Military Architecture between Theory and Practice in the Early Modern Eastern Adriatic

Papeš, Karla

Università
Ca'Foscari
Venezia

University of Zagreb

Ca' Foscari University of Venice

University of Zagreb, Faculty of Humanities and Social Sciences

Karla Papeš

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Architettura militare tra teoria e pratica nell'Adriatico orientale della prima età moderna

PhD Coordinator
Full Professor Pier Mario Vescovo
Supervisor
Associate Professor Jasenka Gudelj

PhD Coordinator *cotutelle*
Associate Professor Davor Nikolić
Supervisor *cotutelle*
Full Professor Bernardina Petrović

PhD Student
Karla Papeš
Matricola 956572

Sveučilište u Zagrebu

Filozofski fakultet

Karla Papeš

Vojna arhitektura između teorije i prakse na ranonovovjekovnome istočnom Jadranu

DOKTORSKI RAD

Mentori:

izv. prof. dr. sc. Jasenka Gudelj
prof. dr. sc. Bernardina Petrović

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ABOUT THE SUPERVISORS

Jasenka Gudelj is an Associate Professor of Architectural History at the University of Ca' Foscari in Venice and Director of the European Research Council (ERC) project "Architectural Culture of the Early Modern Eastern Adriatic" and the Italian Ministry of Science (FARE) project "Architectural Culture of Contact Regions in the Early Modern Adriatic". She has studied and lectured at the University of Zagreb, the University of Pittsburgh, and the Max Planck Institute for Art History – Bibliotheca Hertziana in Rome.

She has led research projects funded by the HAZU Foundation, the Croatian Science Foundation (HRZZ) – "Visualisation of Nationhood. Confraternities and Colleges of Schiavoni/Ilyirians in Italy and Exchange of Artistic Experiences with Southeast Europe (15th–18th Century)" and "Unz – Migration, Networks, Identities: Schiavoni, Greeks and Visual Arts between Italy and Croatian Historical Lands (15th-18th century)". She also actively participated in projects supported by the Croatian Ministry of Science (PIs Igor Fisković and Nada Grujić) and in international research projects: "Cosmopolitan City" (PI Donatella Calabi, IUAV, Venice), "Portable Antiquities" (PI Alina Payne, Max Planck Foundation, Harvard University) and "Roma communis Patria" (PI Susanne Kubersky-Piredda, Max Planck Foundation, Bibliotheca Hertziana).

Gudelj is the author of numerous studies on the history of architecture in the Adriatic region, focusing on the circulation of artistic and architectural knowledge through various media and networks. For the book, the *Europska renesansa antičke Pule* (*European Renaissance of Ancient Pula*, Školska knjiga, Zagreb, 2014) she received the Croatian National Science Award. She held more than forty presentations at scientific conferences, published over forty scientific and professional papers on the history and theory of the art and architecture of Renaissance and Baroque in significant international and national publications, edited four scientific books, curated three exhibitions, organised more than twenty scientific and professional conferences and sessions, translated two professional books and held a series of public and invited lectures. She was the head of a scientific event, "Dani Cvita Fiskovića", with a twenty-year tradition and editor-in-chief of a serial publication derived from it, for which she received the Charter of the Croatian Society of Art historians for the enhancement and Promotion of Art history (2019).

Bernardina Petrović, Full Professor, was born on the 24th of December 1965 in Vinkovci, Croatia. She obtained university degree in Croatian language and literature in 1991, master's degree in 1999, and doctorate in 2003. From 1991 to 1993, she taught Croatian language and literature in primary and secondary schools. From 1993 to 2004, she was employed at the Institute for Linguistic Research at the Croatian Academy of Sciences and Arts. Since 2004, she has worked in the Section of Croatian Standard Language under the Department of Croatian Language and Literature at the Faculty of Humanities and Social Sciences. She teaches compulsory and elective courses at the undergraduate and graduate programs (*Hrvatski standardni jezik – fonologija i morfonologija, Hrvatski standardni jezik – morfologija, Hrvatski jezik za nastavnike, Hrvatski jezik u digitalnome dobu, Hrvatska leksikologija, Normativne razine hrvatskoga standardnog jezika, Semantika hrvatskoga jezika,* and *Tekstna lingvistika*). As an external associate, she taught Croatian Standard Language at the Faculty of Teacher Education during the a. y. 2006/2007. From the a. y. 2008/2009 up to 2021/2022, she taught Croatian language in engineering practice at the Faculty of Electrical Engineering and Computing. Additionally, she facilitated collaboration between the Faculty of Humanities and Social Sciences and two departments at the University of Zagreb, the Department of Biology at the Faculty of Science for the *Genetikon* project, and the Department of Telecommunications at the Faculty of Electrical Engineering and Computing for the *PozdraviMe* project. During the a. y. 2007/2008, she was a visiting professor at the Institute of Slavic Studies at the University of Graz under a CEEPUS scholarship. She has published five books and ninety papers in scientific journals and proceedings and has participated in around eighty international and domestic scientific conferences. From 1999 to 2004, she was the secretary of the Philology editorial office. From 2012 to 2017, she was the president of the State Commission for the Croatian Language Competition. She is a member of the editorial board of the scientific journal *Croatica* (since 2016) and the editor-in-chief of the Velika Gorica magazine *Luč* (since 2013). She has actively participated in organising several scientific gatherings and congresses and in editing scientific and professional publications. She delivered approximately seventy invited lectures at professional gatherings, seminars, summer schools, and popular science forums. During the a. y. 2014/2015 and 2015/2016, she was the head of the Department of Croatian Language and Literature. She is a member of the Croatian Philological Society and was a vice president of the Matica Hrvatska Branch in Velika Gorica from 2008 to 2018. In 2021, she was awarded the Zagreb City Award as a working group and project team member of the scientific research and publishing project *Povijest hrvatskoga jezika od srednjeg vijeka do 21. stoljeća*.

ABSTRACT

Military architecture, which emerged in the Eastern Adriatic as an active battlefield between the 1460s and 1660s, was a revitalised response to the invention and use of firearms. At the same time, texts on military architecture became increasingly popular in Europe. This research focuses on the circulation, adaptation, and use of theoretical and practical fortification knowledge in the Eastern Adriatic under the Republics of Venice and Ragusa. It compares the formal characteristics of buildings, archival material, and treatises, and it also includes a terminological analysis of the sources, considering innovative technical terms as one of the main means of disseminating and applying knowledge. The first hypothesis suggests that Early Modern fortification architecture in the Eastern Adriatic depended on speculative designs by influential military experts. Unsubstantiated theories led to experimental and non-functional structures, marking a crucial point in the history of Eastern Adriatic fortifications. Moreover, in the perpetual state of war, the Eastern Adriatic fortifications directly witnessed changes in fortification science and served as a testing ground that validated hypotheses and shaped new theoretical solutions through practical experience. The third hypothesis proposes that the formulation of Croatian fortification terminology is rooted in insights from Early Modern military architecture, mainly influenced by Italian terminology. The comparison of theoretical instructions in treatises with architectural designs by Michelozzi in Dubrovnik, the Sanmicheli family workshop in Zadar, Giangirolamo Sanmicheli's fortress of St. Nicholas, and De Ville's project in Pula showed that the Eastern Adriatic fortifications directly reflected changes in fortification science. In the case of Zadar, new theoretical solutions were combined with practical changes. Giangirolamo's and De Ville's fortifications were interpreted as experimental structures. The example of Dubrovnik and the case study of besieged fortresses in Šibenik and Split were proven examples of the harmonisation of theory and practice.

KEYWORDS

fortifications, military architecture, Eastern Adriatic, Early Modern Period, treatises, art of war, terminology

RIASSUNTO

L’architettura militare creata sulla costa orientale dell’Adriatico come area di combattimento attiva tra il 1460 e il 1660 rappresentò una risposta rivitalizzata all’invenzione e all’uso delle armi da fuoco. Allo stesso tempo, l’Europa registra anche la crescente popolarità di testi teorici, sia istruzioni pratiche che manuali standardizzati sulla costruzione, trattati. Questa ricerca si concentra sulla circolazione, l’adattamento e l’uso delle conoscenze teoriche e pratiche sulle fortificazioni sulla costa orientale dell’Adriatico sotto le repubbliche di Venezia e Ragusa nel periodo citato. Si propone un confronto tra trattati, materiale d’archivio sulla costruzione e manutenzione delle fortificazioni prescelte e le loro caratteristiche formali. Inoltre, la ricerca comprenderà anche un’analisi terminologica, assumendo che il linguaggio e il materiale pittorico costituissero il principale mezzo di flusso e acquisizione delle conoscenze sull’architettura militare.

PAROLE CHIAVI

fortificazioni, architettura militare, Adriatico orientale, prima età moderna, trattati, arte di guerra, terminologia

PROŠIRENI SAŽETAK

Napredak, protok i usvajanje znanja o vojnoj arhitekturi istražuju se u kontekstu vojne teorije i prakse između 1460-ih i 1660-ih godina na dijelu obalnoga teritorija današnje Republike Hrvatske koji je tijekom toga razdoblja bio u sastavu Mletačke i Dubrovačke Republike. U navedenome su vremenskom okviru neprestani ratovi uzrokovali učestalu promjenu granica čineći istraživani teritorij pogodnim za proučavanje razvoja vojne arhitekture. Usto s obzirom na to da je riječ o razdoblju kada se umijeće ratovanja izdvaja kao zasebna znanost, naročito zahvaljujući unapređenju balistike i geometrije te ratne strategije i arhitekture, postavlja se pitanje kako je protjecalo znanje o modernim načelima fortificiranja na području na kojemu je bilo najpotrebnije, ali i kako mu se prilagodilo.

U ovome je istraživanju izdvojeno pet studija slučaja. Obilježili su ih događaji značajni za povijest vojne arhitekture istočnoga Jadrana i Europe, poput boravka proslavljenih vojnih arhitekata i inženjera ili vođenja odlučujućih bitaka protiv osmanske vojske koje su odredile daljnji tijek ratova i uspostavu granica. Uz sačuvane je primjere arhitektonske obrambene baštine glavni izvor istraživanja bila pisana riječ čineći pritom svojevrsni korpus, od izvješća političkih tijela i dužnosnika, službenih nadzornih izvješća vojnih stručnjaka i autora projekata do traktata, to jest stručne literature o fortifikacijskoj arhitekturi. Istraživanjem se pisanih izvora prvenstveno htjelo propitati usvajanje i optjecaj novih znanja i vještina na istočnome Jadranu, ali i ukazati na ključnu ulogu nekolicine različitih jezika i njihova stručnog nazivlja u tim procesima kroz sve veću potrebu bilježenja podataka o vojnim i fortifikacijskim temama.

Rastući se interes za balistiku i vojnu arhitekturu u traktatima potvrdio neprestanim ispitivanjima tradicionalnih i postojećih modela fortifikacija, ali i predlaganjem novih. Stoga se razmatralo moguće uključivanje vojne arhitekture istočnoga Jadrana u ranonovovjekovnu traktatistiku, s obzirom na to da su zauzimale poseban položaj na graničnome prostoru nekoliko zemalja. Osim toga su autori traktata poput Bonaiuta Lorinia, Francesca Tensinia i Antoinea de Villea izravno sudjelovali u odlukama o utvrđivanju istočnoga Jadrana i bilo je potrebno propitati njihove teorijske pristupe, ali i prijedloge i odluke za odabrane studije slučaja. Uzme li se pritom u obzir i prisutnost prijašnje generacije istaknutih arhitekata poput Michelozza Michelozzia i radionice obitelji Sanmicheli, njihova su rješenja dalekosežno utjecala na prihvaćanje novih znanja o vojnoj arhitekturi, ali i širenje fortifikacijskoga nazivlja krajem petnaestoga stoljeća i u prvoj polovini šesnaestoga stoljeća.

U drugoj je polovini petnaestoga stoljeća fortifikacijske forme prvenstveno određivala sposobnost odupiranja napadačkome topništvu. No tijekom šesnaestoga je stoljeća novi pristup

ignorirao otpor i naglasio potrebu bočne paljbe koja je jedina omogućavala obranu. Stoga je cilj vojne prakse bio provesti spoznaje i opravdanja postojećih teorija. Smatralo se da jednom kada se ustanovio model bočne vatre koji se prihvatio kao teorijska norma, praksa više nije imala utjecaja i nije mogla promijeniti opći teorijski okvir. No istraživanje je istočnojadranske vojne arhitekture ukazalo da je praksa imala utjecaj u poboljšanju teorijskih načela novim eksperimentalnim rješenjima. Iako praksa nije mogla stvoriti nove principe projektiranja fortifikacija, mogla je projektirati nova rješenja sa zadanim principima. Stoga se izdvajaju dvije hipoteze o odnosu teorije i prakse na istočnome Jadranu. Prvo, vojna arhitektura ranonovovjekovnoga istočnog Jadranu ovisila je o hipotetskim prijedlozima utjecajnih vojnih stručnjaka. Ako njihove teorije nisu mogle biti dokazane, navedene su fortifikacije napuštene kao primjeri neuspjelih eksperimenata i nefunkcionalne strukture. Drugo, istočnojadranska je vojna arhitektura, obilježena neprestanom ratnom opasnosti, izravno svjedočila promjenama u uznapredovanoj vojnoj znanosti. Fortifikacije se mogu istražiti kao poligoni za potvrđivanje hipoteza vojnih stručnjaka, pritom definirajući nove teorijske principe usavršene novim rješenjima u praksi.

Prva studija slučaja istražuje promjene nastale dolaskom Michelozza Michelozzia 1460-ih godina u Dubrovnik i njegovim projektom modernizacije gradskih zidina. Michelozzi je morao zadržati dotadašnje srednjovjekovne zidine, ali je pritom osmislio projekt novoga sustava. Na taj je način omogućio istovremenu zaštitu i od hladnoga i vatrenoga oružja i povezao sustav obrane. Također je njegov projekt ljevkastih kazamata omogućio pravilno i brzo odvođenje dima. Projekt Minčete slijedio je onodobna načela fortificiranja, kako je ubrzo propisao i Francesco di Giorgio Martini. Michelozzi se prilagodio postojećoj strukturi gradskih zidina, usavršivši je radi zaštite od vatrenoga oružja. No zanemario je opasnost okolnih uzvisina oko grada i njegovih glavnih obrambenih točaka. Pitanje uzvisina već se krajem petnaestoga stoljeća ukazalo kao jedan od ključnih problema dobro promišljene obrane gradova.

Druga je studija slučaja eksperimentalni projekt zadarskih jugoistočnih gradskih zidina Michelea Sanmichelia tijekom 1530-ih godina. U Micheleovu je slučaju upitno može li se govoriti o oblikovanju standardiziranoga modela. Prije bi se radilo o prilagodbi postojećim nedostacima gradilišta. No iako je u početku bila riječ o hvaljenu projektu, ubrzo se ukazalo na njegove nedostatke o kojima svjedoče predstavljena izvješća političkih i vojnih lica Mletačke Republike. Iako bi se projekt Michelea Sanmichelia i njegove obiteljske radionice mogao ispitati kao primjer pokušaja i pogreške, radi se o završenome projektu prema ideji Sforze Pallavicina krajem 1560-ih i početkom 1570-ih godina. Stoga se može govoriti o procesu standardizacije fortifikacijskoga znanja. Početne su projektne pogreške ubrzo bile ispravljene,

a na njih je ukazao i Giulio Savorgnano u desecima stranica o potrebnim poboljšanjima modela, gradnje, opreme i upravljanja zadarskim fortifikacijama. Za vojnu je povijest Zadra bio značajan vojni inženjer i traktatist Bonaiuto Lorini koji je 1580-ih radio na gradskim fortifikacijama i uvrstio ih u svoj traktat *Delle fortificationi di Bonaiuto Lorini libri cinque* iz 1596. godine. Uvrštavanje primjera istočnojadranske vojne arhitekture u traktat jednoga od najistaknutijih autoriteta vojne znanosti uključuje zadarske fortifikacije kao usporediv uzor u stručnu literaturu i ukazuje na njihov značaj u autorovu opusu. Pritom se omogućuje razumijevanje uloga vojnih stručnjaka koji su sudjelovali u utvrđivanju Zadra te su bili začetnici pojedinih modela, od obitelji Sanmicheli do Sforze Pallavicina i Bonaiuta Lorinia. Uključenje zadarskih fortifikacija i njihovih značajki u traktat Bonaiuta Lorinia omogućilo je njihovu dostupnost široj javnosti, naročito jer je autor oblikovao navedeni dio traktata kao fiktivnu raspravu dvojice vojnih stručnjaka. Širenje je tiskanih traktata omogućilo pojedincima izvan bliskih vojnih krugova upoznavanje i potencijalno raspravljanje i o zadarskim fortifikacijama. Zadarski je primjer, uz neobjavljeni rukopisni traktat Dubrovčanina potpisanoga kao Michielle Hraniaz iz 1617. godine, dosad jedini istaknuti primjer istočnojadranskih fortifikacija u vojnoj traktatistici.

Ono što se 1540-ih godina smatralo inovativnim i iznimnim rješenjem vojne arhitekture za tridesetak je godina postalo neprimjereno i zastarjelo na primjeru šibenske Tvrđave Sv. Nikole. Riječ je o otočnoj obrambenoj građevini trokutnoga tlocrta nastaloj prema projektu Giangirolama Sanmichelia. Karakteristični su položaj i tlocrt ujedno bili i problematična i česta tema vojnih stručnjaka i traktatista pri projektiranju tvrđava. Stoga se ovaj jedinstven i značajan primjer istočnoga Jadrana istražuje usporednom mnogobrojnih izvještaja iz druge polovine šesnaestoga stoljeća koji ukazuju na različita shvaćanja prihvatljivosti tvrđavnoga projekta i razumijevanje funkcionalnosti vojne arhitekture određene tipologije s uputstvima i preporukama iz traktatistike.

Prijedlog određenih rješenja gradnje fortifikacija u traktatistici i njihova realizacija na istočnome Jadranu mogu se propitati i na pulskome primjeru. Naime vojni je inženjer Antoine de Ville početkom 1630-ih godina predstavio projekt za dvije tvrđave u Puli. Gradnja je otočne tvrđave zaustavljena na samome početku i nastavilo se s gradnjom tvrđave na brežuljku koja čini četvrtu studiju slučaja ove disertacije. De Ville je u svojemu traktatu, koji je prvi put objavljen 1629. godine, razmatrao različite položaje fortifikacija i pritom ih podijelio prema njihovu obliku na pravilne i nepravilne. Pravilne su fortifikacije imale jednake stranice i kutove, s pripadajućim jednakim bastionima na kutovima. Međutim u disertaciji se ukazalo na potrebu razmatranja funkcionalnosti tvrđave jer nikada nije bila dovršena, a u izvještajima su pronađeni

dokazi o njezinoj neučinkovitosti. Stoga se propituje odnos početnoga projekta, procesa gradnje i neostvarenoga rješenja.

Kandijski rat (1645.–1669.) jedan je od ratova koji su odredili raspodjelu istočnojadranskih područja i doveli do djelomična oslobađanja od osmanske vlasti. Posljednja studija slučaja predstavlja usporedbu dviju istočnojadranskih tvrđava izgrađenih tijekom ratne opasnosti koje su pritom morale odgovoriti na izazove opsada testirajući njihovu obrambenu funkciju. Riječ je o Tvrđavi Sv. Ivana u Šibeniku tijekom manjega napada 1646. i odlučujuće opsade 1647. godine i Tvrđavi Gripe u Splitu tijekom višestrukih napada 1657. godine. Obje su tvrđave zamišljene kao vanjski sustav obrane najugroženijih dijelova u blizini grada. Njihova se funkcionalnost i način opsade istražuju i u kontekstu tadašnje već razvijene vojne traktatistike i rješenja vođenja napada i obrane.

