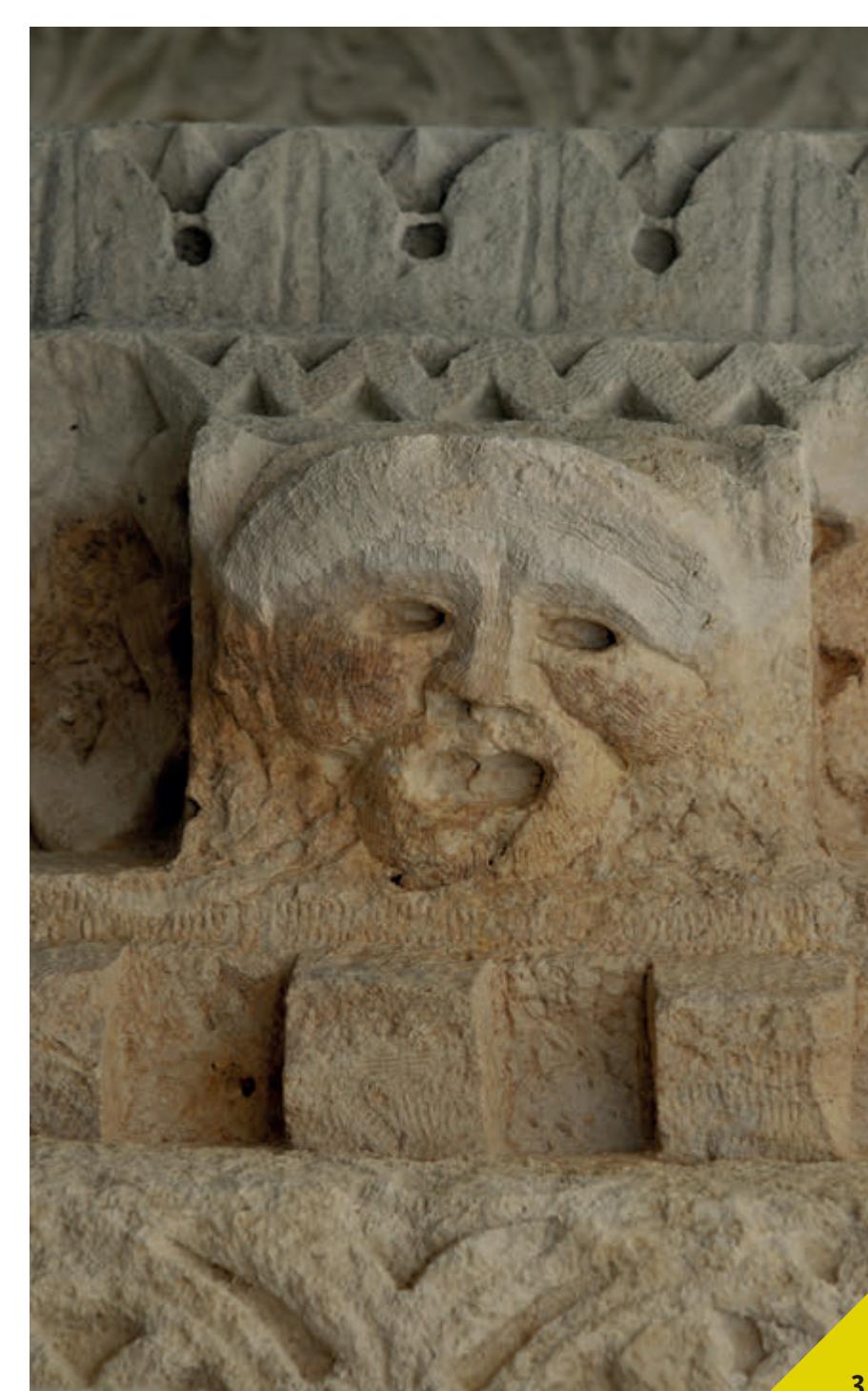
Na zapadnom dijelu zabata uočava se jedna kazališna maska, a iznad nje reljefni prikaz magarca. Prilikom čišćenja vanjskog sjevernog zida Vestibula, pronađena je u njega ugradena antička reljefna spolia, vjerojatno dio pokrova sarkofaga.

## The Beauty of Carved Decorations

The researchers of the Palace have long noticed that the carvings in different places had been left uneven, unfinished or their completion had been interrupted. Different column diameters and heights, differences in intercolumniations, capital heights and forms of cornices dentils have all been found in Peristyle. Plinth profiles have been carved only on front sides facing the square, while the back sides have only rough finishing. Acanthus leaves on Corinthian capitals have various shapes and capitals differ in height and volume.

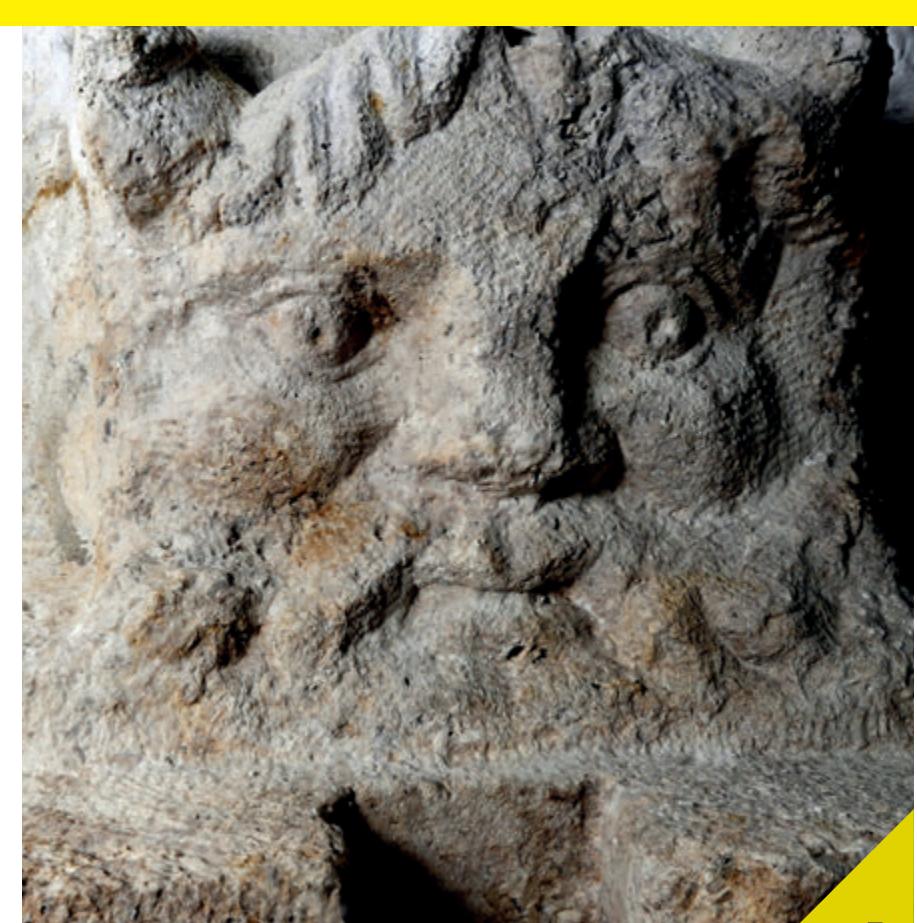
Conservation-restoration works on stone sculptures have enabled a closer examination, detailed documentation and the analysis of all decorative elements. When stone had been cleaned with laser of thick incrustations, iconographic and figural elements, previously only partially noted, have appeared. As much as five consoles with anthropomorphic scenes in a row were found in the south-east corner of Prothyrion. Two of them depict figures of human-bull, symbols of the empire's well-being, similar to those previously found in the Mausoleum and on the North Gate.

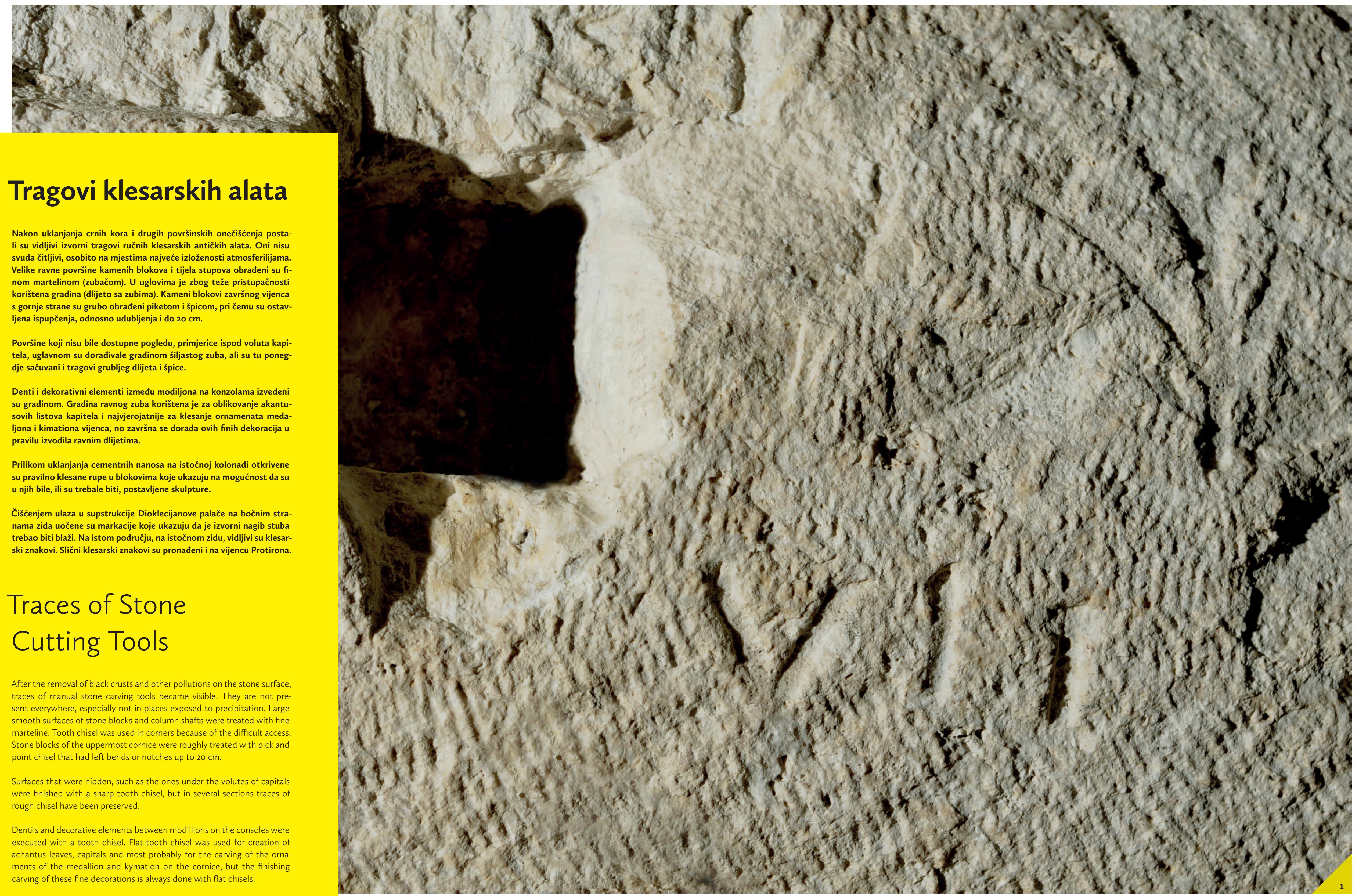
On the west section of the pediment there is a theatre mask and above it a relief scene of a donkey. While cleaning the outer north wall of the Vestibule, a relief spolia from the antiquity was found, probably originating from a lid of a sarcophagus.



1, 2. DETALJI ORNAMENTA SA VIJENCA ZABATA PROTIRONA; 3. DETALJ SA VIJENCA ZABATA PROTIRONA – TRAGIČNA MASKA; 4. DETALJ SA UNUTRAŠNJEGR PORTALA VESTIBULA; 5. DETALJ SA VIJENCA ISTOČNE KOLONADE NA KOJEM SE VIDI NEUSKLADENOST BLOKOVA; 6. SPOJ ZABATA PROTIRONA I ZAPADNE KOLONADE PERISTILA; 7. DETALJ SA VIJENCA ZABATA PROTIRONA – LICE SA BRADOM I ROGOVIMA; 8. KAPITEL ISTOČNE KOLONADE; 9. CVIJETNI ORNAMENT SA ZABATA PROTIRONA; 10. SPOILIA UGRADENA U STRAŽNIJU ZID PROTIRONA

1. DETAILS FROM THE CORNICE OF THE PROTHYRON PEDIMENT; 2. DETAIL FROM THE CORNICE OF THE PROTHYRON'S PEDIMENT – TRAGIC MASK; 3. DETAIL FROM THE INTERIOR PORTAL OF THE VESTIBULE; 5. DETAIL FROM EASTERN CLONNADE ON WHICH CAN BE SEEN THE MISMATCH OF BLOCKS; 6. JUNCTION OF THE PROTHYRON PEDIMENT AND THE WESTERN COLONNADE; 7. DETAIL FROM THE CORNICE OF THE PROTHYRON'S PEDIMENT – A FACE WITH BEARD AND HORNS; 8. CAPITAL FROM EASTERN COLONNADE; 9. FLORAL ORNAMENT FROM PROTHYRON PEDIMENT; 10. REUSED CARVED STONE FOUND EMBEDDED IN THE BACK WALL OF THE PROTHYRON





## Tragovi klesarskih alata

Nakon uklanjanja crnih kora i drugih površinskih onečišćenja postali su vidljivi izvorni tragovi ručnih klesarskih antičkih alata. Oni nisu svuda čitljivi, osobito na mjestima najveće izloženosti atmosferiljama. Velike ravne površine kamenih blokova i tijela stupova obradeni su finom martelinom (zubačom). U uglovima je zbog teže pristupačnosti korištena gradina (dlijeto sa Zubima). Kameni blokovi završnog vijenca s gornje strane su grubo obradeni piketom i špicom, pri čemu su ostavljeni ispuštenja, odnosno udubljenja i do 20 cm.

Površine koji nisu bile dostupne pogledu, primjerice ispod voluta kapitela, uglavnom su doradivale gradinom šiljastog zuba, ali su tu ponegdje sačuvani i tragovi grubljeg dlijeta i špice.

Denti i dekorativni elementi između modilliona na konzolama izvedeni su gradinom. Gradina ravnog zuba korištena je za oblikovanje akantušovih listova kapitela i najvjerojatnije za klesanje ornamenata medalljona i kimationa vijenca, no završna se dorada ovih finih dekoracija u pravilu izvodila ravnim dlijetima.

Prilikom uklanjanja cementnih nanosa na istočnoj kolonadi otkrivene su pravilno klesane rupe u blokovima koje ukazuju na mogućnost da su u njih bile, ili su trebale biti, postavljene skulpture.

Čišćenjem ulaza u supstrukcije Dioklecijanove palače na bočnim stranama zida uočene su markacije koje ukazuju da je izvorni nagib stuba trebao biti blaži. Na istom području, na istočnom zidu, vidljivi su klesarski znakovi. Slični klesarski znakovi su pronađeni i na vijencu Protirona.

## Traces of Stone Cutting Tools

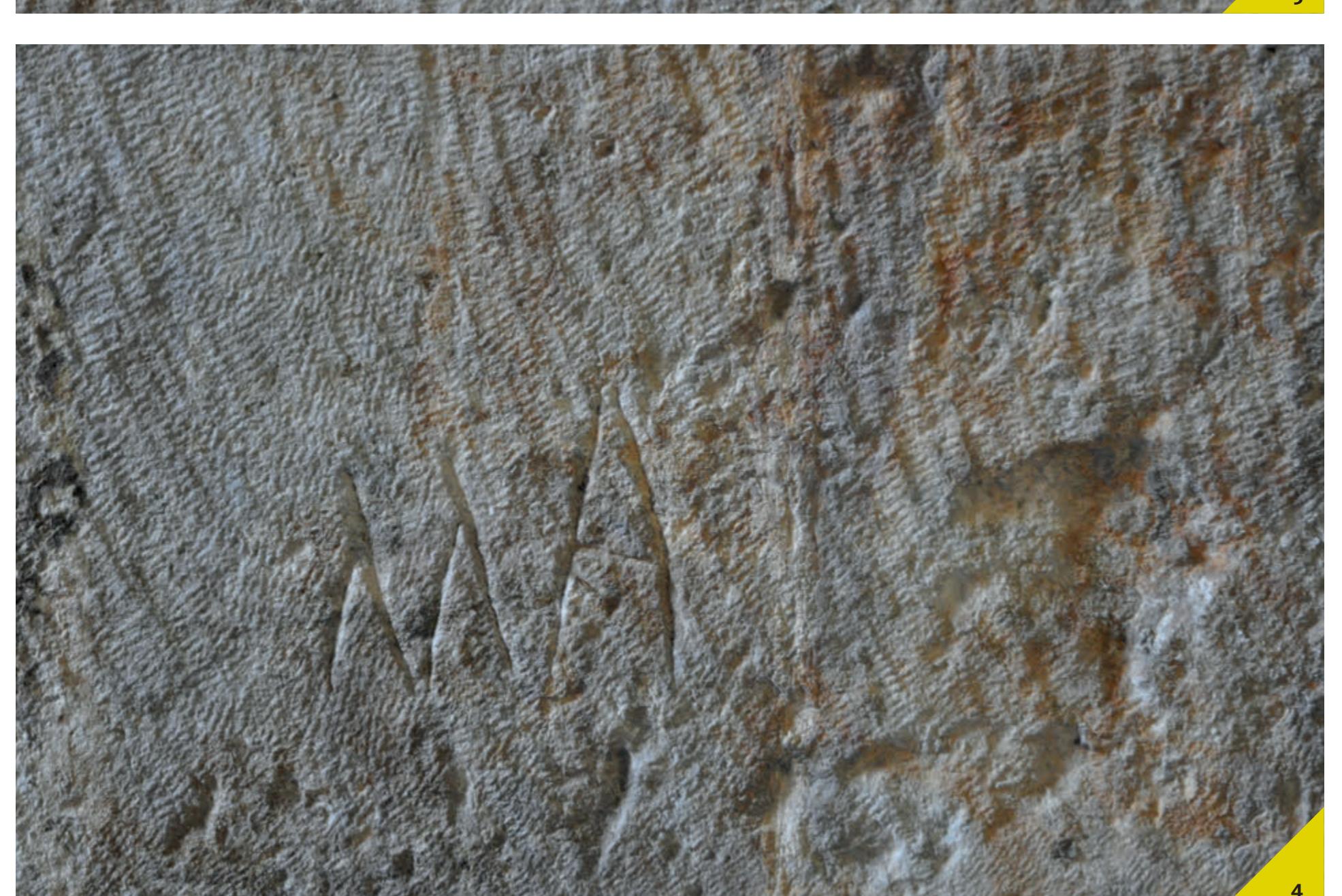
After the removal of black crusts and other pollutions on the stone surface, traces of manual stone carving tools became visible. They are not present everywhere, especially not in places exposed to precipitation. Large smooth surfaces of stone blocks and column shafts were treated with fine marteline. Tooth chisel was used in corners because of the difficult access. Stone blocks of the uppermost cornice were roughly treated with pick and point chisel that had left bends or notches up to 20 cm.

Surfaces that were hidden, such as the ones under the volutes of capitals were finished with a sharp tooth chisel, but in several sections traces of rough chisel have been preserved.

Dentils and decorative elements between modillions on the consoles were executed with a tooth chisel. Flat-tooth chisel was used for creation of achantuš leaves, capitals and most probably for the carving of the ornaments of the medallion and kymation on the cornice, but the finishing carving of these fine decorations is always done with flat chisels.

After the cement layers on the east colonnade were removed, regularly carved holes appeared in stone blocks that indicate the possibility that they had, or were supposed to have, served as a setting for sculptures.

While cleaning the entrance to the substructures of Diocletian's Palace, marks were spotted on the side walls that indicate that the original staircase should have been less steep. On the east wall in the same area, stone mason's marks can be seen. Similar marks were found on the cornice of the Prothyron.



1, 3, 4. OZNAKE KLESARA PRONADENE ZA VRIJEME KONZERVATORSKO-RESTAURATORSKIH ZAHVATA; 2, 5, 6, 7. PRIMJERI ZAVRŠNE OBRADE KAMENE POVRŠINE

1, 3, 4. STONE CUTTERS' MARKS FOUND DURING THE RESTORATION WORKS; 2, 5, 6, 7. EXAMPLES OF THE STONE SURFACE FINISHINGS



## Uklanjanje metala, cementa i organskih onečišćenja

Površine kamena tijekom povijesti su oštećivane sidrenjem metalnih elemenata (kopče, klinovi, vijci, nosači električnih instalacija). Oni su uklonjeni finim klesarskim alatima pažći da se ne ošteći struktura kamena. Dotrajali željezni elementi koji se nisu mogli ukloniti bez oštećivanja kamena (poput elemenata između kapitela i tijela stupu) injektirani su inhibitorima korozije. Bakreni klamfe, obruči i svornjaci, postavljeni u prethodnim restauracijama, koji ne uzrokuju oštećenja kamena, nisu uklanjeni jer još uvijek obavljaju svoju funkciju. Izvorne antičke korodirane željezne spojnice između kamenih blokova izvadene su i zamijenjene novima od nehrđajućeg metalra, zaliivenima olovom poput izvornih.

Mehanički su uklonjene naslage cementnog morta, dotrajale rekonstrukcije i zapuna od neodgovarajućih materijala. Stvarni opseg oštećenja kamena postao je vidljiv tek nakon uklanjanja starih zapuna i čišćenja.

Organjska onečišćenja (biološka kolonizacija i izmet od ptica) uklonjena su u kombinacijom mehaničkih i kemijskih metoda. Tim zahvatom površina kamena je očišćena, dezinficirana i pripremljena za daljnji rad.

## Removal of Metal, Cement and Organic Dirt

Stone surfaces have through history been damaged by anchoring metal elements (clips, pins, bolts, electric cable supports). They were removed with fine stone carving tools with special attention paid in order not to damage the stone structure. Battered iron elements that could not have been removed without damaging the stone (elements between capital and column shaft) were injected with inhibitors. Copper clamps, rings and clevis fasteners that were set during previous restorations and do not damage the stone, were not removed due to the fact that they are still functional. Original ancient corroded iron joints connecting the stone slabs were removed and replaced with the new ones made of stainless metal, coated in lead just like the original ones.

Layers of cement mortar were removed, as well as the battered reconstructions and fillers made of unsuitable material. Actual extent of stone damage became obvious only after the removal of old fillers and cleaning.

