
Đeni GOBIĆ-BRAVAR



UNUTARNJI DIO KOMPLEKSA DVOJNIH VRATA U PULI

Istraživanja, očuvanje, zahvati

THE INNER ZONE OF PULA'S PORTA GEMINA COMPLEX

Investigation, Preservation, and Interventions

Đeni Gobić-Bravar
Arheološki muzej Istre, Pula, Hrvatska
geni.gobic.bravar@gmail.com

Đeni Gobić-Bravar
Archaeological Museum of Istria, Pula, Croatia
geni.gobic.bravar@gmail.com

UDK 904:72](497.571Pula)“652“
Stručni članak
Primljeno: 31. 3. 2023.
Odobreno: 12. 6. 2023.

UDC 904:72](497.571Pula)“652“
Professional paper
Received: March 31, 2023
Approved: June 12, 2023

Dvojna vrata u Puli jedna su od tek dvaju antičkih očuvanih ulaza u grad. Međutim, tako važan i jedinstven ulazni kompleks nije posljednjih stoljeća prezentiran i shvaćen u svojem izvornom obliku. Nekad su Dvojna vrata činila monumentalni natkriveni ulazni kompleks, opasan zidinama koji se prema gradu trapezoidno sužavao u manja ulazna vrata. Od tih drugih vrata danas su sačuvani samo bočni pilastri, koji su kroz povijest gotovo uništeni. Ovim člankom želimo predstaviti povijest otkrivanja i događanja koja su se vezala uz pilastre, posebno tijekom 19. stoljeća, te njihovo stanje očuvanosti i konzervatorsko-restauratorske zahvate kojima im je napokon vraćeno monumentalno dostojanstvo.

The Porta Gemina (“Double Gate”) in Pula is one of only two surviving antique period entrances to the city. Over the past several centuries, however, this important and unique gate complex has not been presented or appreciated in its original form. The Porta Gemina once comprised a monumental covered entrance complex enclosed by walls forming a trapezoidal zone narrowing towards the city and ending at a smaller gate. Only the lateral pilasters of this second gate now survive, almost entirely destroyed in the past. This paper aims to present the history of their discovery and events associated with these pilasters, in particular during the 19th c., their state of preservation, and the conservation and restoration interventions that have finally restored their monumental dignity.

KLJUČNE RIJEČI: kompleks Dvojnih vrata; povijesna arheološka istraživanja; konzervacija-restauracija

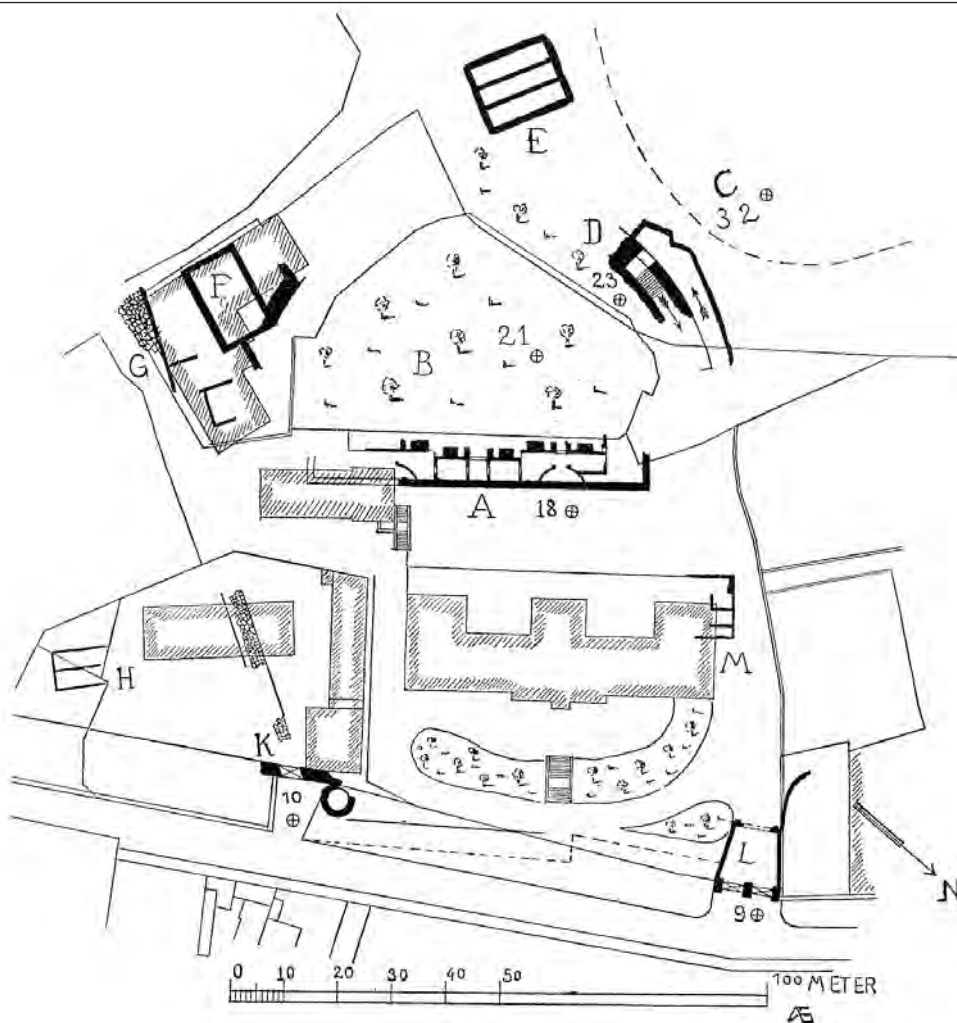
KEY WORDS: Porta Gemina complex; historical archaeological investigation; conservation and restoration

UVOD

Antička Pula, opasana zidinama, imala je (prema Kandleru) 14 vrata kroz koja se moglo ulaziti u grad. Prema moru otvaralo ih se osam: *S. Giovanni, Duomo, Monastera, Stovagnaga, Piazza, Barbaria, Abbazia, S. Giuliana*, a prema kopnu njih šest: *Fontana, Gemina, Ercole, S. Stefano, Aurata, Teatro* (L'Istria 1847). Neke od ovih naziva moguće je prepoznati i danas, u nazivlju ulica poput Stovagnage, ili slijedom povezivanja s danas postojećim građevinama poput *Abbazia - Sv. Marija Formoza, Duomo - Katedrala*. Međutim, od antičkih gradskih vrata koja su uvodila u Pulu danas nam ostaju samo dvojica, Herkulova i Dvojna vrata, te siguran podatak o poziciji Zlatnih vrata na koja se naslanjao slavoluk Sergijevaca. Stoga je od izuzetne važnosti pronaći i sačuvati što više informacija o vratima, kako postojećim, tako i onima nestalim (Sl. 1).