Ovom se disertacijom istražuje i jedan od ključnih problema prilikom istraživanja vojne arhitekture – hrvatsko nazivlje – koje zasad nije sustavno organizirano, a nedoumice izaziva i pojavnost više naziva za isti element ili tip građevine. Također se nameće i pitanje neposredne komunikacije među sudionicima izgradnje fortifikacijskih objekata, na primjer kako su se sporazumijevali nadređeni i podređeni, tj. kako su komunicirali. Stoga je treća hipoteza da je uspostavljanje i ustavljivanje hrvatskoga fortifikacijskog nazivlja utemeljeno na teorijskim polazištima i praktičnim znanjima ranonovovjekovne vojne arhitekture pretežno talijanskoga fortifikacijskog nazivlja. Istraživanje se temeljilo na prvome istraživanju takve vrste iz 2019. godine koje se u disertaciji naziva prvom fazom. Obrada traktata ukazala je da su njihovi autori definirali i ukazivali na važnost novih naziva fortifikacijske arhitekture i njihovo pravilno definiranje i razumijevanje. Prisutnost brojnih političkih i vojnih dužnosnika na istočnoj obali Jadrana utjecala je na njihovo širenje i usvajanje. Istraživanje je omogućilo izdvajanje novoga francuskog korpusa kako bi se ispitale njihove potvrde u rječnicima i literaturi. Također su određeni daljnji razvojni stupnjevi u sveukupnome istraživanju hrvatskoga fortifikacijskog nazivlja.

KLJUČNE RIJEČI

fortifikacije, vojna arhitektura, istočni Jadran, rani novi vijek, traktati, umijeće ratovanje, terminologija

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1 INTRODUCTION

1.1 SUBJECT OF RESEARCH

Between the fifteenth and seventeenth centuries, the Eastern Adriatic was a frontier zone divided between the Venetians, the Ragusans, the Habsburgs and the Ottomans. The constant need to defend territories led to extensive building campaigns, creating an architecture capable of responding to new weapons. In other words, the introduction and further extensive use of gunpowder and artillery led to a race to build fortresses and major investments in defensive architecture. This process went through the experimental trial-and-error phase to gradually arrive at standardised methods of fortification, corresponding to the rise of theoretical writings on the subject across Europe. Therefore, focusing on the mechanisms, media and actors of knowledge circulation, the present research examines the relationship between architectural practice in the Eastern Adriatic and the emergence of fortification theory.

Early Modern fortifications in Europe are a widely discussed topic. However, much less research has focused on the coastal areas of present-day Slovenia, Croatia, and Montenegro, despite the fact that this was a specific frontier area in constant danger of siege and therefore directly dependent on the development of scientific disciplines in the arms race. The main research question is how knowledge of the predominantly defensive architecture was developed, disseminated, and adapted in the midst of constant warfare. Second, the sixteenth century witnessed the rise of books on architecture, including fortifications, which soon became exclusively specialised military treatises transmitting new knowledge. What role did they play in the construction of the Eastern Adriatic? Thirdly, could the Eastern Adriatic as a space of experimentation influence the standardisation of knowledge recorded in treatises, either in general or locally? On the other hand, how (successfully) did the gradual standardisation influence some architectural solutions in the region under study? Moreover, how were these new norms evaluated in the construction of fortifications? Who were the actors who disseminated the new knowledge?

This area is characterised by frequent border changes due to constant warfare, especially with the well-armed Ottomans[1]. Due to the wide geographical scope, it was necessary to limit the

[1] Grgin, Borislav. "The Ottoman influences on Croatia in the second half of the fifteenth century." *Povijesni prilozi* 23 (2002): 87–102.

research focus to the most advanced cases, all built by the two maritime republics, Venice, and Dubrovnik. As a result, five specific case studies were identified, now located in the territory of the Republic of Croatia. In addition, the temporal scope for addressing the research questions was limited to the period between 1460 and 1660, which was considered to be the most indicative of the research problems cited, as follows: the trial-and-error method in Dubrovnik in the early 1460s, the harmonisation of practice and theory in Zadar between the 1530s and the 1560s, the standardisation in the Fortress of St. Nicholas in Šibenik's from 1540, Antoine de Ville's originally ideal design for the fortress in Pula that faced challenges in its execution, and besieged monumental seventeenth-century fortresses in Šibenik and Split during the War of Candia (1645–1669).

The selected examples of fortification architecture were chosen on the basis of the following criteria: monumentality; significant financial investment; involvement of important actors (military architects, military engineers, generals and captains); existence of written documents on the design and construction of a specific fortification or testimony to its subsequent importance; a siege as a test of the fortification; influence of theoretical models; fortifications as possible models for future designs, constructions and theoretical observations. Furthermore, the selected examples correspond to the historical territories of the Republic of Venice and the Republic of Dubrovnik (Ragusa). While acknowledging Habsburg and Ottoman control over parts of the Eastern Adriatic, the research revealed that these political entities did not place the same emphasis on fortifying their littoral possessions. Moreover, the comparison between the two maritime republics allows for a more systematic study of the processes of territorialisation and standardisation, which can only be compared with those of the empire in a second step, which is beyond the scope of this research for the time being.

The growing interest in contemporary ballistics and fortification is evident in many Early Modern printed books, especially from the sixteenth century, which were used as fortification manuals, reviewing traditional, existing models, and proposing new ones. The authors of the treatises referred to tradition, but introduced new solutions and norms, both written and illustrated, thus equating the so-called art of war with science and scientific disciplines, distinct from experience and practice[2]. Alina Payne's influential research has challenged the duality of

[2] See Gudelj, Jasenka and Dubravka Botica. *Arte et Marte: knjige o arhitekturi u Zriniani*. Zagreb: Nacionalna i sveučilišna knjižnica, 2012; Fara, Amelio. *Il sistema e la città: architettura fortificata dell'Europa moderna dai trattati alle realizzazioni 1464–1794*. Genoa: Sagep Editrice, 1989; Mallagh, Christopher. "Science, Warfare and Society in the Renaissance, with Particular Reference to Fortification Theory." PhD diss., University of Leeds, 1981.

theory and practice in Renaissance architectural treatises[3], while Christopher Mallagh's study of fortifications and fortification treatises has included a large number of texts on the response to artillery and related siege techniques[4].

Noting the parallel development of fortifications and publications on the subject, and considering the importance of the Eastern Adriatic as a war-torn borderland between four rival states, this research conducts a comparative analysis of case studies and knowledge recorded in treatises and other written sources selected for their relationship to the Eastern Adriatic and their wider circulation in this part of Europe. It tests two hypotheses:

1. Fortification architecture in the Early Modern Eastern Adriatic depended on the hypothetical designs of influential military experts. If their theories could not be proven, these fortifications remained mere experiments and non-functional structures.

2. The Eastern Adriatic fortifications, as the structures directly related to the ever-present war, directly witnessed the changes in fortification science. Located in the war zone, these fortifications were polygons for the confirmation of hypotheses, thus defining new theoretical solutions modified by practice.

The diffusion of theoretical and practical concepts of military fortification architecture depended on the pair of "tools for knowledge spread" – visual sources and expert terminology – because of their extensive repetition and possible standardisation in diverse sources studied. Images of fortifications and expert terms are two constants that repeat and diffuse from treatises to instructions on military matters, from detailed prints to simplified geographical maps, and from image captions to tables of contents and indexes. Images as visual source differ due to function and typology, for example, from diagrams to pictorial scenes, the latter even representing cities and reconstructions of battles. On the other hand, expert military terminology of fortification, particularly in the once multilingual area, is still an open problem. Therefore, it is particularly interesting to study Croatian, a language that lacks Early Modern theoretical writings on fortification but is rich in literary and dictionary production. Looking at the present-day Croatian part of the Eastern Adriatic, the appearance of multiple terms for the same

[3] Payne, Alina. *The Architectural Treatise in the Italian Renaissance: Architectural Invention, Ornament, and Literary Culture*, Cambridge University Press, 1999.

[4] Mallagh, "Science, Warfare and Society", 316.

architectural element or building type makes their study and use less clear[5]. Croatian terminology has been heavily influenced by other languages previously used in the area and has yet to be systematically organised. Historically, there was the problem of direct contact between participants on the construction sites, between superiors and subordinates.

Therefore, the third hypothesis of the present research is that the establishment and codification of fortification terminology in Croatian was mainly based on the standardisation of Italian fortification terminology, which was widely spread in the area. The influence of Latin and, from the nineteenth century, French and German should also be considered.

1.2 STATE OF THE ART

The Eastern Adriatic fortifications have been a part of historiography since Giorgio Vasari's biographies of famous artists in the mid-sixteenth century. In his 1568 edition of *Vite*, Vasari included a chapter on Michele Sanmicheli and his workshop, mentioning their Dalmatian projects in Zadar and Šibenik[6]. Vasari's mentioned biographical model continued in the eighteenth century with Bartolomeo Dal Pozzo[7], Tommaso Temanza[8], and Francesco Milizia[9] expanding on the Sanmichelis in Dalmatia. This continued in the following century, as publications by Antonio Giovanni Selva[10], Ferdinando Albertolli[11], and Francesco Ronzani

[5] See more in Papeš, Karla. "Terminologija hrvatske fortifikacijske arhitekture." MA thesis. Filozofski fakultet Sveučilišta u Zagrebu, 2019.

[6] Vasari, Giorgio. *Delle vite de' più eccellenti pittori, scultori, e architettori scritte da M. Giorgio Vasari pittore et architetto aretino. Secondo, et ultimo volume della terza parte*, Florence: Appresso i Giunti, 1568.

[7] Dal Pozzo, Bartolomeo. Le vite de' pittori, degli scultori et architetti veronesi, Verona, 1718.

[8] Temanza, Tommaso. *Vite dei più celebri architetti e scultori veneziani che fioriscono nel secolo decimosesto*, Venice: C. Palese, 1778.

[9] Milizia, Francesco. *Memorie degli architetti antichi e moderni I*. Bassano, 1785.

[10] Selva, Giovanni Antonio. *Elogio di Michel Sanmicheli, architetto civile e militare: letto nella Cesarea Regia Veneta Accademia di Belle Arti per la distribuzione de' premi il dì 7 agosto 1814*. Rome: De Romanis, 1814.

[11] Albertolli, Ferdinando. *Porte di città e fortezze, depositi sepolcrali ed altre principali fabbriche pubbliche e private di Michele Sanmicheli, veronese*. Milan: Cesarea Regia Stamperia, 1815.

clearly show[12]. During the 1870s, Antonio Bertoldi authored a book about Michele's service in the Serenissima[13].

In the second half of the 19th century emerged the publications on art and architectural history in Croatian language, thus forming a new perspective on the Eastern Adriatic military architecture. In 1858, Ivan Kukuljević Sakcinski, continuing the Vasarian biographical tradition, included "Mihaljo San Micheli" and "Ivan Jerolim San Michele"[14] in his seminal work of Croatian national art history, *Slovnik umjetnikah jugoslavenkih* (*The Dictionary of South-Slavic Artists*). Sakcinski applied two main criteria to his choice of "Yugoslav" artist: the Eastern Adriatic origin (sometimes indicated by a "Schiavone" last name) and the activity in the historical Croatian lands. His writings, heavily based on archival research, became the basis for a historiographical tradition that remained virtually unknown to non-speakers of Croatian[15].

In the decades leading up to World War II, authors such as Thomas Graham Jackson, Giuseppe Sabalich, Vitaliano Brunelli, and Carlo Cecchelli wrote about the history of Zadar, opening a debate on the attribution of single fortifications[16]. According to most authors, Giangirolamo executed the fortification works based on Michele's designs. This was in contrast to Del Pozzo's and Temanza's earlier hypotheses, favouring Giangirolamo. Antonio Morassi's "lost" monograph on Sanmicheli, based on his thesis written in German at the Vienna university, would have been the first modern monograph on the artist in the 20th century[17]. In 1933, Ljubo Karaman highlighted the role of the two Sanmichelis in his book on the art of Dalmatia between

[12] Ronzani, Francesco and Gerolamo Luciolli. *Le fabbriche ecclesiastiche e militari di Michele Sanmicheli*. Verona: Giuseppe Antonelli Editore, 1823.

[13] Bertoldi, Antonio. *Michele Sanmicheli al servizio della Republica Veneta. Documenti tratti dal Regio Archivio generale di Venezia*. Verona: Franchini, 1874.

[14] Kukuljević Sakcinski, Ivan. *Slovnik umjetnikah jugoslavenkih,* Zagreb: Tiskom Narodne tiskarne Dra. Ljudevita Gaja, 1858, 395, 396.

[15] Mance, Ivana. *Zèrcalo naroda. Ivan Kukuljević Sakcinski: povijest umjetnosti i politika*, Zagreb: Institut za povijest umjetnosti, 2012, 79.

[16] Jackson, Thomas Graham. *Dalmatia, Quarnero and Istria 1*, Oxford: Clarendon Press, 1887; Sabalich, Giuseppe. *Guida archeologica di Zara.* Zadar: Woditzka, 1897; Brunelli, Vitaliano. "Le opere fortificatorie e la compagnia degli Artiglieri del Comune di Zara." *Rivista dalmatica* 3, 1904; Cecchelli, Carlo. *Catalogo delle cose d'arte e di antichità d'Italia. Zara*. Rome: Treves, 1932.

[17] Zavatta, Giulio. *Il Michele Sanmicheli di Antonio Morassi. La tesi all'Università di Vienna e una monografia perduta (1916–1920)*. Treviso: ZeL Edizioni, 2022.

the 15th and the 16th centuries published in Croatian[18]. Eric Langenskiöld published another crucial monograph on Michele in 1936, this time in English[19]. Angelo De Benvenuti published in 1940 his book on Zadar and its fortifications[20].

After the war, diverse research on warfare, fortification design, and construction emerged. Year 1955 marked significant changes in a long-lasting approach to military history studies. Michael Roberts' 1955 theory on the military revolution between the 1550s and 1660s identified four ground-breakable elements in Early Modern warfare: tactics, strategy, army size, and the general impact on society[21]. During the early 1960s, Horst de la Croix published his influential texts on the importance of military treatises, manuscript records and designs. He also discussed the idea of an overall fortification literature developed in Italy during the so-called Renaissance[22]. In the late 1970s, Roberts' theses on military revolution sparked new discussions and elaborations, giving more importance to military literature. Geoffrey Parker argued that changes in fortification techniques from the late fifteenth century onwards were revolutionary. He also considered developments such as specialised military education, military academies, and the emergence of extensive literature on the art of war as revolutionary[23]. In his book on Renaissance fortifications, J.R. Hale suggested that changes in the building styles of churches and palaces were parallel to the revolution in fortification design[24]. In 1980, Hale published a work discussing military literature, evoking the so-called book industry in Renaissance Venice[25]. Moreover, the experts in fortification architecture were one of the topics of Christopher Mallagh's 1981 dissertation, in which he explained the diffusion of military knowledge. Mallagh analysed sixteenth-century fortification treatises and the approaches and methods of military experts, highlighting a strict division between fortification theory and

[18] Karaman, Ljubo. *Umjetnost u Dalmaciji – XV i XVI vijek*. Zagreb: Matica hrvatska, 1933.

[19] Langenskiöld, Eric. *Michele Sanmicheli, the Architect of Verona, his Life and Work*. Uppsala: Almqvist & Wiksell, 1938.

[20] De Benvenuti, Angelo. *Zara nella cinta delle sue fortificazioni*. Milan: Fratelli Bocca Editore, 1940.

[21] Compare Black, *European Warfare*, 32; Parker, "The 'Military Revolution'"; Parker, *The Military Revolution*, 2; Rogers, "The Military Revolutions"; Rogers, The Military Revolution Debate.

[22] De la Croix, "The Literature on Fortification"; De la Croix, "Military Architecture"; De la Croix, "Palmanova"; De la Croix, *Military Considerations*.

[23] Parker, "The 'Military Revolution'", 2, 197.

[24] Hale, John Rigby. *Renaissance fortification. Art of engineering*. London: Thames and Hudson, 1977, 14.

[25] Hale, John Rigby. "Industria del libro e cultura militare a Venezia nel Rinascimento". Storia della cultura veneta 3 (1980): 245–288.

practice[26]. More recently, Kelly DeVries questioned the rise of the Early Modern states and its connection with the impact of gunpowder and new warfare techniques[27], Jeremy Black argued that the development of European warfare between 1494 and 1660 focused on technology and innovation[28].

Regarding the post-WWII historiography in Croatian, Lukša Beritić played a crucial role as the author of several works on the fortifications of the Republic of Ragusa[29]. In 1955, he published a monumental monograph on the fortifications of the city of Dubrovnik[30]. The author presented manuscript material on the decisions of Ragusan councils regarding the construction and inventories of the fortifications from the present-day State Archives in Dubrovnik (DAD) in chronological order, using paraphrased translations. In 1965, Maja Novak wrote about Zadar in the context of the provincial capital[31], and in 1968, Ana Deanović, a prominent Croatian art historian, published her first significant text on the two Sanmichelis[32]. Deanović would dedicate a lifetime to fortifications, publishing on Michelozzo Michelozzi in Dubrovnik[33], much investigated by Harriet McNeal Caplow[34], and fortification works by Juraj Dalmatinac[35]. She also dedicated several texts to fortification historical terminology, publishing in French[36] and

[26] Mallagh, "Science, Warfare and Society."

[27] DeVries, Kelly. "Gunpowder Weaponry and the Rise of the Early Modern State." *War in History* 5/2 (1998): 127–145.

[28] Black, *European Warfare*, 50.

[29] Beritić, "Miho Hranjac"; Beritić, "Stonske utvrde"; Beritić, "Stonske utvrde (II. dio)"; Beritić, "Tvrđava Sokol u Konavlima"; Beritić, "Utvrđenja i regulacioni plan Cavtat".

[30] Beritić, *Utvrđenja grada Dubrovnika*. Zagreb: JAZU, 1955.

[31] Novak, Maja. "Zadar glavni grad mletačke Dalmacije i Albanije." *Radovi Instituta JAZU* (1965): 187–202.

[32] Deanović, Ana. "Il contributo dei Sanmicheli alla fortificazione della Dalmazia", *Castellum* 7 (1968): 37–56. Croatian translation Deanović, Ana. Prilog Sanmichelijā...(bilj. 18).

[33] Deanović, Ana and Ivan Tenšek, "Predziđe dubrovačke Minčete u zamisli Michelozza", *Prilozi povijesti umjetnosti u Dalmaciji* 21 (1980): 302–312. DEANOVIĆ, "Prilog Michelozza".

[34] Mcneal Caplow, Harriet. "Michelozzo at Ragusa: New Documents and Revaluations." *Journal of the Society of Architectural Historians* 31, 2 (1972): 108–119; McNeal Caplow, Harriet. *Michelozzo*, New York, 1977.

[35] Deanović, Ana. "Juraj Matejev Dalmatinac – graditelj utvrda", *Radovi Instituta za povijest umjetnosti* 3-6 (1982): 101–107. Published in *Utvrde i perivoji*.

[36] Deanović, Ana. "La ville maritime (Adriatique) fortifiée – Le répertoire de termes présentant le système de sa défense au Moyen-âge", *Bulletin IBI* 33 (1977): 37–43. Used translation Deanović, Ana. "Utvrđeni grad na Jadranskome moru. Izbor termina koji pokazuju njegov obrambeni sustav u srednjemu vijeku", *Utvrde i perivoji…*, 10–11.

Croatian[37]. At the end of the eighties, a group of Croatian scholars published a book on the history of Zadar under the Republic of Venice, which questioned the political, economic, social, and military aspects of the provincial capital[38], while politics and market were the topics of Ivan Pederin's research of Dalmatia under the Republic of Venice[39].

Since the 1992 article by Josip Ćuzela, the individual studies of the Fortress of St. Nicholas have been the focus of Croatian scholars[40], primarily due to the involvement of Sanmichelis, as written by Kruno Prijatelj shortly after[41]. In 1994, Sena Sekulić Gvozdanović finally published her long-term research on the fortified churches in the Croatian territory[42]. The sixteenth-century fortifications of Zadar were explored by Žmegač in 2003[43]. In 2005, Pavuša Vežić discussed Michele's works in Zadar[44], as Ćuzela in his book on the fortifications of Šibenik. Ćuzela's book reopened the topic of the 17th century's sieges and battles in the Dalmatian territory[45]. Antonio Miculian studied the Ottoman sieges of the Venetian fortifications[46]. Josip Kljajić questioned the rise of the so-called schools of military architecture[47].I n 2009, Žmegač published a comprehensive study of the bastion and bastion-like fortifications in the Venetian,

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[37] Deanović, Ana. "Glosar naziva u upotrebi srednjovjekovnog i renesansnog vojnog graditeljstva u Hrvatskoj". *Rad JAZU* 381 (1978.), 35–48.