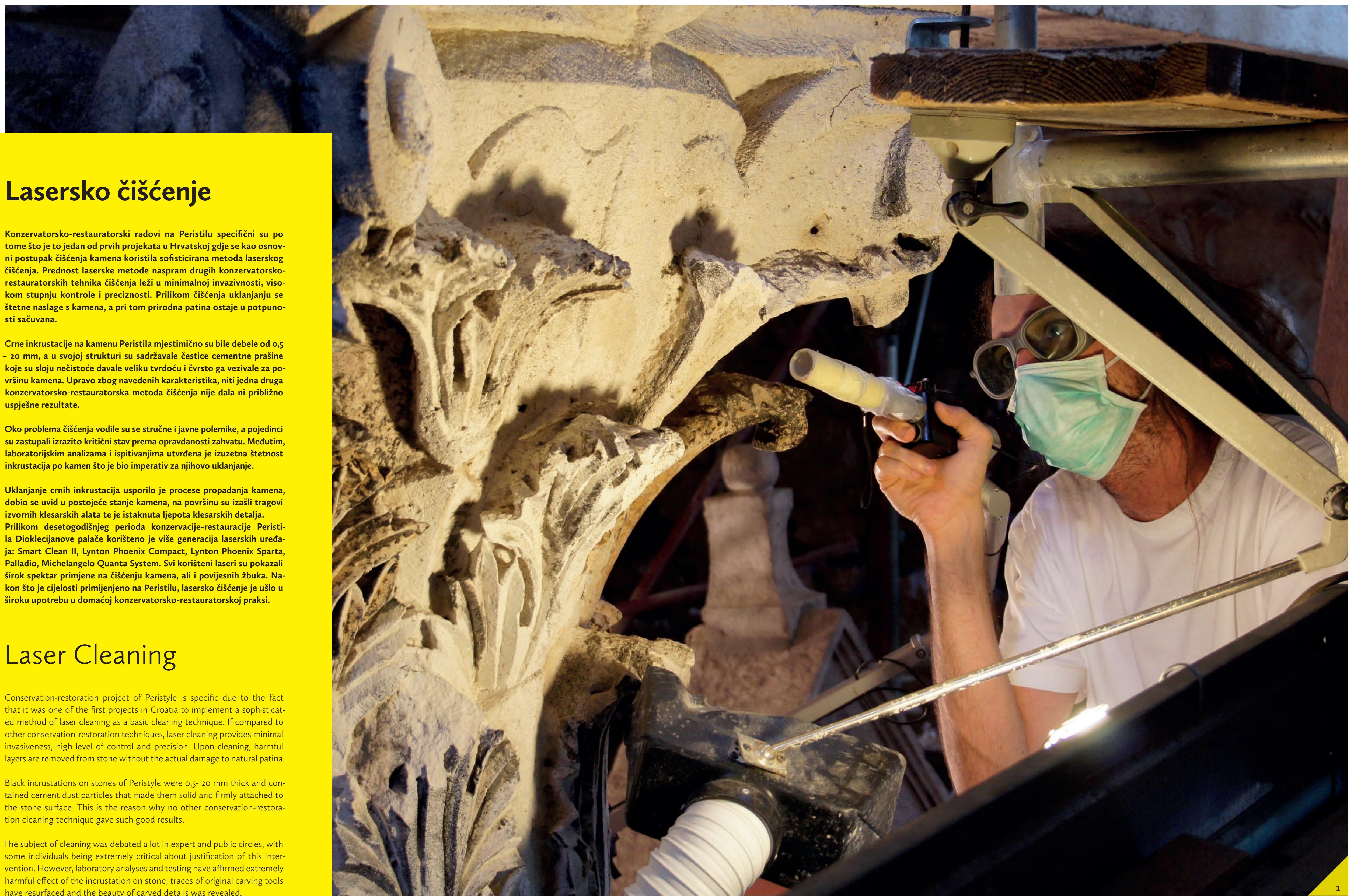
Organic dirt (biological colonization and bird droppings) was removed with a combination of mechanical and chemical methods. With this intervention, the stone surface was cleaned, disinfected and prepared for further work.



1, 2, 3. UKLANJANJE KORODIRANIH ŽELJEZNIH KOPČI SA ZABATA PROTIRONA; 4. POSLJEDICE EKSPANDIRANJA KORODIRANE ŽELJEZNE KOPČE; 5. UKLANJANJE CEMENTA IZ KAMENIH SLJUBNICA; 6. ODSTRANJIVANJE CEMENTNIH REKONSTRUKCIJA IZ PORTALA VESTIBULE

1, 2, 3. REMOVAL OF CORRODED IRON CLAMPS FROM THE GABLE OF THE PROTHYRON; 4. RESULTS OF EXPANSION OF CORRODED IRON CLAMP; 5. REMOVAL OF THE CEMENT MORTAR POINTING; 6. REMOVAL OF THE CEMENT MORTAR PATCHES FROM THE PORTAL OF THE VESTIBULE; 7. HOT STEAM STONE CLEANING; 8. STONE AFTER APPLYING CHEMICAL AGENT TO ELIMINATE BIOLOGICAL OVERGROWTH





## Lasersko čišćenje

Konzervatorsko-restauratorski radovi na Peristilu specifični su po tome što je jedan od prvih projekata u Hrvatskoj gdje se kao osnovni postupak čišćenja kamena koristila sofisticirana metoda laserskog čišćenja. Prednost laserske metode naspram drugih konzervatorsko-restauratorskih tehnika čišćenja leži u minimalnoj invazivnosti, visokom stupnju kontrole i preciznosti. Prilikom čišćenja uklanjanju se štetne naslage s kamena, a pri tom prirodnna patina ostaje u potpunosti sačuvana.

Crne inkrustacije na kamenu Peristila mjestimično su bile debele od 0,5 – 20 mm, a u svojoj strukturi su sadržavale čestice cementne prašine koje su sloju nečistoće davale veliku tvrdcu i čvrsto ga vezivale za površinu kamena. Upravo zbog navedenih karakteristika, niti jedna druga konzervatorsko-restauratorska metoda čišćenja nije dala ni približno uspješne rezultate.

Oko problema čišćenja vodile su se stručne i javne polemike, a pojedinci su zastupali izrazito kritični stav prema opravdanosti zahvata. Međutim, laboratorijskim analizama i ispitivanjima utvrđena je izuzetna štetnost inkrustacija po kamenu što je bio imperativ za njihovo uklanjanje.

Uklanjanje crnih inkrustacija usporilo je proces propadanja kamena, dobio se uvid u postojeće stanje kamena, na površinu su izali tragovi izvornih klesarskih alata te je istaknuta ljeputa klesarskih detalja.

Prilikom desetogodišnjeg perioda konzervacije-restauracije Peristila Dioklecijanove palače korišteno je više generacija laserskih uređaja: Smart Clean II, Lynton Phoenix Compact, Lynton Phoenix Sparta, Palladio, Michelangelo Quanta System. Svi korišteni laseri su pokazali širok spektar primjene na čišćenju kamena, ali i povijesnih žbuka. Nakon što je cijelost primjenjeno na Peristilu, lasersko čišćenje je ušlo u široku upotrebu u domaćoj konzervatorsko-restauratorskoj praksi.

## Laser Cleaning

Conservation-restoration project of Peristyle is specific due to the fact that it was one of the first projects in Croatia to implement a sophisticated method of laser cleaning as a basic cleaning technique. If compared to other conservation-restoration techniques, laser cleaning provides minimal invasiveness, high level of control and precision. Upon cleaning, harmful layers are removed from stone without the actual damage to natural patina.

Black incrustations on stones of Peristyle were 0,5- 20 mm thick and contained cement dust particles that made them solid and firmly attached to the stone surface. This is the reason why no other conservation-restoration cleaning technique gave such good results.

The subject of cleaning was debated a lot in expert and public circles, with some individuals being extremely critical about justification of this intervention. However, laboratory analyses and testing have affirmed extremely harmful effect of the incrustation on stone, traces of original carving tools have resurfaced and the beauty of carved details was revealed.

In the ten-year period of the conservation-restoration of Peristyle of Diocletian's Palace, several generations of laser equipment were used: Smart Clean II, Lynton Phoenix Compact, Lynton Phoenix Sparta, Palladio, Michelangelo Quanta System. All of the lasers used have shown a great range of application on the cleaning of stone, as well as historic mortars. After its implementation in Peristyle, laser cleaning became widely used in conservation-restoration work in Croatia.



1. ČIŠĆENJE KAMENA LASERSKOM TEHNOLOGIJOM; 2, 3, 4, 8. USPOREDBE OČIŠĆENIH I NEOČIŠĆENIH ZONA; 5, 6. GRB OBITELJI GRISOGONO PRIJE I NAKON LASERSKOG ČIŠĆENJA; 7. LASERSKO ČIŠĆENJE KAPITELA

1. CLEANING OF STONE WITH LASER; 2, 3, 4, 8. COMPARISON OF THE CLEANED AND UNCLEANED ZONES; 5, 6. COAT OF ARMS OF GRISOGONO FAMILY BEFORE AND AFTER THE LASER CLEANING; 7. LASER CLEANING OF THE CAPITAL





## Desalinizacija i zaštita kamena

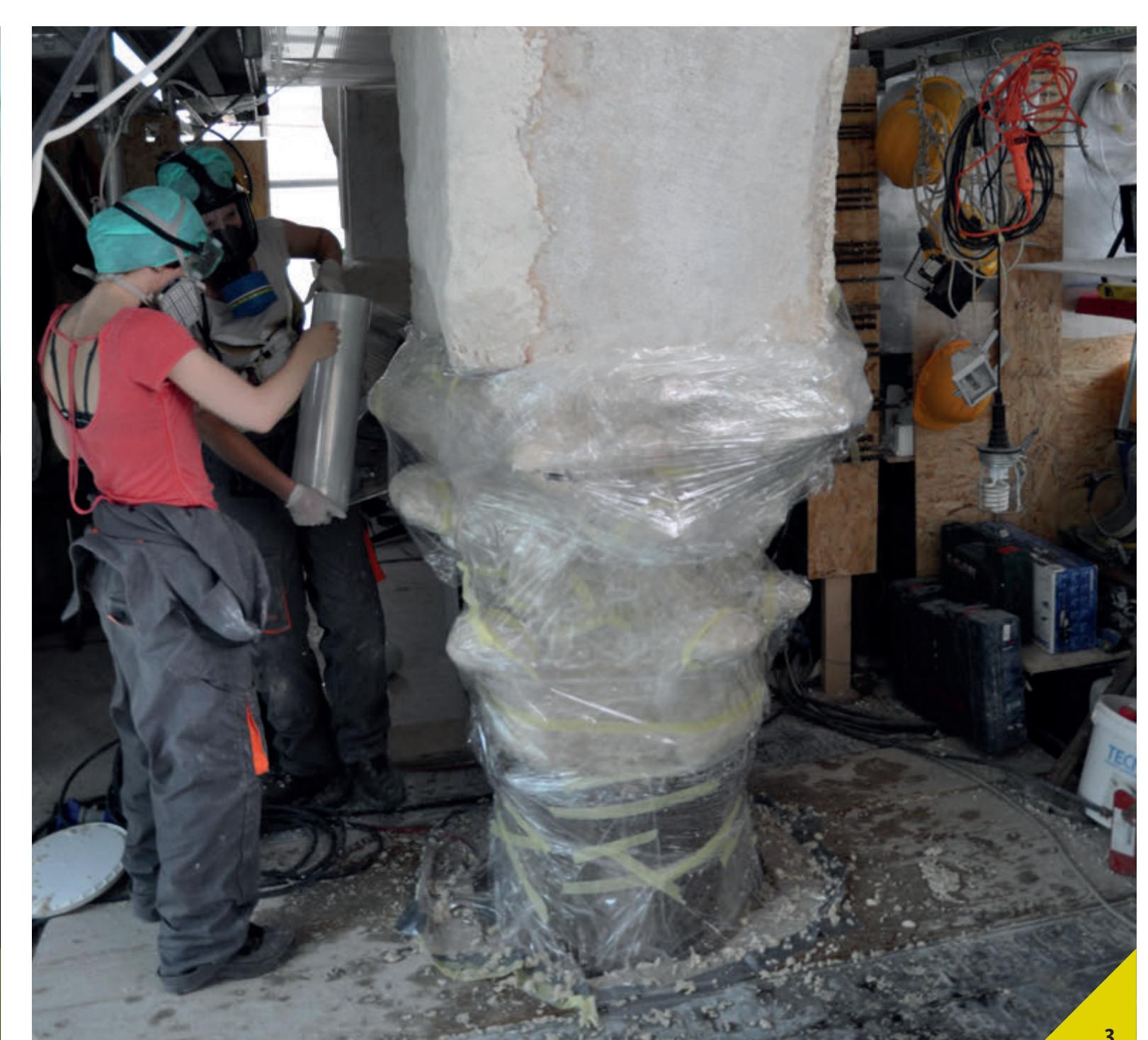
Dijagnostička ispitivanja kamena pokazala su izuzetno visoku koncentraciju štetnih topljivih soli u kamenu. Na pojedinih zonama koncentracija soli bila je i do 10 puta veća od dopuštenog. Uzimajući u obzir izrazito destruktivni utjecaj vodotopljivih soli po strukturu kamena, odlučeno je da će se tretmanu odsoljavanju podvrgnuti sva područja gdje je dokazana njihova štetna koncentracija, svi dijelovi kamene ploštice koji su se osipali i ljuškali, kao i područja koja su bila prekrivena naslagama crne kore. Premda je tretman desalinizacije u teoriji logičan i jednostavan, u praksi se pokazao kao jedan od najzahtjevnijih konzervatorsko-restauratorskih zahvata na Peristilu. Za uspješno odvijanje kemijske reakcije prilikom nanošenja celulozne kaše s otopinom amonij-karbonata i barij-hidroksida, bilo je potrebno poštivati točno određene vremenske i temperaturne parametre te omogućiti gotovo laboratorijske uvjete. Ovakav zadatak, ako uzmemo u obzir veličinu objekta i uvjete kojima je izložen, organizacijski je bio jako težak i fizički vrlo zahtjevan. Utinak desalinizacije je višestruk po strukturu kamena: zaustavlja štetne mehanizme topljivih soli, ali ujedno djeluje i kao učvršćivač (konsolidant) kamene površine.

Tijekom pete faze konzervatorsko-restauratorskih radova na Prothronu za odsoljavanje i zaštitu kamena koristio se amonij-oksalat. Prirodoslovni laboratoriј Hrvatskog restauratorskog zavoda proveo je dijagnostička ispitivanja in situ i u laboratoriјu, pri čemu je osmišljen naručnikoviti i u ekonomski najplativiji način apliciranja amonij-oksalata na kamen. Dobiveni rezultati, znanstveno potvrđeni dijagnostičkim ispitivanjima u laboratoriјu i na terenu, uvelike su ubrzali i pospešili način zaštite kamena, te su postali referentni za slične zahvate konzervacije i restauracije kamena.

## Desalination and stone conservation

Diagnostic surveys of stone have shown extremely high levels of harmful soluble salts. In certain areas salt concentration was ten times higher than the allowed level. Considering the destructive effect that salts soluble in water have on stone, it has been decided that desalination treatment should be implemented in all areas that had shown high level of concentration, on all parts of stone sculptures that had started to crumble and split, as well as areas covered in black crust. Although desalination treatment is logical and simple in theory, in practice it has developed into one of the most demanding conservation-restoration treatments at Peristyle. For successful chemical reaction while applying cellulose paste with ammonium carbonate and barium hydroxide solution, exact weather and temperature parameters had to be respected and conditions similar to the ones in a laboratory had to be achieved. If we consider the size of the structure and present conditions, this task has proven to be extremely difficult and physically demanding. Desalination effects stone in many ways: it stops harmful mechanisms of soluble salts, but also acts as a consolidant of the stone surface.

During the fifth phase of conservation-restoration works at Prothron, ammonium-oxalate was used for desalination and conservation of stone. Natural science laboratory of the Croatian Conservation Institute has conducted diagnostic surveys in situ and at the laboratory and designed the most effective and economic mode of ammonium-oxalate application on stone. Scientifically confirmed by diagnostic surveys in laboratory and field-proven results have greatly accelerated and improved stone conservation, and have become a reference point for similar stone conservation and restoration projects.



1, 2, 3. NANOŠENJE PULPE SA AMONIJ-OKSALATOM NA LUKU DECMUMANUSA; 4, 5, 6. UKLANJANJE PULPE NAKON ZAVRŠENOG TRETMANA; 7, 8, 9. NANOŠENJE ZAVRŠNE ZAŠTITE NA POVRŠINU KAMENA

1, 2, 3. APPLYING AMMONIUM-OXALATE CELLULOSE POUltICE ON THE ARCH OF THE DECUMANUS PORTICO; 4, 5, 6. REMOVAL OF THE AMMONIUM-OXALATE CELLULOSE POUltICE AFTER THE TREATMENT; 7, 8, 9. APPLICATION OF THE PROTECTIVE FINISH TO THE STONE SURFACE





## Učvršćivanje nestabilnih i rekonstruiranje nedostajućih dijelova

Na zonama gdje je prijetilo odvajanje i ispadanje fragmenata kamena oni su, ovisno o stupnju oštećenja, učvršćeni sidrima od karbona i epoksidnim ljepilom.

Pukotine i strukturalna oštećenja su rekonstruirani smjesom umjetnog kamena kako bi se izbjeglo prodiranje i zadržavanje vode te daljnje oštećivanje strukture kamena.

Zone većih oštećenja rekonstruirane su uz prethodno postavljanje karbonske nosive armature, uz dodatak karbonskih niti. Smjesa umjetnog kamena se postavlja na nosivu armaturu i oblikuje špatulama. Nakon sušenja, rekonstruirani dijelovi se dodatno obraduju tradicionalnim klesarskim alatima kako bi se uklonili u kolnu površinu. Na mjestima većih oštećenja, gdje je bilo nužno vratiti nosivost konstrukcije, izvedene su rekonstrukcije u prirodnom kamenu (tašeli). Za njih je korišten kamen koji fizikalnim svojstvima i izgledom odgovara izvornom vapnencu. Izrada rekonstrukcija u prirodnom kamenu predstavljala je poseban izazov zbog toga što su teški kameni blokovi, prethodno grubo obradeni u radionici, trebali biti podignuti na skelu i ugradeni na odgovarajuće mjesto, što je iziskivalo vještina i terensko iskustvo stručnog kadra, kao i zahtjevnu koordinaciju. Nakon montaže kamenog bloka, ručno je tradicionalnim klesarskim alatima izvršena završna obrada površine.

## Reinforcement of unstable and reconstruction of missing parts

In the areas where stones were threatening to separate and fall off, they were reinforced with anchors made of carbon and epoxy glue, depending on the level of damage. Cracks and structural damages were reconstructed with an artificial stone mixture in order to prevent water from penetrating and further damaging the stone.

Areas of significant damage were reconstructed with previously installed carbon support framework and added carbon fibres. Artificial stone mixture was applied on the framework and modelled with spatulas. When dry, reconstructed parts were additionally treated with traditional stone carving tools to merge with the surrounding areas.

Reconstructions with natural stones were implemented in places of significant damages where load-bearing capacity of construction needed to be restored. Stone with physical characteristics and the appearance similar to the original limestone was used. Reconstructions in natural stone were especially challenging because the heavy stone blocks, previously prepared in a workshop, needed to be lifted on the scaffolding and set in a particular position. Skill, experience and demanding coordination were essential. After the stone block was set, the traditional carving hand tools were used for finishing the stone surface.

1. KAMENI BLOK SA ISTOĆNE KAPELICE PRIJE UGRADNJE; 2, 3. REKONSTRUKTIVNI ZAHVATI NA PORTALU VESTIBUL; 4. NADVRATNIK PORTALA NAKON ZAVRŠENIH KONZERVATORSKO-RESTAURATORSKIH RADОVA; 5, 6. OBRADA I RETUŠ NA REKONSTRUIRANOM DIJELU GRANITNOG STUPA; 7. UZIMANJE OTISKA PROFILACIJE SA VIJENCA; 8, 9, 10. OBRADA KAMENIH TAŠEЛA; 11, 12. STANJE NAKON ZAVRŠENIH REKONSTRUKTIVNIH RADОVA

1. STONE BLOCK FROM THE EASTERN CHAPEL BEFORE THE MOUNTING; 2, 3. THE RESTORATION WORKS AT THE VESTIBUL PORTAL; 4. THE PORTAL LINTEL AFTER THE COMPLETION OF THE RESTORATION WORK; 5, 6. FINAL RETOUCHING OF THE RECONSTRUCTED PART OF A GRANITE COLUMN; 7. TAKING IMPRINT OF THE PROFILE FROM THE CORNICE; 8, 9, 10. FINISHING OF A STONE BLOCK; 11, 12. CONDITION AFTER THE RESTORATION WORK.



## Fugiranje, izrada zaštitnog pokrova i zaštita od ptica

Sljubnice između kamenih blokova fugirane su akrilno-vapnenom žbukom. Kako bi se spriječilo ispiranje kamenih površina kišnicom, na sve veće horizontalne plohe postavljen je nakošeni pokrov od morta, na koji je pričvršćena oplata od olovnog lima s okapnicom koja osigurava zaštitu kamena od oborinskih voda.

Sve manje površine kamene plastike: istaci kapitela i kamenih vijenaca ozbuđani su kako bi se izbjeglo korozivno i erozivno djelovanje atmosferičnog vremena na strukturu kamena. Naposljetku, na isturene površine postavljen je sustav igličaste zaštite od ptica kako bi se spriječilo njihovo slijetanje i zadržavanje.

## Repointing, Mounting of Protective Cover and Bird Control Systems

Joints between the stone blocks were repointed with acrylic-lime mortar. All of the large horizontal slabs were covered with slanted mortar with lead sheeting to protect stone from rain.

Smaller stone sculptures such as projections on capitals and stone cornices were plastered to prevent the corrosion and erosion caused by weathering. Finally, a system of spikes was installed on projecting surfaces to prevent birds from landing.



1. ŽBUKANJE GORNJIH DIJELOVA LUKOVA KOLONADE; 2. NOVA SLJUBNICA IZMEĐU PORTALA I ZIDA VESTIBULA; 3. ŽBUKANJE GORNJIH DIJELOVA KAPITELA, 4. POSTAVLJANJE IGLIČASTE ZAŠTITE OD PTICA; 5. ZAŠTITA MORTOM RAVNIH PLOHA KOLONADE; 6, 7. IZRADA SLJUBNICA I PUЊENJE LAKUNA AKRILNO-VAPNENIM MORTOM 8, 10. IZRADA ZAŠTITE OD MORTA I POSTAVLJANJE OLOVNIH PLOĆA; 9, 11. ZABAT PROTIRONA I ISTOČNA KOLONADA S POSTAVLJENIM OLOVNIM PLOČAMA

1. PLASTERING OF THE UPPER PARTS OF THE COLONNADE ARCHES; 2. NEW JOINT BETWEEN THE PORTAL AND THE VESTIBULE WALL; 3. PLASTERING OF THE UPPER PARTS OF THE CAPITAL; 4. ANTI-PIGEON SYSTEM OF SPIKES; 5. MORTAR PROTECTIVE LAYER ON THE UPPER SURFACES OF THE COLONNADES; 6, 7. FILLING-IN OF LACUNAS AND REPOINTING WITH ACRYLIC-LIME MORTAR; 8, 10. MORTAR CAPPING AND LEAD FLASHING; 9, 11. PEDIMENT OF PROTHYRON AND EASTERN COLONNADE WITH LEAD COVER





## Istražni radovi na konstrukciji Peristila i arheološka istraživanja

Istražni radovi na konstrukciji Peristila započeli su 2007. godine. Tijekom 2008. i 2009. godine prati se stanje konstrukcije, ispituju vlastite frekvenčne građevine, provode geofizički i geomehanički istražni radovi. Ispitivanja stanja temelja nužno prate zaštitna arheološka istraživanja. Najnovija arheološka istraživanja dijelom su se nadovezala na istraživačke radove koje je između 1956. i 1961. godine provodio Odjel za povijest graditeljstva Urbanističkog biroa Split.