INTRODUCTION

Antique period Pula's encircling walls were (according to Kandler) penetrated by fourteen gates allowing access to the city. Eight faced the sea: the *S. Giovanni, Duomo, Monastera, Stovagnaga, Piazza, Barbaria, Abbazia, and S. Giuliana* gates; and six faced inland: the *Fontana, Gemina, Ercole, S. Stefano, Aurata, and Teatro* gates (L'Istria, 1847). Some of these appellations are recognisable to this day, in names such as that of the *Porta Stovagnaga* street, or by association with still existing edifices such as the "Abbazia" (St Mary Formosa) and the "Duomo" (the cathedral). Only two of the antiquity period city gates remain extant: the *Hercules Gate* and the *Porta Gemina* ("Double Gate"), and we have confident data concerning the position of the *Porta Aurea* ("Golden Gate"), abutted by the Arch of the Sergii. It is, thus, of particular importance that we identify and preserve as much data as possible concerning both the extant and the lost gates (Fig. 1).



Sl. 1 Tlocrt područja gradskih zidina početkom 20. stoljeća; Dvojna vrata označena su slovom L (preuzeto iz Gnirs 1912).
Fig. 1 Plan of the city wall area in the early 20th c.; the Porta Gemina is indicated as "L" (after Gnirs 1912).

Dostupne informacije o pulskim antičkim gradskim vratima prikazuju nam vrlo raznovrsnu situaciju, od ulaza s jednim lukom, poput Herkulovih vrata, s dva luka, poput Dvojnih vrata, do tri luka kod Zlatnih vrata. Neka su vrata bila samo kratak prolaz dok su druga uvodila u nadsvođeni sistem koji je odvajao kolni prolaz od onoga za osobe. Također, kroz povijest su često bila prepravljana, rušena i/ili obnavljana.

U današnjem viđenju gradskih vrata, Dvojna vrata jednostavni su prolaz koji je direktno uvodio u grad. Jedino po čemu se ističu je stražnji otvor u strukturi luka, kroz koji se spuštao sistem za zatvaranje vrata. Međutim, Dvojna vrata u Puli tek su vanjski dio kompleksnog antičkog ulaza u grad. Originalni je ulaz bio tlocrtno trapezoidnog oblika, zatvoren zidovima, a u dijelu prema gradu se sužavao i prolazio kroz jednostruka lučna vrata, od kojih danas preostaju samo dva pilastra s reljefno obrađenim bazama i jednim polustupom. U potpunosti nedostaje zidana struktura koja je povezivala dvojna vrata te elementi lučnog ulaza i originalno popločenje. Iako su sama Dvojna vrata bila predmet interesa, istraživanja i konzervatorskih zahvata, dva pilastra u pozadini uglavnom su ostajala u sjeni i nije im se posvećivala posebna pažnja.

The available data on Pula's Roman period gates presents us with a diversity of situations, from single-arched structures such as the Hercules Gate, double-arched such as the Porta Gemina, and triple-arched as in the case of the Porta Aurea. Some of the gates constituted simply a short passage, while others led to a vaulted system that separated wheeled from pedestrian traffic. They have seen episodes of remodelling, demolition, and/or renovation.

As it appears to us now the Porta Gemina is a simple passage that led directly into the city. The only standout feature is the slot at the back of the arch through which the system used to shut the gate was lowered. Pula's Porta Gemina, however, is only the outer section of a complex antique period entrance to the city. The original entrance had a trapezoidal footprint enclosed by walls, tapering as it ran towards the city before passing through a single arched gate, of which we now have only two pilasters with bases worked in relief, and a single engaged column. Entirely absent is the masonry structure that linked the two gates and elements of the arched entrance and original paving. And while the Porta Gemina itself has been an object of interest, investigation, and conservation interventions, the two pilasters to the back have been largely disregarded and not afforded any particular attention.



Sl. 2 Pogled na Dvojna vrata s vidljivim pilastrom u pozadini (Dokumentacijski odjel AMI-ja).

Fig. 2 View of the Porta Gemina with a pilaster visible in the background (AMI Documentation Department).

Naravno, povjesničari i arheolozi primijetili su pilastre i povezali ih s realnim stanjem. Vrijeme izgradnje Dvojnih vrata, podignutih na ostacima starijih rimskih vrata, na sjeveroistočnoj strani pulskih gradskih zidina, smješta se u kraj 2. stoljeća (Matijašić, Buršić-Matijašić 1996, 61), ali bitno je napomenuti da Fischer prema dekoraciji vijenca smatra da bi se mogla smjestiti i u polovicu 1. stoljeća (Fischer 1996, 66-67). U pozadini se nalaze dvije kamene baze koje na sebi nose četvrtaste pilastre ukrašene s gradske strane. Na zapadnom pilastru prisutan je ostatak kaneliranog polustupa s bazom, dok je na istočnom preostala samo baza. Ova su dva pilastra bili dijelovi antičkog kompleksa gradskih vrata koja su se vezivala na Dvojna vrata u nastavku gradskih zidina, tvoreći zatvoreni ulaz. Prvobitno su vrata imala trapezoidni tlocrt koji se pružao prema unutrašnjosti grada (Mlakar 1978, 28). Isti je trapezoidni tlocrt istaknut danas ogradnim zidom dvorišta Arheološkog muzeja Istre i dvorišta Hrvatske gospodarske komore, a moguće je pretpostaviti da relativno vjerno prikazuje originalne poteze vrata s obzirom da su u istom pravcu pružanja označeni zidovi i tijekom povijesnih istraživanja (Sl. 2).