[38] Raukar, Tomislav, lvo Petricioli, Franjo Švelec and Šime Peričić. *Zadar pod mletačkom upravom 1409–1797*. Zadar: Narodni list. 1987.

[39] Pederin, Ivan. *Mletačka uprava, privreda i politika u Dalmaciji (1409 – 1797)*. Dubrovnik: Časopis Dubrovnik, 1990.

[40] Compare works by Glavaš and early works by Žmegač, such as Žmegač, "Utvrda Sv. Nikole"; Žmegač, "La Fortezza"; Žmegač, "Još jedan stari prikaz".

[41] Prijatelj, Kruno. "Sanmicheli e la Dalmazia." In *Michele Sanmicheli. Architettura, linguaggio e cultura artistica nel Cinquecento*, edited by Howard Burns, Christoph Luitpold Frommel and Lionello Puppi, 222–227. Milan: Electa, 1995.

[42] Sekulić Gvozdanović, Sena. *Crkve-tvrđave u Hrvatskoj*. Zagreb: Školska knjiga, 1994. Compare Sekulić Gvozdanović, Sena. *Utvrđeni samostani na tlu Hrvatske*. Zagreb: Golden marketing, Tehnička knjiga, Arhitektonski fakultet Sveučilišta u Zagrebu, 2007.

[43] Žmegač, Andrej. „Zadarske utvrde 16. stoljeća." *Radovi Instituta za povijest umjetnosti* 27 (2003): 107–118.

[44] Vežić, Pavuša. "Vrata Michelea Sanmichelija u Zadru." *Radovi Instituta za povijest umjetnosti* 29 (2005): 93–106.

[45] Ćuzela, Josip. *Šibenski fortifikacijski sustav*. Šibenik: Gradska knjižnica "Juraj Šižgorić", 2005.

[46] Miculian, Antonio. "Le incursioni dei turchi e le fortezze veneziane." *Atti* 31 (2001): 155–188.

[47] Kljajić, Josip. 2003. "Pregled razvoja vojnoga graditeljstva u Europi od 15. do 19. stoljeća." In *Zbornik Mire Kolar–Dimitrijević. Zbornik radova povodom 70. Rođendana*, edited by Damir Agičić, 63–77. Zagreb: FF press, 2003.

Ragusan and Habsburg territories of Adriatic Croatia, showing how new types of fortification were introduced into different urban spaces, differentiated by the importance of the site and the response to the potential threat of war[48]. Sanmichelis' workshop in Zadar and Šibenik was elaborated on by Borić in 2015[49], while Ivo Glavaš, Josip Pavić, Andrija Nakić, and Ana Karađole published new results on Šibenik's fortresses[50]. The writings on the seventeenth-century fortress of Pula by Ivetic, Križman, Bertoša, Budicin, and Žmegač[51] contributed to its distinction as an ideal case study of fortification theory in the Eastern Adriatic. The Gripe Fortress in Split was built as a part of fortifications in response to the War of Candia (1645–1669), as discussed by Duplančić, Kečkemet, and Perojević[52]. Jasenka Gudelj wrote extensively on Eastern Adriatic architecture and cultural transfers[53], and according to the findings of Gudelj,

[48] Žmegač, Andrej. *Bastioni jadranske Hrvatske*. Zagreb: Institut za povijest umjetnosti, Školska knjiga, 2009.

[49] Borić, Laris. "Dujam Rudičić, Sanmichelijevi i Girolamo Cataneo." *Radovi Instituta za povijest umjetnosti* 39 (2015): 41–54.

[50] Glavaš, Ivo and Josip Pavić. "Tvrđava Sv. Ivana u Šibeniku – nove spoznaje i istraživanja." *Godišnjak zaštite spomenika kulture Hrvatske* 40 (2016): 91–104; Glavaš, Ivo, Ana Karađole and Josip Pavić. "O tvrđavi Barone iznad Šibenika." *Portal* 9 (2018): 49–59; Pavić, Josip. "Inženjer Magli i njegova (ne)vidljiva šibenska utvrda." *Osvit* 2 (2017): 137–144; Pavić, Josip. „Early development of the St. John's Fortress in Šibenik." In *Defensive Architecture of the Mediterranean 5. Conference Proceedings*, edited by Víctor Echarri Iribarren, 305–310. Alicante: Publicacions Universitat d'Alacant, 2017; Pavić, Josip. "From 'ridotto' to 'forte' – Barone Fortress in Šibenik." In Defensive Architecture of the Mediterranean 7. Conference Proceedings, edited by Anna Marotta and Roberta Spallone, 189–194. Turin: Politecnico di Torino, 2018.

[51] Ivetic, Egidio. *Istočni Jadran. Povijesni atlas jednog sredozemnog primorja*. Rovinj: Centro di Ricerche Storiche, 2017; Bertoša, Miroslav. "Tutamen civitatis&provinciae (»Štit gradu I pokrajini«). Vojni inženjer Antoine De Ville i njegova tvrđava u Puli u spletu povijesnih okolnosti XVII. i XVIII. stoljeća." *Istra* 119 (1991): 26–45; Budicin, Marino. "Considerazioni sulle strutture murario-difensive dei centri costieri dell'Istria veneta all'indomani della guerra uscocca (1619-1620)." *Atti* 31 (2001): 37-73; Žmegač, Andrej. "Ingegnero francese – De Villeova pulska utvrda." In *Sic ars deprenditur arte. Zbornik u čast Vladimira Markovića*, edited by Sanja Cvetnić, Milan Pelc and Daniel Premerl, 551–563 Zagreb: Institut za povijest umjetnosti, Odsjek za povijest umjetnosti Filozofskog fakulteta Sveučilišta u Zagrebu, 2009..

[52] Kečkemet, Duško. "Splitska utvrda Gripe." *Vojnopomorski ogledi* 2 (1971): 27–62; Duplančić, Arsen. "Prilog poznavanju obrane Splita u XVII. i XVIII." stoljeću. *Vesnik Vojnog muzeja* 33 (1989): 117–156; Duplančić, Arsen. *Splitske zidine u 17. i 18. stoljeću*. Zagreb: Mala biblioteka zaštite spomenika kulture Hrvatske. 2007; Perojević, Snježana. "Tvrđava Gripe u Splitu. Izgradnja od 1647. do 1682. godine." *Prostor* 45 (2013): 2–13; Kečkemet, Duško. *Utvrde Splita*. Split: Naklada Bošković, Muzej grada Splita, 2020.

[53] Gudelj, Jasenka. "Stato da Mar: l'architettura. Il Cinquecento in Istria e in Dalmazia." In *Storia dell'architettura nel Veneto: il Cinquecento*, edited by Donata Battilotti, Guido Beltramini, Edoardo Demo and Walter Panciera, 262–267. Venice: Marsilio, 2016.

Anita Ruso, and Cristiano Guarneri, there was a readership for architectural books in the Eastern Adriatic[54].

The interest in Italian historiography for Michele Sanmicheli after World War II was revived by an exhibition held in Verona and Piero Gazzola revisiting the question of authorship of the Porta Terraferma in Zadar and attributed it to Michele[55], as previously done by Langenskiöld and most mentioned scholars. During the 1980s, influential Italian scholarship written by Ennio Concina[56], Pietro Marchesi[57], Lionel Puppi[58], and Antonio Manno[59] focused on the research of the fortification system of the Republic of Venice. Concina's study examined the sixteenth-century fortification planning of the *Serenissima*, emphasising a unified defensive space within the Venetian fortification system. In 1988, he published a book that explored the construction terms traced in the Venetian sources from the fifteenth to the eighteenth century[60]. At the same time, Amelio Fara focused in his studies on fortification designs and treatises[61]. Elisabetta Molteni and Silvia Moretti published a compilation of maps presenting the fortifications from Museo Correr in Venice, including the Eastern Adriatic examples[62]. Filippo Toso's 2000 research highlighted the almost entrepreneurial considerations of Michele Sanmicheli and his

[54] Gudelj, Jasenka and Anita Ruso. "Tiskani renesansni traktati o arhitekturi u Dubrovniku." *Peristil* 56 (2013): 101–112; Gudelj, Jasenka. "Architectural treatises and the East Adriatic Coast: cultural transfers and the circulation of knowledge in the Renaissance." In *Artistic Practices and Cultural Transfer in Early Modern Italy. Essays in Honour of Deborah Howard*, edited by Nebahat Avcioğlu and Allison Sherman, 107–127. Farnham, Ashgate, 2015; Guarneri, Cristiano. *Circulation, Use, Impact: The Consumption of Architectural Books in Early Modern Eastern Adriatic*. Brepols, Turnhout (forthcoming). Compare Guarneri, Cristiano. "Trattati e trattatisti di architettura militare a Brescia nel Cinquecento." In *Libri d'architettura a Brescia. Editoria, circolazione e impiego di fonti e modelli a stampa per il progetto tra XV e XIX secolo, Testo, immagine, luogo*, edited by Irene Giustina, 31–40. Palermo: Caracol, 2015.

[55] Gazzola, Piero. *Michele Sanmicheli, architetto veronese del Cinquecento*. Venice: Neri Pozza, 1960.

[56] Concina, Ennio. *La macchina territoriale – la progettazione della difesa nel Cinquecento veneto*. Rome: Laterza, 1983.

[57] Marchesi, Pietro. *Fortezze veneziane 1508–1797*. Milan: Rusconi Immagini, 1984; Marchesi, Pietro. "I forti sanmicheliani di Sant'Andrea a Venezia e San Nicolò a Sebenico." *Atti e memorie della Società dalmata di storia patria* 17 (1989), 49–66.

[58] Puppi, Lionelo. *Michele Sanmicheli architetto. Opera completa*. Rome: Calibano Editore, 1986.

[59] Manno, "Politica e architettura militare".

[60] Concina, Ennio. *Pietre, parole, storia. Glossario della costruzione nelle fonti veneziane*. Venice: Marsilio, 1988.

[61] Fara, *Il sistema e la città*.

[62] Molteni, Elisabetta and Silvia Moretti. *Fortezze veneziane nel Levante. Esempi di cartografia storica dalle collezioni del Museo Correr*. Venice: Comune di Venezia, Musei civici Veneziani, 1999.

relative Paolo Sanmicheli, Giangirolamo's father, as well as the existence of the Sanmicheli family workshop. Croatian art historians subsequently emphasised these findings. Toso's comparative approach confirmed Michele as the sole author of Porta Terraferma in Zadar, additionally supported by Michele's drawing of Porta Terraferma from the Uffizi Gallery in Florence, addressed to Paolo[63]. In 2001, Ennio Concina and Elisabetta Molteni published an instructive book on the military architecture of the *Serenissima* that provided a relevant perspective on the defensive mechanisms of the Republic's frontiers[64]. Michela Dal Borgo provided an overview of Venetian fortifications[65], while Stefano Tosato published the drawings of the Venetian fortifications from the Municipal Library of Treviso in 2014[66].

An influential monograph on Michele Sanmicheli was published in 2004 Paul Davies and David Hemsoll[67], reviving the international interest on the topic. In 2014, the conference on Early Modern military architecture of the Republic of Venice brought together scholars to discuss the exchange of architectural models, actors, etc.[68], while a chapter on Sanmicheli in Dalmatia by Ana Šverko was included in 2022 book on the artistic transfers between the Mediterranean and the Black Sea edited by Alina Payne[69].

The transnational research of the Eastern Adriatic fortifications has led to the inclusion of the Venetian defence systems on the UNESCO list in 2017, namely fortifications of Bergamo, Peschiera del Garda, Palmanova, Kotor, Zadar, and the Fortress of St. Nicholas in Šibenik[70].

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[63] Toso, Filippo. "Porta San Martino a Legnago e Porta Nuova a Verona. Nuovi documenti sul Sanmicheli Architecto nella fabbrica militare." *Annali di Architettura: rivista del Centro Internazionale di Studi di Architettura Andrea Palladio* 12 (2000): 59–68.

[64] Concina, Ennio and Elisabetta Molteni. *»La fabrica della fortezza.« L'architettura militare di Venezia*. Verona: Banca popolare di Verona, Banco S. Geminiano e S. Prospero, 2001.

[65] Dal Borgo, Michela. "Strutture Militari Veneziane – le città murate dello Stato da Terra e le città fortificate dello Stato da Mar." *Mediterranean world. Mediterranean studies* 21 (2012): 149–163.

[66] Tosato, Stefano. *Fortezze veneziane dall'Adda all'Egeo. le difese della Repubblica di Venezia nei disegni della Biblioteca comunale di Treviso (secoli XVI–XVIII)*. Venice: Marcopolosystem, 2014.

[67] Davies, Paul and David Hemsoll, *Michele Sanmicheli*. Milan: Electa, 2004.

[68] Mazzi, "Michele Sanmicheli"; Kovačić, "Città fortificate in Dalmazia"; Žmegač, "Fortezze venete in Dalmazia"; Lalošević, "Bay of Kotor"; Bilić, "I protagonisti".

[69] Šverko, Ana. "Peripheral or Central? The Fortification Architecture of the Sanmichelis in Dalmatia." In *The Land between Two Seas*, edited by Alina Alexandra Payne, 40–58. Leiden: Brill, 2022

[70] Venetian Works of Defence between the 16th and 17th Centuries: Stato da Terra – Western Stato da Mar, https://whc.unesco.org/en/list/1533/.

1.3 SOURCES AND METHODOLOGY

This interdisciplinary research brings together the methods of architectural history, art history, linguistics, but also interests in military, social and political history, with a focus on the circulation of knowledge.

The direct analysis of buildings selected as case studies was carried out through sites visits that enabled the autopsy, including examination of building materials and collection of other data on the history of the building and its location. Further formal and historical analysis was based on contemporary architectural drawings, examination of historical and contemporary photographs and reports on archaeological campaigns.

The textual and linguistic analysis of the body of fortification treatises, both printed and manuscript, focused on terminology and illustrations, considering them as tools for the dissemination of fortification knowledge. The majority of the treatises were accessed through online resources. The selection of these treatises was primarily guided by their relevance to the Eastern Adriatic, with a particular focus on the works of Lorini and De Ville. In addition, literature highlighting the importance of Christine de Pizan's work prompted an in-depth examination of her modern English translation, with particular reference to the first published preparation for defence and attack during sieges with firearms. Other treatises were scrutinised to explore key themes relevant to this research. In particular, Tensini's treatise provided crucial insights into the relationship between the centre and the periphery. The examination of Tensini's work is intriguing as it is dedicated to the Venetian government and offers a perspective on defence strategies from a military expert based in what is considered the periphery. Pietro Sardi's references to the interplay between theory and practice in military architecture also made a significant contribution to the study. In all the papers, particular attention has been paid to terminology and its role in understanding the transmission of new knowledge.

The threat to Dalmatia and other Eastern Adriatic territories has persisted for centuries due to wartime conflicts. Records and works by writers from the region document the crucial battles and sieges that occurred during the mid-seventeenth century and beyond, aimed at liberating this territory. Such perspectives offered Franjo Difnik’s historiographical work on the military

history of the Eastern Adriatic after 1645[71] and also Girolamo Brusoni's from 1673[72] on the last Venetian-Ottoman war.

Textual and linguistic analysis was also carried out on published and original archival sources, both written and visual, such as drawings, contracts, reports on the condition of buildings and the need for renovation, inventories of weapons and equipment, lists of soldiers and their pay, information on the situation at the frontiers. Several sources from the Dubrovnik State Archives have been published by Lukša Beritić and H. McNeal Caplow[73]. For the historically Venetian part of the Eastern Adriatic, main sources from the Venetian State Archives have been transcribed and published in eight volumes by Simeon Ljubić and Grga Novak under the title *Commissiones et relationes Venetae*. Several documents have also been transcribed and published in *Atti e memorie della Società istriana di archeologia e storia patria* in the late 19th century and by Giuseppe Caprin[74].

Finally, original archival sources have been located and analysed in the Dubrovnik State Archives (especially the fund *Acta Consilii Rogatorum* and *Acta Minoris Consilii*), Zadar State Archives (drawings, maps, cadastres, and manuscripts, as well as the *Miscellanea* collection, the collection relating to the city of Split, and those preserving notarial records and Venetian dragomans) and Šibenik State Archives (*Miscellanea,* collections of maps and drawings). The Archives of the Croatian Academy of Arts and Sciences preserve the manuscript of the Miho Hranjac's 1617 relation on the fortifications of city of Dubrovnik. Extensive research has been conducted in Venetian State Archives (*Miscellanea materie miste notabili, Provveditori alle fortezze* etc.*).*

The dissertation is divided into five chapters, the introductory being the first and the concluding the fifth one. The second chapter "Peripatetic of Knowledge..." aims to familiarise the reader with the changes that have influenced the development of Early Modern military architecture. In particular, it highlights the concurrent development and proliferation of literature, a trend that was greatly enhanced by the advent of the printing press. Essential to this discussion is the inclusion of fortifications from the Eastern Adriatic in the treatises and reports. The transition to the third chapter "Territorialisation and Fortification..." involves a detailed examination of

[71] Difnik, Franjo. *Povijest Kandijskog rata u Dalmaciji*, edited by Duško Kečkemet. Split: Književni krug. 1986.

[72] Brusoni, Girolamo. *Historia dell'ultima guerra tra' Veneziani, e Turchi*. Venice: Stefano Curti, 1673.

[73] Beritić, *Utvrđenja grada Dubrovnika*; McNeal Caplow, *Michelozzo*.

[74] Caprin, *Istra Nobilissima*

territorialisation through focus on selected case studies, extending the themes introduced in the second chapter. This section focuses on dissemination of fortification knowledge in design and construction through five different approaches that question the influence of military theory and the reliance on military practice. The relationship between monuments and the texts describing them is central, with Bonaiuto Lorini and Antoine de Ville in particular, as reflected in numerous reports spanning centuries. The fourth chapter "Expert Military Fortification Terms..." focuses on the study of an essential tool for the transfer of knowledge – fortification terminology. This chapter builds on the author's 2019 research, which focused on historical fortification terms in the Croatian language. Selected segments of this research represent the second phase of the ongoing investigation, which is still in its initial stages, as the corpus of terms facilitating new research continues to be collected. The focus has been on Italian and French expert fortification terms, mainly used in treatises and repeated in archival documents, laying the groundwork for their future analysis in other written sources.

2 PERIPATETIC OF KNOWLEDGE IN EARLY MODERN EUROPEAN MILITARY ARCHITECTURE

2.1 THE FIFTEENTH CENTURY FORTIFICATION THEORY AND THE INTRODUCTION OF FIREARMS

Practices of studying, writing, and reading about developing military knowledge were expected in the Early Modern period. First, warfare itself was influenced by pan European dynamics such as demographic expansion, transoceanic discoveries, intellectual inquiry, and the spread of printing[75]. At the same time, it is arguable that innovative warfare mediated and encouraged these processes. One can theorise about the reciprocity of the influence of the Early Modern warfare[76]. New overseas territorial gains transformed Early Modern warfare into a global international matter.

The first texts on military matters in the late Medieval Italy were inspired by the works of Roman authors, such as Julius Caesar and Flavius Vegetius Renatus[77]. Perhaps the first in Europe to write in detail about the use of new weapons was a French court writer of Venetian origin, Christine de Pizan (1364–1430)[78]. Her 1410 modern military prototreatise,[79] *Le livre de faiz d'armes et de chevallerie*, stands out within the body of theoretical work on warfare and military architecture not only for the gender of its author but also for its extensive treatment of budgetary issues, thus providing a particular insight into the military theory of the time. Since the end of the fifteenth century, it has been available through a printed version of 1488 by the Parisian publisher Antoine Verard, which suggests that the work is his translation of Vegetius

[75] Black, *European Warfare,* 2.

[76] See Caferro, "Warfare and Economy", 208.

[77] De la Croix, "The Literature on Fortification", 32–34.