Jedan od zanimljivijih nalaza onaj je oštećenog antičkog pithosa (velike glinene posude za čuvanje namirnica, ukopane u zemlju), koji je otkopan u sondi uza zapadnu stranu istočne kolonade, uza stolobat podno šestoga stupu. Osim što su pomogla u razumijevanju uzroka oštećenja konstrukcije, ova su istraživanja potaknula dvojbe o izvornoj funkciji substrukcija kolonade: dok jedni stručnjaci govore o proširenju temelja, drugi misle da se radi o ostacima građevine koja je prethodila Palazi.

Istraživanje renesansne crkvice koja zatvara sjeveroistočni ugao Peristila, a posvećena je zaštitniku od kuge, sv. Roku, donijelo obilje novih spoznaja. U doba velikih epidemija kuge, kakve su Splitom harale do 19. stoljeća, u crkvi su se ukapale žrtve. O tome svjedoči natpis "OB PESTEM" ("zbog kuge") na nekim grobnim pločama. Otkriveni su i grobovi bratima sv. Roka iz 17. stoljeća. Crkвica sv. Roka nekад je bila dio gustom urbanog tkiva. U njeni istočni dio uklonjeni su ostaci romaničke kuće. Na istoku se na nju nadovezivala i biskupska palača, podignuta 1675., stradalna u požaru 1924. godine i kasnije porušena. Už južni zid sv. Roka postojala je starija crkвica sv. Sebastijana, kasnije sv. Barbare. Ta je crkвica djelomično porušena 1876. godine, a njezino pročelje, utisnuto u rimski luk trijem u decumanusu, ostalo je sačuvano do 1922. godine. Už južni zid sv. Roka i danas su uklonjeni dijelovi arhitrava kolonade antičkog trijema.

## Research into the Structure of the Peristyle and Archaeological Investigation

Research into the structure of the Peristyle started in 2007. During 2008 and 2009 the condition of the structure was monitored, the building's frequencies were tested and geophysical and geomechanical operations conducted. Tests into the state of the foundations are necessarily accompanied by rescue archaeological operations. The most recent archaeological research partially carried on from investigative operations that were conducted between 1956 and 1961 by the Architectural History Department of the Urban planning Bureau in Split.

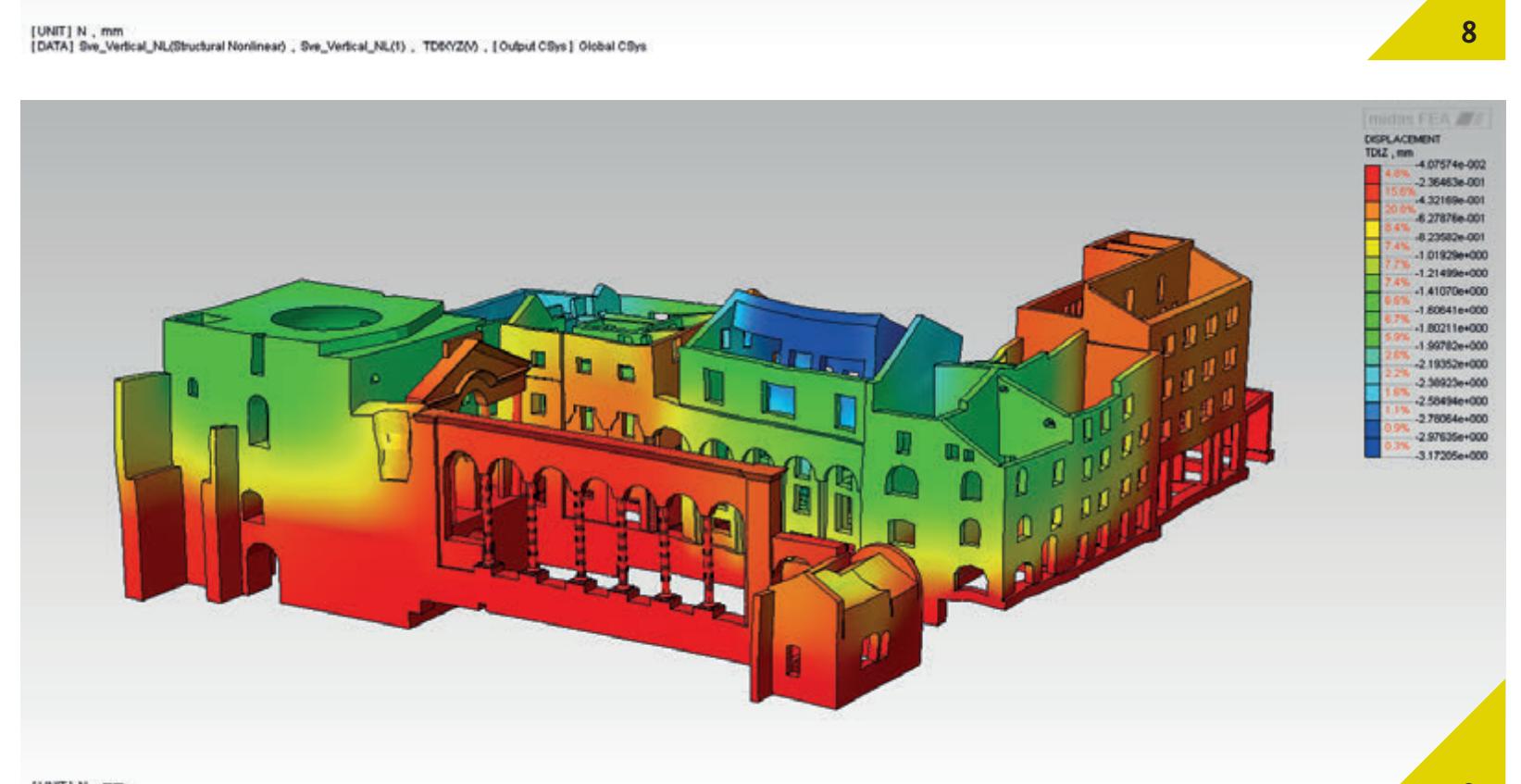
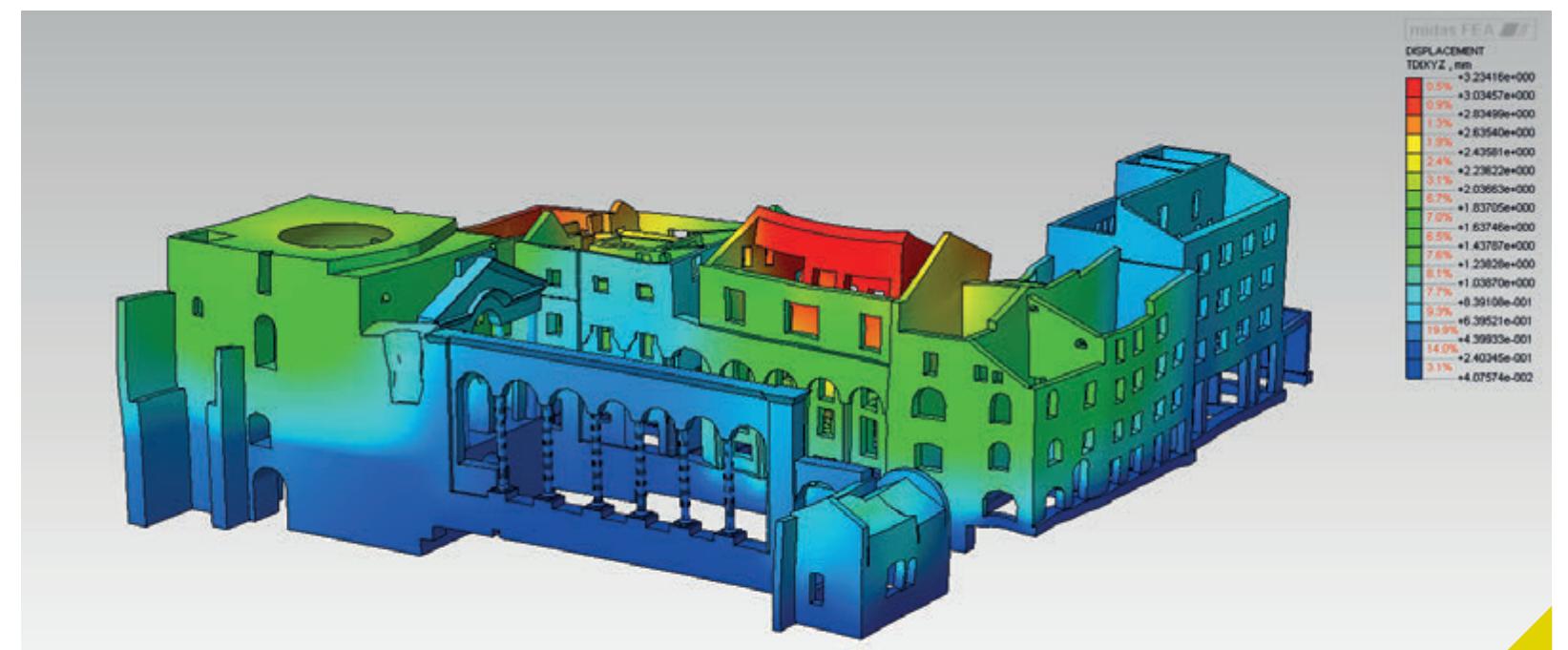
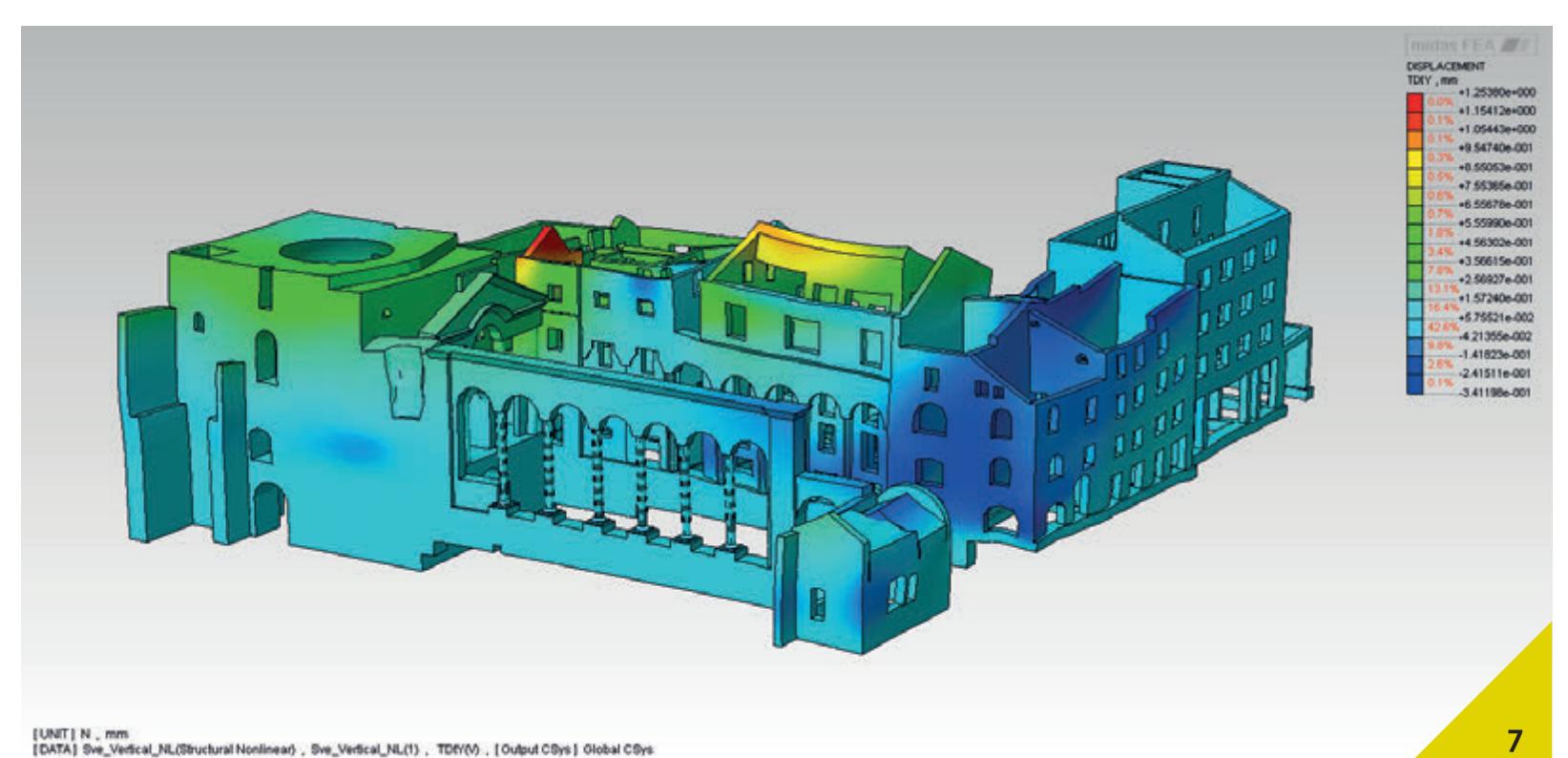
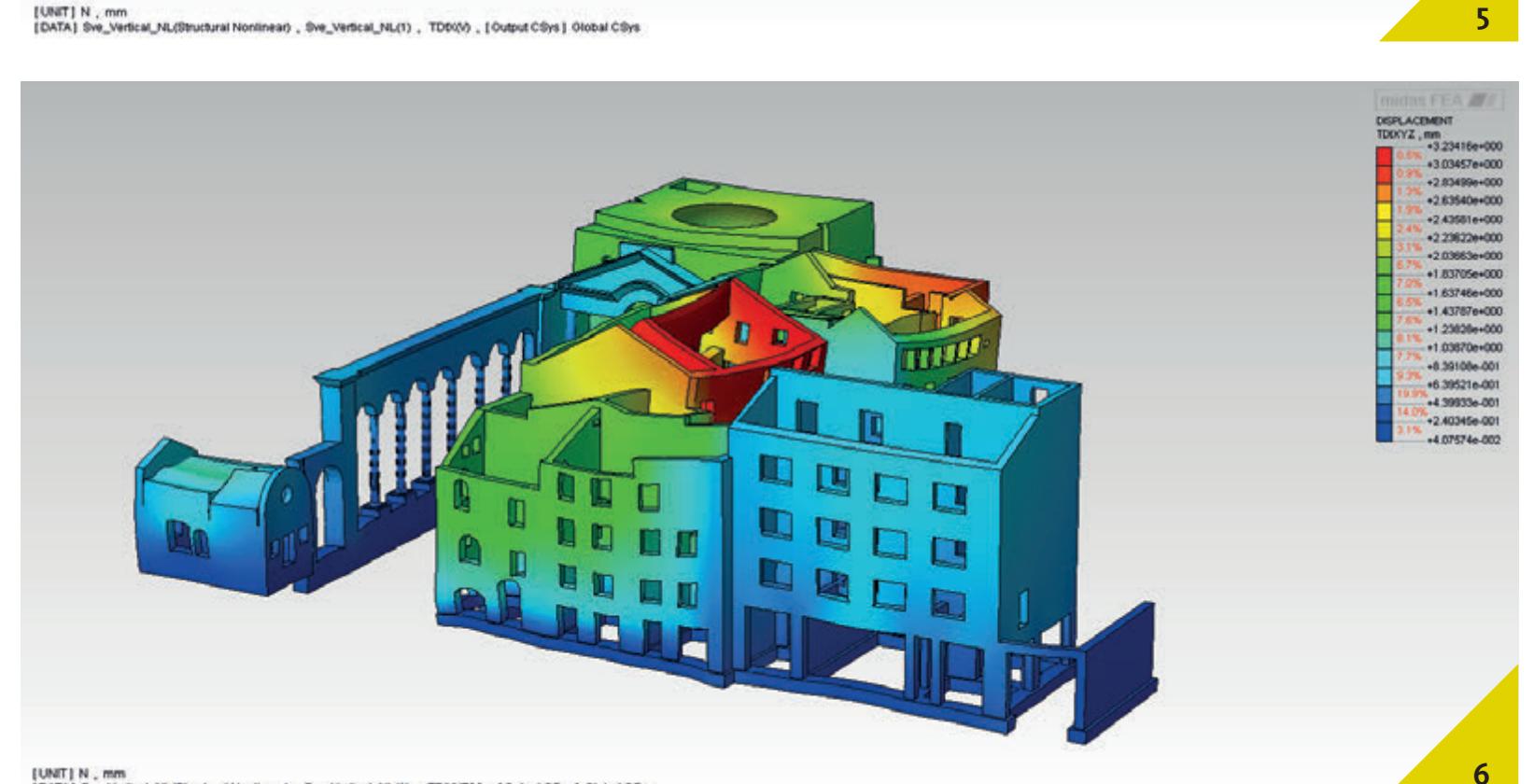
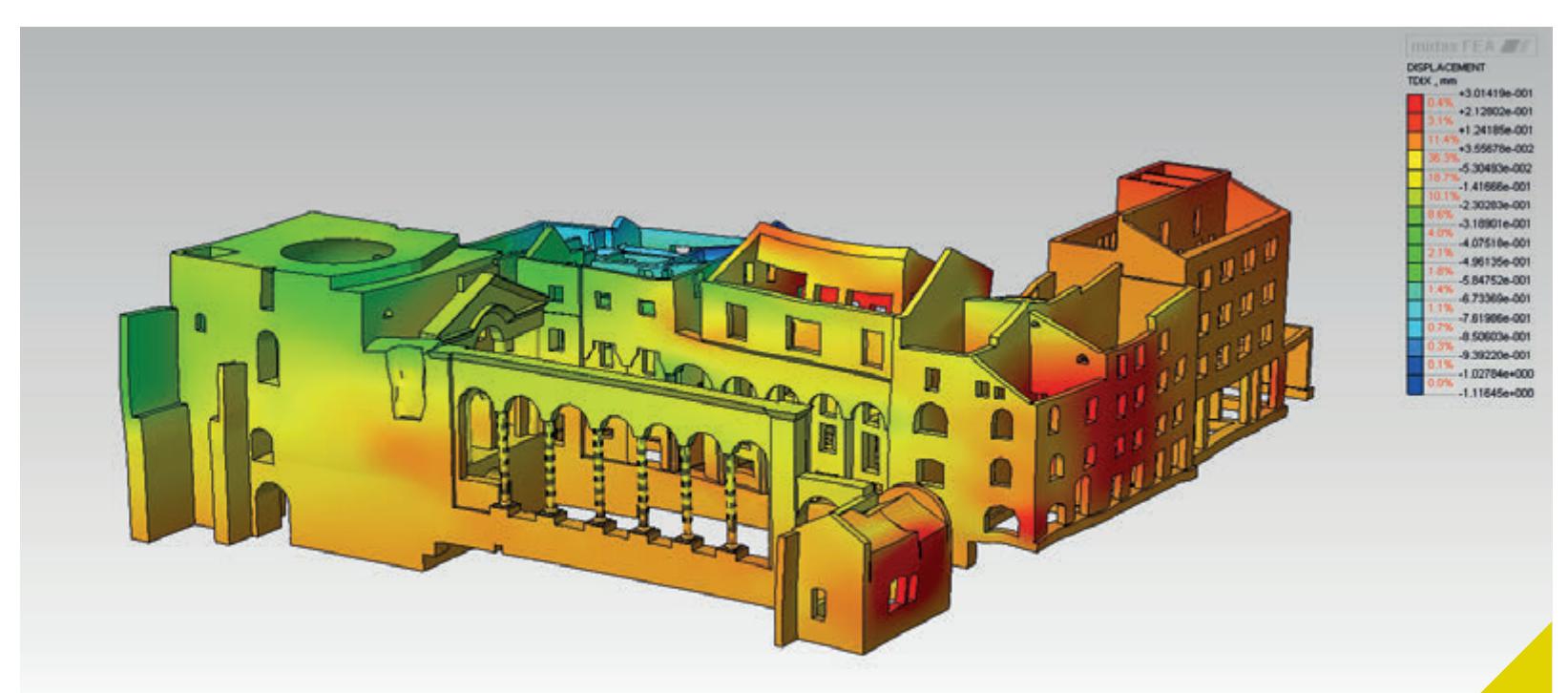
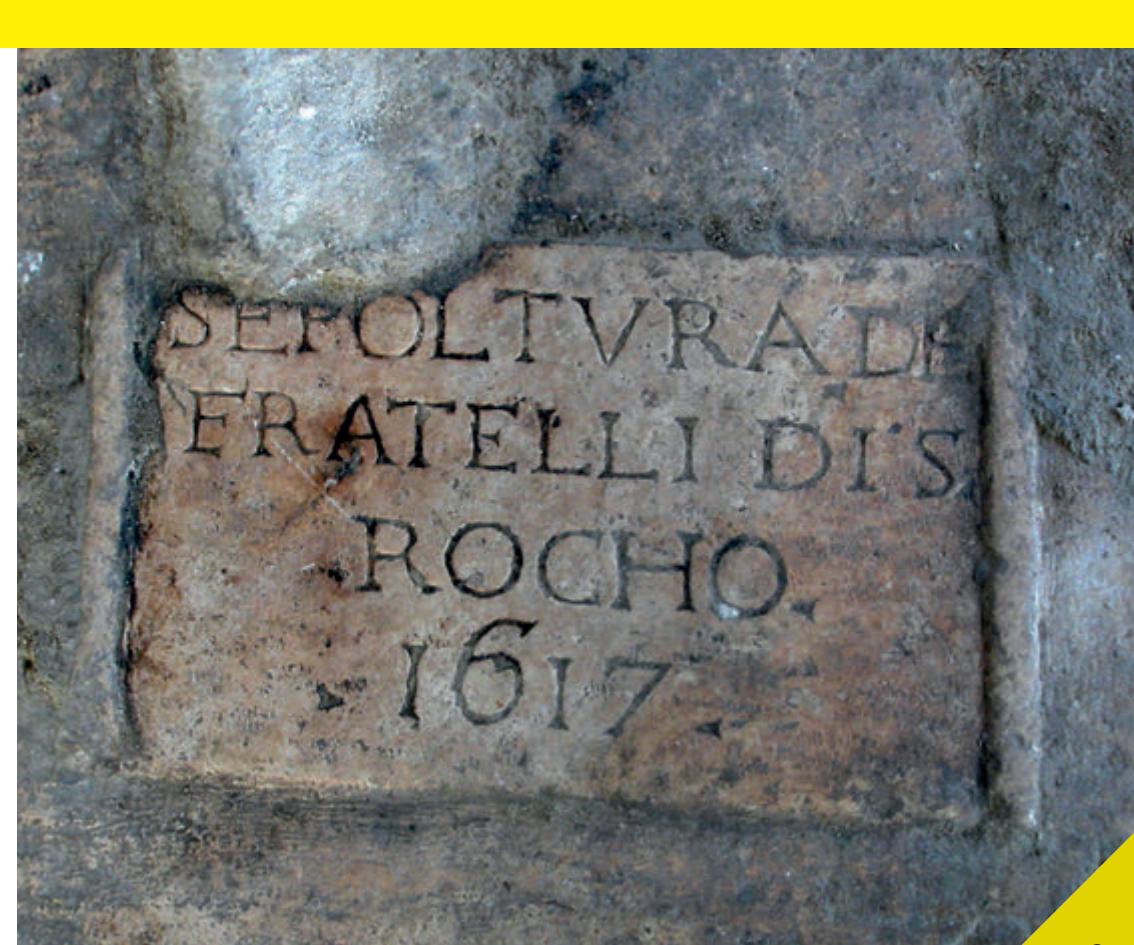
One of the interesting finds was that of a damaged Roman period pithos (a large clay vessel for the storage of provisions buried in the earth), which was buried in a test dig alongside the western side of the eastern colonnade, next to the stolobate below the sixth column. Apart from helping in understanding the causes of the damage to the structure, this research set off doubts about the original function of the subtraction of the colonnade; while some experts talk of the expansion of the foundations, others are of the opinion that it is a matter of remains of a building that preceded the palace.