POVIJESNA ISTRAŽIVANJA I ZAHVATI NA KOMPLEKSU ANTIČKOG ULAZA KOD DVOJNIH VRATA

Arheološka istraživanja Dvojnih vrata sežu u početak 19. stoljeća. Prvo iskopavanje ne bi li ih se oslobodilo zemljanog nasipa koji ih je prekrivao provedeno je 1818. godine, ali je zaustavljeno (Rusconi 1926; Pavan 1988). Sljedeći poznati zahvati bili su 1821. godine u organizaciji Pietra Nobilea, kada F. Bruyn istovremeno istražuje područje amfiteatra i Dvojnih vrata, međutim u tom su periodu istraživanja još uvijek fokusirana isključivo na sama vrata, ne na njihovu pozadinu. Slični su i zahvati G. Carrare iz 1831. godine (Weisshäupl 1894). Ali 1845. godine Carrara istražuje šire područje oko Dvojnih vrata, kada dokumentira i zidove u pozadini vrata u smjeru grada. Carrara piše: "Na potezu b-d postojala su unutarnja vrata prema gradu, sastavljena od jednog luka čiji je otvor bio 5,5 metara. U točkama e i f postoje još uvijek čvrsti na svojoj bazi, kameni dovratnici luka, koji su s vanjske strane ukrašeni reljefno kaneliranim polustupovima, koji međutim nisu monolitni s bazama već postavljeni na iste. Podnica, popločana poligonalnim blokovima, diže se s nivoa Dvojnih vrata prema ovim jednostrukim vratima. Na pločama su također prisutni duboki tragovi kola koji odmah nakon vrata skreću u

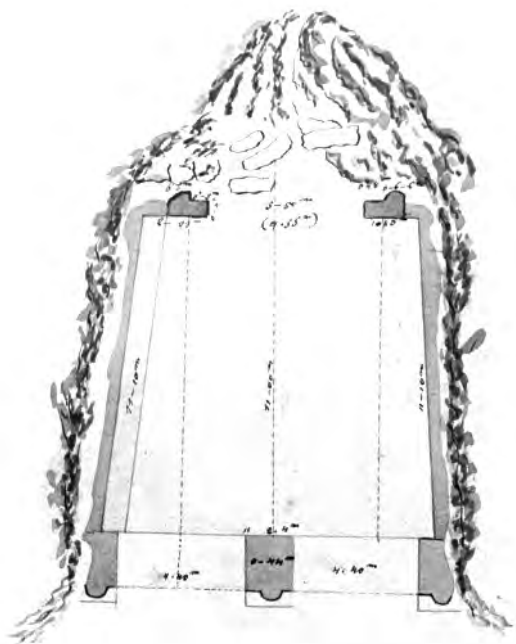
Historians and archaeologists have, of course, observed the pilasters and their actual relationship. The erection of the Porta Gemina, raised atop the remains of an older Roman gate at the northeast side of Pula's walls, has been dated to the late 2nd c. (Matijašić, Buršić-Matijašić 1996, p. 61), but it is worth noting that, based on the decoration of the cornice, Fischer is of the opinion that the date could also be in the mid-1st c. (Fischer 1996, pp. 66-67). To the back are two stone bases bearing rectangular pilasters, decorated on the side facing the city. On the pilaster to the west we see the remains of a fluted engaged column with its base, while on the east pilaster only a base survives. These two pilasters were part of an antique period enclosed entrance complex that included the Porta Gemina where the city wall ran. Initially the gate complex had a trapezoidal footprint tapered towards the city (Mlakar 1978, p. 28). The same trapezoidal footprint is presently apparent in the fence wall of the courtyard of the Archaeological Museum of Istria and of the Croatian Chamber of Commerce building, and we can posit that it relatively faithfully shows the original line of the gate, given that walls were recorded along the same line during historical investigation episodes (Fig. 2).

PAST INVESTIGATIONS AND INTERVENTIONS TO THE ANTIQUE PERIOD ENTRANCE AT THE PORTA GEMINA

Archaeological investigation of the Porta Gemina began early in the 19th c. The first excavation work, aimed at removing the bank of earth that covered the gate, was performed in 1818, but was cut short (Rusconi 1926; Pavan 1988). The following interventions of which we know were performed in 1821 under the leadership of Pietro Nobile, concurrent with the work of F. Bruyn in the investigation of the area of the amphitheatre and the Porta Gemina; the investigative work of this period, however, was still focused solely on the gate itself, and not on the area behind it. The interventions of G. Carrara in 1831 were of a similar nature (Weisshäupl 1894). In 1845, however, Carrara investigated the broader area around the Porta Gemina, during which time he documented the walls to the back of the gate towards the city. Carrara observed that "there was an inner gate towards the city along the B-D line, comprised of a single arch having a clear span of 5.5 metres. The stone piers of the arch, decorated to the outside with fluted engaged columns, are still firmly on their bases at points E and F; they do not, however, form a monolithic mass with the bases, but are rather installed atop them. The pavement, paved with

smjeru ‘Grčke crkve’...” (današnja pravoslavna crkva sv. Nikole). Odmah iza vrata pronađeni su mnogobrojni ulomci koji su im pripadali. Najznačajniji su: tri kamena bloka samoga luka, dva dijela bočnog dovratnika s ostacima reljefnih stupova, dva dijela arhitrava i tri dijela friza koji su ukrašavali gornji dio. Friz je kompozitno korintski i izvrsno je izrađen, a tragovi obrade ukazuju da je nekada podržavao i atiku. Carrara se nada da će u nasutoj zemlji biti u mogućnosti pronaći i veći dio ostatka vrata (Weisshäupl 1894). Izvještaji Carrare govore o namjeri da se vrata rekonstruiraju pronađenim ostacima ili da se ulomci barem sačuvaju na okupu (Weisshäupl 1892) (Sl. 3).