[78] Partial results of this research were published in Papeš, "Fortification Inventories". Another article discussing De Pizan's influential treatise should be published during 2024.

[79] See the note above.

and makes no mention of Christine[80]. Her fame flourished in England, however, thanks to William Caxton's duly credited English translation, published around 1489[81].

Christine begins her text by expressing her unworthiness to undertake such a task, declaring that she should not even have dared to consider it, for audacity is blameworthy. However, she is not inspired by arrogance or foolish presumption, but rather by her other writings. She suggests a feminine approach to the matter, invoking Minerva[82], the Roman goddess of wisdom, strategic warfare, justice, law, victory, etc., who sees war as an art and not as mere violence (embodied by Mars). One or both authorities - ancient authors and Christianity - are linked to Christine's opinions and justifications for war.

Christine explained the theory of warfare, the essential elements that led to victory and the budgetary principles that, combined with strength, made a good ruler[83]. She criticised contemporary customs by describing how the ancients taught their offspring the art of warfare, unlike her contemporaries who were brought up at the courts of nobility, implying that young men should be educated to become knights[84]. She also found that most soldiers were uncoordinated in battle; they were expensive to maintain but underpaid, making them untrustworthy. Poorly planned battles and showing strength in numbers often led to slaughter[85]. Understanding a written work by Christine de Pizan in a non-original language required a special method and approach to identify the most critical aspects and her approach to the innovative war practices of her time.

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[80] Cifarelli, Paola. "Antoine Vérard, éditeur des Faits d'armes et de chevalerie de Christine de Pizan." In *Les lettres médiévales à l'aube de l'ère typographique*, edited by Renaud Adam, Jean Devaux, Nadine Henrard, Matthieu Marchal and Alexandra Velissariou, 17–30. Paris : Classiques Garnier, 2020.

[81] Caxton's version was adapted to modern English in 1932 by A. T. P. Byles. The most recent modern English version is by Sumner Willard and Charity Cannon Willard from 1999, use in this research. Compare Caxton, William. *The Book of Fayttes of Armes and of Chyvalrye*, ed. A.T.P. Byles, London, 1932.

82 De Pizan, Christine. *The Book of Deeds of Arms and of Chivalry*, Translated by Sumner Willard and Charity Cannon Willard, University Park, Pennsylvania, 1999, 12.

[83] De Pizan, *The Book of Deeds*, 41.

[84] Gray, Douglas. "Fayttes of Armes and of Chyvalrye.". *Selim* 7 (2019): 5–31.

[85] De Pizan, *The Book of Deeds*, 37–39.

Table 1 Chapters of Part II of 1999 English edition of Le livre de faiz d'armes et de chevallerie.

PART II
I. The first chapter speaks of Scipio the African.
II. Concerning Duke Marius, Sertorius, Duilius, and Pericles.
III. This speaks of the city of the Boii, of Hannibal, of Denis the Tyrant.
IV. Of Spaniards, Alexander the Epirote, Leptines, Hannibal, and others.
V. Of Menole (Memnon), commander of Rhodes, of Scipio, of Sertorius, of Hannibal, Lentulus.
VI. Concerning Scorylo, chieftain of Dacia, Fulvius Nobilior, Epaminondas, general of Thebes, Fabius Maximus, the second Scipio of the African, Sertorius, and once more Epaminondas, the Theban general.
VII. The second part of Frontinus speaks of the Lacedaemonians, of Julius Caesar, of Papirius Cursor, of Pompey.
VIII. This concerns Alexander the Great, Caesar Augustus, Crats, Duke of Athens.
IX. In book three there is the case of Lysimachus, king of Macedonia, and of Fabius Maximus.
X. Concerning Hamilcar, leader of Carthage, Hanno, emperor of Africa, Hannibal, Valesius.
XI. Frontinus, in his fourth book, speaks of Caesar, Dominicus, Aemilius, Scipio the African, Gayus, Scipio.
XII. The book of Valerius speaks of Hannibal, of a king of Greece, of another in a similar situation, of Romans who had to deal with mercenaries.
XIII. Devices of the besieged Romans, of the Roman army, of Quintus Metellus, of the king of Sicily, and of Hannibal.
XIV. Here begins a discussion of the way to fight in castles and towns and, first, how to construct them.
XV. Here we speak of the provisions needed for a castle or town in time of war.
XVI. Particular needs for stocking a fortress with food supplies as well as weapons.
XVII. How a fortress should be provided with water.
XVIII. How loyal people are necessary for the garrison of a city, with some examples.
XIX. On the same subject.
XX. Here we begin to speak of laying siege and attacking a fortress, according to Vegetius.

XXI. Here begins a prescription for laying siege: what is necessary for attacking an important stronghold according to present-day custom.
XXII. Of the same, speaking of the powder needed for the cannons mentioned, charcoal, and other materials.
XXIII. Next come the mantelets (or shields).
XXIV. What is needed to transport and arm the equipment required for assault.
XXV. Other useful equipment.
XXVI. Equipment for firing.
XXVII. Other equipment.
XXVIII. Here follow stones for the cannons.
XXIX. Small equipment for the attack.
XXX. The square wood needed to make the following equipment.
XXXI. The workmen necessary for this equipment.
XXXII. Herein is explained how food and equipment will be taken care of and their delivery protected.
XXXIII. Here are discussed other necessities.
XXXIV. Here is discussed blocking the harbour.
XXXV. Machines useful for assault, as described by Vegetius.
XXXVI. Defending castles and cities, according to Vegetius.
XXXVII. Concerning the same thing.
XXXVIII. Remedies against the assault weapons described.
XXXIX. Protection against mines.
XL. Here Vegetius speaks of sea battles.
XLI. Defence garrisons to equip men who fight at sea.

The chapters written by Christine and "with the help of anonymous contemporaries" were essential for the study of the new gunpowder weapons and their role in attack or defence during sieges. These contemporaries were wise knights and military experts who wished to remain anonymous. It is interesting to study this text by a female author, considering that the art of warfare and the knowledge of its economy were close to the domestic economy, oftentimes the domain of women. Pizan introduced the economic dimension of wars in Italy, focusing on Venice and Florence, which were fought "more with their money than with their citizens." By dissociating ancient customs from modern weapons and warfare, she was able to write more

freely about contemporary knowledge. More than ten chapters of the second part are lists of the necessities needed during a siege – soldiers, food, weapons, etc., making the estimated/ideal budget of the fortress the most original part of her book.

Table 2 Inventory lists according to Christine de Pizan Le livre de faiz d'armes et de chevallerie (English 1999 edition)

FORTRESS STOCK DURING WAR AND/OR SIEGE		
men-at-arms	**200**	**600**
servants (2 per each)	**400**	
Timespan	**6 months**	
food (per one person)		
wheat (1/3 bread, 2/3 flour)	110 measures (Parisian measure = 1872 litres)	
dried beans	4 measures	
Peas	2 measures	
Wine	120 jugs of wine (c. 500 litres each)	
Vinegar	2 measures	
sour grape juice	1 measure	
Oil	1 measure	
Salt	1 measure	
spices (ginger, cumin, other)	50 pounds	
Saffron	2 pounds	
mustard seed	2 measures	
Mill	1	
large oxen (salted and alive)	100	
Bacon	100 or 120 flitches	
Sheep	8 score	
Poultry	supply*	
Eels	1000	
Herring	25 barrels	
Cod		
Hake	Many	
salted butter	a cask	
Almonds	11 pounds	

Rice		10 or 12 pounds	
Oatmeal		10 or 12 pounds	
rose water			
Ointments			
other medicines			
Dishes			
earthen pots		120 / 10 dozen	
goblets for drinking		144 / 12 dozen	
leather buckets to hold water		10	
Rope		200 toises*/6 foot * an old French unit of length equal to 6 French feet, 6.396 u.s. feet, or 1.949 meters	
kitchen (if it is winter)			
large logs		200 cartloads	
Coal		60 loads	
or *esterels*/small bundles of wood		thousands	
large earthen pots		240 / 20 dozen	
Cauldrons		6	
pans (large-medium-small)		24 / 2 dozen	
wooden spoons		48 / 4 dozen	
wooden bowls		2000	
Trenchers		as many	
Goblets		as many	
Cups		as many	
empty caskets			
Bellows		20 or 30	
other small necessities			
provisions for the defence on the place			
cannons throwing stones	larger (to break up machines, mantelets, and other coverings)	12	2 out of 12
Bricoles		2	

other rock-throwing machines		2	
Slings			
Ropes			
stock of stone		great*	
large crossbows on wheels		2 or 3	
Arrows			
powder	Powder	1000 or 1500 pounds	1/3
	Ingredients		2/3
lead (to make shot for the cannons)		3000 pounds	
iron-tipped lances		72 / 6 dozen	
crossbows, good, well equipped		24	
crossbows, on wooden bases		6	
strings for arrows		72 / 6 dozen	
sheaves of arrows		100	
crossbows, score, with hooks		12	
machines for bending crossbows		12	
? + other machines for bending them ?		2	
leather belts		18	
strings for leather belts		48 / 4 dozen	
large shields		60 or 80	
spinning arrows	for longer distances	24000	12000 of 24000
round stones for the cannons		200	
other stones		a great many	
Wood		enough to make 400 tampons (plugs)	
= tampons (plugs)		400	
Other			
carpenter for tampons		1	
masons to make stone cannon balls		3	
horse-operated mills		2	
Ovens		2	
well-provided forge		1	
Iron		4000 pounds	

Steel	500 pounds
Coal	4 hogshead/hogheads
Charcoal	24 horseloads
kettles with feet	4
bellows for countermining	8
equipped baskets	24 / 2 dozen
wooden shovels	72 / 6 dozen
Stretchers	96/8 dozen
Vats	
adequate tubs	

FORTRESS ATTACK – EQUIPMENT: ideal narrated case			
Pieces of machinery and cannons			
Large machines, armed, ready to throw projectiles		2	
Medium machines, armed, ready to throw projectiles		2	
Entirely new catapults/trebuchets, completely equipped		4	
Cables for trebuchets		2 per machine = 8	
8Slings for trebuchets		4 per machine = 16	
Large cannons	Garite	4	Firing 400-500 pounds
	Rose		Firing approx. 300 pounds
	Seneca		Firing 200 > pounds
	Maye		Firing 200 > pounds
Cannon Montfort (the best one)		1	Firing 300 pounds
Cannon Artique		1	Firing 100 pounds
Other ordinary cannons firing stones		20	
Other small cannons firing lead and ordinary stones of 100-120 pounds			
Large cannons		2	Firing 300-400 pounds
Smaller ones		4	
Other cannons	Large	3	1
	Small		2
Other large cannons firing stones		24	Firing 200-300 pounds or 400 pounds
Other smaller cannons		60	
Plugs of wood (for gunpowder chambers)			

TOTAL SHOULD BE		248	
Materials			
Cannon powder	In the prepared product	30 000 pounds	15 000 out of 30 000
sacks of charcoal from willow wood		3000	
sacks of charcoal from oak trees		2000	
Large braziers with 3 feet and a handle for gun fire		20	
Bellows		20	
Reinforced cart for the transport of each cannon			
Carts for carrying the powder and other necessities		25	
Horses for each cart		3 = 75	
Wooden tampons for the cannons		300-500	
Mantelets or shields			
Large mantelets (for the large cannons fashioned on an axle with supports, 10-12 feet wide, 30 feet long, a handbreadth thick)		6	
Large flat shields (30 feet long, 16 feet high, all made of white wood a ½ foot square and 5 inches in breadth, each with 5 wheels of elm wood with spokes on each side)		2	
large pointed mantelet similar to the other two		1	
Small mantelets (12 feet long, 8-10 feet high, similar to the other large mantelets, each with a window for firing the cannons)		10	
Pointed mantelets, each on 4 wheels		2	
Large mantelets (for large cannons and stone-throwers made of wooden squares a ½ foot in width, each 36 feet long, 18 feet high)		8	
Large engines with arms (lifting and setting up of equipment)		3	
Machines required to transport and arm the assault equipment			
Machine to carry stones from boats, loads them into cart, unloads them where necessary		1	
Ironclad mechanical devices to take wood for the machines and mantelets from the boats		3	
Large reinforced ironclad sledges to take the rods of the machines from the boat		2	
Other useful equipment			
Boards for palisades (in panels 34 feet long, 12 feet wide)		560	
Panels of small boards (10 feet high, 12 feet wide)		506	

gates	Gates with a closing device	4	1 out of 4
Sentry boxes			
Trestles (10 feet long, 8 feet high) for making covered alleys for mantelets, cat, siege towers		500	
Hurdles (bundles or interlaced twigs) to cover the trestles and mantelets and form bulwarks		11 000	
Wooden pins		8 full tons	
Shelter to house the mills and other necessities (144x48 feet)			
Equipment for firing			
Crossbows		200	
crossbows with spanning devices		30	
Crossbows with hooks		100	
Quarrels or bolts		200 000	
Large bolts		1000	
quite new spanning frames for shooting the crossbows		12	
Strong lever-spanning machines for bending crossbows		13	
Leather belts		50	
Antwerp cord for making bow strings		400 pounds	
Other spanning frames to bend crossbows		50	
Hand bows		300	
Strings for hand bows		3 per each = 900	
Strings for the bows		800	
Arrows		1 200 000	
Iron hooks (to be placed on the ground)		10 000	
Other equipment			
Shields		1300	
Lanterns		200	
Other lanterns (16 feet tall, bound with great bands of iron to place in the ground)		30	
Ropes covered with pitch to burn in the lamps		27 000	
Battle-axes	With falcons' beaks	400	
	Others		
Pointed spades (mining)		400	

Wooden shovels		1000
Scoops to empty water		400
Large iron hooks, each with 2 loops		12
Baskets, all with provisions, 2 lanterns		1500
Large iron bars (1 ½ long)		1000
Small iron bars		12
Barrels of nails	½ foot long	4
	4 fingers long	
	3 fingers long	
	2 fingers long	
Equipped forges		3
Ropemakers		2
Leatherworkers		2
Wheelwrights		
Wood turners to make plugs for the cannon		2
Carts filled with elm wood to make plugs		2
Bundles of iron		3000
Bundles of steel		60
Charcoal from dirt		60 measures
Sacks of wood charcoal for the workmen		200
Spun rope to make cords for the machines		2000 pounds
Tanned cowhides to make bases for machines (for leatherworkers)		40
Rawhides to make sling for machines		25
Rawhides to make girdles for the slings		25
Wood (for wheelwrights)		
Ropes for machines		
Leather strings bound with iron		
Barrels that can be locked		22
Wheelbarrows shaped like stretchers to put the stones in the cannon barrels		80
Stones for the cannons		
Stones, ready dressed and rounded for Montfort		150
Stones, ready dressed for other large cannons		120
Stones, for the small guns		300

Stones, not rounded for 3 cannons		600	
Stones, for stone-throwers / trebuchets		400	
Stones, only broken up and placed in piles		500-600	
TOTAL		Approx. 2200	
Lead for pellets		6000 pounds	
Small equipment for the attack			
Picks		100	
Goat-feet grappling hooks		50	
Bridge joinings		16	
Large and strong double ladders with 4 levels (for 4 men; 34-40 feet high; on each ladder 3 pulleys at the upper end)		24	
Score of ladders (24-26 feet high)		7-8	
Smaller ladders			
Square wood for a “bearded cat” and a “belfry” 48-50 feet high, 2 feet wide			
Boards		2400 feet	
Wheels		24	
Smaller pieces		A great quantity	
Nails*			
Masts (60-80 feet high)		6	
Horse-drawn mills (only two wheels)		4	
Cask of tallow		4	
Wooden pulleys		36 / 3 dozen	
Copper pulleys		12	
Workmen			
Machines	Workers	2	4
	Masons	2	
Carpenters (raising the walls, constructing the mantelets, projectile tower, etc.)		6	
		Groups of 10	
		Groups of 50	
		Groups of 30	
Other men who assist the carpenters		600	
Workmen who dig ditches for the stockades		2000	

Knights and squires (setting up 5 panels of stakes and dig around them)	Carpenters	100	10
	Assistants		10
	Workmen		3 groups of 10
	Carts		6
Carpenters who erect mantelets for the cannoneers, dig ditches, emplace the cannons		50	
Common soldiers who erect mantelets for the cannoneers, dig ditches, emplace the cannons		20	
Supervisors of carpenters and common soldiers who erect mantelets for the cannoneers, dig ditches, emplace the cannons			
Those in charge of stone-throwers	Common soldiers who dig ditches, establish the machines, put the mantelets in place		20
	Their own people		
	Carts		16*
Those in charge of gunpowder, artillery, and other equipment	Carts to transport gunpowder, artillery, and other equipment		8
	Carts to transport food and other necessities from the boats		
Those in charge of mantelets	Carts to bring the mantelets and lumber from the boats		25
	Workers		50
Delivery and protection of food and equipment			
Protection of the routes and passages			
Commander		1	
Men-at-arms		100	
Archers		100	
Pikemen		200	
Large shields		100	

Cannons	10
Powder	
Guidance of boats loaded with artillery, food, and other equipment	
Commander	1
Men-at-arms	200
Bowmen	100
Carpenters (as many of them as possible archers)	200
Guidance of large boats with machines	
Commander	1
Men-at-arms	100
Archers	100
Looking after food supplies that come by land	
Commander	1
Men-at-arms	200
Archers	100
Crossbowmen	100
Other necessities	
Those who inspect the place where the siege will be undertaken and fortifications established	6-8
Blocking the harbour	
Big, old oceangoing vessels	10 or 12
Commander	1
Men-at-arms	3000
Archers	500 >

The text functions as a sequence of narrative scenes. The first deals with the supply of the fortress during a siege from a defensive point of view, giving the exact number of subjects involved - two hundred men-at-arms plus two servants per man for six months - followed by lists of food, crockery and other kitchen utensils and supplies for defence. Food included wheat, dried beans, salt, oil, wine, vinegar and much more per person. Christine mentioned all the necessary equipment a kitchen should have, such as dishes, coal, various materials, etc. After mentioning food and kitchen necessities, she concentrated on the requirements needed to defend

a given place, such as cannons, ropes, crossbows, arrows, gunpowder, strings and, in a separate group, various materials such as coal, steel and iron. In the event of an attack, the purpose of a given inventory is to ensure that the fortress is equipped with the most essential supplies, starting with food and survival materials, and then weapons. During sieges, it was crucial to prepare for an extended stay without the necessary provisions. Therefore, the placement of fortifications to ensure the supply of water, which, as mentioned above, was the subject of later treatises, was a key issue. It is understandable that the amount of wine required was also emphasised. One can also understand what the siege of the fortress in 1410 meant: the need for a parallel defence from and with firearms and pre-modern weapons. Christine de Pizan had an insight into the practice of fortress fortification in her time, which she described as a known method that should have been mentioned in a written source. The question is whether the need to write down such information was a standard that was considered normal at the beginning of the fifteenth century. Of course, one should not find this initiative to be of her origin but simply a need of a writer to leave a mark of circulated knowledge, which, as will be visible with other fortification writing, is quite a frequent practice.

The second narrative scene involves the siege of a well-fortified, hard-to-capture fortress near water. Preparing for a siege required considerable equipment, so detailed lists of weapons and other supplies are provided. This provides an insight into the planning of sieges and the weapons available in 1410, their firing power, the amount of gunpowder, the animals needed to transport them and the distinct types of projectiles. Christine even noted the number of workers and their duties. She began with the machines and cannons, which varied in size and capacity. The total number of cannons in her prescribed siege was two hundred and forty-eight. Next came the materials, such as gunpowder, charcoal, etc. Then the mantelets or shields, followed by the transport machines, various useful supplies, and the firing equipment. The latter also allows us to understand the importance of pre-modern weapons in warfare at the beginning of the widespread use of gunpowder weapons in Europe. As the Dubrovnik case study will show, it was necessary to be equipped to ensure victory. Christine wrote down the number of stones and small items of equipment needed for the cannons. A special part of her lists is the precise classification of the soldiers according to their positions during the attack. During the attack, each individual had an exact role, recorded with exact numbers. The same was true for the soldiers who would deliver supplies, protect food and equipment, and blockade the harbour. Christine also mentioned that six to eight soldiers would inspect where the siege would take place and where fortifications would be built.