Research into a Renaissance chapel that closes off the north-east corner of the Peristyle, dedicated to St Roch, patron saint who is particularly invoked against the plague, provided a wealth of new knowledge. At the time of the great epidemics of the Black Death that raged in Split until the 19th century, the victims were buried in the church. This is revealed by the inscription OB PESTEM (of the plague) on some of the gravestones. Also uncovered were graves of the members of the confraternity of St Roch of the 17th century. St Roch's Chapel was once part of a dense urban tissue. The remains of a Romanesque house are incorporated into the eastern part of the chapel. The bishop's palace, put up in 1675, but seriously damaged in a fire in 1924 and later demolished, carried on from it in the east. Alongside the southern wall of St Roch's there was once an older church, St Sebastian's, later St Barbara's. This church was partially knocked down in 1876, although its facade, inserted into the Roman arch of the portico along the Decumanus was extant until 1922. Even today, parts of the architrave of the colonnade of the ancient portico are incorporated into the southern wall of St Roch's.

1. ARHEOLOŠKA ISTRAŽIVANJA NA JUŽNOJ STRANI CRKVICE SV. ROKA; 2. ARHEOLOŠKA SONDA U JUGOISTOČNOM KVADRANTU SA OTKRIVENIM PITHOSOM;

3. NADGROBNI NATPIS U UNUTRŠNJOSTI CRKVE SV. ROKA; 4. UNUTRŠNOST CRKVE SV. ROKA; 5, 6, 7, 8, 9. RAČUNALNA ISPITIVANJA STABILNOSTI ARHITEKTONSKOG SKLOPA PERISTILA NA SILE POTRESE

1. ARCHAEOLOGICAL INVESTIGATIONS ON THE SOUTHERN SIDE OF ST. ROCH CHAPEL; 2. ARCHAEOLOGICAL TEST PIT AT THE SOUTHEAST CORNER WITH REMAINS OF A PITHOS; 3. AN INSCRIPTION ON A TOMBSTONE IN THE CHURCH OF ST. ROCH; 4. THE INTERIOR OF THE CHURCH OF ST. ROCH; 5, 6, 7, 8, 9. COMPUTER ANALYSIS OF THE STRUCTURAL STABILITY OF THE PERISTYLE IN THE EVENT OF AN EARTHQUAKE





## Zahvati na zapadnoj kolonadi

Zapadna kolonada je danas vidljiva jedino od strane Peristila jer su se između stupova smjestile fasade zgrada. Na sjevernom dijelu se se smješteli obitelji Cipci i Grisogono, a na južnom palać Skočibučić-Lukaris. Ova posljednja je nastala spajanjem i dogradnjom nekoliko zgrada kroz različite epohe, zato danas imamo isprepleteno bogatstvo stilova, od romanike, preko renesanse do baroka. Zbog ugradnje balkona u palać Skočibučić-Lukaris, kapiteli pilaster i prvi stup su većim dijelom oštećeni.

Vijenac, zid kolonade i kapiteli su bili u velikoj mjeri prekriveni tamnim skramama bogatim česticama uglikija. Sama kolonada, baze, lukovi i vijenac pretrpjeli su brojna strukturalna oštećenja od klinova i kopči sidrenih u kamen, napuknuća uzrokovana statičkim pomacima i sl. Ova oštećenja su tokom povijesti bila sanirana na različite načine. Najčešći primjer takve sanacije je ispunjavanje rupa ugradnjom opeka presvučenih cementnom ili vapnenom žbukom. Žbuka bi s vremenom otpala što bi uvelike nagrdavalo kolonadu. Posebno je ružno djelovala zakrpa od opeka u vijencu iznad drugog stupu, pa je uklonjena i na njeno mjesto postavljen kameni tašel na kojemu je izveden nedostajući dio ornamentike.

Zbog pomaka konstrukcije došlo je do raznih oštećenja. Pod pritiskom kapitela odvojio se gornji dio granitnog stupa, dok se dio kapitela raspuo i odvojio. Tri kamena bloka iz pročelja palaće Cipci su raspukli do te mjerje da je bilo potrebno njihov prednji dio u potpunosti zamjeniti kamenim tašelom. Slična situacija je bila i na lukovima koji povezuju stupove. Na spiju lukova je jedan od blokova pretrpio oštećenje zbog korozije željeznog trna te se dio materijala odvojio. Korodiranji željezni trn je premazan inhibitorom u svrhu usporavanja procesa korozije. Kamen je vraćen na svoje mjesto, uvršten karbonskim trnovima, a nedostajući dijelovi su rekonstruirani umjetnim kamenom.

Svi balkoni na palaći Cipci i balkonu palaća Skočibučić-Lukaris su demontirani i temeljito očišćeni. Sva puškuća su podlijepljena i sidrena nehrdajućim trnovima, a oštećenja su rekonstruirana umjetnim kamenom. Stupići i kamene ograda balkona palaća Skočibučić-Lukaris su međusobno povezani trnovima od nehrdajućeg čelika koji su u kamen usidreni olovom.

Na pročelju iste palaće znatan dio žbuke se odvojio od podlage i otpao. Učvršćivanje nestabilnih i rekonstruiranje nedostajućih dijelova ožbukane fasade izveo je Odsjek za zidno slikarstvo, mozaike i štuko Hrvatskog restauratorskog zavoda.

## Works on the West Colonnade

West colonnade is visible today only from Peristyle because the space between the columns is occupied with facades of buildings. Palaces of Cipci and Grisogono families are located in its north section and the Skočibučić-Lukaris Palace occupies its south part. The latter was created through connection and reconstruction of several buildings in different periods. That is why today there is an abundance of styles present, from Romanesque to Renaissance and Baroque. Pilaster and first column capitals were severely damaged when the balcony was built on the Skočibučić-Lukaris Palace.

Cornice, colonnade wall and capitals were mostly covered in dark coatings rich in carbon fibres. Colonnade itself, with its bases, arches and cornice has suffered numerous structural damages from clasps anchored in stone, cracks caused shifts in static etc. These damages have been treated in various ways through history. The most common example was closing the openings with bricks coated in cement or lime mortar. In time mortar would fall off, greatly defacing the colonnade. Brick patch in the cornice over the second column was exceptionally unsightly, so it was replaced with a stone patch with the reconstruction of the missing ornaments.

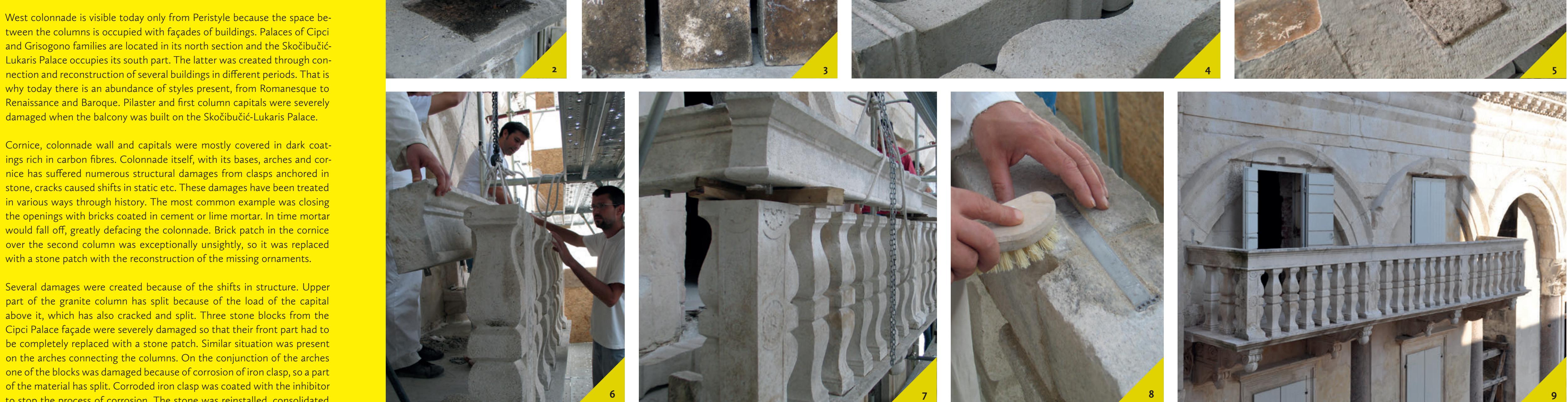
Several damages were created because of the shifts in structure. Upper part of the granite column has split because of the load of the capital above it, which has also cracked and split. Three stone blocks from the Cipci Palace facade were severely damaged so that their front part had to be completely replaced with a stone patch. Similar situation was present on the arches connecting the columns. On the conjunction of the arches one of the blocks was damaged because of corrosion of iron clasp, so a part of the material has split. Corroded iron clasp was coated with the inhibitor to stop the process of corrosion. The stone was reinstated, consolidated with carbon clasps, missing parts were reconstructed in artificial stone.

All of the balconies on the Cipci Palace and one balcony on the Skočibučić-Lukaris Palace were disassembled and thoroughly cleaned. All the cracks were glued and anchored with stainless clasps while damages were reconstructed in artificial stone. Stone balusters and parapet of the Skočibučić-Lukaris Palace were connected with stainless steel clasps anchored in stone with lead.

Façade of the same palace has lost most of its mortar. Consolidation of unstable and reconstruction of missing parts of the façade was carried out by the Department of Wall Painting, Mosaics and Stucco of the Croatian Conservation Institute.

1. DIO KOLONADE U KOJU JE UGRADENA PALAĆA GRISOGONO-CIPCI; 2. JEDAN OD STUPOVA BALKONA PRILIKOM DEMONTAŽE; 3. NUMERIRANJE STUPOVA PRIJE ČIŠĆENJA; 4. STUPOVI NAKON ČIŠĆENJA; 5. PRIPREMA ZA MONTAŽU STUPOVA; 6, 7. POSTAVLJANJE KAMENE GREDE NA STUPOVE; 8. OBRAĐA REKONSTRUIRANIH DIJELOVA NAKON MONTAŽE; 9. BALKONSKA OGRADA NAKON ZAVRŠETKA KONZERVATORSKO-RESTAURATORSKOG ZAHVATA; 10, 11. VIJENAC IZNAD PROZORA NA PALAĆI SKOČIBUČIĆ-LUKARIS, STANJE PRIJE I POSLUJE REKONSTRUKCIJE; 12. KAPITEL NAKON KONZERVATORSKO-RESTAURATORSKIH ZAHVATA; 13, 14. KAPITEL DOVTRATNIKA PALAĆE SKOČIBUČIĆ-LUKARIS, STANJE PRIJE I NAKON ZAHVATA; 15. OBNOVljENA ŽBUKA SA OSTATKOM RENESANSNE OGRADE NA FASADI PALAĆE SKOČIBUČIĆ-LUKARIS

1. GRISOGONO-CIPCI PALACE BUILT INTO THE COLONNADE; 2. A BALCONY BALUSTER DURING THE DISASSEMBLING PROCESS; 3. NUMBERING OF BALUSTERS BEFORE CLEANING; 4. BALUSTERS AFTER CLEANING; 5. PREPARATION FOR THE MOUNTING OF BALUSTERS; 6, 7. MOUNTING OF THE BALUSTRADE RAIL; 8. FINISHING OF THE RECONSTRUCTED PARTS; 9. BALCONY FENCE AFTER CONSERVATION-RESTORATION WORKS; 10, 11. A CORNICE ABOVE THE WINDOW ON THE SKOČIBUČIĆ-LUKARIS PALACE, BEFORE AND AFTER THE INTERVENTION; 12. A CAPITAL AFTER RESTORATION; 13, 14. A CAPITAL OF THE DOOR POST OF THE SKOČIBUČIĆ-LUKARIS PALACE, BEFORE AND AFTER THE INTERVENTION; 15. RENEWED PLASTER WITH THE TRACES OF THE RENAISSANCE BALUSTRADE ON THE FAÇADE OF THE SKOČIBUČIĆ-LUKARIS PALACE



## Zahvati na istočnoj kolonadi

Istočna kolonada se sastoji od šest stupova međusobno povezanih lukovima koji omedjuju dva pilastera. Sjeverni dio kolonade je kroz povijest pretrpio veća oštećenja zbog interpoliranja jedne kuće koja je obuhvatila i teško oštetila dva mramorna stupa. Oni su restaurirani tadeliranjem i ojačani bakrenim obručima 1907. godine, kada je izvršena demontaža i montaža vjenca i trabeacija tog dijela istočne kolonade. Upravo su sjeverni pilaster i dva susjedna stupa činili prvu fazu konzervatorsko-restauratorskih radova na Peristilu na kojima je izveden cijeli niz istražnih radova na osnovu kojih su dobivene smjernice za obnovu cijelog Peristila.

Zanimljivo je da je vanjski plasti ove kolonade svijetle boje za razliku od unutrašnjeg koji je bio gotovo potpuno prekriven tamnim skramama. Razlog ovaj razlici leži u smještaju kolonade. Naime, vanjski plasti je, za razliku od unutrašnjeg, izložen udarima vjetra, koji u kombinaciji s kišom i sitnim česticama pjeska uzrokuje kontinuiranu abraziju kolonade tako da se tamne naslage ne mogu zadržati na kamenim površinama. Vjenac kolonade je na više mesta bio oštećen, što je prekidalo ornamentalni niz i narušavalo ljeput i sklad cijelog vjenca. Na tim mjestima krišnica je intenzivno ispirala i oštećivala kamen pročelja na kome je veliki kontrast svijetlih, opranih i tamnih, onečišćenih površina uvelike otežavao "čitanje" arhitektonskih oblika. Ova mesta su rekonstruirana umjetnim kamenom, pri čemu se vodilo računa o logici ornamentalnog niza i načinu na koji je antički klesar obradio površinu kamena. Osim rekonstrukcija u umjetnom kamenu, u vanjski plasti vjenca, koji nije ukrašen ornamentikom, ugrađen je kameni tašel većeg volumena čija je gruba obrada i profiliranje izvedeno u restauratorskoj radionici, a fina obrada in situ. Završna obrada je izvedena na martelinu (zubacu), pazeci pri tome da tekstura obrade bude što sličnija teksturi okolnih kamenih blokova. Posebna zanimljivost je oštećenje koje se dogodilo na krajujućem kapitelu. Naime, željezni trn koji povezuje kapitel s podnožjem luka je eksplandirao pod utjecajem vlage, pri čemu je razvio dovoljno velike tlačne sile da izbije dilj kamenog materijala na kapitelu i na podnožju luka. Taj kameni materijal koji se odvojio od cijeline je izvaden, željezni trn je zamijenjen novim, trnom od nehrdajućeg čelika i zaliwen olovom kako bi čvrsto stajao u svojem kamenom ležištu. Odvojeni kameni materijal je ponovo vraćen na svoje mjesto i usidren karbonskim šipkama i epoksidnim ljeplilom, dok je spojno mjesto obrađeno umjetnim kamenom. Završni vjenac kolonade je bio prekriven betonskim pokrovom na dvije vode. Ovaj pokrov je odstranjen, a željezne kopče koje povezuju kamene blokove su zamijenjene kopčama od nehrdajućeg čelika. Postavljen je novi pokrov od vapnenog morta koji služi kao podloga za pokrov od olovnog lima s okapnicom kao zaštitom pročelja od ispiranja krišnicom.

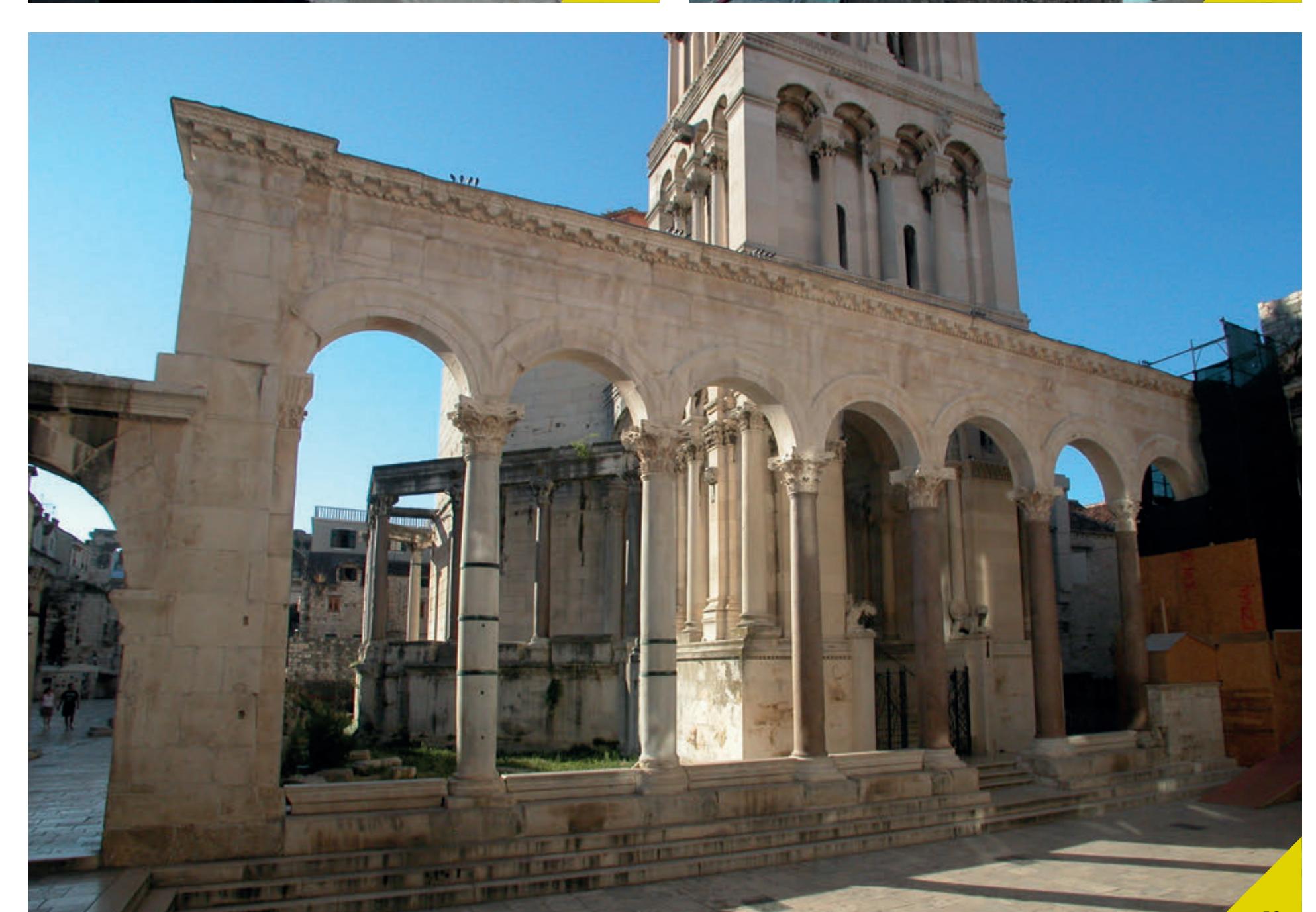
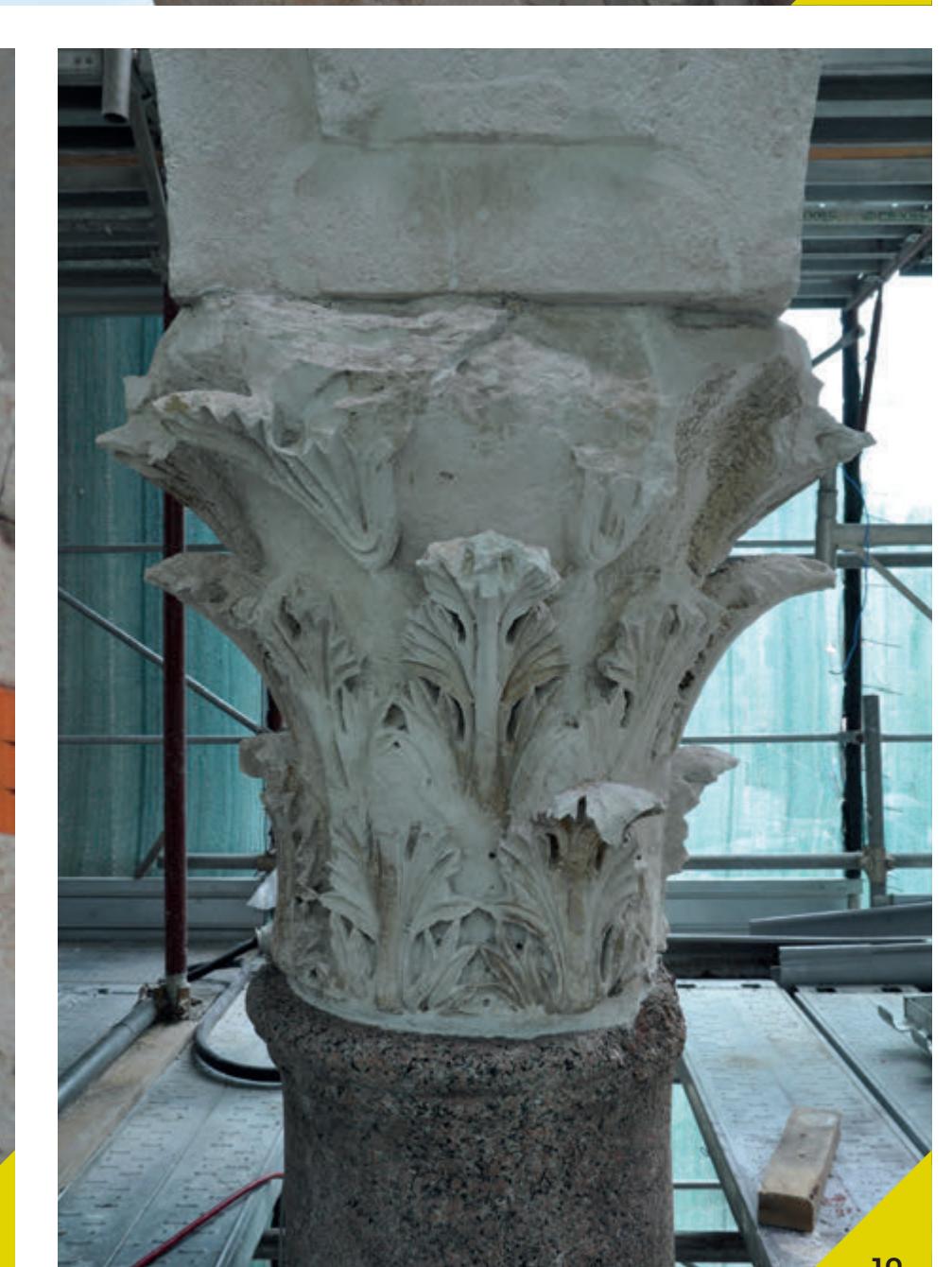
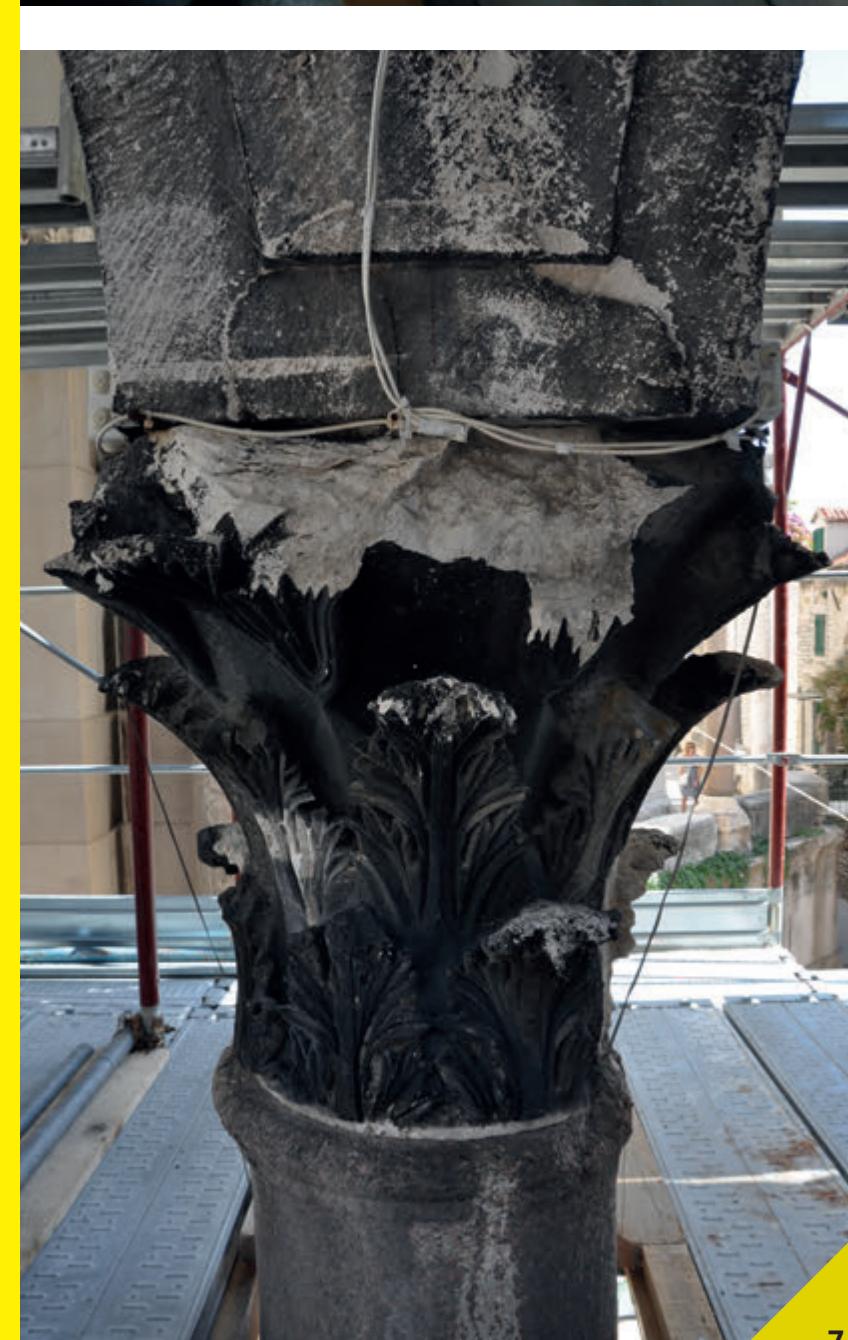
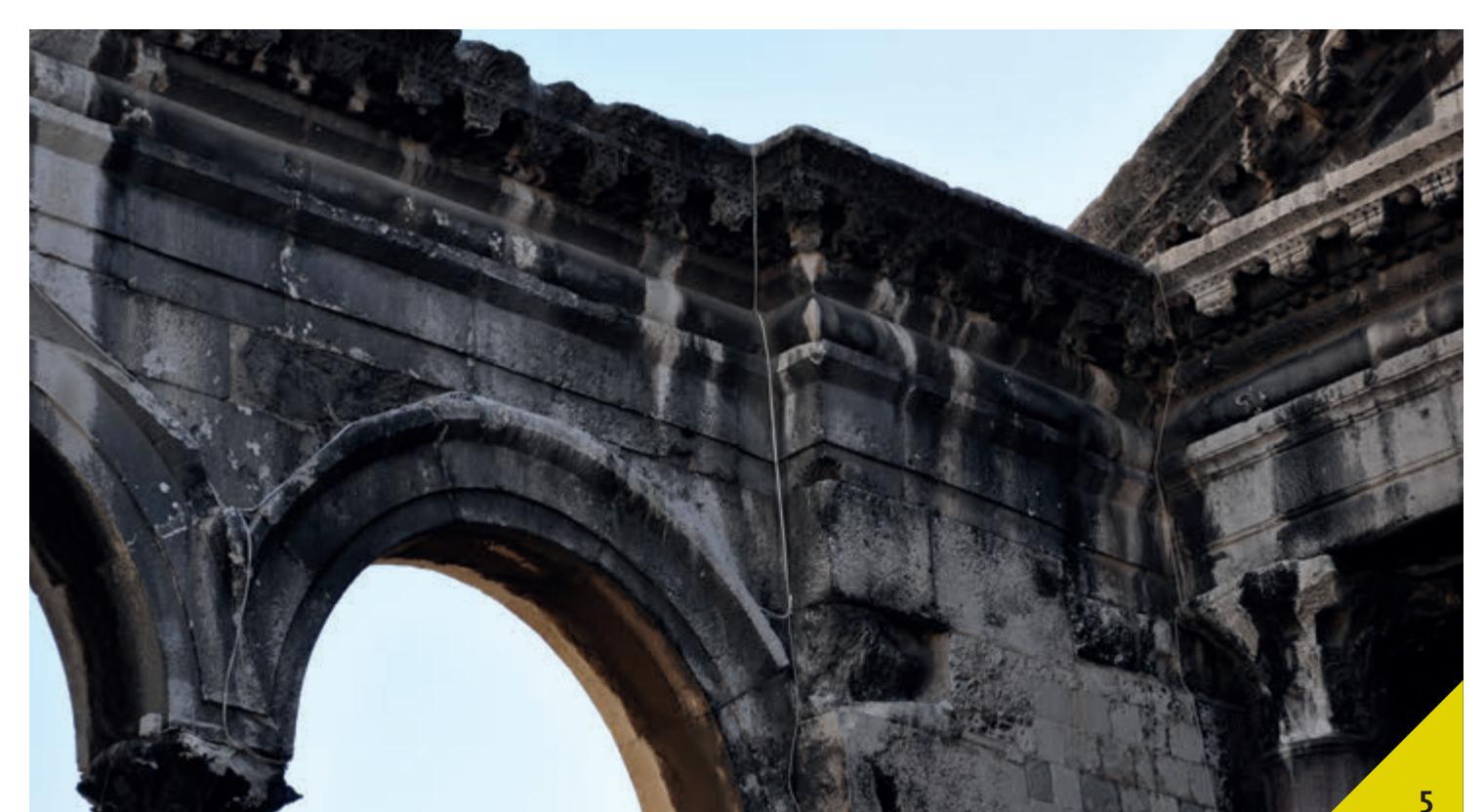
## Works on the East Colonnade