O ovim istraživanjima govori i Kandler u časopisu *L’Istria*, u skupnom članku o arheološkim istraživanjima grada Pule tijekom 1845. godine, koja su bila financirana državnim sredstvima nakon što je Ferdinand I. posjetio Pulu 1844. Kandler prenosi da su se u nastavku Dvojnih vrata nalazila još jedna jednostruka vrata, bogato arhitektonski obrađena, koja su se spajala s vanjskima tvoreći zatvoren i natkriven ulazni kompleks. Uspoređuje situaciju sa Zlatnim vratima, koja su bila trostruka, ali su završavala jednim prolazom koji je činio slavoluk Sergijevaca. Smatra da su Dvojna vrata morala biti posvećena Jupiteru, s obzirom da su na lokalitetu tijekom arheoloških istraživanja pronađene mnogobrojne glave,



Sl. 3 Prikaz gradskih vrata nakon istraživanja 1843. godine (Fondo fotografico di Trieste, CMSA F NV 3, Inv. 2453d).

Fig. 3 The city gate following the 1843 investigation (Fondo fotografico di Trieste, CMSA F NV 3, Inv. 2453d).

polygonal blocks, rises from the level of the Double Gate towards this single-arched gate. Also present on the paving stones are the deep furrows of wheels, which turn towards the ‘Greek church’ immediately upon passing the gate” (the referenced Greek church is the present-day orthodox Church of St Nicholas). Numerous fragments of the gate were identified in the area just beyond its location. Of these the most significant are: three stone blocks from the arch [voussoirs], two parts from a pier with the remains of columns in relief, two parts of the architrave, and three parts of the frieze that adorned the upper part. The frieze was done in the composite Corinthian style and exhibits excellent workmanship, with traces of tooling indicating that it once supported an attic. Carrara expressed his hope that most of the remains of the gate would be found in the earthen embankment (Weisshäupl 1894). The reports drawn up by Carrara speak to his intention that the gate be reconstructed with the recovered remains or that the fragments be at least preserved as a group (Weisshäupl 1892) (Fig. 3).

These investigations are also discussed by Kandler in the journal *L’Istria* in a co-authored article concerning the archaeological investigations performed in Pula in the course of 1845, financed with state funding following Ferdinand I’s visit in 1844. Kandler observes that there was another single-arched gate of lavish architecture beyond the Porta Gemina, connected to the outer gate and thus forming an enclosed and covered entrance complex. He drew comparisons with the Porta Aurea, which was triple-arched but terminated in a single passage formed by the Arch of the Sergii. He expressed the opinion that the Porta Gemina must have been dedicated to Jupiter given the many heads—of coarse but evidently Roman fabric—found at the site during archaeological investigation. He further notes that the inner gate had a passage with a shallow arch and that numerous fragments of the beam atop the arch were found. Kandler, like Carrara, was of the opinion that a restoration (reconstruction) of the inner entrance with its arch would be a possible and worthwhile undertaking. Also uncovered at the time were the remains of a road that led to the castle, which had seen significant destruction in its central part. Raised stone blocks were observed in the paving which—Kandler posited—served to guide wheeled carriages and prevent them from veering off the road. Also identified was a branch of the road heading in the direction of the forum (*L’Istria* 1846, 31 Jan. 1846, *Degli scavi di Pola*, pp. 21–28).

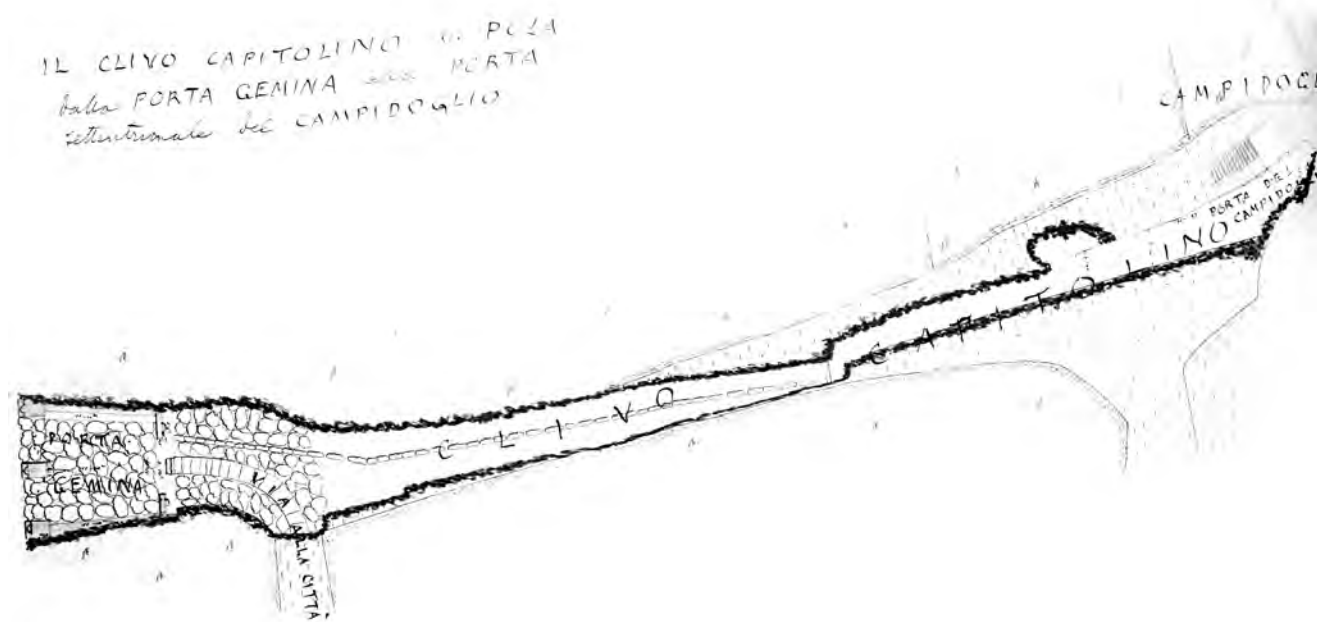
There is presently no data available as to the whereabouts of reports concerning events related to the area behind the

grube, ali sigurno rimske fakture. Također, prenosi da su unutarnja vrata imala prolaz sa spuštenim lukom te da su pronađeni mnogobrojni ulomci nadlučne grede. I Kandler, poput Carrare, smatra da bi bilo moguće i poželjno provesti restauraciju (rekonstrukciju) unutarnjeg ulaza s lukom. Pronađeni su tada i ostaci ceste koja je vodila prema kaštelu, a koja je u centralnom dijelu bila dosta uništena. U samom su popločenju posebno primijećeni izdignuti kameni blokovi koji su, pretpostavlja Kandler, služili za točno usmjeravanje kola da ne bi skretala s puta. Utvrđen je i odvojak ceste koja skreće prema forumu (L'Istria 1846, 31.01.1846., *Degli scavi di Pola*, str. 21-28).