A comparison of these budget lists shows that, understandably, more space is given to food stocks in the description of stocks during defence. However, there is no mention of soldiers and their positions. Weapons are detailed and are the most critical segment in both scenarios.

One of the most influential treatises writers, Leon Battista Alberti (1404–1472), published his *De re aedificatoria* posthumously in Florence by *magistri Nicolai Laurentii Alamani* on 29th December 1485. Although scholars have historically disputed Alberti's influence in the early formation of modern fortification theory, novel studies suggest otherwise. Alberti was indeed the first to formally describe the elements of fortifications in precise mathematical terms: shape, measurements, relationships, and proportions. Moreover, in *Ludi matematici*, he was the first to introduce the practical problems of ballistic bombards in general. As a theoretician who "refashioned" Vitruvius, he was more inspired by the aim than the results. Alberti's understanding of Vitruvius was essential, since he, instead of struggling and trying to make Vitruvius more understandable, created a new treatise for his contemporaries. Alberti studied how things were done *all'antica* and how they were done in his time and codified the rules he gathered from his observations into a new set of norms. Leon Battista Albert, one of the crucial figures of the architectural theory, was restudied as the first modern thinker of defence and defensive tactics and even the first significant figure in creating the new military science. With his four precise mathematical terms, he could explain and list the indications for the study of fortifications, thus marking the beginning of the scientific treatment of military architecture[86].

Francesco di Giorgio Martini (1439–1502) finished his *Trattato di architettura civile e militare* in the last decade of the fifteenth century. The treatise, which remained unpublished until the nineteenth century, describes the development of fortification architecture and offers many innovative designs[87]. Its fifth chapter is dedicated to the new weapons and military architecture. He pays attention to the individual elements of defence such as *fossi*, *rivellini*, *torroni*, ancient casemates *capannati*, and the relation of the walls and city gates, as well as bridges and monumental towers. Afterwards, Martini brings examples of fortifications depending on their site and floor plan, differentiating the terms Rocca and Fortezza, and implying the possibilities of their defence, while also taking ports into consideration[88].

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[86] More on Alberti's influence on fortification theory in Bevilacqua, Marco Giorgio and Kim Williams. "Alberti and Military Architecture in Transition." *Nexus Network Journal* 16 (2014): 523–541.

[87] Gudelj and Botica, *Arte et Marte*, 34–37.

[88] *Trattato di architettura civile e militare di Francesco di Giorgio Martini architetto senese del secolo XV, a cura di Cesar e Saluzzo, due volumi con atlante*, Torino (Chirio e Mina), 1841.

Martini argued that fortresses cannot be conquered and destroyed solely through bombardments that knock down walls or through attacks that do not prohibit access to the natural site. In such cases, nature should be praised more than art[89]. After explaining how the new weapons caused the changes in fortification, he lists the necessary features a fortress should have, from the acceptable site to the positioning of towers and gates. In order to better the understanding of all general and particular norms, Martini introduces some examples: "Onde, oltre a tutte le generali e speciali regole dichiarate, a più chiara notizia giudico essere utile alcuni esempli disegnare, per i quali meglio l'intelletto giudichi e con fermezza ritenga, perché gli esempi più muovono gl'intelletti che le ragioni, massimamente gli uomini esperti ed i non molto esperti. Cominciando adunque dalle cose semplici ed alle composte seguendo, prima è da scrivere alcuni modi speciali di cinti di muri: secondo, di più varie forme di fortezze"[90]. By introducing the changes that occurred after the development of firearms, Martini expressed his famous thesis that a fortress's strength depends on the excellence of its design and not on the thickness of its walls[91].

2.2 STANDARDISATION OF FORTIFICATION KNOWLEDGE BETWEEN THE 1550s AND THE 1650s

The fast-moving development of fortification architecture in the last decades of the fifteenth century influenced the increasing number of texts about the new ways of war[92]. Registering, multiplying, and diffusing information became crucial but also more manageable, faster, and available since each state was forced to invest in its defences. Military science and particularly fortification knowledge became more universal due to quicker exchange of information on significant evolutions, discoveries, and events: the development of gunpowder weaponry, the printing press, the Ottoman conquest of Constantinople, the overseas conquests and rise of the navy.

Still, the main issue remained that the defensive architecture had to adapt to each attacker's new gunpowder weapons of interest. Those possessing significant firearms had significant chances

[89] *Trattato di architettura civile e militare*, 255.

[90] *Trattato di architettura civile e militare*, 274.

[91] *Trattato di architettura civile e militare*, 254.

[92] De la Croix, "The Literature on Fortification", 34.

to conquer a besieged fortification. Constant experimentation and adaptation in the arms race forced fortification development. Besides their internal arms race and conquests of newly discovered overseas lands, European powers faced another powerful challenger. The Ottomans threatened with new weapons, thus rapidly conquering the southeastern and eastern parts of the continent. Therefore, protecting the borders was one of the biggest challenges. The European armies soon adapted their greatest weapon, fortification architecture. Over three hundred years, it developed in "non-impregnable" structures that can be discussed as one of the main reasons the Ottoman power did not conquer the territories west of the Eastern Adriatic. The defence was fundamental, followed by the constant evolution of weaponry strong enough to test it.

Acquiring a method to send and gain information rapidly was made possible due to the printed, written word, creating the so-called culture of print. Massive 'collections of knowledge' became available to the broader public, and the book market quickly flourished. In addition, printed manuals on military knowledge – gunnery, tactics, drills, fortification, and siege craft – were spreading "more rapidly than word of mouth or manuscripts"[93]. Easier book distribution allowed faster circulation of knowledge, making the basis for easier comprehension and speedier specialisation of military architecture. Gaining knowledge was being invested in and paid for. As J. R. Hale underlined: "From the 1520s [op. a. arguably before], the frequent need for the hasty adaptation of walls led the authors of manuals written for soldiers to provide instruction in the elements of fortification"[94].

Military science was rising, and known principles required harmonisation. As the set of norms was formulated, scientific literature had the role of a trustable source or manual of knowledge for a chosen well-educated public that dealt with the matters of war: "Manuals also permitted and made possible a degree of standardisation that both helped to increase military effectiveness and was important for cohesion and the utilisation of military resources"[95]. The urge for protection in defence and adequate attack tactics started to depend on the tested knowledge written down in the treatises. Treatises could also serve as polygons for experimentation as "ideas put on paper" – theorisation before experimentation – allowing constant discussion with the actors involved: "Literacy and printing generally fostered discussion of military organisation and methods and encouraged a sense of system"[96].

[93] Black, *European Warfare,* 50.

[94] Hale, *Renaissance Fortification,* 33–34

[95] Black, *European Warfare*, 50.

[96] Black, *European Warfare*, 51.

During the first half of the sixteenth century, but particularly around the mid-sixteenth century, the book market prospered[97]. This was because of the number of books produced and the combined mass interest in various sciences and scientific disciplines. Still, the leading topics were focused on religious questions, bearing in mind the spiritual climate at the time. Greater demand formed a sort of reading practice, even a trend of book collecting. Venice had a leading role in the spreading of fortification knowledge through printed treatises[98].

In a short time, these written carriers of knowledge became a trend – as the number of people invested in military matters started to grow, mainly because it provided a permanent occupation, the demand and market began to expand rapidly: "The great number of treatises on military architecture that appeared in the second half of the sixteenth century suggests that many of them may have been written for publicity purposes. One gets the impression that they intended to advertise the knowledge and specialized skills of their authors, who in this manner, tried to sell their services to interested kings and potentates"[99]. One may argue it was expected that a well-qualified, experienced man of war would write on military matters. Indeed, the public was required to be literate and informed on war matters. Potential readers were nobility, well-educated elites, soldiers, (military) architects and engineers, politicians, specialists, or experts on military issues, and those who had a word about them in court or on the battlefield[100]. Cultural and intellectual elites could grow more than in the previous century, accessibility-wise. Particularly stimulating for the research of military architecture are the private collections, which were used to detect what literature was considered essential to be acquainted with.

Scholars have recently detected an interest in military theory and treatises in the Eastern Adriatic[101], thus demonstrating the practice of book collecting in the area and the demand for novelties in architectural theory[102]. Although, until recent years, there was no significant

[97] See more on treatises published in Italy to spread the new knowledge in: Fiore, Francesco Paolo. "Architettura e arte militare. I trattati alla meta del Cinquecento." In Architettura e arte militare. Mura e bastioni nella cultura del Rinascimento, edited by Francesco Paolo Fiore, 69–77. Rome: Campisano Editore, 2017, 205, 212.

[98] Hale, John. Rigby. "Industria del libro e cultura militare a Venezia nel Rinascimento". *Storia della cultura veneta* 3 (1980): 245–288.

[99] De la Croix, "The Literature on Fortification", 39.

[100] Gudelj and Botica, *Arte et Marte*, 17.

[101] Gudelj and Botica, *Arte et Marte*; Gudelj, Jasenka and Anita Ruso. "Tiskani renesansni traktati o arhitekturi u Dubrovniku." *Peristil* 56 (2013): 101–112; Guarneri, Cristiano. *Circulation*, *Use, Impact: The Consumption of Architectural Books in Early Modern Eastern Adriatic*. Brepols, Turnhout 2023 (forthcoming).

[102] The Croatian nobility engaged in military architecture primarily for the need of defence and not exclusively for theoretical knowledge and admiration for monuments, Gudelj and Botica, *Arte et Marte*, 13. A collection of books

research on familiarity in the Eastern Adriatic with the architectural and fortification theory, recent studies proved that interest did exist, and that architectural knowledge *was* circulating. Future investigations will shed more light on the influence of architectural theory on the practices in the area.

Without a doubt, for the spread of military knowledge and its scientific literature, crucial was the role of expert terminology since any discovery and invention directly affected the language; thus, creating new terms was inevitable, and they can be studied as tools of knowledge spread since their repetitiveness is expectedly witnessed in researched written sources on military matters.

It must be taken into consideration that the rise in availability of information caused the knowledge reserved for the elites to become more widely accessible, finally increasing the number of individuals employed in the warfare who gradually pressured the economy[103]. Warfare was the most expensive endeavour[104]. And, regarding either city-states, Republics or grand monarchies and empires of the time, the conclusion is similar – the war impacts[105] were not handled by expansion, governmental policy, and institutional changes but rather by long-term standing commercial and fiscal advantages accompanied by shrewd military and economic policies. In some cases, it guided the evolution of smaller states into territorial powers (i.e. Venice, Florence, Milan)[106].

Though studying military matters was practised over the centuries, the post-fifteenth-century destructive firearm innovations influenced the increasing number of war-engaging texts. However, there was a particular novelty – the scientific literature dealing with the *art of war* was printed and purchased all over Europe, making the new data provision faster and more in demand.

From the middle of the sixteenth century, there was a specialisation of treatises on fortification architecture, as Giovan Battista Bellucci (1506–1554), the author of the works *Nuova invenzione di fabricare fortezze di varie forme* (published posthumously on 20th January 1598

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that belonged to the Croatian ban of Nicholas VII and his son Adam Zrinski is one of the rare examples of a preserved Early Modern private library from today's Croatia, Gudelj and Botica, *Arte et Marte*, 9. Nikola Zrinski owned treatises on fortification architecture in Italian, German, Dutch and French (the latter in Italian and German translation), Gudelj and Botica, *Arte et Marte*, 17.

[103] Parker, "The 'Military Revolution,'"; Caferro, "Warfare and Economy".

[104] Compare with: Caferro, "Warfare and Economy", 169.

[105] On the different approaches to impact and impacts of war see: Caferro, "Warfare and Economy", 204.

[106] Caferro, "Warfare and Economy", 207–208.

in Venice) and *Trattato delle fortificazioni di terra* (unpublished) testifies. In *Nuova invenzione*, Bellucci briefly discussed the definition and importance of fortifications and the role of those working in the field. Bellucci is very explicit and brief in his descriptions, focusing on the dimensions, sites and design while considering the constructed fortifications' material, form, and function. He considers particularly important the harmonisation of knowledge of mathematics and drawing: "Per voler levar le piante, e di bisogno sapere ben la pratica delli strumenti, & haver un poco di dissegno, e di pittura. La pratica delli strumenti s'impara mediante le mathematiche, perché da quelli s'impara l'uso loro, la pittura impara prima con il sapere ben disegnar, & poi colorir…"[107].

The formulation of norms of fortification in scientific terms has been discussed by Bonaiuto Lorini (1537–1611), who published his treatise *Delle fortifcationi* in Venice in 1596[108]. This monumental work on fortification is divided into five parts: the first focuses on the norms of fortification as described in the fortification history; the second focuses on the practice of building the fortifications; the diversity of floor plans; the diverse sites and how to approach them, while the final one is dedicated to the manufacturing machines and instruments. Lorini wrote a basic manual for fortifications, making the fortification knowledge more available, accompanied with illustrations for each studied example.

Lorini notes the existence of military affairs as a discipline of study: "Et se frà tutte l'arti, e scienze (lasciando le sacre lettere) la disciplina Militare tiene il primo luogo, si potrà col mezo di questa ascendere a tutti i maggiori honori", and the main claim to support this statements he find in the connection with the Church, as Pizan did in the introductory of her writing: "... non sò qual maggiore, ò più generosa attione possa far l'huomo, che per conservare la libertà della patria, e discacciare gli infedeli, e nemici di Santa Romana Chiesa, esporsi à tanti incommodi, e pericoli della vita, che apportano l'imprese della guerra, e massime ne gli assalti delle Fortezze, e ne'fatti d'arme"[109].

Moreover, he also explained the basic requirements for military engineers: "E dovendo sopra questa parte del mestiero della guerra (cioè saper conoscere i siti, e quelli Fortificare) esser fondata la presente Opera, doveranno tutti quelli, i quali à tal professione si vorranno dedicare, haver non poca intelligenza, e pratica delle offese, che da esso nemico potranno ricevere: però

[107] Bellucci, Giovan Battista. *Nuova inventione di fabricar fortezze*, Venice, 1593, 3.

[108] Lorini, Bonaiuto. *Delle fortificationi di Buonaiuto Lorini libri cinque*. Venice: Appresso Gio. Antonio Rampazetto, 1596.

[109] Lorini, *Delle fortificationi*, Ai lettori, not numerated.

che da intelligenza tale deve dipendere la pratica della più sicura, e reale strada, che osservar si possa per determinare, e con buon ordine fabricare il corpo della Fortezza...", indicating that the science of fortification was known by the ancients: "... e tanto più sendo la scienza del Fortificare fondata sopra termini demonstrabili (come al suo luogo si dirà) la quale scienza fù non solo da gli antichi Romani, ma poi da gli altri Principi potenti non poco apprezzata, & usata per lor difesa"[110].

Lorini also compared the military architecture to the civil one, following Vitruvius. However, he noted the disparity of opinions (and, therefore, the lack of norms) of his fellow military experts: "Onde non sono mancati gli Scrittori, che hanno trattato in materia del Fortificare, i qualli tutti sono buoni, e giovevoli. Benche al parer mio habbino lasciato adietro molte ragioni, & avvertimenti, che haveriano potuto (scrivendogli) agevolare l'intendimento di questa facoltà col fondamento della pratica di essa, massime per le tante, e così diverse loro opinioni lasciate irresolute, che pure una sola deve esser la migliore, e stabilita sopra le sue ragioni. Vero è, che questa Arte par che sia oltre a tutte l'altre assai difficile ad apprendere, overo essere insegnata per essequirsi, poi che non si può con una, o più regole dare ad intendere come l'altre onde ne nasce la sua nobiltà, sendo posseduta da pochi. Ne ciò punto si deve apportare ammiratione, poi che altra scienza non si trova che (come questa assolutamente) dipenda dalla vivacità, & altezza dell'ingegno, di quello che la vuole usare, che è nel saper conoscete tutto quello che con l'ingegno, e con la forza possono fare infiniti altri huomini, per poter molto prima, che riceva l'offesa anticipatamente difendersi..."[111]

Adam Freytag, also Freitag (1608–1650), a Polish engineer, arrived to the same conclusions. In his treatise *Architectura militaris nova et aucta* from 1631, here used in its French translation *L'architecture militaire, ou la fortification nouvelle* published in 1635 in Leiden he stated that fortification is a science, which teaches how to properly fortify all kinds of places, & how to defend them well against the attack of enemies. Its beginning is very ancient, but it has been corrected in several ways over year: "La fortification est une science, qui enseigne à bien fortifier toute sorte de places, & à les bien defendre contre l'assaut des ennemys. Son commencement est tres-antique, mais elle a esté corrigée en diverses manieres durant une longue suite d'années".[112] He divided his treatise into three parts: first, the basics of fortification design, locations and proportions; second, the study of external fortifications; and third, the

[110] Lorini, *Delle fortificationi*, Ai lettori, not numerated.

[111] Lorini, *Delle fortificationi*, Ai lettori, not numerated.

[112] Freytag, *L'architecture militaire*, Premier livre, 1.

study of sieges and the involvement of certain fortifications in defence or attack, taking into account the position of the army forces.

The tension between the theory and the practice was also noted by Pietro Sardi's *(1559–1638)* in his *Corona imperiale dell'Architettura militare*, published in Venice in 1618: "E potrei ben dire con ragione, che il primo Trattato della Teorica sia come un chiarissimo Sole per illuminare il giorno, & il Trattato secondo della Pratica sia come una luminosa Luna per indolcire le tenebre della note, cioè, che il primo Trattato potrà servire, e darà forse più gusto à qualche spirito elevato, dotto, e perito, come chiaro giorno illuminato da diverse scienze, per la varietà de gli esempi & Autorità, tanto Greche, come Latine, e modo di procedere molto differente, quasi come in astratto, da quegli, che fino a qui hanno di tanta Scienza, o Arte trattato. Et il secondo Trattato della Pratica servirà come una luminosa Luna per quegli, che non tanto seranno versati nelle altre scienze, e discipline, ma più semplici, & idioti non haveranno modo d'intendere la lingua Latina, e conoscere la diversità dello stile; Ma contentandosi della pura, e reale scienza, con semplici, e pure parole, e figure dimostrata, di altro più altro stile non si cureranno…"[113]

Sardi begins the preface by saying that his task is to describe the art or science that is so noble and necessary to the world, that of military architecture. Sardi's book is divided into two parts, the first devoted to theory and the second to practice. The theoretical aspects include the discussion, supported by the authority of the ancient authors, of fortification sites, attack and defence, forms, etc., while the highlighted practical issues concern the advantages and disadvantages of the chosen fortifications. The pure science with the design in front of one's eyes and all the variety and diversity of forms and sites will allow even an uneducated person to sketch a plan of a fortification and bring it to life with great taste and wonder to the world..[114] Thus, the first part was written for a learned public familiar with military matters, history and geometry, while the second part served as a manual to expand the military knowledge of the less educated.

The military engineer behind the fortress in Pula, Antoine de Ville (1596–1656/1658/1674[115]***)***, was also a theoretician of fortification architecture.[116] His most famous work is *Les*

[113] Sardi, Pietro. *Corona imperiale dell'architettura militare divisa in due trattati. Venice*, 1618, "Lo Autore al benigno Lettore", not numerated.

[114] See the note above.

[115] Different years of death, according to scholars. Bertoša referred to A. de Zastrow's 1674 since he was "the best *connoisseur* of De Ville's work". See more in Bertoša, "Tutamen civitatis&provinciae", 34, 44, notes 58, 59, 60.

[116] See D'Orgeix, "Les fortifications".

fortifications du chevalier Antoine de Ville Tholosain, avec L'Ataque & la Defence des Places, published in 1629. This is another tripartite treatise, with the first part dealing with the basics of fortification, the second with the aspects of fortification under attack, and the third with defence. De Ville informs the reader that he followed what he saw by experience to be the most practised and added the historical annotations: "Dans le Discours i'ay suiui ce que i'ay veu par experience estre le plus pratiqué, & y ay aiousté le rapport del'Histoire pour ceux qui s'y plaisent comme aussi les raisons Physiques aux lieux qui se sont rencontrez à propos; les demonstrations necessaires n'y manquent pas: I'ay cotté à dessein aux marges chaque chose, afin qu'on puisse laisser ce qui ne plairra pas sans interrompre le Discours..."[117] His descriptions are artistic and articulate, accompanied by the use of metaphors and comparisons to strengthen his explanations. However, unlike Sardi, who believed that historical commentaries were not for the uneducated and strictly divided theory, a set of scientifically proven knowledge that could be demonstrated from practice, a mere experience, De Ville does not make such a division. His treatise is rather a manual for understanding what fortification is and how it should be carried out.