East colonnade consists of six columns connected by arches flanked by two pilasters. North part of the colonnade has suffered significant damage through history due to the interpolation of a house that had embedded and severely damaged two marble columns. They were restored by patching and consolidated with copper rings in 1907, where cornice and trabeation of that part of the east colonnade were disassembled and reassembled again. North pilaster and two neighbouring column were the first phase of conservation- restoration work at Peristyle and series of surveys were conducted there that provided guidelines for the rehabilitation of the complete Peristyle.

It is interesting that the outer sheet of this colonnade is bright, unlike the inner one that was almost completely covered in dark sediment. Reason for this lies in the position of the colonnade. The outer sheet is, unlike the inner one, exposed to strong wind that combined with rain and small sand particles continuously causes abrasion so that dark sediment cannot hold to the stone surface. Cornice was damaged in several places. That has produced breaks in the ornamental strip and disturbed the beauty and harmony of the whole cornice. In such places rain has intensively damaged the stone, creating big contrasts between washed, bright and soiled, dark surfaces thus making it hard to „decipher“ the architectural forms. These places were reconstructed in artificial stone. A lot of attention was paid to the logic of the ornamental strip and the method of the ancient stone carving. Besides the reconstructions made in artificial stone, a large stone patch was inbuilt into the outer cornice sheet that had no ornaments. This patch was roughly cut in a workshop and finely finished in situ. Finishing treatment was carried out with marteline, with special attention given to the texture. Damage made on the last capital towards south is exceptionally interesting. Iron clasp connecting the capital to the base of the arch has expanded because of humidity and created enough thrust to break out the stone of the capital and arch base. Stone separated from the rest was taken out, iron clasp was replaced with the new one made of stainless steel and was coated in lead so that it would hold firmly to its stone bed. Separated stone was returned to its place and anchored with carbon bars and epoxy glue and the conjunction was treated with artificial stone. Uppermost cornice of the colonnade was covered with Portland cement slanted coating. This has been removed and iron clasps connecting the stone blocks were replaced with the stainless steel ones. New lime mortar coating was installed as a base for the lead sheeting with a sash as a protection from rain.

1. DIO ISTOČNE KOLONADE ISPRED KATEDRALE SV. DUJE; 2, 3. UGRADNJA I OBRAĐA KAMENOG BLOKA SA VANJSKE STRANE ISTOČNE KOLONADE; 4. KAMENI BLOK NAKON REKONSTRUKCIJE; 5, 6. JUŽNI DIO ISTOČNE KOLONADE, STANJE PRIJE I POSLJE ZAHVATA; 7, 8, 9, 10. SANACIJA NAPUKNUĆA UZRUKOVANOG KOROZIJOM METALNOG TRNA, STANJE PRIJE, TIJEKOM I NAKON; 11, 12, 13. POGLED NA ISTOČNU KOLONADU

1. A PART OF THE EASTERN COLONNADE IN FRONT OF THE ST. DOMINIC CATHEDRAL; 2, 3. MOUNTING AND FINISHING OF THE STONE BLOCK ON THE OUTER SIDE OF THE EASTERN COLONNADE; 4. STONE BLOCK AFTER THE RECONSTRUCTION; 5, 6. SOUTHERN SIDE OF THE EASTERN COLONNADE, CONDITION BEFORE AND AFTER THE INTERVENTIONS; 7, 8, 9, 10. REPAIR OF A CRACKED STONE CAUSED BY CORROSION OF AN IRON CLAMP, BEFORE, DURING AND AFTER TREATMENT; 11, 12, 13. VIEW OF THE EASTERN COLONNADE



## Zahvati na Crkvi Sv. Roka

Crkva sv. Roka se smjestila u sjeveroistočnom dijelu Peristila, na samom križisu nekadašnjeg carda i decumanusa. Zauzela je prostor nekadašnjih srednjovjekovnih kuća. Južni pročelje, nekadašnji srednji zid između crve sv. Roka i susjedne crkve sv. Barbare, obuhvatilo je ostatke trijema decumanusa: ugaoni pilon s kapitelom, tri pilona sastavljena od elemenata arhitrava, koji su zamijenili stupove, te arhitrav kolonade trijema koji je ostao na mjestu. S obzirom na činjenicu da je crkva uklonjena u cijelinu istočne kolonade Peristila, zahvat na njoj je bio logičan nastavak konzervatorsko-restauratorskih radova.

### KONZERVATORSKA ISTRAŽIVANJA

Prije početka izrade projekta sanacije crkve Sv. Roka izrađen je konzervatorski elaborat u kojemu su obrađeni povijesni izvori koji govore o crkvi, kao i crteži, načrti i fotografije koje prikazuju jezin nekadašnji izgled. U crkvi i oko nje provedeni su istražni arheološki i konzervatorski radovi koji su pomogli razumijevanju povijesti građevine. Ispod recentnog kamennog poda i sloja betonske podlage pronađen je izvorni kameni pločnik i osam grobnica iz vremena hajdara kuge u 17. stoljeću. Istraživanja su potvrdila da su zidovi srednjovjekovnih kuća koje su prethodile crkvi temeljeni izravno na kamenom pločniku decumanusa. Izvan zone temelja rimski pločnik nije pronađen.

Pronadjen je ugaoni pilon trijema decumanusa na koji se prislonilo zapadno pročelje crkve s ostatkom polustupa koji je pripadao kolonadi trijema. Na sjevernom zidu, na mjestu gdje završava romanička struktura zidanja, uočen je trag nekadašnjeg zapadnog zida romaničke kuće. Nakon što je s krova crkve uklonjen pokrov, a zatim i šut, postala je vidljiva gornja površina svoda i završnice sjevernog i južnog zida. Vrh južnog zida čine tri kamene grede (arhitrava) trijema decumanusa.

### ZATEČENO STANJE

Na glavnom pročelju crkve sv. Roka uočen je niz oštećenja, koncentriranih na dijelu pročelja od horizontalnog vijenca zabata na niže. Uzroci oštećenja su višestruki. Horizontalni potisak rimske arkature prenosi se na kamene blokove pročelja koji su izvorno bili klesani sa skošenim stranicama i ugradeni bez slijubnica, tako da je na vanjskom licu došlo do velike koncentracije napona pa je kamen popucao uglavnom vertikalnim pukotinama. Dodatni uzrok oštećenja je loše temeljenje koje je dokazano geomehaničkim i arheološkim ispitivanjima, korozija željeznih rešetki (prozor), mehanički udari (nadvratnik portala) i atmosferski utjecaji (istureni dijelovi profilacija).

Kamen je onečišćen crnim korarama koje su zatećene na unutrašnjem dijelu preslice, na uvućenim dijelovima arhitektonskih elemenata, te na čitavoj površini rozete. Istureni dijelovi profilacija izloženi kiši prekriveni su biološkim izraštajima. Crnim inkrustacijama su bile onečišćene i bočna pročelja crkve, dok je stražnje bilo prekriveno recentnom žbukom.

## Works on the Church of St. Roch

The Church of St. Roch occupies the north-east part of the Peristyle, the very intersection of former cardo and decumanus. It was built at the site of medieval houses. Its south facade, formerly a central wall between the Church of St. Roch and the adjacent Church of St. Barbara, has embedded the remains of decumanus porch: corner pillar with capital, three pillars consisting of lintel elements that had replaced the columns, and the lintel of the porch colonnade that has kept its location. Since the church is actually a part of the east section of Peristyle, its treatment was a logical continuation of conservation-restoration works.

### CONSERVATION SURVEYS

Conservation survey has been composed before the start of the rehabilitation project of the Church of St. Roch. It has elaborated all the information on the history of the church including drawings, plans and photographs of its historic appearance. Archaeological and conservation research was conducted in and around the church that helped the understanding of its history. Under the recent stone floor and a layer of Portland cement, original stone pavement was found together with eight tombs dating from the time of the plague in the 17th century. Research has confirmed that the walls of the medieval houses that preceded the church were founded directly on the stone pavement of decumanus. Roman pavement was not found outside the foundation zone.

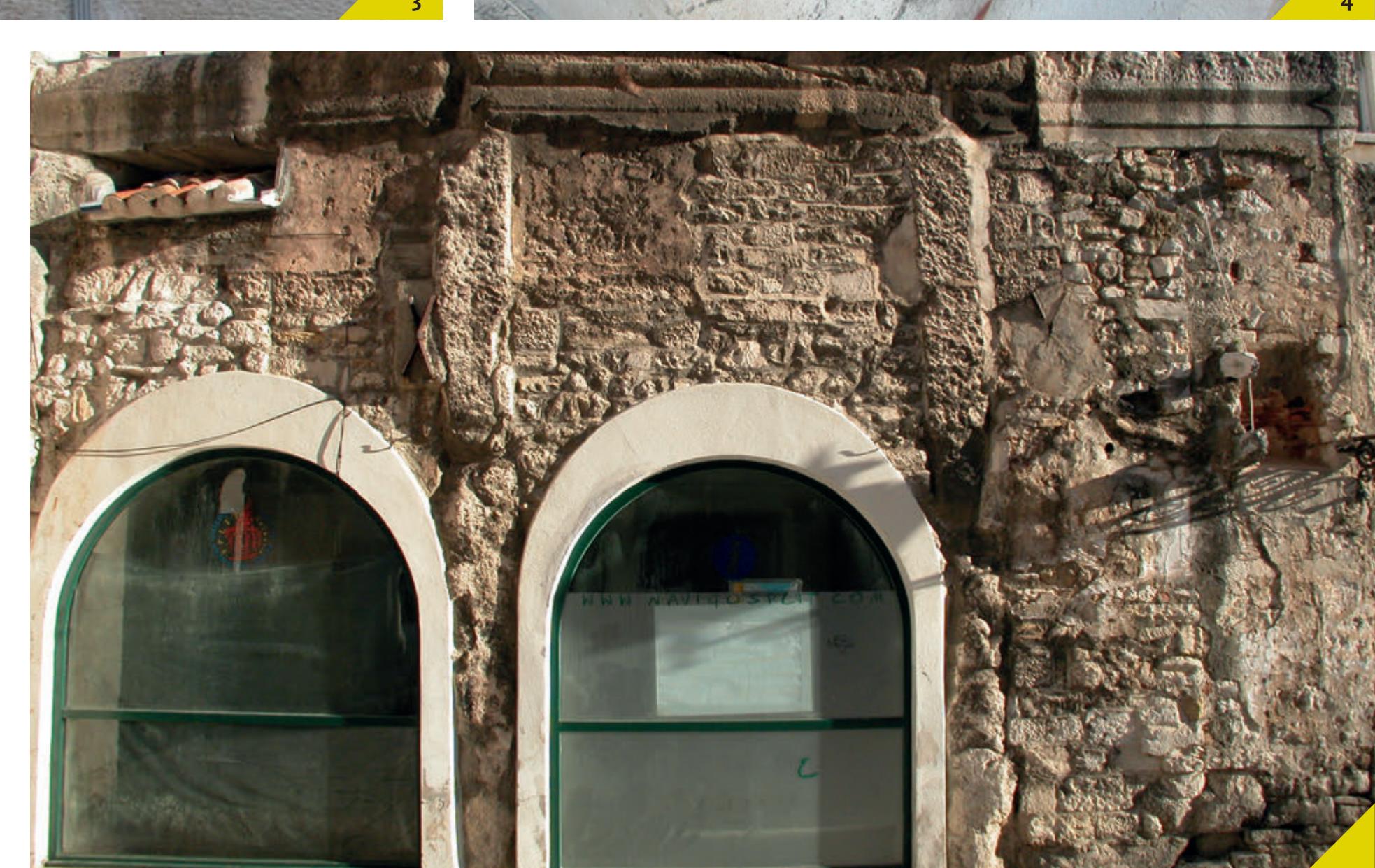
It was discovered that the west church facade is leaning on the corner pillar of the decumanus porch with a trace of an embedded column belonging to the porch colonnade. Trace of a formerly west wall of a Romanesque house was found on the north wall, at a place where Romanesque construction structure ends. After the roof cover and constructional waste had been removed, there appeared the upper surface of the vault and the final parts of the north and south walls. Top of the south wall consists of three stone beams (lintels) of the decumanus porch.

### AS-FOUND CONDITION

Series of damages of the main facade of the Church of St. Roch are concentrated in the area below the horizontal cornice. Causes of damage are manifold. Horizontal thrust of Roman arcades is transferred to the stone blocks of the facades that had originally been carved with slanted sides and installed without joints, so the exterior walls were overstrained and the stone was damaged mainly with vertical cracks. Bad foundations have added to the damages which was proven through geomechanical and archaeological research, as well as corrosion of iron bars (window), mechanical blows (transom above entrance) and weathering (protruding parts). Stone was soiled with black crusts that were found on the inner side of the bell-gable, indented parts of architectural elements and the whole rosette surface. Protruding parts exposed to rain were covered in biological growth. Side facades were also soiled with black incrustations while the rear facade was recently covered with mortar.

1. LUK TRIJEMA ANTIČKOG DECMUMANUSA; 2. FASADA CRKVE SV. ROKA; 3. VERIKALNO PUĆANJE KAMENA NA FASADI CRKVE SV. ROKA; 4. ROZETA CRKVE SV. ROKA PREKRIVENA SKRAMOM; 5. DETALJ SA CRKVE SV. ROKA SA CRNOM SKRAMOM NA DJELOVIMA KOJI NIŠU ISPRANI KISOM; 6. JUŽNA STRANA CRKVE SV. ROKA PRIJE KONZERVATORSKO-RESTAUTATORSKOG ZAHVATA; 7. MECANIČKO OŠTEĆENJE NA VJENCU PORTALA CRKVE SV. ROKA; 8. ARHITRAVIMA TRIJEMA DECMUMANUSA PRONAĐENI SU TRAGOVI ROMANIČKIH PROZORA; 9. TEMELJI NA SJEVEROZAPADNOM UGLU CRKVE SV. ROKA

1. THE FIRST ARCH OF THE PORTICO OF THE ANCIENT DECMUMANUS; 2. THE FAÇADE OF THE CHURCH OF ST. ROCH; 3. VERTICAL CRACKING OF STONE ON THE FAÇADE OF THE CHURCH OF ST. ROCH; 4. ROSE WINDOW OF THE CHURCH OF ST. ROCH COVERED WITH BLACK CRUST; 5. DETAIL OF THE CHURCH OF ST. ROCH WITH A BLACK CRUST ON THE PARTS THAT ARE NOT WASHED BY RAIN; 6. THE SOUTH SIDE OF THE CHURCH OF ST. ROCH BEFORE CONSERVATION-RESTORATION WORK; 7. MECHANICAL DAMAGE TO THE PORTAL OF ST. ROCH; 8. TRACES OF ROMANESQUE WINDOWS WERE FOUND ON THE ARHITRAVES OF THE DECMUMANUS PORTICO; 9. FOUNDATIONS AT THE NORTHWEST CORNER OF THE CHURCH OF ST. ROCH





## Zahvati na Crkvi Sv. Roka

### KONZERVATORSKO-RESTAURATORSKI RADOVI

Konstruktivna sanacija crkve sv. Roka započela je uklanjanjem pokrova i sanacijom svoda s gornje strane. Rubovi su zajedno s uzdužnim vijencima ojačani karbonskim trakama, kao i zapadno pročelje s unutrašnje strane. Šupljine u zidu zapadnog pročelja su popunjene injekcionom smjesom na vapnenoj osnovi kako bi se sile koje su bile koncentrirane na vanjskom licu ravnomjerno rasporedile po širini zida. Jako oštećeni kameni blokovi su zamjenjeni novim, a manja oštećenja su rekonstruirana smjesom umjetnog kamena. U umjetnom kamenu je rekonstruiran i nedostajući dio vijenca iznad ulaznih vrata. Oštećenja i pukotine na kamenim blokovima su sanirani karbonskim trnovima i epoksidnim ljepljom. Veći broj blokova je učvršćen konsolidantima čije je prodiranje u strukturu kamena poboljšano vakumiranjem površine. Stare cementne sljubnice zamjenjene su novima izrađenim od akrilino-vapnenog morta. Biološka kolonizacija je uklonjena kemijski i mehanički, a crne inkrustacije su očišćene laserom. Prodror vlage u konstrukciju saniran je postavljanjem novog pokrova od kupe kanalice i opisivanjem olovnim limom kritičnih mјesta na spoju krova sa zidovima i na gornjoj plohi zabata. Oštećen i teško raspoznavljiv rimski kapitel ugaonog pilona trijema decumanusa, koji je većim dijelom zakrivljen južnim zidom crkve, radi bolje prezentacije je rekonstruiran prema analogiji s dobro očuvanim kapitelom pilona u obližnjoj zgradi banke.