Danas više ne znamo gdje su izvještaji koji bi nam prenijeli što se s područjem iza Dvojnih vrata događalo u vrijeme Carrarinog istraživanja 1845. godine i za vrijeme iskopavanja za potrebe izgradnje Gimnazije 1890. Postoji međutim dokument kojim gradska uprava 31. ožujka 1862. prijavljuje Kandleru iskopavanja iza Dvojnih vrata, pri čemu vojne snage ne obavještavaju o nalazima, ali koriste kamen koji tamo pronalaze te čak ruše dva još postojeća pilastra da bi ih iskoristili negdje drugdje (Kandler, *Atti del Conservatore*, No 278, svezak 3, Sveučilišna knjižnica Pula). Godine 1892. Weisshäupl navodi da su baze vrata zajedno s pripadajućim polustupovima pronađene ponovno tijekom iskopavanja za potrebe izgradnje Gimnazije (1890. godine), ali da ne zna gdje su nestali ostali ulomci koje Carrara nabraja (Weisshäupl 1892). Po ovim zapisima moguće je zaključiti da su unutarnja gradska vrata nakon otkrivanja 1845. godine ponovno zatrpana te da su pripadajući ulomci bili sakupljeni negdje u blizini samih vrata. Prostor je s vremenom ponovno prekriven nanosima zemlje i drugog materijala, ali je 1862. godine tijekom iskopavanja vojska preuzela arhitektonske elemente vrata te srušila dva pilastra s polustupovima. Vrata su ponovno otkrivena oko 1890. godine, kada se provode iskopavanja zbog izgradnje Gimnazije te se dodatno kopa i oko Dvojnih vrata jer su im "baze bile s vremenom prekrivene nanosima". Inženjer Natale Tommasi započinje iskopavanja upravo na poziciji jednostrukih vrata u pozadini, kada vraća blokove s polustupovima na njihovo mjesto (Mader 2011). Vezano uz zahvate koji su obavljani na predmetnim pilastrima zanimljiva je i bilješka koju Weisshäupl iznosi 1901. godine, gdje kaže da su unutarnja jednostavnija vrata bila široka 5,5 metara, ali je današnja širina vrata 4,75 metara. Pilastri su vjerojatno bili pomaknuti te su tijekom rekonstrukcije postavljeni bliže nego u izvornoj situaciji (Weisshäupl 1892) (Sl. 4).

Porta Gemina during the period of Carrara's investigative efforts of 1845 and the period of excavation works for the construction of a gymnasium (secondary school) in 1890. There is, however, a document in which the municipal administration on 31 March 1862 notified Kandler of excavation work behind the Porta Gemina, where the military did not file reports concerning finds, but did exploit stone found there and even took down two extant pilasters in order to use them elsewhere (Kandler, *Atti del Conservatore*, No. 278, Vol. 3, Sveučilišna knjižnica Pula). In 1892 Weisshäupl notes that the bases of the gate and the attendant engaged columns were re-discovered during excavation work for the construction of the gymnasium (1890), but that he is unaware of where the fragments enumerated by Carrara are (Weisshäupl 1892). Based on these written observations we can conclude that the inner gate, following its discovery in 1845, was re-buried, and that the fragments in question were collected somewhere in the proximity of the gate. Over time the area was once again covered by deposits of earth and other material, but in 1862 the army, in the course of excavation work, took possession of the architectural elements of the gate, and took down two pilasters with engaged columns. The gate was re-discovered around the year 1890 in the course of excavation work for the construction of the gymnasium, with additional excavation performed around the Porta Gemina as "over time their bases had become covered by deposits". Engineer Natale Tommasi commenced excavation works at precisely the position of the single-arched gate to the back during which time he restored blocks with engaged columns to their positions (Mader 2011). Notable in relation to interventions performed with the pilasters in question is a note written by Weisshäupl in 1901 in which he states that the simpler inner gate had a breadth of 5.5 metres, while the breadth of the gate now stands at 4.75 metres. The pilasters were likely shifted in position and placed in the course of this reconstruction closer to one another than in their original configuration (Weisshäupl 1892) (Fig. 4).

While there is no textual documentation, we can posit that the pilasters were raised in the course of the restoration of the Porta Gemina and the development of the access way serving the gymnasium building, i.e., between 1890 and 1893. The fragments of the pilasters were raised at what was presumed to be their correct position and were reinforced with iron clamps that connected the fragments (lead was poured into the slots into which the iron elements were inserted), and with cement-based mortar. Lacunae were filled with a masonry structure of small terracotta bricks, also bonded



Sl. 4 Prikaz gradskih vrata i nastavka ceste tijekom arheoloških istraživanja polovicom 19. stoljeća (Fondo fotografico di Trieste, FO74745).
 Fig. 4 The city gate and the continuation of the road during the archaeological investigative work of the mid-19th c. (Fondo fotografico di Trieste, FO74745).

Iako ne postoji pisana dokumentacija, moguće je pretpostaviti da su pilastri podignuti tijekom restauracije Dvojnih vrata i uređenja pristupa prema zgradi Gimnazije, znači u periodu između 1890. i 1893. godine. Ulomci pilastara podignuti su na pretpostavljenu točnu poziciju, a učvršćeni su željeznim trakastim klinovima koji su međusobno povezivali ulomke (utori u koje su željezni elementi umetnuti zaliveni su olovom) te cementnim mortom. Nedostajući su dijelovi nadograđeni zidanom konstrukcijom od malih keramičkih cigli povezanih cementnim mortom. Radi međusobnog povezivanja

with cement-based mortar. New slots were drilled into the blocks to receive and hold the reinforcing iron bands. Also attached to the pilasters was an iron fence for which slots were again drilled into the stone to receive its ends, affixed in this case only with cement-based mortar (Fig. 5).