On a more practical side of the theory stands Francesco de Marchi (1504–1576), who in the Introduction to one of the most important treatises on fortification architecture, *Della architettura militare* (published posthumously in 1599), points out the necessity of the knowledge of fortification architecture for a soldier[118]. The soldier must be able to read drawings and make measured designs. In the second part of the book, he focused on the fortification elements, their function, defence and the materials used, with a particular interest in the water supply; the third part contains various fortification designs, through which De Marchi tried to question all the possible (non-)ideal cases, using a treatise as a polygon for experimentation; the fourth part is dedicated to artillery, its manufacture, storage and use.

Francesco Tensini (1581–1630) dedicated his tripartite treatise *La fortificazione, guardia, difesa et espugnazione delle fortezze* (Figures 1, 2)[119] to the Doge and the Senate of the Republic of Venice. He started with the discussion of the fortification of borders or central cities of a

[117] De Ville, Antoine. *Les fortifications du chevalier Antoine de Ville, contenans la maniere de fortifier toute sorte de places tant regulierement, qu'irregulierement en quelle assiete qu'elles soient*. Lyon: Irenee Barlet, 1629, "Au lecteur", not numerated.

[118] De Marchi, Francesco. *Della architettura militare*. Brescia: Appresso Comino Presegni, ad instanza di Gasparo dall'Oglio, 1599, *A lettori*, not numerated.

[119] Tensini, Francesco. *La fortificatione guardia difesa et espugnatione delle fortezze esperimentata in diverse guerre*, Venice, 1624. For this research, the 1624 edition was used.

state, thus relating fortification theory to the production of territories; the second book questions the role of military men and politicians during war, and the strategies of arming the fortifications; the third book is dedicated to the cases of sieges, both in terms of attack and defence. Tensini, as a soldier in service of the Republic of Venice who was in direct contact with the malfunction of its defences, left various reports and indication for fortifying the borders, which will be furtherly discussed in the following chapters on the case studies of the Eastern Adriatic.

2.3 REPORTS FROM THE EASTERN ADRIATIC FRONT: LORINI, HRANIAZ, AND DE VILLE

The mention of Zadar's fortifications in Bonaiuto Lorini's *Delle fortifcationi* remains the only direct discussion of an Eastern Adriatic fortification in the body of published treatises on military architecture. Lorini, who had first-hand knowledge of the Dalmatian city, used literary escamotage of fictional dialogues on fortifications, while his book allowed knowledge of Zadar's fortifications to reach a wider audience than the Venetian governmental bodies. Lorini's assessment of Zadar's fortifications will be further examined in the subchapter devoted to this case study.[120]

An extremely interesting manuscript report on the fortifications of the capital of the Republic of Ragusa, Dubrovnik, written around 1617, is now in the Archives of the Croatian Academy of Arts and Sciences[121]. First studied by Lukša Beritić,[122] somewhat elusive Michielle Hraniaz signs it, and contains a brief *discorso* on Dubrovnik port, site, and defence strategies (Figures 3, 4, 5, 6, 7).

Hraniaz divided his report into three parts. The first discusses the city's harbour, focusing on the adverse winds and assessing its state of disrepair, while also suggesting various maintenance measures and ways to increase its capacity to accommodate more ships. The second part describes the location of the city and its defences against attacks from sea and land. The third and final part proposes designs for new fortifications, describing their shape and size, locations, expected costs, necessary artillery, and other ammunition[123].

[120] See subchapter 3.2.2.6.2 ZADAR AS A DISTINCTIVE CASE STUDY IN MILITARY HISTORY.

[121] Archive HAZU I. d-130. *Fortificatione della Città di Ragusa*.

[122] See Beritić, *Utvrđenja grada Dubrovnika*, 169.

[123] Arhiv HAZU I. d-130. *Fortificatione della Città di Ragusa*, 1r.

In his opening passages, Hraniaz states that months ago he was appointed to draft the report on the city's fortifications by Cristoffano d'Antonio Gozze, who meanwhile became the Rector of the Republic[124]. Furthermore, the text seems to indicate that this was due to the suspected movements of the Venetian fleet. Michielle Hraniaz was most probably a Ragusan, as he signed himself as a loyal and humble servant of the Republic, demonstrating his affection for his homeland[125].

The most important part of Hraniaz's writing is the design and description of fortifications that should be built on the strategic locations around Dubrovnik. While in the second part of his text he defines the exact distance between these focal points and reports on the necessary artillery, in the third chapter Hraniaz presents solutions for undefended angles. Thus, he provides the overall program of the new defence system separated from the city walls and the Fortress of St. Lawrence. He proposes fortifying the elevated locations around town and on the island of Lokrum, while also protecting all entrances and main routes to the city.

On more than forty pages of his manuscript, Hraniaz describes the state of Dubrovnik's fortifications in 1617, including their inventories. He proposes important repairs and the design and construction of new projects. In addition, he describes the advantages and disadvantages of fortification designs and locations, using comparable examples from Naples, Trapani, Palermo, Malta etc., to highlight the similarities and demonstrate his knowledge of military matters[126]. In the second chapter, Hraniaz demonstrates his knowledge of military writings of the period, especially those dealing with weapons, mentioning not only ancient but also modern authors such as *Signor Gienrollamo Cattaneo, Signor Giacomo Merciari* and *Francischo Balbi*.[127] Therefore, Hraniaz left a testimony from the Eastern Adriatic coast that demonstrates that both not only the military men and experts were knowledgeable of warfare and fortification writings but also the political elites of the Republic of Ragusa.

Fortificatione della Città di Ragusa is one, if not the only, example of a writing on fortification architecture in the region whose author was also a local. It provides an insight into practical and theoretical solutions for fortifications based on the author's knowledge of modern warfare and fortification principles, as well as a visual and textual source on ideal fortress designs that were planned but never executed in Dubrovnik.

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[124] That is, around 1617. Translated in Croatian as Kristofor Antun Gučetić, see Beritić, *Utvrđenja grada Dubrovnika*, 169.

[125] See appendix Michielle Hraniaz.

[126] Arhiv HAZU I. d-130. *Fortificatione della Città di Ragusa*, 17v.

[127] Arhiv HAZU I. d-130. *Fortificatione della Città di Ragusa*, 6v.

A few years later, in the northernmost part of the area studied in this thesis, another report on the design of the Eastern Adriatic fortifications was prepared for the authorities who commissioned the work: Antoine de Ville's 1630 Report on the Fortress of Pula for the Venetian Senate. The designer of the Pula fortress included his creation in a comprehensive work on the city of Pula and its ancient monuments, *Descriptio portus et urbis Polae*, published in Venice in 1633. The short text is an attempt to reconcile the classical tradition with contemporary fortification architecture. A comprehensive study of de Ville's architectural works, texts and drawings is included in the fourth sub-chapter of the case studies[128].

A comparison between Hraniaz's discourse on the fortifications of Dubrovnik and De Ville's on Pula reveals similarities in their writing styles, with both focusing on design and construction proposals. These are detailed reports for the authorities - but not without flashes of underlying knowledge of military matters and ancient architecture. Lorini's monumental treatise, on the other hand, situates the Zadar example within a broader theoretical framework, using it to illustrate the spread of knowledge about fortifications and to elaborate on the author's reflections.

[128] See subsections of the subchapter 3.2.4 FROM THE IDEAL FORTIFICATIONS OF DE VILLE'S TREATISE TO HIS MALFUNCTIONING FORTRESS DESIGN IN PULA.

3 TERRITORIALISATION AND FORTIFICATION IN THE EARLY MODERN EASTERN ADRIATIC

3.1. INTRODUCTION

The Eastern Adriatic is a sizeable geographical territory, a historical border area and the meeting place of Central European and Mediterranean civic models[129], often redivided during the Early Modern period (Figure 8). Its borders' alterations are challenging to determine and define due to the numerous wars and peace agreements.

The Adriatic Sea is the northernmost arm of the Mediterranean, lying between the Apennine or Italian Peninsula in the west and the Balkan peninsula in the east, while its southeastern limit of the Strait of Otranto links with the Ionian Sea. Its eastern part corresponds with the territories of present-day Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, and Albania: "The spatial boundaries of the world's oceans and seas have been defined by the International Hydrographic Organization (IHO) in S-23 publication: Limits of oceans and seas (IHO, 1953). (...) The IHO boundary between the Adriatic and Ionian Sea is a line running from the mouth of the Butrinto River in Albania (39°44' N) to Cape Karagol (39°45' N) in Corfu, through this island to Cape Kephali and on to Cape Santa Maria di Leuca. According to bathymetry, the Adriatic Sea is divided into three sub-basins: North, Middle, and South. The limits of the subbasins are modified after Velić and Malvić (2011) and Jovanović (1978). The North Sub-basin extends up to the line connecting the cities of Ancona and Zadar. The Middle and South Adriatic are divided by Palagruža Sill, with the boundary line running from Monte Gargano on one side to the Island of Mljet and Pelješac Peninsula on the other"[130]. The provided information supports the claim that Greece also owns 73 km of the island coast in the Adriatic and, definitely geographically, can be part of the discussion on the Eastern Adriatic area.

The Eastern Adriatic, in particular, appeared as a place and a historical concept with more significant frequency after the disappearance of the Socialist Federal Republic of Yugoslavia[131].

[129] Ivetic, *Istočni Jadran*, 11–12.

[130] Vrdoljak, Režić, and Petričević. "Bathymetric and Geological Properties of the Adriatic Sea", 99. See also Caligiuri, "The Maritime Boundaries".

[131] Ivetic, Egidio. *Istočni Jadran*, 18.

To paraphrase Egidio Ivetić, its complexity is shown and repeated in each part of the region[132]. From this regional point of view, Istria, Dalmatia, Croatia, Montenegro, Herzegovina, and Albania are historical terms associated with the Eastern Adriatic[133]. From the political point of view, between the 1460s and 1660s, the main actors in the Eastern Adriatic were the Republic of Venice, the Republic of Ragusa, the Ottoman Empire, and the Kingdom of Croatia in personal union with the Kingdom of Hungary[134], from 1527 under the *Haus Habsburg*.

Since the tenth century, the Republic of Venice has repeatedly conquered and lost possessions on the eastern Adriatic coast. With the Treaty of Zadar[135] in 1358, the Republic was forced to hand over its Dalmatian possessions to the Hungarian-Croatian Kingdom. With the treaty of Visegrád of the same year, Dubrovnik recognised the authority of the Hungarian-Croatian king, ending the century and a half of Venetian rule over the south Adriatic city[136]. Ragusan nobles elected the government and the rector, though it was virtually subordinated to the Croatian-Dalmatian ban. The newly legalised aristocratic-republican system did not change significantly until the collapse of the Republic of Ragusa in 1808. The Hungarian coat of arms was accepted as the Republic of Ragusa's, and the Hungarian-Croatian king received an annual tribute, also requesting naval help in case of war. The Republic of Ragusa was granted the right to trade with Islam-ruled countries by the 1433 Council of Basel. From 1458, it became a tributary state of the Ottoman Empire, obliged to pay the sultan a large annual sum[137].

The *Serenissima* acquired the right to Dalmatia in 1409, fifty-one years after the Treaty of Zadar. By 1420 most of the towns had accepted its rule, but not without resistance. The first to be acquired were Zadar, Pag, Novigrad, Vrana, Rab, Nin, Cres and Lošinj. Ostrovica and Skradin were bought from the Grand Duke of Bosnia, Sandalj Hranić, in 1411, but were later recaptured. Šibenik surrendered on 30 October 1412. Brač, Hvar, Korčula, Vis and the surrounding islets also recognised Venetian authority in 1420. After heavy bombardments by the Venetian fleet, Trogir fell on 21 June 1420, and Split surrendered on 28 June of the same

[132] Ivetic, *Istočni Jadran*, 12.

[133] Ivetic, *Istočni Jadran*, 32.

[134] According to Josip Vrandečić, the treaty confirmed the territorial and political unity of the Dalmatian area. The state-political community *Regnum Dalmatiae et Croatiae*/*Regna Dalmatiae et Croatiae* was reunited. During the reign of King Louis I of Hungary and Croatia (1342–1382), also King of Poland (1370–1382), and Duke of Transylvania (1339–1342). See more in Vrandečić and Bertoša. *Hrvatska povijest*, 9.

[135] February 18, 1358.

[136] May 27, 1358. See more in: Janeković-Römer, *Višegradski ugovor*.

[137] See more in Miović, "Dragomano nostro della Porta".

year. A few years later, in 1444, the Republic acquired Poljica, Omiš and the area up to the Neretva River in 1452. The Croatian noble Ivan VII Frankapan ceded the island of Krk in 1480, but the *Serenissima* officially became its ruler after Ivan's death in 1486. Before the significant Ottoman conquests in the sixteenth century, the Eastern Adriatic was almost entirely ruled by Venice, with the exception of Habsburg inner Istria, the Croatian-Hungarian Crown's coastal territories from Trsat to Vinodol towards Senj and the hinterland of Obrovac, Knin, Sinj and Klis, and the territory of the Republic of Ragusa[138].

However, the rapid advancement of Ottoman forces along the Western Balkan and Eastern Adriatic had important consequences. This was particularly evident after the siege and fall of Constantinople in 1453 and the following conquests of Smederevo in 1459 (Belgrade was under siege in 1456 but did not fall until 1521), Argos in 1463, the Kingdom of Bosnia in 1463, and the Venetian-Ottoman war (1463–1479). The Ottomans secured their position by establishing the Sanjak of Bosnia in 1463 and the Sanjak of Herzegovina in 1470 after the conquest of Mostar in 1466. In the territory of Kingdom of Hungary, the Captaincy of Senj was founded in 1469 as a defence against the Venetians and the Ottomans[139].

The Ottoman conquests continued in the second half of the fifteenth century. Negroponte was conquered in 1470 and Shkodra in 1479. In the same year, the Treaty of Constantinople was signed. The new danger came close to the populated, strategic cities of the Eastern Adriatic, especially considering the fall of Herceg Novi (Castelnuovo) to the Ottomans in 1482 and the conquest of Otranto on the western Adriatic coast in 1480-1481. On 9 September 1492, the Battle of Krbava was fought in the Lika region near Udbina in the Eastern Adriatic hinterland, resulting in an Ottoman victory. Another Venetian-Ottoman war began in 1499. The Ottomans conquered Makarska and the coastal area between Omiš and the Neretva River. Venice lost Modon, Koroni (Corone) and Durrës by the treaty of 1503[140].

Suleiman the Magnificent came to power in 1520. The new borders in the Eastern Adriatic were delineated after the Hungarian-Croatian defeat in the 1526 Battle of Mohács. One of the consequences was the election of Archduke Ferdinand I Habsburg[141] as Croatian king in

[138] Žmegač, *Bastioni jadranske Hrvatske*, 21.

[139] Compare Žmegač, *Bastioni jadranske Hrvatske* and Papeš, "Terminologija", 21–28.

[140] Papeš, "Terminologija", 21–28.

[141] Ferdinand's brother Charles V was elected Holy Roman Emperor in 1519, ruling the Austrian lands, Burgundy, Spain, the Kingdom of Naples, and Württemberg. In 1521, the brothers divided the power: Ferdinand received the Austrian lands and Württemberg, Charles the rest. Thus, they established the Austrian-German and Spanish-Dutch

Cetingrad on January 1, 1527. The House of Habsburg became responsible for the military issues in the area, and the triplex Venetian-Habsburg-Ottoman frontier's meeting point was formed and constantly modified in the following centuries.

The Ottomans conquered part of Zadar's hinterland between 1537 and 1540. Klis, Ferdinand's last stronghold in Dalmatia, fell in 1537. The guerilla soldiers, *Uskoci,* were forced to withdraw to Senj. During the Cyprus War (1570–1573), the Ottomans took over Cyprus in the 1571 Siege of Famagusta. However, the Christian naval army (the Holy League) won a significant Battle of Lepanto in the same year. Nevertheless, with the 1573 Treaty of Constantinople, the Republic of Venice lost Cyprus. Another Christian victory occurred soon afterwards. The Ottomans were defeated in the Battle of Sisak in 1593, between June 15 and 22. This battle was fought during the so-called Long War between the Habsburgs and Ottomans from 1593 until 1606, but the conflict mainly regarded regions of Transylvania, Wallachia, and Moldavia [142.] The war ended with the Treaty of Zsitvatorok in 1606 [143]. Milan Kruhek argues that historical land of Croatia gained an internationally recognised border with the Ottoman Empire for the first time after the mentioned treaty, which remained unchanged until the end of the seventeenth century[144].

Between 1606 and 1645 there were no wars between the Ottomans and the two Christian powers. However, there was a war between the *Serenissima* and the Habsburgs. The so-called Uskok War was fought from 1615 to 1617 in the northern Adriatic[145].

The Venetians won important victories in the Eastern Adriatic during the War of Candia (1645-1669). However, they lost Crete. Soon after, in 1647, the Venetians took power in the Dalmatian towns of Novigrad, Obrovac, Skradin, Solin and the fortress of Kamen near Split. In 1648 Klis was captured from the Ottomans. Poljica and the Makarska coast also came under Venetian rule. In addition to the Venetian victory at the Battle of Lepanto, another victory came in 1656 at the Battle of the Dardanelles. However, Heraklion fell under Ottoman rule in 1669, when the treaty was signed. The *Serenissima* still had control over the islets near the island. Linea Nani defined the new borders in Dalmatia in 1671[146].

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lines of the Habsburg dynasty. However, Charles renounced the imperial title, making Ferdinand I the elected emperor in 1556. See more in Budak, Strecha and Krušelj, *Habsburzi i Hrvati*, 31–33.

[142] Papeš, "Terminologija", 21.

[143] Name variants: Zsitvatorok, Sitvatorok. Žitava. The present-day border between Slovakia and Hungary along the Žitava River.

[144] Kruhek. *Krajiške utvrde*, 9–12.

[145] Gruenfelder, "Senj i rat protiv Uskoka".

[146] Compare Papeš, "Terminologija", 21.

The Ottoman army tried again to reach Vienna and succeeded in 1683. However, it was defeated again, starting the so-called Great Ottoman or Morean War (1684-1699). In the Eastern Adriatic, the Venetians won the towns of Knin, Sinj and Vrgorac, as well as the area of the mouth of the Neretva River along the settlement of Gabela and the town of Čitluk in Herzegovina. The victory of Prince Eugene of Savoy at Zenta in 1697 marked the defeat of the Ottomans[147]. Peace negotiations began in 1698 and ended in Karlovy Vary on 26 January 1699, resulting in the new territorial gain for the *Serenissima*, known as the *acquisto nuovo*, defined by the Grimani line[148]. From 1714 to 1718 the Christian forces continued to fight the Ottomans. They took control of Imotski and areas in the Dalmatian hinterland north of the towns of Knin and Sinj. The war ended with the Treaty of Požarevac in 1718, when new borders were established – the Venetians gained the territory of *acquisto nuovissimo* up to the Mocenigo line[149]. This was also the last Veneto-Ottoman war[150].

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3.2 OPERATIONALISING THE THEORY OF FORTIFICATION: A PRACTICAL EXAMINATION

The five examples or case studies in the following subsections illustrate how a particular area of Europe reacted and defended its lands during the rise of military science. The development, dissemination and adaptation of fortification knowledge was imperative, given its frontier status. The question arises: does the Eastern Adriatic represent an area of experimentation in the design and construction of fortifications? Could new theoretical imperatives be adapted in a region with particular building practices? Could such an area be a witness to possible architectural standardisation?

Standardisation is a phenomenon that the study of military architecture has often addressed, but what was considered standard in the evolving science was constantly changing and remains

[147] Name variant: Zenta/Senta/Сента. Present-day Republic of Serbia.

[148] Name variants: Karlowitz, Sremski Karlovci, Сремски Карловци. Present-day Republic of Serbia.