Unutrašnjost je preuređena prema konzervatorskim zahtjevima. Grobovi pronađeni ispod recenstnog poda su konzervirani i zaštićeni novim kamenog pločnjicom. Kameni imposti i vijenci na zidovima su rekonstruirani, široki lučni otvori na južnom pročelju su zazidani, a dotrajala žbuka zamjenjena vapneno-akrilnom žbukom.

## Works on the Church of St. Roch

### STRUCTURAL AND RESTORATION WORK

Rehabilitation of construction of the Church of St. Roch started with the removal of cover and repair of the upper part of the vault. Edges were, together with longitudinal cornices, reinforced with carbon straps. The same method was used on the interior side of the west façade. Cavities in the wall of the west façade were injected with lime-based mixture, so that the thread concentrated on the outer layer would be evenly transferred throughout the wall. Severely damaged stone blocks were replaced with new ones and smaller damages were reconstructed with the mixture of artificial stone. The same method was used for the missing part of the cornice over the entrance. Damages and cracks of the main façade were repaired with carbon clasps and epoxy glue. Major part of stone blocks was reinforced with consolidants, further enhanced by surface vacuum molding. Old cement joints were replaced by new ones made of acrylic-lime mortar. Biological colonization was removed using chemical and mechanical methods and black incrustations were cleaned by laser. Future water absorption in the construction was prevented with installation of new roof cover of channel tiles, and with covering the critical areas of connection of walls and a roof and the upper part of the pediment with lead sheeting. Damaged and hardly recognizable Roman capital belonging to the corner pillar of the decumanus porch, for the most part hidden by the south wall of the church, was reconstructed after the well-preserved capital of the pillar situated in the neighbouring bank.

Interior was redecorated in accordance with conservation demands. Tombs found under the recent floor have been conserved and protected with a new stone pavement. Stone imposts and cornices on the walls have been reconstructed, wide arch openings in the south wall have been walled-up and old mortar was replaced with a new acrylic-lime mortar.



1. OBRAĐA KAMENOG BLOKA ZA UGRADNJU U FASADU CRKVE SV. ROKA; 2. FASADA CRKVE SV. ROKA NAKON KONZERVATORSKO-RESTAURATORSKOG ZAHVATA; 3, 4. TIJEKOM IZRade REKONSTRUKCIJE NA VJENCU PORTALA SV. ROKA; 5, 6. VJENAC PORTALA SV. ROKA PRIJE I NAKON KONZERVATORSKO-RESTAURATORSKOG ZAHVATA; 7. INJEKTIRANJE EPOXIDNE SMOLE I UMETANJE KARBONSKIH TRNOVA U VERTICALNO RASPUCALU STRUKTURU KAMENA U SRVHU UČVRŠĆIVANJA ISTOГ; 8. FASADA CRKVE SV. ROKA TIJEKOM KONSOLIDIRANJA POVRŠINE VAKUM METodom; 9. IZRADA REKONSTRUKCIJE NA FASADI CRKVE SV. ROKA; 10. JUŽNA STRANA CRKVE SV. ROKA NAKON KONZERVATORSKO-RESTAURATORSKOG ZAHVATA; 11, 12. RELIEF SV. ROKA NA FASADI CRKVE PRIJE I NAKON KONZERVATORSKO-RESTAURATORSKOG ZAHVATA

1. PROCESSING STONE BLOCK SO THAT IT FITS INTO THE FACADE OF THE CHURCH OF ST. ROCH; 2. THE FACADE OF THE CHURCH OF ST. ROCH AFTER CONSERVATION AND RESTORATION WORK; 3, 4. DURING THE RECONSTRUCTION OF THE CORNICE OF THE PORTAL OF ST. ROCH; 5, 6. WREATH OF THE PORTAL OF ST. ROCH BEFORE AND AFTER CONSERVATION-RESTORATION WORK; 7. INJECTING EPOXY RESIN AND CARBON CLAMPS IN VERTICALLY FRACTURED STONE IN ORDER TO STRENGTHEN IT; 8. THE FACADE OF THE CHURCH OF ST. ROCH DURING CONSOLIDATION OF STONE WITH VACUUM METHOD; 9. RECONSTRUCTION ON THE FACADE OF THE CHURCH OF ST. ROCH; 10. THE SOUTH SIDE OF THE CHURCH OF ST. ROCH AFTER CONSERVATION-RESTORATION WORK; 11, 12. RELIEF OF ST. ROCH ON THE FACADE OF THE CHURCH BEFORE AND AFTER THE CONSERVATION-RESTORATION WORK





## Rezultati konzervatorsko-restauratorskih zahvata

Na završetku složenog i opsežnog posla koji je, zajedno s pripremama, potrajan čitavo desetljeće, možemo sa zadovoljstvom utvrditi da su ciljevi koji su postavljeni na početku u potpunosti ispunjeni, te da je konačni rezultat čak i nadmašio očekivanja. Možemo ukratko nabrojati razloge zbog kojih projekt Peristil predstavlja jedan od najznačajnijih konzervatorsko-restauratorskih potvrdava u novije vrijeme u Hrvatskoj, a njegova je kvaliteta prepoznata i u međunarodnim stručnim krugovima.

Zbog važnosti Peristila u domeni antičke arheologije, povijesti umjetnosti i arhitekture, te s obzirom na složenost konzervatorsko-restauratorskih problema, u projekt su uključeni brojni domaći i strani stručnjaci i institucije. Multidisciplinarnost, koja je sve važnija oznaka suvremene konzervatorske i restauratorske prakse, ovdje se pokazala kao bitna odlika bez koje se ne bi mogli ostvariti zacrtani ciljevi, pri čemu su doprinosi stručnjaka iz raznih područja dali projektu i znanstvenu težinu.

Kombinacijom građevinskih i restauratorskih postupaka usporeni su uzravne procesi deformacija konstrukcija i propadanja kamena i drugih materijala. Uklanjanje tamnih naslaga nečistoće povratilo je čitkost arhitekture i dekorativnih elemenata. Spomeničke vrijednosti su unaprijedene spoznajom novih činjenica vezanih uz izvorni materijal i povijest izgradnje.

U tom kontekstu vrijedno je spomenuti dekorativne motive koji su tek nakon čišćenja kamena po prvi put u cijelosti prepoznati i dokumentirani. Pet reljefnih lica u jugoistočnom ugлу zabata Prothrona predstavljaju simbole Dioklecijanove vladavine: dva fantastična lika u obliku čovjeka-bika, mogući prikaz Jupitera Amona, te dva jako oštećena lika koja nije moguće identificirati, ali su zasigurno dio ikonografskog repertoara carske propagande. Lasersko čišćenje je omogućilo bolji vid u detalju i plastičnost reljefa, a na vidjelo su izšli i tragovi izvornog klesarskog alata. Desalinacija i konsolidacija su poboljšali karakteristike materijala i povećali otpornost na atmosferske utjecaje.

Osim unapređenja estetskih i spomeničkih vrijednosti, konzervatorsko-restauratorski zahvati su imali i širi urbanistički i socijalnu dimenziju. Projekt predstavlja značajan korak u redefiniranju vrijednosti stare gradske jezgre u cjelini i putokaz za revitalizaciju njezinih zapuštenih dijelova. Peristil je, vjerujemo, postao ugodnije mjesto boravka za građane i posjetitelje. Nije zanemariva ni edukativna komponenta: javnost je putem medija i dosadašnjih izložbi upoznata s problemima Peristila i stare gradske jezgre. O konzervatorsko-restauratorskim zahvatima na Peristilu struka je dala svoju ocjenu – Nagradu Vicko Andrić za izvanrednu postignuća u području zaštite kulturne baštine u Hrvatskoj. Manje formalno, ali jednakim vrijedno priznanje, dali su građani Splita koji su prihvatali obnovljeni Peristil, nastavljajući tradiciju okupljanja na trgu koji je oduvijek bio i ostao srce Palace i grada.

## Results of the Restoration Works

At the close of complex and extensive work which, together with preparations, lasted an entire decade, we can state with satisfaction that the objectives formulated at the outset have been entirely achieved, and that the final result has even surpassed expectations. We can now briefly list the reasons that make the Peristyle Project one of the most important conservation-restoration undertakings in Croatia in the recent past, with praise for its quality expressed by professionals at the international level as well.

Due to the Peristyle's importance in the fields of classical archaeology, art history and architecture, and given the complexity of the relevant conservation-restoration problems, numerous Croatian and foreign experts and institutions were involved in the project. The multidisciplinary approach, which is becoming an increasingly important feature of contemporary conservation and restoration practices, has been shown here as an essential component without which the set objectives could not have been accomplished. The contributions of experts from different fields gave the project additional scientific weight.

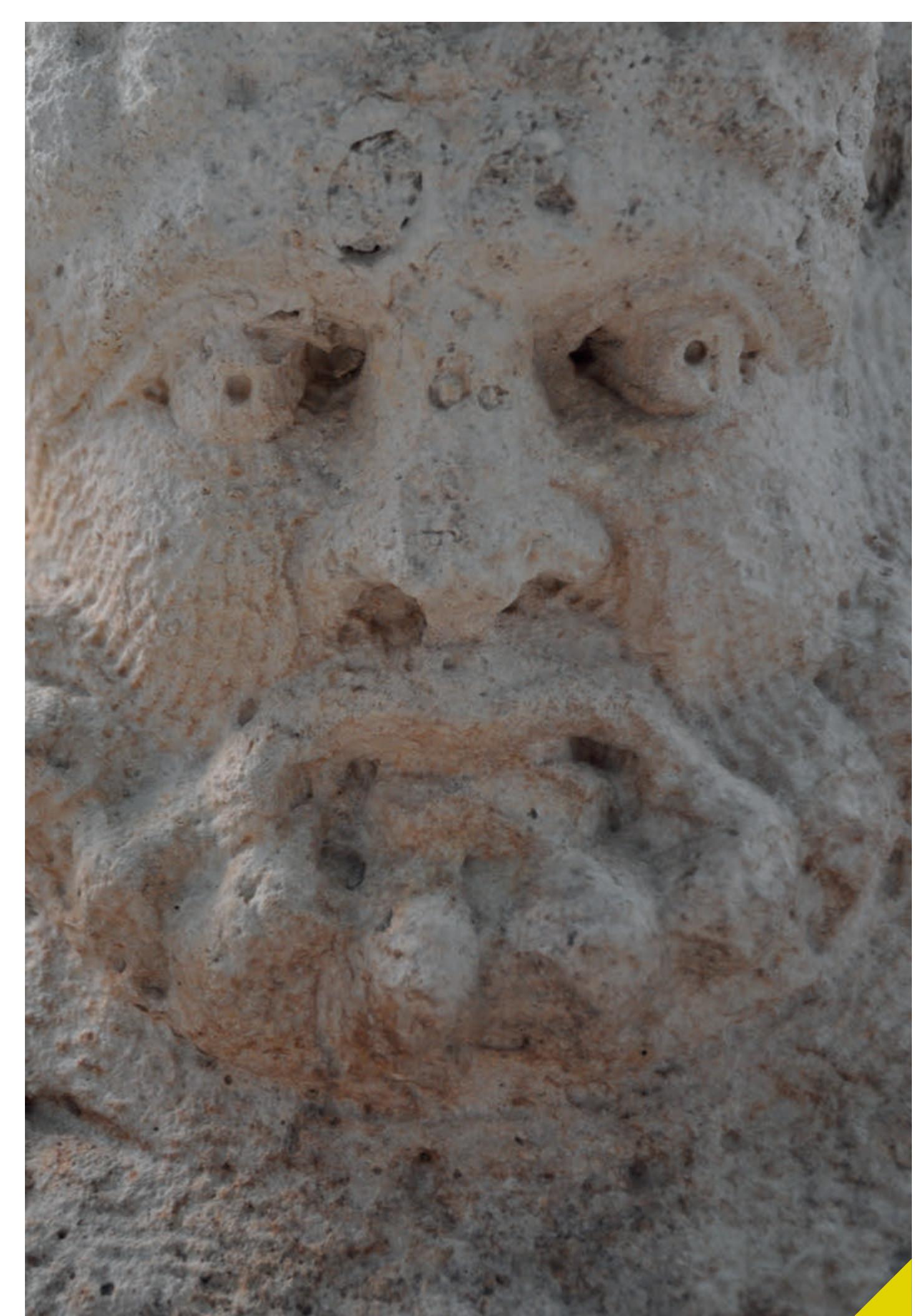
The advanced processes of deterioration of the structure and decomposition of stone and other materials have been slowed through a combination of construction and restoration procedures. The removal of dark layers of impurities has restored the cleanliness of the architecture and decorative elements. The value of the monument has also been increased by the discovery of new facts concerning the original materials and construction history. In this context, noteworthy are the decorative motifs which were fully recognized and documented only after cleaning. The five relief faces in the south-east corner of the Prothyron's pediment represent the symbols of Diocletian's reign: two fantastic characters in the form of man-bulls, a possible portrayal of Jupiter Ammon, and two much damaged images which cannot be identified, but which were certainly a component of the iconographic repertoire of imperial propaganda. Laser cleaning facilitated greater insight into the details and plasticity of the relief images, and even some traces of the original stone-carving tools became visible. Desalination and consolidation improved characteristics of the material and increased its resistance to weathering.

In addition to enhancing general aesthetic and monumental values, the conservation and restoration interventions also had a wider dimension relating to spatial planning and their social impact. This project constitutes a significant step in redefining the value of the old urban core as a whole and serves as a signpost for revitalization of its neglected sections. We believe the Peristyle has become a more pleasant place to be for both city residents and visitors. The educational component is not negligible either: the public has learned about the problems of the Peristyle and the old city core through the media and exhibitions.

The profession also made its own assessment of the conservation-restoration work at the Peristyle by awarding it the Vicko Andrić Prize for extraordinary achievements in the field of cultural heritage protection in Croatia. A less formal but no less valuable recognition was bestowed to it by the citizens of Split, who welcomed the restored Peristyle by continuing the tradition of gathering at the square which has always been the heart of the Palace and the entire city.

**1. PERISTIL, STANJE NAKON ZAVRŠENIH KONZERVATORSKO-RESTAURATORSKIH ZAHVATA; 2. ORNAMENTIRANI VIJENCI NA ZABATU PROTHYRONA; 3, 4. DVJE GLAVE SA ZABATA, STANJE PRIJE I NAKON ZAHVATA; 5, 6. KONZOLE SA PRIKAZOM TRAGIČNIH MASKI; 7, 8. PRIKAZ LJUDSKOG LIKA S BRADOM, STANJE PRIJE I POSLJE**

**1. PERISTILE, CONDITION AFTER CONSERVATION-RESTORATION INTERVENTIONS; 2. ORNAMENTED CORNICES OF THE PROTHYRON GABLE; 3, 4. TWO HEADS ON THE GABLE, CONDITION BEFORE AND AFTER THE INTERVENTION; 5, 6. BRACKETS WITH TRAGIC MASKS; 7, 8. HUMAN FACE WITH BEARD, BEFORE AND AFTER CONDITION**



# PERISTIL

# PERISTYLE

## 2003-2013

IZLOŽBA O KONZERVATORSKO-  
RESTAURATORSKIM RADOVIMA NA PERISTILU  
EXHIBITION OF CONSERVATION-  
RESTORATION WORKS AT THE PERISTYLE

INVESTITORI | CLIENTS  
Grad Split  
City of Split  
Ministarstvo kulture Republike Hrvatske  
Ministry of culture, Republic of Croatia  
world monuments fund

UZ POTPORU | WITH THE SUPPORT OF:  
Antiqua foundation  
American express foundation

IZVODAČ RADOVA | CONTRACTOR  
Hrvatski restauratorski zavod  
Croatian conservation institute  
Mario Braun, prof. ravnatelj | director

ZA GRAD SPLIT | ON BEHALF OF THE CITY OF SPLIT:  
Zvonimir Pušić, gradonačelnik | mayor (2005-2007)  
Ivan Kuret, gradonačelnik | mayor (2007-2009)  
Željko Kerum, gradonačelnik | mayor (2009-2013)  
Andelka Visković, zamjenica gradonačelnika | deputy mayor  
Ljiljana Vučetić, pročelnica službe za planiranje i izvršenje proračuna | head of the office for budget planning and realization

I | AND  
Grad Split, Odsjek za staru gradsku jezgru | City of Split, Service for the old city core  
Duško Marasović, dipl. ing. arh., pročelnik Odsjeka do 2005. | head of the Service until 2005  
dr. sc. Goran Nikšić, pročelnik Odsjeka do 2006. | head of the Service since 2006

ZA MINISTARSTVO KULTURE REPUBLIKE HRVATSKE  
ON BEHALF OF THE MINISTRY OF CULTURE OF THE REPUBLIC OF CROATIA:  
dr. sc. Antun Vujić, ministar | minister (do/until 2003)  
mr. sc. Božo Biškupić, ministar | minister (2003-2010)  
mr. Jasen Mesić, ministar | minister (2010-2011)  
prof. dr. sc. Andrea Zlatar Violić, ministrica | minister (od/since 2011)

KONZERVATORSKI NADZOR | CONSERVATION SURVEILLANCE  
Ministarstvo kulture Hrvatske | Ministry of culture of the Republic of Croatia  
Miljenko Domijan, prof. glavni konzervator | chief conservator  
Konzervatorski odjel u Splitu | Conservation department split  
dr. sc. Josko Belamarčić, pročelnik Odjela do 2009. | head of Department until 2009  
mr. sc. Tajna Rizmondo, pročelnica Odjela | head of Department (2009-2011)  
dr. sc. Radoslav Bužančić, pročelnik Odjela od 2011. | head of Department since 2011  
dr. sc. Goran Nikšić, konzervatorski nadzor | conservation surveillance (2002-2006)  
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mr. sc. Dubravka Čerina, arheološki nadzor | archaeological surveillance (2009-2010)  
dr. sc. Vanja Kovačić, konzervatorski nadzor | conservation surveillance (2009-2012)  
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GRADEVINSKI NADZOR | SUPERVISING ENGINEER  
KIB d.o.o. SPLIT  
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ANGAŽIRANIM ZA REALIZACIJU PROJEKTA  
DATA CONCERNING ESTABLISHMENTS AND EXPERTS  
ENGAGED FOR THE ACCOMPLISHMENT OF THE PROJECT

DJELATNICI HRVATSKOGA RESTAURATORSKOG ZAVODA  
ZADUŽENI ZA KOORDINACIJU I VODITELJI ORGANIZACIONIH JEDINICA ZAVODA  
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Mario Braun, prof. ravnatelj | director (od kolovoza/since August 2012)  
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Academician, external adviser of the Croatian Conservation Institute

KONZERVATORSKA ISTRAŽIVANJA  
CONSERVATION INVESTIGATIONS

ARHITEKTONSKA DOKUMENTACIJA I GRAFIČKA OBRAĐA NACRTA  
ARCHITECTURAL AND GRAPHIC DOCUMENTATION (2003-2004)

Odjel za graditeljsku baštinu | Department for Architectural Heritage:  
Ivana Gobec, dipl. ing. arh. | architect  
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Marja Valjato Fabrić, dipl. ing. arh. | architect  
Ana Škevin Mikulandra, dipl. ing. arh. | architect  
Mladen Popović, arh. tehn. | architectural technician

POVIJESNI PREGLED I IZRADA ELABORATA KONZERVATORSKIH ISTRAŽIVANJA  
HISTORIC OVERVIEW AND CONSERVATION RESEARCH REPORT (2003-2004)

Petar Puhmajar, dipl. pov. umj. | art historian

PRIRODOSLOVNA ISTRAŽIVANJA  
SCIENTIFIC RESEARCH

PRIRODOSLOVNI LABORATORIJ | NATURAL SCIENCE LABORATORY:

dr. sc. Domagoj Mudronja, voditelj | head  
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Marija Bošnjak, dipl. ing. kemije | chemical engineer  
Mirjana Jelinčić, dipl. ing. kemiske tehnologije | chemical technology engineer  
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geologist, Institute's external associate

KONZERVATORSKO-RESTAURATORSKI RADOVI  
CONSERVATION-RESTORATION WORKS

Hrvatski restauratorski zavod – restauratorski odjel u Splitu

ODSEK ZA KAMENU PLASTIKU  
CROATIAN CONSERVATION INSTITUTE – SPLIT DEPARTMENT FOR CONSERVATION –  
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Marija Baraćić, voditelj Odsjeka za kamenu plastiku | head of the Section for Stone  
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Ivana Hodak, dipl. konzervator-restaurator | conservator-restorer (2006-2007)  
Veljko Karić, suradnik restauratora tehničara | assistant restorer (2010-2013)  
Maja Kiršić, dipl. konzervator-restaurator | conservator-restorer (2005-2006)  
Nenad Lešina, akad. kipar | academy trained sculptor (2004-2013)  
Ivka Lipanović, dipl. konzervator-restaurator | conservator-restorer (2008-2013)  
Nikola Luša, dipl. konzervator-restaurator | conservator-restorer (2003-2006)  
Vinka Marinković, dipl. konzervator-restaurator | conservator-restorer (2006-2013)  
Mladen Matijaca, dipl. restaurator-konzervator | conservator-restorer (2006-2013)  
Duje Orduli, dipl. konzervator-restaurator | conservator-restorer (2010-2013)  
Frane Orebić, klesarski tehničar | stone carving technician (2007-2013)  
Ante Ostojia, klesarski tehničar | stone carving technician (2010-2013)  
Iva Paduan, bacc. ing. sig. | bacc. ing. sec. (2008-2013)  
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Tihana Pleština, prof. lik. kulture – restaurator | visual culture graduate-restorer (2005-2012)  
Franje Prižmić, klesarski tehničar | stone carving technician (2008-2013)  
Željka Radić, dipl. konzervator-restaurator | conservator-restorer (2008-2013)  
Sagita Mirjam Sunara, dipl. konzervator-restaurator | conservator-restorer (2005-2011)  
Marina Škarlić, prof. lik. kulture | art teacher (2006-2007)

ODSEK ZA ZIDNO SLIKARSTVO I MOZAIKE | SECTION FOR WALL PAINTINGS AND MOSAICS:  
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ZA PROVEDBU PROJEKTA PORED NAVEDENIH STRUČNIH SLUŽBI HRVATSKOG  
RESTAURATORSKOG ZAVODA ZASLUŽNE SU I ZAVODSKE POPRATNE SLUŽBE  
KOJE SU ODRADILE FINANCIJSKE, ADMINISTRATIVNE I PRAVNE POSLOVE TE  
PROVELE POSTUPKE JAVNE NABAVE.

BESIDES THE ABOVE-MENTIONED CROATIAN CONSERVATION INSTITUTE'S  
PROFESSIONAL SERVICES THE PROJECT HAS BEEN REALIZED THANKS TO THE  
WORK OF THE INSTITUTE'S SUPPORTING SERVICES PERFORMING FINANCIAL,  
ADMINISTRATIVE AND LEGAL AFFAIRS AND PUBLIC PROCUREMENT PROCEDURES.