Later investigative campaigns in the area around the Porta Gemina make no mention of the smaller inner gate; the situation under the pavement of the inner trapezoidal area was, however, determined in the 1930s (Forlati Tamaro 1932) and with the recent investigative campaigns of 2019 and 2020 (Fig. 6).



Sl. 5 Dvojna vrata početkom 20. stoljeća, u pozadini su slabo vidljiva unutarnja vrata (Dokumentacijski odjel AMI-ja).
 Fig. 5 The Porta Gemina early in the 20th c., with a partly obscured view of the inner gate in the background (AMI Documentation Department).

STATE OF CONSERVATION

Up to 2021 it was evident that the two pilasters had not in the past been recognised as monuments worthy of preservation. Slots had been drilled into them for the installation of a fence, and iron elements of indeterminate purpose had been inserted at numerous points. The opening of a military tunnel just to the back of these structures certainly contributed to the neglect they have suffered, as it had the effect of shutting off a direct view of their decorated sides and entirely negated the route of the road that developed in the antique period from the Porta Gemina in the direction of the theatre building of that period and the hill upon which the city core stood. Planted trees almost entirely screened them from



Sl. 6 Gradska vrata tijekom recentnih arheoloških istraživanja (Dokumentacijski odjel AMI-ja).
 Fig. 6 The city gate during recent archaeological investigation (AMI Documentation Department).

željeznim elementima, u blokovima su izbušene nove rupe u koje su umetnuti trakasti klinovi. Na pilastre se vezivala i željezna ograda za čije su potrebe također izbušene rupe u kamenu te je ona učvršćena samo cementnim mortom (Sl. 5).

Kasnija istraživanja područja oko Dvojnih vrata ne spominju unutarnja manja vrata, ali situacija ispod popločenja unutarnjeg trapezoidnog oblika utvrđena je najprije tridesetih godina 20. stoljeća (Forlati Tamaro 1932) te kasnije, nedavno dovršenim istraživanjima 2019. i 2020. godine (Sl. 6).

STANJE KONZERVACIJE

Sve do 2021. godine bilo je primjetno da dva pilastra nisu povijesno prihvaćena kao spomenik vrijedan očuvanja. U njima su bušeni utori za postavljanje ograde te su na mnogim pozicijama prisutni umetnuti željezni elementi nepoznate namjene. Njihovom je zapostavljanju sigurno doprinijelo i otvaranje vojnog tunela odmah u pozadini, što je zatvorilo mogućnost otvorenog pogleda na ukrašenu stranu te u potpunosti negiralo smjer ceste koja se u antici od Dvojnih vrata razvijala prema antičkom kazalištu i središnjem gradskom

view, and the installation of a two-winged iron gate that closed the space between the pilasters, thus redirecting the flow of pedestrians, had the net effect of setting this monument in an effectively obscured position (Fig. 7).

The numerous inserted iron elements posed the greatest hurdle to the preservation of this monument (Fig. 8). Most have corroded over time and thus caused both large and small fractures in the structure of the stone (Fig. 9). The cement filling present in places has deteriorated and become separated, leaving openings in which water and dirt have accumulated, thus creating the conditions for degradation caused by the freeze-thaw cycle and the growth of tall plants. The surface of the monument was covered with algae and lichens, and exhibited black and grey patina.

Thick deposits of tar, small areas of graffiti, and surface scratches were present at numerous positions. Spalling and the loss of parts of the original structure are especially evident at the bases and the engaged column. Large fractures, and the presence of deep alveolisation in the lower parts of the monument, were of primary structural significance (Fig. 10).



Sl. 7 Kompleks gradskih vrata prije početka zahvata konzervacije i restauracije (fotografija: Đ. Gobić-Bravar).

Fig. 7 The city gate complex prior to the commencement of the conservation and restoration intervention (photo: Đ. Gobić-Bravar).



Sl. 9 Duboka i dugačka pukotina uzrokovana dilatacijom željeza na sjevernom pilastru (fotografija: Đ. Gobić-Bravar).

Fig. 9 A deep and long crack in the pilaster to the north caused by the expansion of iron (photo: Đ. Gobić-Bravar).



Sl. 8 Detalj umetnutih željeznih elemenata (fotografija: Đ. Gobić-Bravar).

Fig. 8 Detail of the inserted iron elements (photo: Đ. Gobić-Bravar).



Sl. 10 Detalj alveolizacije baze polustupa (fotografija: Đ. Gobić-Bravar).

Fig. 10 Detail of alveolisation at the base of the engaged column (photo: Đ. Gobić-Bravar).

brežuljku. Sadnja stabala koja su ih gotovo u potpunosti zaklonila te postavljanje željeznih dvokrilnih vrata koja su zatvarala prostor između pilastara i tako preusmjerila protok prolaznika, završno su postavili spomenik u gotovo nevidljivu poziciju (Sl. 7).

INTERVENTIONS TO THE PILASTERS

In 2020 comprehensive conservation and reconstruction interventions to the building housing the Archaeological Museum of Istria also included the design and development of the zone to the back of the Porta

Najveći problem za očuvanje spomenika su mnogobrojni umetnuti željezni dijelovi (Sl. 8). Većina ih je s vremenom korodirala i izazvala veće i manje pukotine u strukturi kamena (Sl. 9). Cementne su ispune dotrajale i odvajale su se ostavljajući otvore u kojima su se skupljale voda i nečistoća, stvarajući tako uvjete za degradaciju uvjetovanu ciklusima zamrzavanja vode i rastom višeg bilja. Površina spomenika bila je prekrivena algama i lišajevima te je površinski prisutna crna i siva patina.

Na mnogim su pozicijama bile prisutne debele naslage katrana, manji grafiti i površinske ogrebotine. Okrhnuća i gubitak originalnih dijelova posebno su bili vidljivi na bazama i polustupu. Strukturalno su važne bile velike pukotine, a u nižim dijelovima spomenika prisutnost duboke alveolizacije (Sl. 10).