[149] Name variants: Požarevac/Passarowitz/Пожаревац. Present-day Republic of Serbia. Žmegač, *Bastioni jadranske Hrvatske*, 22–23

[150] Compare Žmegač, *Bastioni jadranske Hrvatske*.

difficult to define. The normativity of military science is always dependent on experimentation, as the treatises show, by presenting possible attack or defence scenarios and instructions on how to deal with them. On the other hand, the term harmony points to a solution to the balanced tension between the need for standardisation of theory and practice, which depends on experimentation, and is used by the author of this dissertation to interpret the attempt to balance theory and practice.

The following case studies represent the most important defence investments made by the Republic of Venice and the Republic of Ragusa. These investments were carried out by the most important military architects and engineers of the time. As explained in the previous chapters, the papers provide examples of the prescribed building designs. The case studies have been selected on the basis of specific criteria that highlight the interaction between fortification theory and practical application. These criteria include the scale of the fortification, the financial investment, the involvement of influential figures in the construction process, the existence of relevant written records reflecting an interest in the design and construction of fortifications at the particular site, strategic considerations including defence against attack and siege, the incorporation of established theoretical models and their potential as prototypes for subsequent designs, constructions and theoretical enquiry.

Chronologically, the Republic of Ragusa appears as the earliest example in the 1460s. During this period, the Republic engaged the services of the renowned architect Michelozzo Michelozzi to modernise the fortifications of Dubrovnik, with particular emphasis on securing the hinterland in response to the Ottoman threat.

The study of Zadar focuses on the years coinciding with Michele Sanmicheli's major interventions in the city's fortifications, a process intricately linked to his family's workshop. Although Sanmicheli was the military engineer of the *Serenissima*, he came into conflict with the commander-in-chief, Francesco Maria della Rovere, because of their different views on the fortification of Zadar. The fortification of Zadar in the sixteenth century and beyond was shaped by military experts who contributed to the complete project of fortifying the peninsula, including its most vulnerable south-eastern part.

The third case study concerns the island-triangular fortress of St. Nicholas in Šibenik, which is notable for its complex typology in design and construction, which has been extensively documented in scholarly works. The fortress, built by Giangirolamo Sanmicheli, is the subject of a comprehensive report on its design and construction plans. Despite historical observations highlighting its shortcomings, these critiques appeared soon after its completion and provided valuable insights.

The early 1630s saw the development of important projects, notably Antoine de Ville's design for the hilltop fortress in Pula, documented in his treatise on fortifications published in 1629. Ville's memoirs on Pula, written in 1633, encompassed his newly constructed defensive structure, revealing challenges during its construction that highlighted shortcomings in his ideas, thus illustrating an inconsistency in the application of fortification knowledge in the given space.

This was followed by monumental fortifications and modernisation of the city walls in Šibenik and Split between the 1640s and 1660s, coinciding with the rise of military theory. Their rapid construction, however, was primarily driven by the threat of war, which led to a re-examination of their functionality. As the only examples of newly constructed fortifications in the Early Modern Eastern Adriatic that were subjected to significant sieges, questions arise about their reliance on military theory.

3.2.1 THE TRIAL-AND-ERROR METHOD IN THE CASE OF DUBROVNIK

3.2.1.1 INTRODUCTION

The first architectural case study represents a particular moment in the fortification history of the Eastern Adriatic – the arrival of architect Michelozzo di Bartolomeo Michelozzi, *magistro Bartolomeo,* to Dubrovnik (Figure 9) to work on fortification design and oversee its construction[151].

On 2 January 1461, the Minor Council of the Republic of Ragusa decided to consider hiring Michelozzo Michelozzi, a Florentine architect and sculptor. One of the conclusions was to pay his expenses if he came to Dubrovnik and was not employed. Another was to deduct his travel expenses from his salary if he was accepted[152].

A few months later, on the 10th of June 1461, after the Senate had authorised the Rector and the Minor Council on the 8th of June to make an agreement with Michelozzi to employ him for one year at a certain monthly salary, the Minor Council concluded that Michelozzi from Florence would be accepted as City Engineer for one year. The starting date was set at 10 May. The part already paid to him in Florence was to be deducted from the agreed annual salary. He was also appointed to "supervise and direct all works of walls, moats and fortresses", to give orders, advise, plan, and make decisions at his discretion and at the request of the government. Michelozzi held similar positions four times in his career as 'consultant engineer for fortifications' for the Florentine government: in 1430 for the fortifications of Lucca; in 1432 for the fortress of Montepulciano; around 1447, he investigated and advised on dam problems at Lake Castiglione; in the late 1440s for the fortifications of Castellina de Greve[153].

How did the Ragusans attract Michelozzi, already in his sixties? Harriet McNeal Caplow argues that the reason must have been financial, as the Ragusans provided him higher salary than he had probably ever received.[154] The last mention of his name in the traced Ragusan documents was on the 5th of May 1464.[155] The Senate rejected the proposal to display Michelozzi's

[151] HR-DAD-3 Acta Consilii Rogatorum 15 Annorum 1456–1458, fol. 17.

[152] McNeal Caplow, "Michelozzo at Ragusa", 110; Beritić marks the 3rd of January in Beritić, *Utvrđenja grada Dubrovnika*, 84, note 490.

[153] McNeal Caplow, "Michelozzo at Ragusa", 110.

[154] McNeal Caplow, "Michelozzo at Ragusa", 109.

[155] Beritić, *Utvrđenja grada Dubrovnika*, 93, note 579.

proposed design of the Rector's Palace after a gunpowder explosion in August 1463 damaged it. Exactly one month later, on the 5th of June 1464, Juraj Dalmatinac (*Georgius de Sibinico*) took over Michelozzo Michelozzi's position[156].

This moment in the history of fortification is crucial for several reasons. First of all, the modernisation of the northern and western walls of Dubrovnik was a huge project, because it combined the old and the new, and it was the first time that fortification was experimented with. It was monumental in its dimensions and the most vulnerable part of the city's defence system. The Republic of Ragusa invested considerable capital. As will be shown, the Republic planned for several years to bring in a prestigious actor to direct and supervise the fortification of the city. At the time of his arrival, Michelozzo Michelozzi was already a famous sculptor and architect who had worked for the Medici family. The Republic also kept data and sometimes detailed descriptions of the development of the fortifications, as well as documents relating to decisions, proposals, doubts, and modifications. On the other hand, the only military treatise of the Republic of Ragusa that has been found so far is a manuscript of 1617 on the fortifications that were never built. However, the Republic had a productive literary and printing tradition, especially in the historical Croatian language. The written legacy also shows an awareness of the shortcomings of the city's geographical location and the fortifications built. The Republic had to be prepared for possible attacks. In the case of Dubrovnik, however, this did not happen. The influence of theoretical models on the fortifications of Dubrovnik in the case of Michelozzi is questionable, as he left no written testimonies; moreover, this was a period of experimentations, of trial-and-error methods. Nevertheless, Michelozzi's methods were quite exceptional, bringing considerable innovation to military architecture and creating possible models for future practice or theory.

[156] HR-DAD-3 Cons. Rog. 18 Annorum 1463–1466, fol. 63, 70v; Beritić, Lukša. *Utvrđenja grada Dubrovnika*. Zagreb: JAZU, 1955, p. 93, notes 580-581.

3.2.1.2 DUBROVNIK AND THE FIREARMS DEFENCE BEFORE MICHELOZZO MICHELOZZI

The Ottoman conquest of Constantinople on 29 May 1453 posed a direct threat to the eastern and south-eastern European states. Moreover, unlike their eastern and south-eastern European opponents, the Ottoman army was well equipped with gunpowder weapons.

In the case of Dubrovnik, however, they were thinking ahead. On 22 November 1351, while still formally under Venetian rule, the Minor Council discussed the purchase of a miniature cannon for the city[157]. From that year onwards, the fortifications were strengthened and modified to resist firearms. In the second half of the fourteenth century, after the Ragusans recognised the authority of the Croatian-Hungarian king, their enemy became the powerful maritime state, the Republic of Venice. The Ragusan authorities therefore invested heavily in the reconstruction of the existing medieval fortifications facing the sea, especially the city gates and the port.

In the second half of the fifteenth century, however, another enemy appeared close to the borders. The focus shifted from the fortifications facing the sea to those facing the hinterland. Therefore, on 24 September 1453, the Senate decided to elect three people to draw up a regulation for the deepening of the western moat[158]. Although the final provision was for deepening the moat towards the west, its title was "Provision for digging a moat on the side of the hill", and the introduction stated that it was for digging a moat around the town, extending from the sea to the Minčeta Tower (Figs. 10, 11) on the west. After the ditch was excavated, it was to be walled on both sides, if necessary. According to this regulation, the ditch was built mainly from Ploče to Minčeta, but its width was much wider than indicated. Shortly afterwards, on the 15th of October, the Senate issued a decree appointing three noble people to draw up and submit a plan for the masonry and other works on the city walls facing the hill. More importantly, the Senate authorised the Rector and the Minor Council to spend up to the agreed price for the arrival of an engineer in Dubrovnik[159].

On the 8th of November 1453, the above-mentioned regulation on the construction of the city wall on the hill was adopted by twenty-six votes to ten. The *cantonata* built at the Ploče gates

[157] Deanović, "Prilog Michelozza", 66, note 22.

[158] HR-DAD-3 Cons. Rog. 13 Annorum 1452–1453, fol. 239v; Beritić, Lukša. *Utvrđenja grada Dubrovnika*. Zagreb: JAZU, 1955, pp.71.

[159] Beritić, *Utvrđenja grada Dubrovnika*, 72.

should have the same height and thickness[160]. From there to St. Jacob's Tower, the city wall was to be doubled on the inside, and its height was to remain the same as that of the old wall. The other five curtain walls from the Minčeta Tower to the St. Jacob's Tower were to be doubled, and Minčeta was to be filled with lime and stoned up to the first vault. Work on Minčeta was to begin immediately and be completed by Easter. After that, the outer wall was to be raised as and where it was deemed appropriate. And much more. In order to carry out these works, it was proposed that five superiors from five different families be elected by the Senate[161], and the Senate appointed the requested supervisors[162].

In March 1454, the Senate appointed Ivan Gučetić to supervise the work on the walls for one month, with payment, and the service was to be extended monthly until June[163]. On the 28th of April 1454, as the city walls were being doubled, the supervisors of the construction of the Minčeta and other towers were authorised to demolish the old wall and build a new one. But only where the doubled new wall was already built next to the outer side of the old one. The thickness of the new wall should be the same as the old one[164]. Construction progressed rapidly, and on 6 May 1455 the Senate ordered that the crenelations on the new walls be built in the same way as those on the old walls. It was refused to make them in the way that was started near the Minčeta Tower[165].

On the 25th of June 1455, the question of bringing the engineer was raised again. The Senate authorised the Rector and the Minor Council to spend the agreed amount to bring Onofrio della Cava or another engineer to Dubrovnik[166].

The strengthening of the walls towards the hinterland included not only the northern wall but also the western wall. The provision for the construction of the western walls was discussed on 1 July 1455, and the proposed requirement was accepted with seventeen votes against fifteen. The instructions stipulated that the Minčeta Tower should have four corners, one facing the town and three facing the outside. These three corners should be surrounded by a slope, which should start from the new city wall and go all the way to the corner facing the St. Lawrence

[160] HR-DAD-3 Cons. Rog. 13 Annorum 1452–1453, fol. 254v.

[161] HR-DAD-3 Cons. Rog. 13 Annorum 1452–1453, fol. 254v, 255, 255v; Beritić, *Utvrđenja grada Dubrovnika*, 72, 74, note 403.

[162] HR-DAD-3 Cons. Rog. 13 Annorum 1452–1453, fol. 256; Beritić, *Utvrđenja grada Dubrovnika*,.74, note 404.

[163] Lukša Beritić brings the Croatised name version in Beritić, *Utvrđenja grada Dubrovnika*,.75.

[164] HR-DAD-3 Cons. Rog. 14 Annorum 1454–1456, fol. 52; Beritić, *Utvrđenja grada Dubrovnika*, 75, note 412.

[165] HR-DAD-3 Cons. Rog. 14 Annorum 1454–1456, fol. 159v; Beritić, *Utvrđenja grada Dubrovnika,* 76, note 421.

[166] HR-DAD-3 Cons. Rog. 14 Annorum 1454–1456, fol. 176; Beritić, *Utvrđenja grada Dubrovnika*,.76, note 424.

Fortress and the sea. All the towers should be fortified with double walls on the inside, except for the tower near the Pile Gate[167]. Lukša Beritić came to the conclusion that although Michelozzi is considered the author of Minčeta, as he created the model for its construction, the basic idea of surrounding the four-sided tower on three sides and building it in a cylindrical shape was introduced by the Ragusan authorities before his appointment as engineer of the Republic.[168] This also suggests that the Ragusan authorities of the time had extensive knowledge of the design and construction of city walls. They also did not underestimate the importance of firearms or pre-modern weapons and frequently renewed their public armoury.
During the second half of 1455, the authorities were busy preparing for the possible attack. Detailed instructions were provided,[169] and on the 18th of October 1455, they purchased from a maestro from Florence five heavy bronze bombards [170], even naming them in advance.[171] In 1456 a certain Beltramus was mentioned in connection with the Minčeta tower. On the 17th of June, the Senate discussed the construction of a round tower near Minčeta, according to the proposal and advice of the expert engineers Beltramus and Francesco Teotonicus[172]. Soon after, on 11 July, the Minor Council proposed to the Major Council that Beltramus be hired as an engineer for the construction of walls and other municipal works for one year, with a regular monthly salary[173]. However, this was all interrupted by an outbreak of plague[174]. In 1457, on the 15th of October, the Senate decided to send for an engineer from Apulia who would be able to build fortresses and walls[175]. Finally, on 2 January 1461, Michelozzi was considered the engineer of the Republic of Ragusa[176].

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[167] HR-DAD-3 Cons. Rog. 14 Annorum 1454–1456, fol. 178–178v; Beritić, *Utvrđenja grada Dubrovnika*, 77, note 427.

[168] Beritić, *Utvrđenja grada Dubrovnika*, .77.

[169] On the 10th of July, HR-DAD-3 Cons. Rog. 14 Annorum 1454–1456, fol. 181–181v; Beritić, *Utvrđenja grada Dubrovnika*, 77–78, note 428.

[170] Maso di Bartolomeo. See more in: McNeal Caplow, "Michelozzo at Ragusa", 109.

[171] Beritić, *Utvrđenja grada Dubrovnika*, 79.

[172] HR-DAD-3 Cons. Rog. 15 Annorum 1456–1458, fol. 17; Beritić, *Utvrđenja grada Dubrovnika,* 80, note 448.

[173] Beritić, *Utvrđenja grada Dubrovnika*, 80, note 449.

[174] Beritić, *Utvrđenja grada Dubrovnika*, 80.

[175] Beritić, *Utvrđenja grada Dubrovnika*, 81, note 459.

[176] *2 January 1461*

"Capto fuit de providendo de habendo ad servitia nostra magistrum Michelocium de Florentia Ingeniarium. Qui si veniet Ragusium et non erit concors nobiscum, habere debeat pro suis expensis ducatos auri vigenti. Et si erit

3.2.1.3 MICHELOZZO MICHELOZZI IN DUBROVNIK

On the 15th of April 1461, the Senate discussed the construction of an outer wall[177]. The conclusion was to postpone it until Michelozzi's arrival. In addition, work on the Minčeta Tower was to be suspended for that month if Michelozzi did not arrive first[178]. The latter was once again decided upon and postponed until 6 May, when the expected maestro from Florence would arrive.[179] In the meantime, their duty was to provide him with a place to stay[180].
Michelozzo eventually arrived a month later[181]. As mentioned above, on 8 June the Senate authorised the Rector and the Minor Council to make an agreement with Michelozzi to employ him for one year at a fixed monthly salary[182]. The Senate decided to start, continue, and

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concors nobiscum id quod sibi dabitur poni debeat ad computum salarii dicti magistri Michelocii." McNeal Caplow, "Michelozzo at Ragusa", 116, according to HR-DAD-5 Acta Minoris Consilii, 15, fol. 149.

[177] *15th April 1461*

"Prima pars est de induciando supra facto Antimuros civitatis. 31-6

Prima pars est de induciando adventum magistri venturi de Florentia. [rejected]

Sa. pars est de induciando per totum presentem et tanto menos quanto cicius dictus magister veniret. [28-8]

Prima pars est de suprastando a murrando turrim de Menze pro totum presentem mensem tanto menos quanto magister citibus veniret. [26-9]"

McNeal Caplow, "Michelozzo at Ragusa", 116, according to HR-DAD-3 Cons. Rog. 16 Annorum 1459–1461, fol. 247.

[178] Beritić, *Utvrđenja grada Dubrovnika*, 84, note 499.

[179] Beritić, *Utvrđenja grada Dubrovnika,* 85, note 503.

[180] *30th May 1461*

"Prima pars est di dando libertatem domino rectori et suo minori consilio providendi magistro Michelocio pro domo pro eius habitatione. [omnes]"

McNeal Caplow, "Michelozzo at Ragusa", 116, according to HR-DAD-3 Cons. Rog. 16 Annorum 1459–1461, fol. 263.

[181] *6th June 1461*

"Prima pars est di dando libertatem domino rectori et suo minore consilio conducendo et achordandi magistrum Michelocium per unum annum promittendo sibi de salario a ducatis xx infra in mense. [26-2]"

McNeal Caplow, "Michelozzo at Ragusa", 116, according to HR-DAD-3 Cons. Rog. 16 Annorum 1459–1461, fol. 264v.

[182] *8th June 1461*

"Prima pars est cum de benedictione et mediante intercession gloriose martiris et pontificis sancti Blasii protectors et confalonerii nostril de incipiendo proseguendo et complendo turrim de Menze juxta designum

complete the Minčeta Tower according to his design or according to his choice. In addition, he had to continue work on the outer wall, the city walls and the *bastice supra Bersaglium*, probably today's fortress of Bokar.[183] On June 10th, the minor council decided to accept Michelozzi as the city engineer for one year. He was also to be excluded from the city's port works. If the government took them into consideration, he would not be obliged to take part in them. Nor is he obliged to work with his own hands[184].

On the very next day[185], June 11th, the Senate decided to fire Bernardino de Parma.[186] Two days later, however, the Senate authorised the Rector and the Minor Council to have a word with him and to inform the Senate.[187]. They were authorised to examine his intentions and

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magistri Micheloci aut aliter prout ipsi Michelocio videbitur et etiam de proseguendo laboreria antimurorum et murorum civitatis nostre ac bastice supra Bersaglium. [omnes]"

McNeal Caplow, "Michelozzo at Ragusa", 116, according to HR-DAD-3 Cons. Rog. 16 Annorum 1459–1461, fol. 265; Beritić, *Utvrđenja grada Dubrovnika*, 85, note 504.

[183] Beritić, *Utvrđenja grada Dubrovnika*, 85, note 505.

[184] *10th June 1461*

"Captum fuit de conducensdo pro Ingeniario Comunis nostril magistrum Michelocium de Florentia ibi presentum et acceptant semper unum annum inceptum die x Maii proxime preteriti cum salario ducatorum ducentorum quadraginta auri de quibus iam habuit pro parte ducatos quadraginta solutos sibi nomine nostro Florentie. Cum hoc quod dictus magister Michelocius teneatur assistere et attendere ad omnia laboreria murorum fossorum castrorum et locorum dominii nostri in ordinando consulendo et disponendo prout sibi melius videbitur et prout erit voluntas dominii nostri nihil exceptando nec detrahendo preterlaboreria portus Ragusii. In qua laboreria si dominium intrare velet non teneatur ipse magister Michelocius ad ipsa laboreria portus Ragusii. Et cum hoc declarato quod dictus magister Michelocius non teneatur aliquid laborare manualiter."

McNeal Caplow, "Michelozzo at Ragusa", 116, according to HR-DAD-5 Acta Minoris Consilii, 15, fol. 184; Beritić, *Utvrđenja grada Dubrovnika*., 85, note 506.