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IZRADA KONZERVATORSKOG ELABORATA I ARHITEKTONSKOG PROJEKTA |  
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PROJEKT STATIČKE SANACIJE | STRUCTURAL REINFORCEMENT PROJECT:  
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Topomatika d.o.o. Zagreb

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Faculty of Civil Engineering Zagreb, Department for Engineering Mechanics

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COOPERATION DURING THE CONSERVATION-RESTORATION WORKS:  
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Neir d.o.o. Split

U okviru suradnje s Odsjekom za konzervaciju-restauraciju Umjetničke akademije u Splitu  
studentima specijalističkih usmjerenja Konzervacija-restauracija kamena i Konzervacija-  
restauracija zidnih slika i mozaika bilo je omogućeno obavljanje studentske prakse.  
As part of the cooperation between the Croatian Conservation Institute and the Art  
Academy of Split the students specializing for conservation-restoration of stone and wall  
paintings and mosaics have been given a chance to perform their student practice at the site.

GRADEVINSKO-ZANATSKI RADOVI | CONSTRUCTION WORKS:  
Spegra d.o.o., Split  
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Neir d.o.o. Split  
Palir d.o.o. Solin  
Feromontaža d.o.o. Split  
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Pisa trade d.o.o. Split  
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PRIRODOSLOVNA ISTRAŽIVANJA 2002. | SCIENTIFIC RESEARCH 2002:  
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FOTOTEKA MINISTARSTVA KULTURE – KONZERVATORSKOG ODJELA U SPLITU  
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dr. sc. Goran Nikšić

 HRVATSKI  
RESTAURATORSKI  
ZAVOD  
 GRAD SPLIT

U konzervatorsko-restauratorskim radovima i istraživanjima i pratećim aktivnostima  
sudjelovalo je velik broj ustanova i stručnjaka koje smo nastojali navesti.  
Isprćavamo se ako smo pri tome nekoga izostavili!  
A great number of institutions and experts took part in the conservation-restoration works  
and research and connected activities and we tried to mention all of them. However, we  
would like to apologize if we have omitted anyone!



## Zahvati na Protironu

Početkom 2010. godine projekt Peristila Dioklecijanove palače u Splitu ušao je u petu fazu, kojom je obnovljen Protiron, njegov središnji i naj-monumentalniji dio. Obnovom su zahvaćene i sve interpolacije: istočna renesansna kapelica Gospe od Bezgrešnog začeća (Sv. Karlo), njoj simetrična, nešto kasnija zapadna kapelica Gospe od Zdravlja (Gospa od Pojasa) te barokni portal između njih. Također, kao integralni dio antičkog Protirona obnovljeno je i sjeverno pročelje Vestibula i njegov portal, uključujući i njegovu južnu stranu prema unutrašnjosti Vestibula, čime je nagovješten skorji pocetak obnove tog ulaznog prostora u nekadašnje carske odaje.

### KONZERVATORSKA ISTRAŽIVANJA PROTIRONA I KAPELICA

Kao priprema za projekt sanacije Protirona, izrađen je konzervatorski elaborat koji je obuhvatio i sjeverno pročelje Vestibula. U sklopu izrade elaborata izvršena su konzervatorska istraživanja.

U unutrašnjosti istočne kapelice uklonjena je žbuka, što je omogućilo razumijevanje njezinih razvojnih faza. Kapelica je nadsvodena križnim svodom koji je izgrađen u naizmjenično postavljenim redovima sedre i opeke. Renesansni trijumfalni luk apside naknadno je povišen, pa su bočne, renesansno profilirane stranice dobile rustično izvedene umetke. Nakon čišćenja poda otkriveni su dijelovi izvornog kamenog popločenja antičkog Protirona uz zapadni i istočni zid, kao i pod sjevernim pročeljem kapelice, što znači da se ovaj zid oslonio izravno na antički pločnik. U istočnoj niši kapelice, kao i u stubišnom prostoru uz apsidu, pronađeni su ostaci utrobe antičkog zida Protirona i detalji koji su unaprijedili spoznaju o njegovom izvornom izgledu.

I na drugim dijelovima Protirona pronađeni su tragovi izvornog stanja. Prema smjernicama iz konzervatorskog elaborata obnovljen je teško oštećeni veliki rastereti luk nad glavnim portalom Vestibula kao i luk rimskog prozora istočne cilindrične prostorije.

## Treatment of the Prothyron

In early 2010 the project of Peristyle of Diocletian's Palace has reached its fifth phase - the rehabilitation of Prothyron, its central and most monumental section. Rehabilitation has included all of its interpolations: east Renaissance chapel of Our Lady of the Immaculate Conception (St. Charles) and its symmetrical pair, somewhat younger west chapel of Our Lady of Good Health (Our Lady of the Girdle) and the Baroque portal in between. As an integral part of the ancient Prothyron, north front of the Vestibule and its portal were also renovated, as well as its south side facing the interior. This has announced the start of the reconstruction of the entrance to the former imperial chambers.

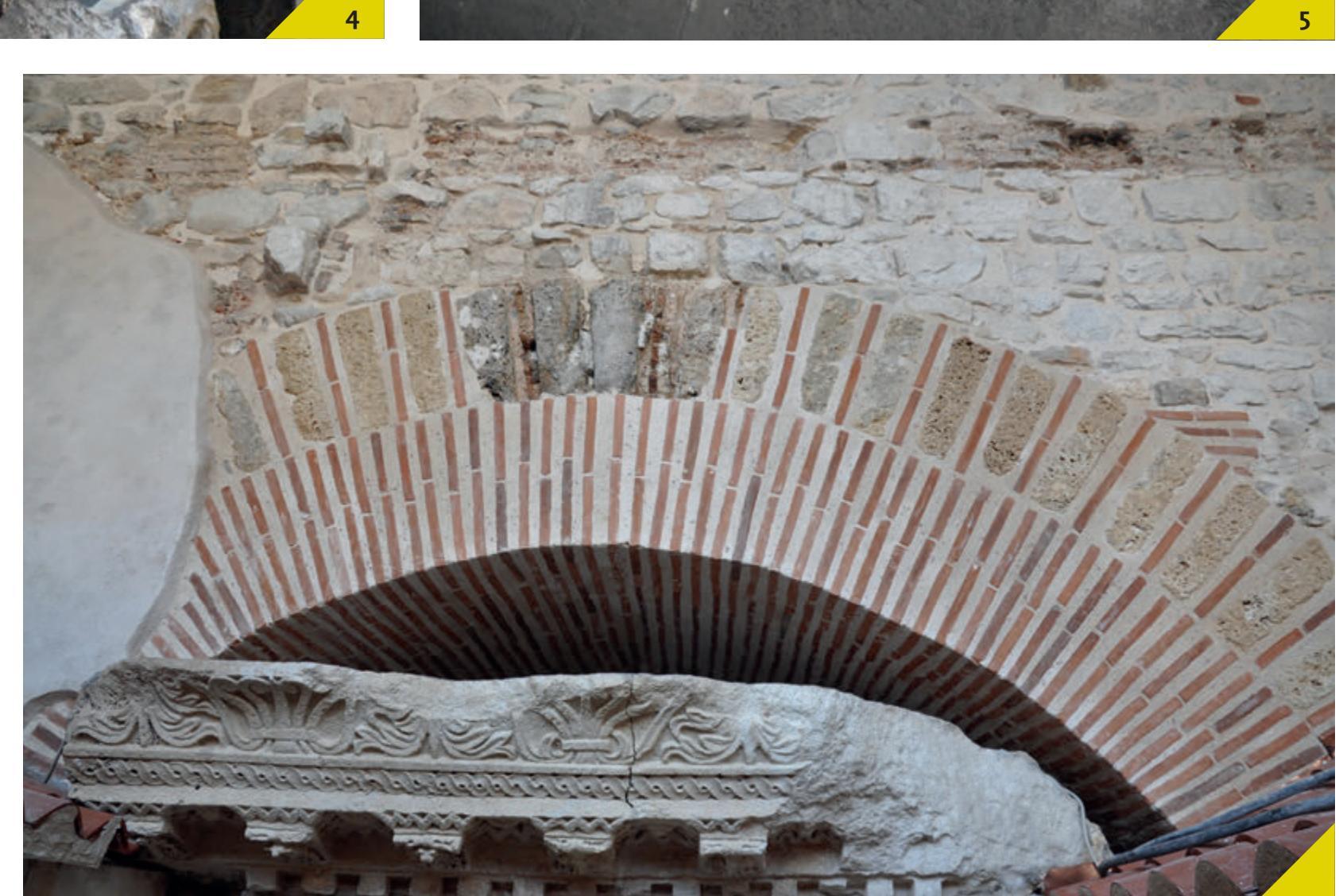
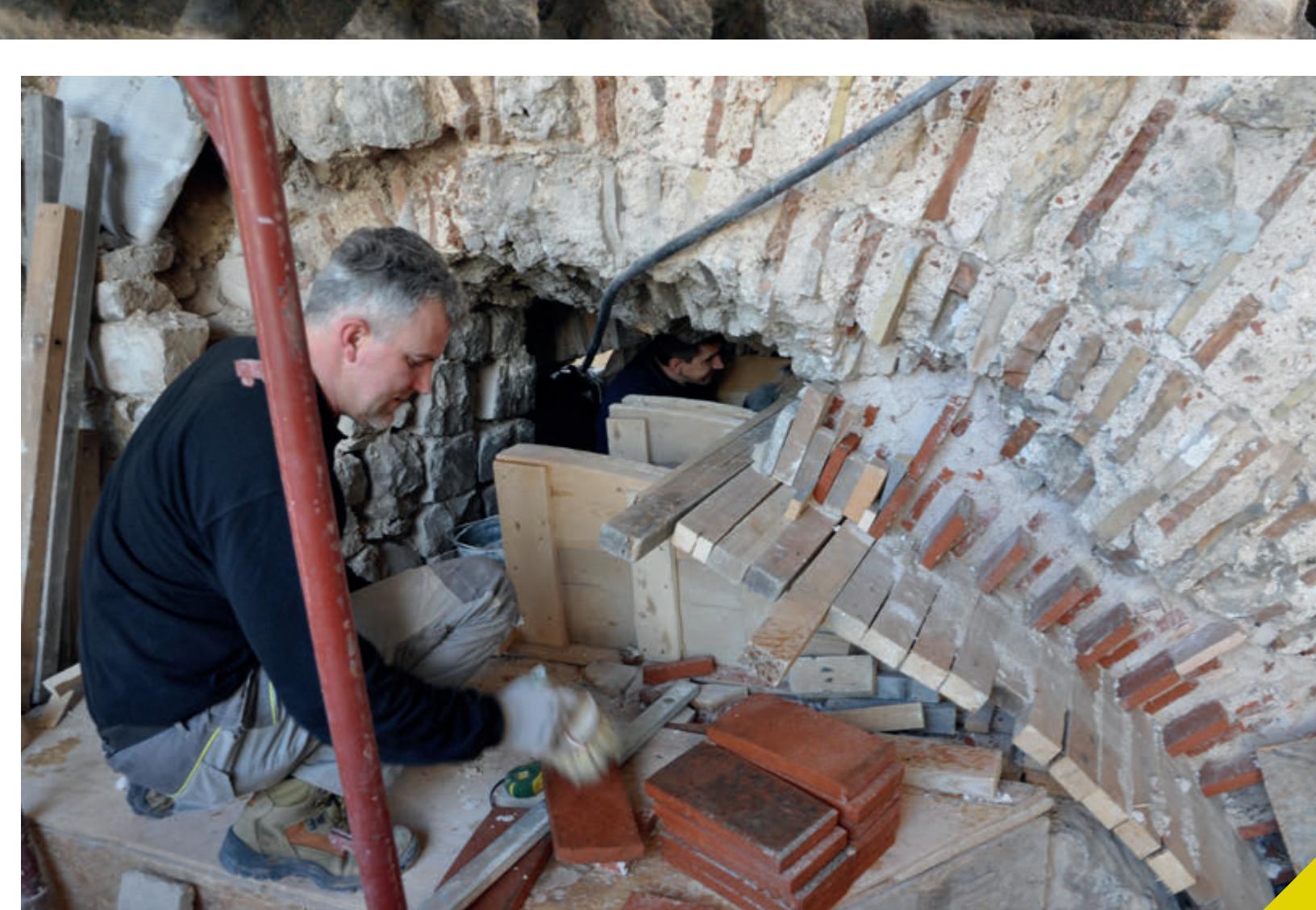
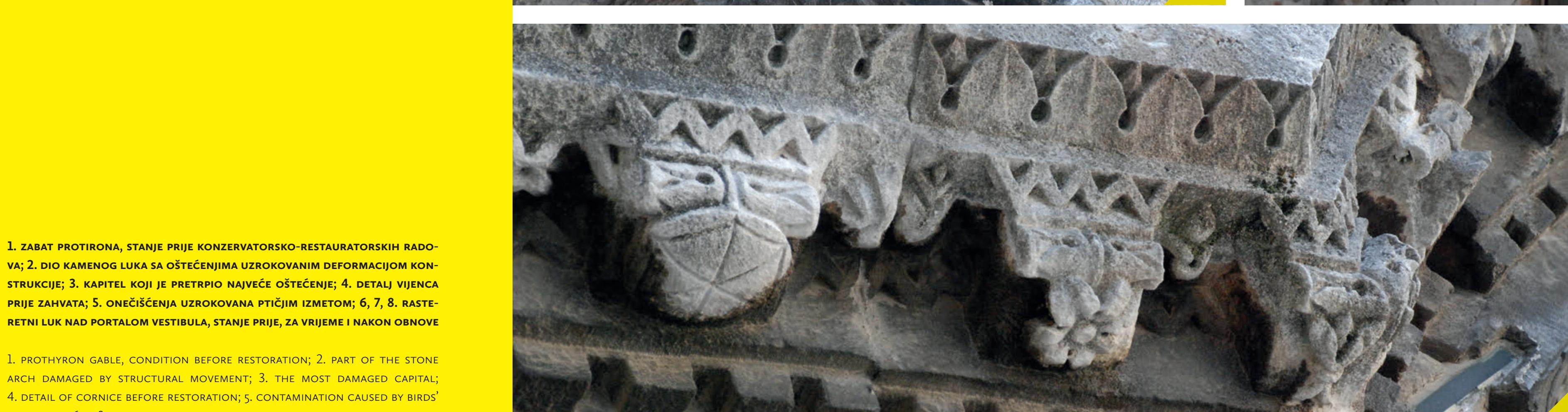
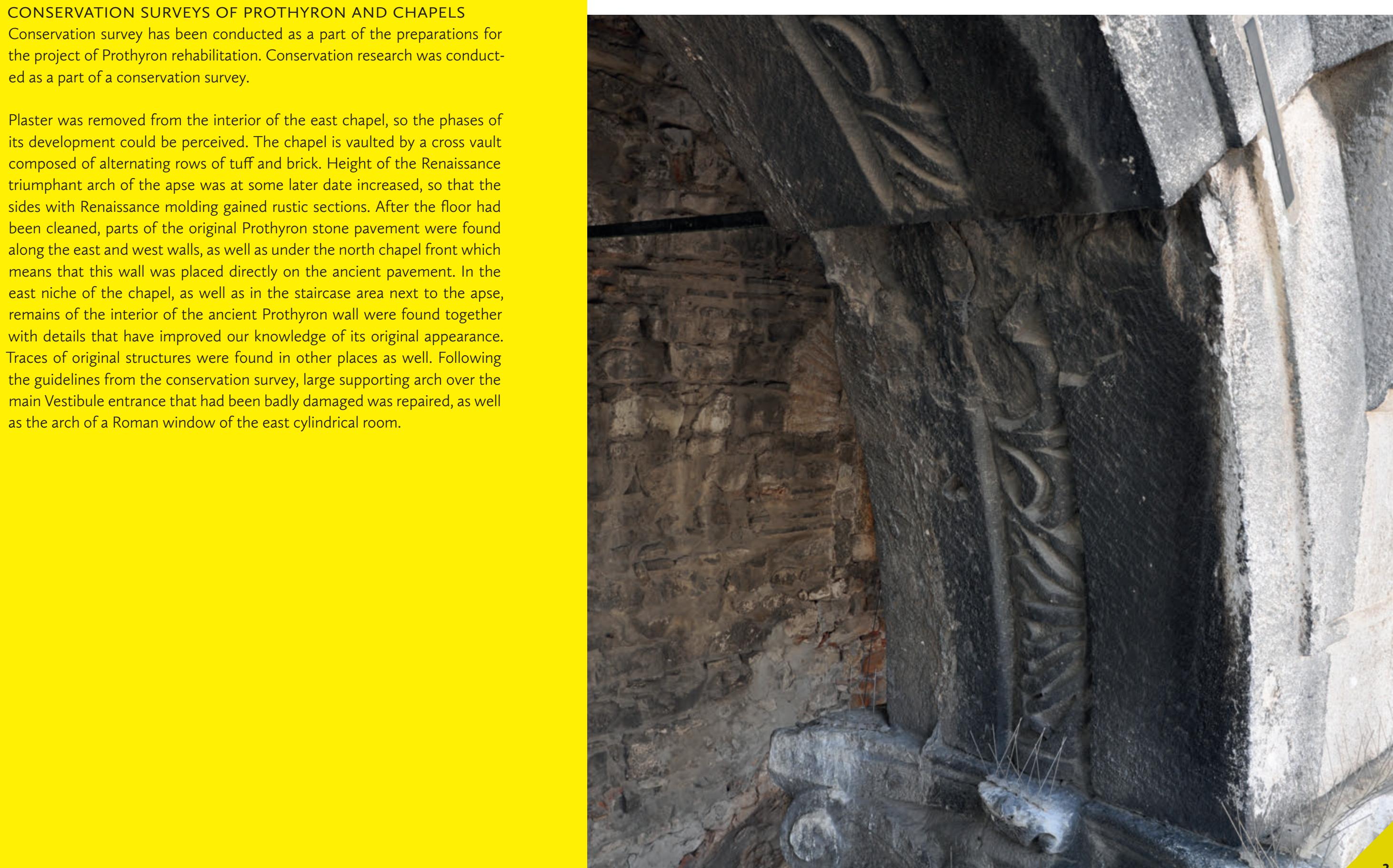
### CONSERVATION SURVEYS OF PROTHYRON AND CHAPELS

Conservation survey has been conducted as a part of the preparations for the project of Prothyron rehabilitation. Conservation research was conducted as a part of a conservation survey.

Plaster was removed from the interior of the east chapel, so the phases of its development could be perceived. The chapel is vaulted by a cross vault composed of alternating rows of tuff and brick. Height of the Renaissance triumphant arch of the apse was at some later date increased, so that the sides with Renaissance molding gained rustic sections. After the floor had been cleaned, parts of the original Prothyron stone pavement were found along the east and west walls, as well as under the north chapel front which means that this wall was placed directly on the ancient pavement. In the east niche of the chapel, as well as in the staircase area next to the apse, remains of the interior of the ancient Prothyron wall were found together with details that have improved our knowledge of its original appearance. Traces of original structures were found in other places as well. Following the guidelines from the conservation survey, large supporting arch over the main Vestibule entrance that had been badly damaged was repaired, as well as the arch of a Roman window of the east cylindrical room.

1. ZABAT PROTIRONA, STANJE PRIJE KONZERVATORSKO-RESTAURATORSKIH RADOVA; 2. DIO KAMENOG LUKA SA OŠTEĆENJIMA UZROKOVANIM DEFORMACIJOM KONSTRUKCIJE; 3. KAPITEL KOJI JE PRETRPIO NAJVĒCE OŠTEĆENJE; 4. DETALJ VJENCA PRIJE ZAHVATA; 5. ONEĆIŠĆENJA UZROKOVANA PTIČIJIM IZMETOM; 6, 7, 8. RASTRETNI LUK NAD PORTALOM VESTIBULA, STANJE PRIJE, ZA VRIJEME I NAKON OBNOVE

1. PROTHYRON GABLE, CONDITION BEFORE RESTORATION; 2. PART OF THE STONE ARCH DAMAGED BY STRUCTURAL MOVEMENT; 3. THE MOST DAMAGED CAPITAL; 4. DETAIL OF CORNICE BEFORE RESTORATION; 5. CONTAMINATION CAUSED BY BIRDS' DROPPINGS; 6, 7, 8. RELIEVING ARCH ABOVE THE VESTIBULE PORTAL, CONDITION BEFORE, DURING AND AFTER RESTORATION



## Zahvati na Protironu

### ZATEĆENO STANJE

Deformacije konstrukcije uvjetovalo su naginjanje stupova Protirona u stranu i prema naprijed, te prouzročili teška strukturalna oštećenja (rukotine) na tri od četiri korintska kapitela, na arhitravu portala Vestibula i rasteretnom luku iznad njega. Oštećenja na vanjskoj strani Protirona su pojačana kristalizacijom štetnih topljivih soli, djelovanjem atmosferilija i biološke kolonizacije. Crne skrme su se formirale na svim uvućenim dijelovima, a izrazito su bile debole na unutrašnjem dijelu središnjeg luka, arhitrav i u kapitelu. Naslage su zatećene i na sjevernom pročelju Vestibula, te na kamenoj plasti portalu. Unutrašnja strana zabata Protirona nije bila pokrivena crnim inkrustacijama, međutim kamen je tamo bio drastično onečišćen ptičjim izmetom. Slojevi cementa su zatećeni na velikim površinama: gornjoj plohi vijenca i bazama stupova. Cementom su bile sanirane fuge sjevernog zida Vestibula i oštećenja na njegovim lukovima.

Pročelja renesansnih kapelica su zatećena u nešto boljem stanju: bila su samo djelomično prekrivena crnim skramama. Nekoliko blokova iznad nadvratnika istočne kapelice je vertikalno napuklo, dok zapadna kapelica gotovo nema strukturalnih oštećenja. Vjenac iznad nadvratnika istočne kapelice, izvorno izrađen od dva kamena bloka, u potpunosti je oštećen, a oštećenje je bilo zapunjeno cementom.

### KONSTRUKTIVNA SANACIJA PROTIRONA

Da bi se zaustavila ili barem znatno usporila daljnja deformacija konstrukcije Protirona, izvedeni su neinvazivni zahvati koji su velikim dijelom povratili stabilnost. Nakon što je analiza računalnog modela konstrukcije pokazala da je neophodno povezati zabit Protirona sa čvrstom masom Vestibula, odlučeno je da se krov Protirona koji je bez pravog opravljanja (isključivo s namjerom djelomične i upitne rekonstrukcije izvornog stanja) postavljen sredinom dvadesetog stoljeća, zamjeni novim, ali ovoga puta da se on iskoristi za ukrućivanje cijekoplogn konstruktivnog sustava. Trostruka daščana oplata spregnuti je s drvenim krovnim gredama koje su usidrene s jedne strane u kamenu strukturu zabata, a s druge u masivni sjeverni zid Vestibula. Stare metalne zatege koje su dotrajale i nisu više aktivno povezivale zid zabata na dvije razine zamijenjene su novima. Bakrene kopče, kojima su početkom dvadesetog stoljeća međusobno povezani kameni blokovi zabata na njegovom vanjskom i unutrašnjem licu, kako bi se zaustavili otvaranje sljubnica nisu uklonjene jer su ispitivanja pokazala da su još uvijek pod naponom. Injektirane su sve sljubnice zabata, a osobito pažljivo i one na spoju kapitela sa stupovima i arhitravima, kako bi se rasteretili rubovi kamenih blokova na kojima zbog pomicanja konstrukcije dolazi do koncentracije naponi i omiljenja kamenja. Injektirani su i ostali zidovi Protirona, odnosno Vestibula.