ZAHVATI NA PILASTRIMA

Tijekom 2020. godine u sklopu opsežnih zahvata konzervacije i rekonstrukcije matične zgrade Arheološkog muzeja Istre projektirano je i uređenje prostora iza Dvojnih vrata. Radi se o glavnom prilazu zgradi muzeja. Zahvaljujući ovim zahvatima, i pilastri iza Dvojnih vrata napokon su dobili mogućnost biti oslobođeni ograda i neprikladnih elemenata koji su se na njih vezali tijekom 20. stoljeća. Konzervatorsko-restauratorski zahvati na pilastrima iza Dvojnih vrata obavljani su tijekom svibnja i lipnja iste godine.

Tijekom zahvata mehanički su uklonjene željezne spojnice zajedno s olovnim amortizacijama, kao i mnogobrojne cementne nadogradnje. Utvrđeno je da je cement prisutan duboko unutar strukture pilastra jer je vjerojatno pri povijesnoj rekonstrukciji korišten u vidu amortizacijskog morta, a ne samo za ispunjavanje pukotina. Spomenik je opran vodom te su aeroabrazivnim čišćenjem sintetičkim kalcijevim karbonatom uklonjene vezane nečistoće, uglavnom crne kore prisutne na bazama pilastara. Završna faza čišćenja sastojala se u odstranjivanju kolonija algi i lišajeva, što je učinjeno kemijskom metodom – proizvodima na bazi kvaternih amonijevih soli.

Nakon odstranjivanja svih nečistoća i stranih materijala sa spomenika bilo je moguće dobiti potpuni uvid u površinsku degradaciju kamena (Sl. 11). Na spoju baze i gornjeg dijela spomenika po odstranjivanju cementnih nadopuna postala je vidljiva degradirana površinska struktura, koja se razlikuje od one na dijelovima izloženim atmosferskim utjecajima. Naime,

Gemina. This area forms the primary route of access to the museum building. These interventions finally rid the pilasters to the back of the Porta Gemina of the fencing and inappropriate elements that had been appended to them in the course of the 20th c. The conservation and restoration interventions to the pilasters to the back of the Porta Gemina were performed in May and June of that year.

The interventions included the mechanical removal of iron clamps and the attendant lead fillings, and of the many cement integrations. It was found that cement was present deep within the structure of the pilasters, it having likely been applied in the course of the past reconstruction as a damper (oscillation absorbing) layer of mortar, rather than simply as a fill for cracks. The monument was washed with water, while air-abrasive cleaning with synthetic calcium carbonate was used to remove bound dirt, for the most part the black crust present at the bases of the pilasters. The final phase of cleaning involved the removal of colonies of algae and lichens; this was achieved by applying a chemical method using products based on quaternary ammonium salts.



Sl. 11 Detalj pukotina i šupljina nakon odstranjivanja željeznih klinova i cementnih ispuna južnog pilastra (fotografija: Đ. Gobić-Bravar).

Fig. 11 Detail of cracks and cavities revealed in the south pilaster following the removal of iron clamps and cement integrations (photo: Đ. Gobić-Bravar).



Sl. 12 Detalj alveolizacije baze polustupa južnog pilastra (fotografija: Đ. Gobić-Bravar).

Fig. 12 Detail of alveolisation at the base of the engaged column of the south pilaster (photo: Đ. Gobić-Bravar).

horizontalna površina kamena koja je bila prekrivena cementnim nadopunama teško je erodirana, izuzetno hrapave strukture. Vjerojatno se radi o degradaciji koja je nastala nakon rekonstrukcije spomenika krajem 19. stoljeća, s obzirom da u mnogobrojnim rupama erozije nema cementa. Uzrok degradacije su vjerojatno ciklusi sezonskog zamrzavanja vode koja je nakon sušenja cementa polako prodirala ispod njega te se zadržavala na površini kamena (Sl. 12).

Postala je vidljiva i površinska ispucanost kamena, kao i veće strukturne pukotine. Do pucanja je vjerojatno došlo tijekom postavljanja blokova u sadašnju poziciju, a ono je tijekom vremena napredovalo uslijed unutarnjih napetosti prouzročenih dilatacijom korodiranih željeznih dijelova. Naime, zbog različitih koeficijenata termičke dilatacije cementa i kamena, s vremenom se stvorila mreža pukotina koja je omogućila vodi pristup željeznim klinovima te njihovu koroziju i dilataciju. Odlomljeni dijelovi vraćeni su na originalnu poziciju dvokomponentnim epoksidnim ljepilom.

Nakon odstranjivanja cementnih zapuna primijećena je i velika količina šupljina u spomeniku. Kameni su blokovi na mnogim pozicijama cementnim mortom povezani tek površinski, dok su duboke šupljine u unutrašnjosti pukotina i između blokova ostavljene prazne. U njima se nalazila velika količina zemlje i biološkog otpada te mravinjaci. Sve su šupljine ispuhane i isprane od nečistoća. Nakon čišćenja injektirane su tekućim mortom na bazi prirodnog hidrauličnog vapna i kamenog brašna, a manje su pukotine injektirane tekućim epoksidnim

Following the removal of all impurities and foreign materials from the monument we were able to obtain a complete picture of the surface degradation of the stone (Fig. 11). Where the base and the upper part of the monument meet the removal of cement integrations revealed the degraded surface structure, which differs from the areas that were exposed to atmospheric action. The horizontal surface of the stone that had been covered by the cement integrations was severely eroded, exhibiting very rough structure. This is likely the result of degradation that occurred following the reconstruction of the monument in the late 19th c. given the absence of cement in numerous eroded cavities. The cause of the degradation was likely the seasonal freeze-thaw cycle; once the cement had cured, water gradually penetrated under the cement and was trapped on the surface of the stone (Fig. 12).

Also revealed was surface cracking and large structural cracks in the stone. The cracking was likely produced during the installation of the blocks in the current position, and progressed over time as the result of internal stresses caused by the dilation of corroding iron parts. Over time differences in the thermal expansion coefficients of cement and stone formed a network of cracks that opened the way for water to penetrate to the iron clamps leading to their corrosion and expansion. The parts that had spalled off were restored to their original positions using a two-component epoxy adhesive.