## Treatment of the Prothyron

### AS-FOUND CONDITION

Deformations of construction have caused Prothyron columns to tilt sideways and towards front, and created severe structural damages (cracks) on three out of four Corinthian capitals, on the lintel of the Vestibule entrance and on the supporting arch above it. Damages on the outer side of the Prothyron have been increased by crystallization of harmful soluble salts, by weathering and biological colonization. Black crusts were formed in all indented areas and were exceptionally thick on the inside of a central arch, lintels and capitals. They were found on the north front of the Vestibule and on stone decoration of the portal. The inner side of the Prothyron pediment was not covered in black crust, but stones were extremely soiled with bird droppings. Layers of cement were found on large surfaces; upper surface of the cornice and column bases. Joints of the north Vestibule wall and damages on its arch were treated with cement.

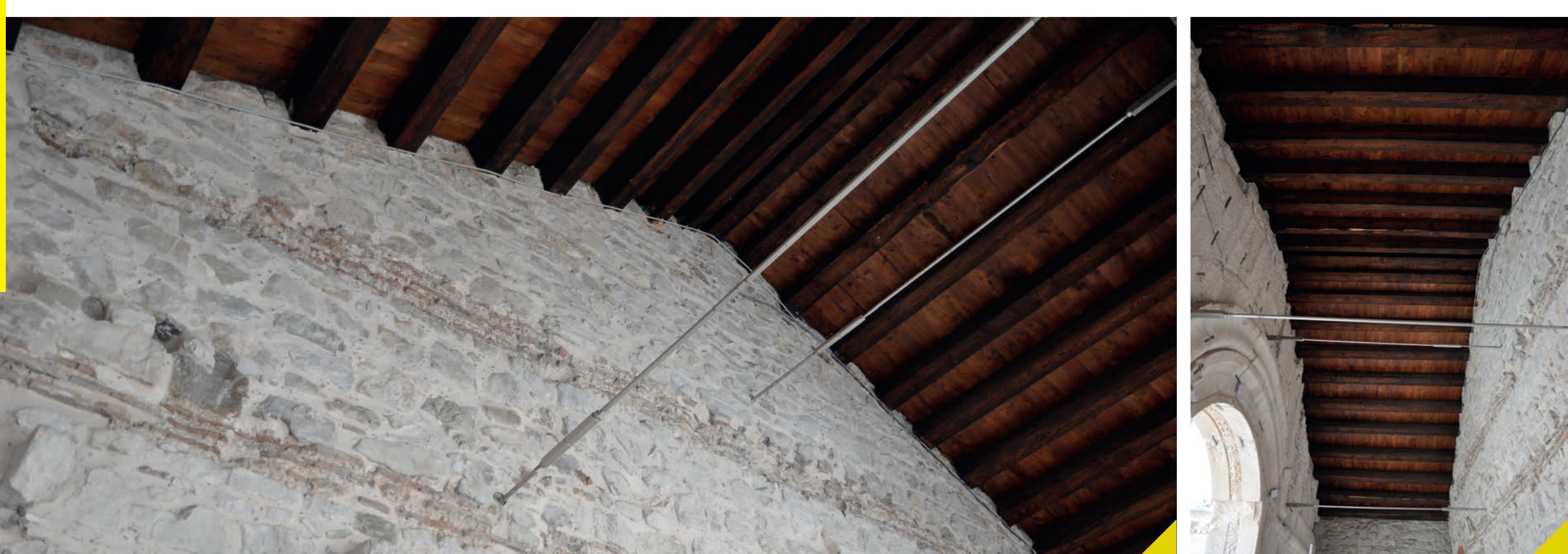
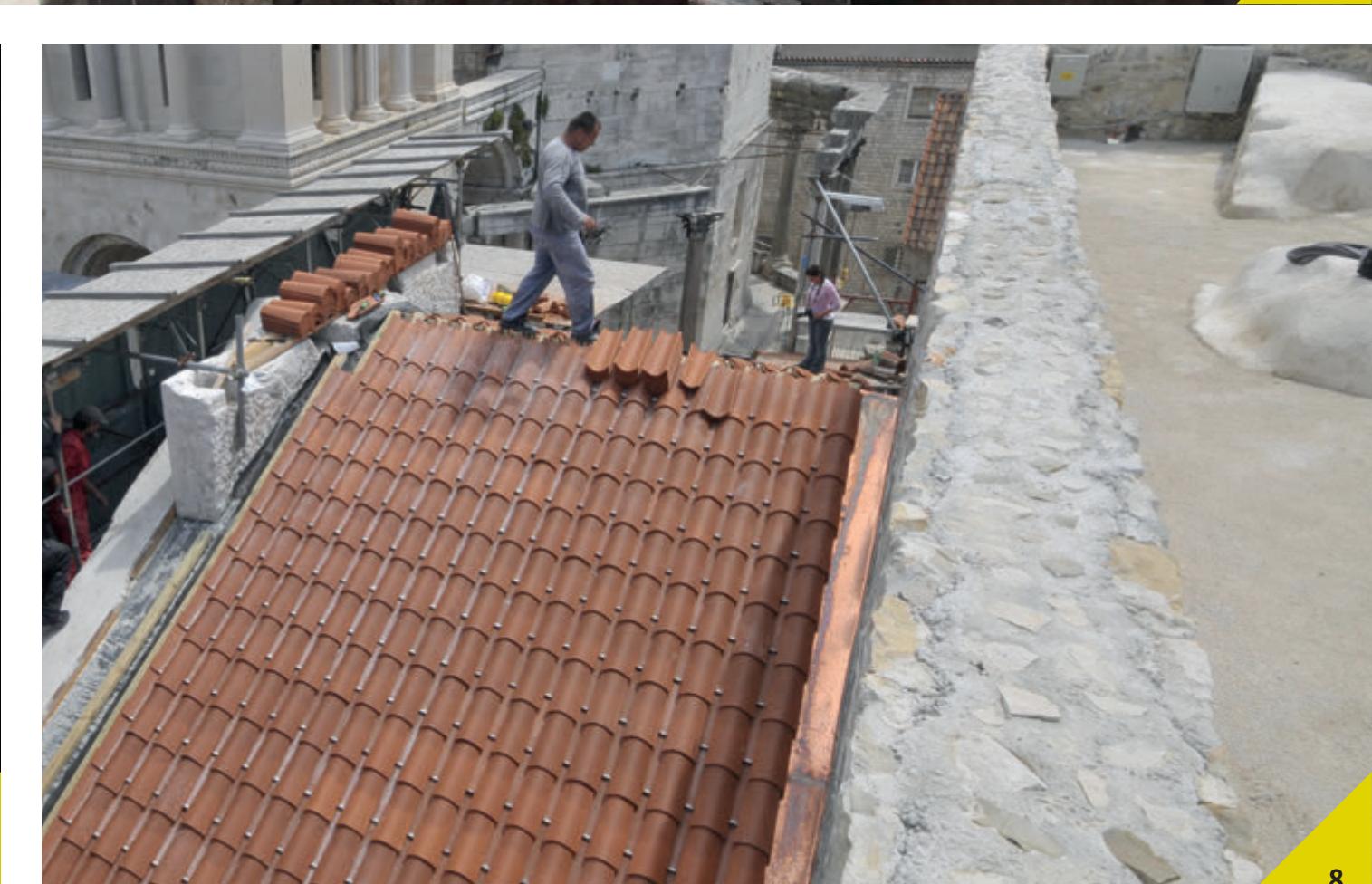
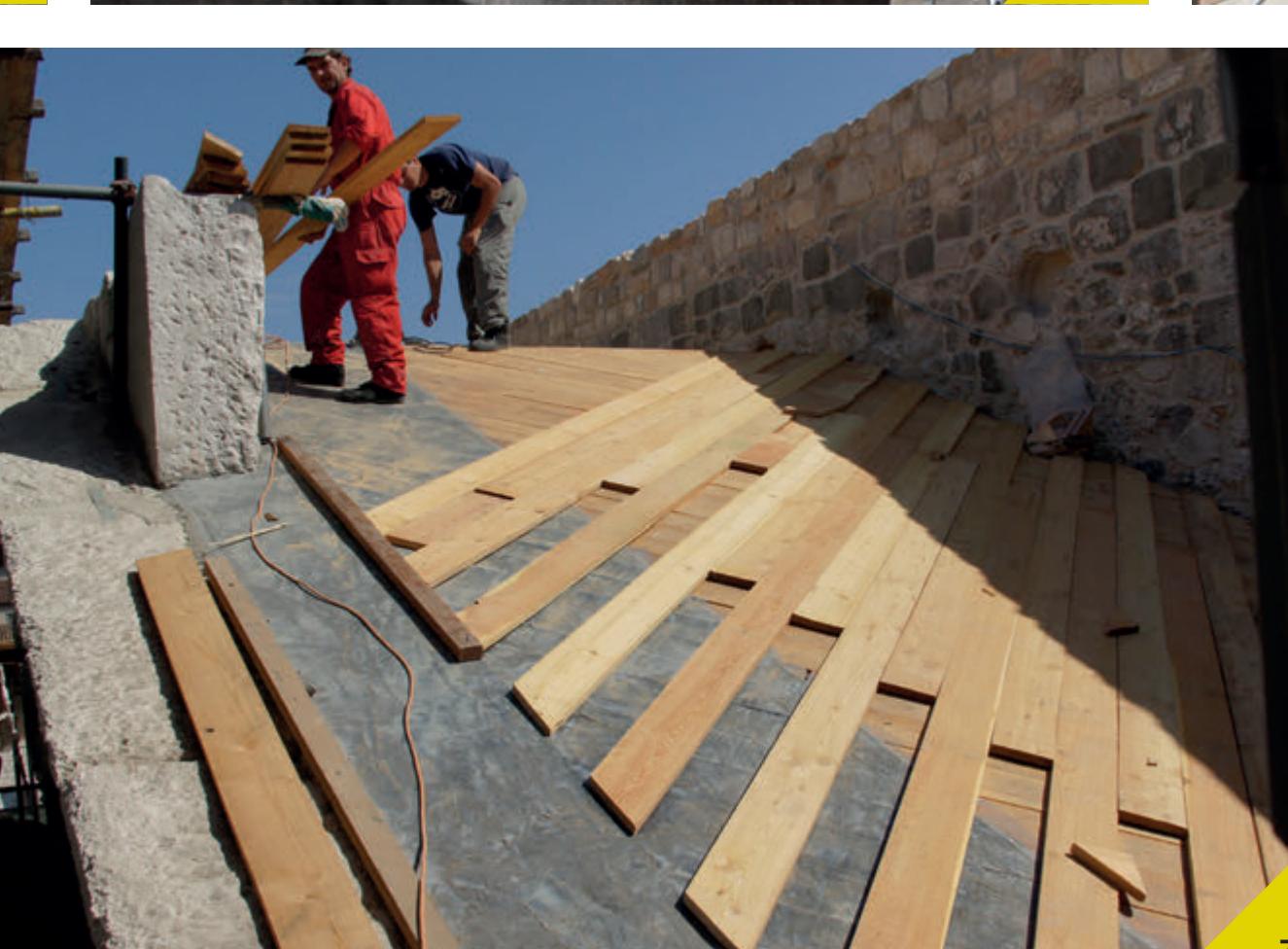
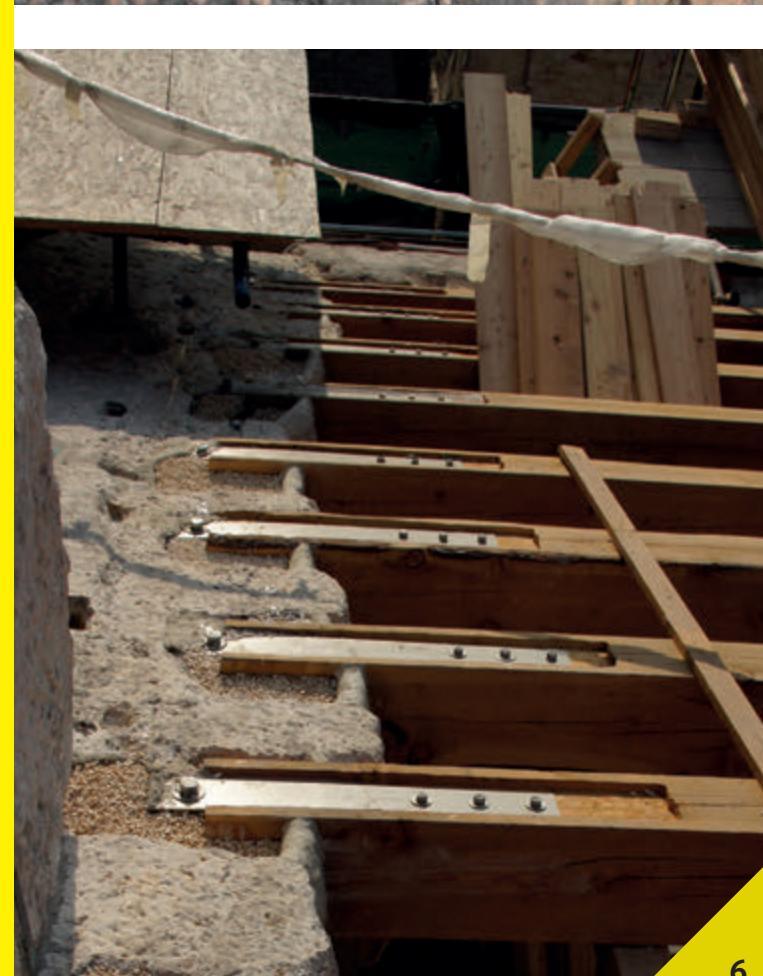
Facades of the chapels were found in somewhat better condition: they were only partially covered in black crusts. Several blocks over the lintel of the east chapel had vertical cracks, while the west chapel structure was nearly intact. Cornice over the lintel of the west chapel, originally composed of two stone blocks, has been damaged completely and damage was filled with cement.

### CONSTRUCTION REHABILITATION OF PROTHYRON

To stop or at least slow down further deformation of Prothyron construction, non-invasive interventions were conducted that have greatly reclaimed stability. After the computer model analysis had shown that it was inevitable to connect the pediment to the firm body of the Vestibule, it was decided to replace the roof of the Prothyron that has unjustifiably (exclusively with the attention of partial and questionable reconstruction of the original state) been installed in mid-20th century with a new one, but this time to use it to consolidate the whole system of construction. Threefold wooden revetment was strongly bound to wooden roof beams that were anchored to the stone pediment structure on one side, and to the massive north wall of the Vestibule on the other. Old metal anchors were no longer actively connecting the pediment wall on two levels, and were replaced with new ones. Copper clasps that were used in the early 20th century to connect stone blocks of the pediment on its inner and outer side to prevent joints from opening up were not removed, because the surveys have shown that they were still active. All the joints on the pediment were injected, especially the ones connecting the capitals to the columns and lintels, so that the edges of stone blocks could be relieved of thrust that is concentrated in those areas due to the shifts in construction. All remaining walls of Prothyron and Vestibule were also injected. A large supporting arch built of brick and tuff placed over the portal leading from Prothyron to Vestibule was heavily damaged and was, maybe as early as during the Middle Ages, supported with stone blocks in mortar. That is how the weight of the wall above the arch was transferred to the stone lintel over the portal that has broken. For this reason it was necessary to reconstruct the supporting arch. Bricks of original Roman shape and blocks of tuff were used.

1. LUK NA PROTHYRONU PRIJE OBNOVE; 2. PUCANJE KAMENA UZROKOVANO DEFORMACIJOM KONSTRUKCIJE; 3. BAKRENE KOPČE KOJE POVEZUJU KAMENE ELEMENTE PROTIRONA; 4. KAPITEL PREKRIVEN CRNOM SKRAMOM I PTIČJIM IZMETOM; 5. STRAŽNJA STRANA ZABATA SA STARIM BAKRENIM ZATEGAMA; 6. SISTEM UKRUĆIVANJA KONSTRUKCIJE PREKO KROVNIH GREDA; 7, 8. RADOV NI NA KROVNOJ KONSTRUKCIJI; 9. DETALJ NOVIH ZATEGA UNUTRŠNJOSTI PROTIRONA; 10. ZID VESTIBULA U KOJI JE SIDRENO PROČEЉUJE PROTIRONA; 11. NOVE ZATEGE I NOVI KROV

1. PROTHYRON ARCH BEFORE RESTORATION; 2. STONE CRACKS CAUSED BY STRUCTURAL MOVEMENT; 3. COPPER CLAMPS HOLDING STONE ELEMENTS OF THE PROTHYRON TOGETHER; 4. A CAPITAL COVERED WITH BLACK CRUSTS AND BIRD'S DROPPINGS; 5. BACK SIDE OF THE GABLE WITH OLD COPPER TIES; 6. STRUCTURAL STABILIZATION USING ROOF BEAMS; 7, 8. ROOF CONSTRUCTION WORKS; 9. THE NEW STAINLESS STEEL TIE IN THE INTERIOR OF THE PROTHYRON, DETAIL; 10. THE VESTIBULE WALL, TO WHICH THE PROTHYRON GABLE WAS TIED; 11. NEW TIES AND THE NEW ROOF





## Zahvati na Protironu

### KONZERVATORSKO-RESTAURATORSKI RADOVI

Površina kamena tretirana je kemijski i hidromehanički čime su odstranjeni mikroorganizmi, površinska prijavština i ptičji izmet. Crne skrame su kao u prijašnjim fazama čišćene laserom, dok je sjeverni zid Vestibula, grube strukture bez dekorativne ornamentike, očišćen mlaznim čišćenjem Rotec tehnologijom. Mehanički su uklonjeni svi cementni nanosi, zapune i sljubnice. Prilikom uklanjanja cementne zapune na području nekadašnjeg vijenca, zaključeno je da postoje svi elementi za njegovu obnovu. Nakon uklanjanja cementnih sljubnica sa sjevernog zida Vestibula uočeno je da su ispod sačuvani različiti ostaci mortova koji su tijekom vremenskog razdoblja bili korišteni za izradu fuga: izvorni antički, srednjevjekovni i austrijski mort.

U ovoj fazi radova izvodi se i konstruktivna sanacija krovista Peristila. Paralelno s navedenim građevnim radovima uklanjanju se željezni elementi sidreni u kamen i mijenjaju novim od nehradućeg metala. Karbonskim trnovima se učvršćuju napuknuti dijelovi kamena. Rekonstrukcije u umjetnom kamenu izvedene su na zonama strukturalnih oštećenja i pukotina. Prirodni kamenom rekonstruiran je nedostajući dio nadvratnika istočne kapele, dok se u opuci rekonstruiraju rasteretri lukučki sjevernog zida Vestibula.

Sljubnice između kamenih blokova se fugiraju vapneno-akrilnom žbukom, dok se sljubnice na sjevernom zidu Vestibula fugiraju žbukama prema izvornim antičkim i srednjevjekovnim recepturama. Kamene površine se tretiraju pulpama namočenim u amonij-oksalat ili se, ovisno o stanju površine kamena, samo premazuju amonij-oksalatom. Ovaj postupak ima dvostruki učinak, izvlači štetne topilive soli iz kamena a ujedno ga i učvršćuje. Premaz ima i funkciju završne zaštite.

Kako bi se sprječilo ispiranje kamenih površina, na svim gornjim ploham vijenaca zabata postavljen je olovni pokrov, koji je malo isturen preko vijenca kako bi se sprječila daljnja erozija kamena zbog slijevanja kiše. Plohe manjih površina se ožbukavaju pod blagim nagibom kako se voda tu ne bi zadržavala i prodriala u kamen. Na gornje plohe, na mjestima na kojima je to bilo nužno, postavljen je sistem igličaste zaštite kako bi se sprječilo zadržavanje ptica na kamenim elementima.

U unutrašnjosti kapelica vrši se zahvati uklanjanja recentnih žbuka i čišćenja podova. U istočnoj kapelici izvršen je zahvat demontaže renesansnog trijumfalnog luka i desalinizacija svih njegovih elemenata. Prilikom ponovne montaze, luk je vraćen na izvornu renesansnu razinu, a svi njegovi elementi su posloženi na izvorno mjesto. Tom se prilikom i pločnik u apsidi podiže na izvornu razinu. Nakon konzervacije-restauracije kamenih elemenata kapelica, zidovi se žbukaju akrilno vapnenom žbukom, a prostori pripremaju za novu funkciju.

## Treatment of the Prothyron

### CONSERVATION – RESTORATION WORKS

Stone surface has been cleaned of microorganisms, surface dirt and bird droppings by chemical and hydromechanical treatments. Black crusts have been cleaned with laser, the same as in previous phases, while the north Vestibule wall whose structure is rough and without decoration, has been cleaned by Rotec technology. All the cement deposits, fillers and joints were cleaned mechanically. While removing the cement fillers from the area of the original cornice, it was concluded that all the elements required for its renovation were present. After the removal of cement joints from the north Vestibule wall, remains of various mortars used for grouting appeared: original ancient, medieval and Austrian mortar.

This phase of work includes the construction rehabilitation of roof structures. Simultaneous to the construction works, iron elements anchored in stone were being replaced with the stainless steel ones. Cracked parts of stone are reinforced with carbon clasps.

Reconstructions done in artificial stone were performed in areas of structural damage and cracks. Missing part of the lintel of the east chapel was reconstructed in natural stone, while the supporting arches of the north Vestibule wall were reconstructed with brick. Joints between the stone blocks were grouted with acrylic-lime mortar, while the joints on the north Vestibule wall were grouted mortars that had been used in the Antiquity and Middle Ages. Stone surfaces are treated with pulp soaked in ammonium oxalate or, depending on the condition of stone surface, pure ammonium oxalate. This method extracts harmful soluble salts from stone and reinforces it at the same time. Coating also serves as a final protection.

To prevent the weathering of stone, upper cornice surfaces were covered with lead sheeting, slightly protruding over the cornice to prevent further erosion caused by rain. Smaller surfaces have been covered in slightly slanted mortar to prevent water from penetrating into stone. Spikes for bird control were installed on upper surfaces. Removal of recent mortars and floor cleaning was carried out in the interior of the chapels. Renaissance triumphal arch from the east chapel was disassembled and all of its elements were desalinated. When reassembled, the arch was returned to its original level with all of its elements in their original position. Pavement of the apse was brought to the original level as well. After the conservation-restoration of stone in chapels was completed, walls were covered in acrylic-lime mortar and spaces were prepared for a new use.

1. ZABAT PROTIRONA, STANJE NAKON KONZERVATORSKO-RESTAURATORSKIH ZAHVATA; 2, 3, 4, 5, 6. RADOVI NA KAMENOM LUKU U ISTOČNOJ KAPELICI; 7, 8, 9. UCVRŠĆIVANJE NAPUKLJIH DJELOVA KAPITELA I ARHA

1. PROTHYRON GABLE, CONDITION AFTER RESTORATION; 2, 3, 4, 5, 6. RESTORATION OF THE STONE ARCH IN THE EASTERN CHAPEL; 7, 8, 9. CONSOLIDATION OF THE CRACKED CAPITAL AND ARCH