Also observed following the removal of the cement integrations were a great number of cavities. At many points the stone blocks had been bonded with mortar at the surfaces only, while deep cavities inside cracks and between blocks were left empty. These voids contained a significant quantity of soil, organic detritus, and ant nests. All of the cavities were cleared with compressed air and cleansed of impurities. Cleaning was followed by the injection of a natural hydraulic lime and stone powder liquid mortar, while smaller cracks were injected with a liquid two-component epoxy adhesive. Finally, most of the cavities present on the surface of the stone as the result of alveolisation were filled. These cavities, besides compromising the aesthetics of the monument, constitute loci open to the penetration of water and degradation processes caused by the freeze-thaw cycle and salt crystallisation, necessitating infilling with reversible mortar.

All stone surfaces were coated with a nanolime based consolidation agent and provided with a final coating of a water-resistant vapour permeable agent based on silane and siloxane in an aqueous solution (Figs. 13, 14).



Sl. 13 Pogled s istoka na pilastre nakon zahvata (fotografija: Đ. Gobić-Bravar).
Fig. 13 The pilasters as viewed from the east post-intervention (photo: Đ. Gobić-Bravar).



Sl. 14 Pogled sa zapada (sa strane antičkog grada) nakon zahvata (fotografija: Đ. Gobić-Bravar).
Fig. 14 View from the west (from the side of the antique period city core) post-intervention (photo: Đ. Gobić-Bravar).

dvokomponentnim ljepilom. Završno, zatvorena je i većina šupljina prisutnih na površini kamena zbog procesa alveolizacije. Ove šupljine, osim što narušavaju estetiku spomenika, predstavljaju pozicije otvorene za prodor vode i degradacijske procese uzrokovane ciklusima zamrzavanja i kristalizacijom soli, stoga ih je bilo nužno zatvoriti reverzibilnim mortom.

Sve su kamene površine premazane konsolidacijskim sredstvom na bazi nano-vapna te završno premazom vodootpornog paropropusnog sredstva na bazi silana i siloksana u vodenoj otopini (Sl. 13, 14).

ZAKLJUČAK

Pilastrima iza Dvojnih vrata, koji su nekada činili jedinstvenu cjelinu s ovim važnim gradskim ulazom, stoljećima su bili zanemareni, a po ponovnom otkrivanju sredinom 19. stoljeća gotovo i uništeni. Srećom, trud tadašnjih konzervatora nije bio uzaludan i barem su djelomično sačuvani u svojoj (gotovo izvornoj) poziciji.

Povijesni zahvati na pilastrima pridonijeli su s jedne strane njihovom očuvanju, ali su također neki modusi, tipični za kraj 19. stoljeća, dali doprinos nastanku novih degradacija. Bitno je prihvatiti da su takve metode restauracije bile izraz tadašnjeg shvaćanja kulturne baštine, a korištenje određenih materijala smatralo se tehnički ispravnim. Nije bilo dovoljno saznanja o štetnim posljedicama korištenja cementnog morta, a željezni su klinovi i ojačanja još uvijek normalno korišteni kao čvrsti materijal za strukturalna povezivanja.

CONCLUSION

The pilasters to the back of the Porta Gemina, which once formed an integral part of the complex of this key entrance to the city, suffered centuries of neglect and were almost entirely destroyed following their discovery in the mid-19th c. Happily, the efforts of the conservators of the time have not been in vain, and they have been partially preserved in what are almost the original positions.

The historical interventions to the pilasters contributed to their preservation; some of the methods used, however—typical of the late 19th c.—contributed to new degradation processes. It is important that we appreciate that these restoration methods were an expression of how cultural heritage was understood at the time, and that the use of certain materials was considered technically appropriate. There was insufficient insight into the detrimental consequences of cement-based mortar, while iron clamps and reinforcements were normally used as a robust material for structural bonds.

The perusal of documents related to the two pilasters has contributed to our knowledge of the original appearance of an entrance complex that provided access to antique period Pula, and of the key moments that contributed to the appearance of this complex in the 21st c. The recent conservation and restoration intervention and the development of the area within the entrance complex have revived the visual unity of the previously disjointed parts in a manner that allows passers-by

Pretraživanje dokumentacije vezane uz dva pilastra pridonijelo je poznavanju izvornog izgleda gradskog ulaznog kompleksa antičke Pule te značajnih trenutaka koji su dali doprinos izgledu kompleksa u 21. stoljeću. Konzervatorsko-restauratorski zahvati, kao i uređenje prostora unutar ulaznog kompleksa, ponovno su iz tada dva odvojena dijela stvorili vizualnu cjelinu koja može prolazniku dati uvid u nekadašnju impozantnu, jedinstvenu monumentalnu strukturu.

to appreciate what was once an imposing and single monumental structure.

LITERATURA / LITERATURE

- FISCHER, G. 1996. *Das römische Pola*, München, 66-67.
- FORLATI TAMARO, B. 1932. Cenni preliminari sulle recenti scoperte archeologiche a Pola e Trieste, *Atti e Memorie della Società Istriana di Archeologia e Storia Patria*, vol. 44, Poreč, 325-328.
- GNIRS, A., Grabungen und antike Denkmale in Pola, *Jahreshefte des Österreichischen Archäologischen Institutes*, 1912, 241-242.
- KANDLER, P. *Atti del Conservatore*, Sveučilišna knjižnica i čitaonica Pula.
- KANDLER, P. *L'Istria*, vol. 79, 1847.
- MADER, B. 2011. Die österreichische Denkmalpflege in Pola 1816-1918, *Anzeiger der philosophisch-historischen Klasse*, Wien, 5-90.
- MATIJAŠIĆ, R., BURŠIĆ-MATIJAŠIĆ, K. 1996. *Antička Pula*, Pula, 61.
- MLAKAR, Š. 1978. *Antička Pula*, Pula.
- PAVAN, G. 1998. Architetto conservatore di monumenti antichi, *Pietro Nobile architetto*, Gorizia, 377-433.
- RUSCONI, L. 1926. Pietro Nobile e i monumenti romani di Pola, *Archeografo Triestino*, vol. 13, serie 3, 343-358.
- WEISSHÄUPL, R. 1892. Die römischen Alterthümer in Pola, *Programm des k.k. Staats-Gymnasiums in Pola*, Pula, 5-25.
- WEISSHÄUPL, R. 1894. Ausgrabungen in Pola. *Mittheilungen der kaiserl. königl. Central-Commission zur Erforschung und Erhaltung der Baudenkmale*, Wien, 220-221.