[185] *11th June 1461*

"Prima pars est de licentiando magistrum Bernardinum de parma ingeniarium missum per Ser Nicolao de bona oratorum nostrum in Ancona.

Prima pars est de dando ipsam magistro Ingeniario ducator viginia pro expenses et dono et nautus barche. [rejected]

Sa. pars est de dando ducatus vigintequinque. [24-3]."

McNeal Caplow, "Michelozzo at Ragusa", 116, according to HR-DAD-3 Cons. Rog. 16 Annorum 1459–1461, fol. 267v.

[186] Beritić, *Utvrđenja grada Dubrovnika*, 85, note 507.

[187] *13 June 1461*

"Prima pars est de dando Libertatem domino Rector et suo minore consilio praticandi cum magistro Bernardino de parma Ingeniario et id quod habebunt reportandi presente consilio. [omnes]"

abilities.[188] After these exams, on 4 July 1464, he was appointed by the Minor Council to the municipal service with a salary, starting on 11 June, the day on which he boarded a ship in Ancona bound for Dubrovnik. His position as an engineer included work in wood, deepening the harbour, making, and arranging bombards and firing, and all engineering work in the city and the state. He would not have to work with his hands but would have to direct the work. The above did not include making and arranging bombards. In that case he would have the helpers[189].

By the end of the year, much of the fortification work had been carried out according to Michelozzi's proposals and instructions. For example, the wall from the Pile gates was to be extended in a straight line to the sea. Also, the wall of the Tower of Pile was to be strengthened from east to west, interestingly contrary to Michelozzi's proposal[190]. An outer wall was built

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McNeal Caplow, "Michelozzo at Ragusa", 117, according to HR-DAD-3 Cons. Rog. 16 Annorum 1459–1461, fol. 268; Beritić, *Utvrđenja grada Dubrovnika*, 85, note 508.

[188] *16 June 1461*

"Prima pars est de dando libertatem domino Rectore et suo minore consilio pratichandi cum magistro Bernardino Ingeniario et si ipso videbitur utilis pro laborariis comunis nostri conducendi eius per uno anno cum salario a ducatis CL infra. [rejected]

Sa. pars est de pratichando cum ipso est et experimentando eius Artificia et ferendo suum ultimum intentionum et reportando present Consilio. [26-5]"

McNeal Caplow, "Michelozzo at Ragusa", 117, according to HR-DAD-3 Cons. Rog. 16 Annorum 1459–1461, fol. 268v.

[189] *6th July 1461*

"Prima pars est di dando Libertatem Rector et suo minori consilio praticandi cum magistro Bernardino di parma Ingeniario et eum firmando pro uno anno pro quanto minus poterunt a ducatis 15o infra. Et quod nullam aliam solutionem habeat pro laborariis qua faceret pro domino nostro. [31-4]"

McNeal Caplow, "Michelozzo at Ragusa", 117, according to HR-DAD-3 Cons. Rog. 16 Annorum 1459–1461, fol. 272; Beritić, *Utvrđenja grada Dubrovnika*, 85, note 512.

[190] *19th July 1461*

"Prima pars est de fabricando telam muri civitatis nostre a porta Pillarum versus Pelagrus eundo per directum et non sicut vadit antimurum antiquum ita ut dicta tela veniat habere inter murum veterem et murum novum fabricandum circa brachia XI de grossitie iuxta parere magistri Micheloci una cum parere domini Rectoris et minoris consilii. [omnes]

Sa. pars est de fabricando ipsam sicut vadit antimurum. [rejected]

Prima pars est di ingrossando turrim supra portum Pillarum a levante in ponentem. [18-14]

Sa. pars est de non ingrossando ipsam turrim quia ipsa expensa non videtur necessaria eo quod in illo loco hostis non potest offendere civitatem juxta parere magistri Micheloci. [rejected]"

around the Tower of Minčeta.[191] On the 27th of October 1461, the Senate decided that the construction of the Minčeta Tower should continue according to Michelozzi's wooden model. This model included two outer walls - one covered and the other uncovered[192]. The first suggests a corridor with casemates, gun loops and cannon openings inside. It is connected diagonally to the front wall and has no terreplein, no upper open corridor and no parapet. The second has a terreplein, a crenelation with cannon openings and gun loops.

In the spring of 1462, the Senate decided to continue doubling the city wall, from the Ploče city gate towards the sea to the Tower of St. Luke.[193] On the 3th of May 1462, Michelozzi was to remain in the municipal service for another year with the previous salary.[194] It should be noted that seventeen voted to stay and as many as fifteen voted against it.

During the summer, the construction of the Bokar was hotly debated. First, the Senate rejected Michelozzi's proposal[195]. Soon after, it was decided to continue construction according to

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McNeal Caplow, "Michelozzo at Ragusa", 117, according to HR-DAD-3 Cons. Rog. 16 Annorum 1459–1461, fol. 277.

[191] *21st July 1461*

"Prima pars est de deliberando supra fabrica turris de Menze. [20-12]

Prima pars est de faciendo Antimuros circum turris de Menze. [20-12]

Sa. pars est de faciendo ipsam turris sine antimuros. [rejected]"

McNeal Caplow, "Michelozzo at Ragusa", 117, according to HR-DAD-3 Cons. Rog. 16 Annorum 1459–1461, fol. 277v; Beritić, *Utvrđenja grada Dubrovnika*, 86, note 514.

[192] *27 October 1461*

"Prima pars est de seguendo fabricam turris de Menze secundum designum lignaminis portatum per Michelocium videlicet cum duobus Antimuris uno coperto et altero dischoperto. [20-13]"

McNeal Caplow, "Michelozzo at Ragusa", 117, according to HR-DAD-3 Cons. Rog. 17 Annorum 1461–1463, fol. 22. Beritić, *Utvrđenja grada Dubrovnika*, 86, note 515.

[193] Beritić, *Utvrđenja grada Dubrovnika*, 87, note 523.

[194] *3rd May 1462*

"Prima pars est de firmando ad salarium comunis nostri magistrum Michelocium de Florentia pro magistro ingeniario per unum annum incepturum die decima presentis cum salario ducatorum ducentorum quadraginta et cum alliis pactis modis et conditionibus consuetes. [17-15]

[In margin:] Firma Magistrum Michelocio di Florentia."

McNeal Caplow, "Michelozzo at Ragusa", 117, according to HR-DAD-3 Cons. Rog. 17 Annorum 1461–1463, fol. 88v. Beritić mistakenly marks the 4th of May in: Beritić, *Utvrđenja grada Dubrovnika*, 87, note 524.

[195] *26 July 1462*

"Prima pars est de seguendo larborarium turretie ad Bersaglium prout Magistro Michelocio videbitur. [rejected]

Sa. pars est quod Dominus Rector cum minori consilio debeant ire personaliter ad locum et postea reportare presenti Consilio. [20-16]"

Michelozzi's initial proposal[196]. Work continued over the following months and Michelozzi's name was often mentioned. The Minor Council allowed him to transfer all the steps to Bokar and to use them[197].

Another incomprehensible misunderstanding occurred in the same year. On 17 September 1462, the Florentine architect wanted to build a special architectural space - a room or a repository - in the thickness of the wall next to the Kalarigna Tower[198] (later incorporated into Bokar)[199]. The Senate discussed the matter and decided on 20 September that Michelozzi was forbidden to build the vaulted room that was to be adjacent to the tower, and that he had to continue building the double wall as decided[200].

During his second year in the capital of the Republic of Ragusa, Michelozzi was constantly occupied and in charge of various works, but he was dependent on the goodwill, considerations, and decisions of the Ragusan authorities. As can be seen and heard, his ideas were not always accepted. The Republic had absolute control over every decision, and although he had a certain freedom in proposing decisions, he did not have the authority he expected.

The year 1463 was a turbulent one in the history of Ragusa's fortifications. The first reason was the proximity of the Ottoman army to the borders of the Republic[201]. Second, the authorities

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McNeal Caplow, "Michelozzo at Ragusa", 117, according to HR-DAD-3 Cons. Rog. 17 Annorum 1461–1463, fol. 114; Beritić, *Utvrđenja grada Dubrovnika*, 88, note 527.

[196] Beritić, *Utvrđenja grada Dubrovnika*, 88, note 528.

[197] Beritić, *Utvrđenja grada Dubrovnika*, 88, note 530.

[198] *17th September 1462*

"Prima pars est de vetando Magistro Michelocio quod non faciat magazenum sine cameretam in Angulo sub torre hospitalis nec voltam. [rejected]

Sa. pars est de vocando dictum magistrum Michelocium et audiendo parere suum et motivum quare facit dictum cameretam. [17-12]"

McNeal Caplow, "Michelozzo at Ragusa", 117, according to HR-DAD-3 Cons. Rog. 17 Annorum 1461–1463, fol. 133; Beritić *Utvrđenja grada Dubrovnika*, 88, note 533.

[199] Peković and Babić. "Razvoj zapadnog ulaza u grad Dubrovnik", 223.

[200] *20th September 1462*

"Prima pars est de vetando magistro Michelocio Ingeniario quod non possit facere illam cameretam achostatam cum voltis turri hospitalis sed debeat segui murum cum sua grossicie achostatum dicte turi. [19-9]

[In margin:] pro camera non faciendi in angulo turris hospitalis.

Sa. pars est de dimuttando ipsum segue fabricam dicte camerete prout cepta est. [rejected]"

McNeal Caplow, "Michelozzo at Ragusa", 117, according to HR-DAD-3 Cons. Rog. 17 Annorum 1461–1463, fol. 133v; Beritić, *Utvrđenja grada Dubrovnika*, 89, note 534.

[201] Beritić, *Utvrđenja grada Dubrovnika*, 89.

were constantly issuing new laws to fortify the capital and the state (Figures 12, 13). Thirdly, money was a constant problem because of the excessive cost of walls, weapons, and soldiers. All spare materials and men were sent to various fortifications and auxiliary works. Fourthly, during these troubled times, relations between the Republic's engineer, Michelozzi, and the Republic's authorities became distant.

As early as 2 January 1463, the Senate approved the specific way in which money was to be used for certain expenses in the first three months of the year, reducing the permanent crew of several Republican fortresses and reducing the wages of the crew that would remain in service[202]. At the end of February, it was ordered that all subjects of the Republic who had windows through the city walls on the port side of the capital had until the following Saturday to fill the bars with lead. This would prevent the window bars from being removed. Those who did not do so would be fined[203].

On 8 March 1463, the Senate proposed to deduct from Michelozzi's salary the days on which he did not come to work. It was also proposed that the Rector should arrange the payment of his duties with the Minor Council. In the end, however, it was accepted that the Minor Council would cover the costs, but this time Michelozzi was only given a warning[204].

The fortification of the gates of Pile and Ploče was of immense importance in this period. On 4 May, the Senate decided to consider the issue of building ravelins in front of the gates of Pile and Ploče[205]. On 7 May, after voting, the Senate decided to accept the proposal for the construction of the two ravelins and to appoint the supervisors of these works[206]. All spare material was used for fortifications, and the lack of it required special management skills. The

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[202] Beritić, *Utvrđenja grada Dubrovnika*, 89–90, note 541, 542.

[203] Beritić, *Utvrđenja grada Dubrovnika*, 90, note 544.

[204] *8th March 1463*

„Prima pars est quod dominus Rector cum minori Consilio debeant ex parte presentis consilii precipere magistro Michelocio quod debeat omni die qua Laborabitur ad muros ire ad dicta Laboraria et omni die qua non ibit sibi defalcabitur de eius salario per ratam. Et ipsi dominus Rector cum suo minori Consilio debeant dicto magistro Michelocio providere de eius solutione dando pro nunc sibi eam partem que ipsis videbitur. [rejected]

Sa. Pars est quod dominus Rector cum minori Consilio debeant providere dicto Magistro Michelocio de eius solutione prout ipsis melius videbitur et ipsum monere quod vadat et sollicitet laboraria nostra. [25-9]“

McNeal Caplow, “Michelozzo at Ragusa”, 117, according to HR-DAD-3 Cons. Rog. 17 Annorum 1461–1463, fol. 192; Beritić mistakenly marks the 9th of March in: Beritić, *Utvrđenja grada Dubrovnika*, 90, note 545.

[205] Beritić, *Utvrđenja grada Dubrovnika*, 90, note 549. See more in Peković and Babić. “Razvoj zapadnog ulaza”, 230.

[206] Beritić, *Utvrđenja grada Dubrovnika*, 90, note 550.

Senate decided that all walls in the gardens and vineyards near the city should be demolished. The stones would be used to build the city walls. Supervisors were to be appointed for these works. Michelozzo Michelozzi managed the entire process[207]. His contract was extended for another year on 8th May, with the significant majority of votes[208].

The 7th of June 1463 was an extraordinary day in the history of Ragusa's fortifications and probably one of the decisive moments in Michelozzi's career that made him question his stay in the Republic. On that day, the Senate voted on the proposal for the outer wall on the side of the hill. The majority of votes, although only five more, were in favour of Michelozzi's proposal. But there was a counter-proposal. Bernardino de Parma and Paulus de Ragusio composed it[209], as Lukša Beritić calls them – Michelozzi's biggest competitors in the Republic[210]. The Ragusan government seems to have taken their assessment seriously, as they lost by only five votes. It will remain an open question whether this was purely political or a more technical problem. In any case, the Senate chose three nobles to work with Michelozzi and Bernardino to assess which buildings adjacent to the walls should be demolished.[211] These

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[207] Beritić, *Utvrđenja grada Dubrovnika*, 91, note 553.

[208] *8th May 1463*

„Prima pars est de tenendo adhuc per unum annum dictum magistrum Michelocium ad salarium comunis nostri. [29-8]

Sa. pars est di non tenendo. [rejected]

[In margin:] Firma magister Michelocio

Prima pars est de tenendo ipsam cum salario consueto. [30-8]

Sa. pars est de tenendo cum minore salario. [rejected]"

McNeal Caplow, "Michelozzo at Ragusa", 117, according to HR-DAD-3 Cons. Rog. 17 Annorum 1461–1463, fol. 214v.

[209] See more about the artist in Kavazović, Robert. "New Findings on the Life and Work of the Medallist Pavao Dubrovčanin (Paulus de Ragusio)." *Dubrovnik annals* 14 (2010): 7–24.

[210] *7 June 1463*

„Prima pars est de faciendo tres qui esse debeant cum magistro Michelocio et magistro Bernardino et examinare ac reportare qua domus et fabriche extra nostrum civitatem sunt deciende et explanande. [omnes]

Prima pars est de faciendo et fortificando antimuros versus montem juxta parere magistri Micheloci. [20-15]

Sa. Pars est de faciendo et fortificando ipsos juxta parere magistri Bernardini et magistri pauli aurificis. [rejected]"

McNeal Caplow, "Michelozzo at Ragusa", 118, according to HR-DAD-3 Cons. Rog. 17 Annorum 1461–1463, fol. 228 – McNeal Caplow mistakenly marks the 1st of June; Beritić, *Utvrđenja grada Dubrovnika*, 86, 91, note 558.

[211] Beritić, *Utvrđenja grada Dubrovnika*, 91, note 558.

were the Church of St. Catharine, the Church of St. Lazarus, the Church of St. John, the Church of St. Thomas, and the Church of St. George.[212]

At that time, Dubrovnik underwent significant fortification works. On 16 June 1463, the Senate passed several resolutions:

1. To stop work on the ravelin in front of the city gate.
2. To demolish the bridges in front of the Pile Gate and in front of the Ploče Gate (not implemented).
3. To excavate and define the outer wall.
4. To demolish the churches on the outskirts of the city.
5. To demolish and bury the cisterns in Rijeka Dubrovačka, Gruž and the suburbs so that the enemy could not use them.
6. The Rector and the Minor Council are authorised to demolish the water supply system if necessary.
7. The owners of the houses in the suburbs must initiate the demolition of their houses.
8. Those who are unable to do so must inform the Rector and the Minor Council[213]

In those days, the Ragusan government took another step to ensure the defence of the city against the Ottoman army. On 27 June 1463, the Senate approved, by twenty-three votes to twelve, the treaty that the Republic's nuncio had signed in the name of the state with the Spirito de Altamura in Apulia. Spirito di Altamura was appointed captain general of the Republic's infantry and lancers[214].

Michelozzi also continued his work on the city's fortifications until the end of 1463. The Senate authorised the Rector and the Minor Council to continue work on the Puncjela Tower, following the instructions of Michelozzi and the Superintendent of the Walls. It was forbidden to open any doors in the tower[215]. He was also authorised to make openings for bombards on the corner fort of the Pile gate.[216]

All the unpleasant circumstances between 1461 and 1464 seem to have affected Michelozzo Michelozzi. From the moment he arrived in the capital of the Republic of Ragusa, his projects were scrutinised and rejected on several occasions. The government interfered in his choices and working methods. On one occasion he was warned after missing a day's work, and although

[212] Beritić, *Utvrđenja grada Dubrovnika*, 92.

[213] Beritić, *Utvrđenja grada Dubrovnika*, 92, note 563.

[214] Beritić, *Utvrđenja grada Dubrovnika*, 92, note 565. See more in Deanović, "Prilog Michelozza", 66, note 25.

[215] Beritić, *Utvrđenja grada Dubrovnika*, 92, note 568.

[216] Beritić, *Utvrđenja grada Dubrovnika*, 93, note 575.

he was very well paid, any inconvenience could result in a deduction from his salary. What is more, apart from the authorities of the Republic, there were other people who, by virtue of their competence and authority, questioned his work in matters for which they were not even responsible, as can be seen on 7 June 1463.

On the 27th of April 1464, the Senate ordered the two members of the Minor Council to communicate with Michelozzi about his intentions.[217] Afterwards, they were to report to the Senate. Several days later, on the 5th of May 1464, Michelozzi was mentioned for the last time.[218] For unknown reasons, the Senate rejected Michelozzi's design for the rebuilding of Rector's Palace after an explosion of gunpowder in the armoury[219]. Exactly a month later, Juraj Dalmatinac replaced Michelozzo as the engineer of the Republic[220].

3.2.1.4 DUBROVNIK FORTIFICATIONS AFTER MICHELOZZI: JURAJ DALMATINAC AND PASKOJE MILIČEVIĆ

Already on the 8th of June 1464, the Senate determined that the Tower of St. Catharine should be built according to the design of Juraj Dalmatinac.[221] On the 19th of July, the supervisors of the walls authorised the continuation of the work on Minčeta according to his designs[222]. The Minor Council assigned three nobles to build a wooden construction for storing gunpowder

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[217] *27 April 1464*

"Prima pars est de praticando per duos de minori consilio cum magistro Michelocio de eius Intentione et id quod praticabitur et habebitur debeat reportandi presenti consilio."

McNeal Caplow, "Michelozzo at Ragusa", 119, according to HR-DAD-3 Cons. Rog. 18 Annorum 1463–1466, fol. 43. Beritić, *Utvrđenja grada Dubrovnika*, 93.

[218] *5 May 1464*

"Prima pars est de portando ad presens consilium designum palatii factum per magistrum Michelocium. [rejected]

Sa. pars est de non portando. [21-18]"

McNeal Caplow, "Michelozzo at Ragusa", 119, according to HR-DAD-3 Cons. Rog. 18 Annorum 1463–1466, fol. 60; Beritić, *Utvrđenja grada Dubrovnika*, 93.

[219] Beritić, *Utvrđenja grada Dubrovnika*, 93, note 579.

[220] HR-DAD-3 Cons. Rog. 18 18 Annorum 1463–1466, fol. 63.

[221] Beritić, *Utvrđenja grada Dubrovnika*, 93, note 581.

[222] Beritić, *Utvrđenja grada Dubrovnika*, 94, note 585.

under the Tower of Minčeta, between the old and new city walls[223]. In addition to the doubling of the city walls, the walls of the St. Lawrence Fortress were to be doubled from the west and the north. It was also necessary to deepen the moat in front of the fortress[224]. The Ponte City Gates were to be translocated from the vicinity of the Rector's Palace and the sea.[225]

On the 28th of September, 1464, the Senate extended Juraj Dalmatinac's service for another eight months.[226] The following year, on 28th March 1465, the Minor Council decided that the statue of St. Blaise, which was to be placed at the gates of the city at the seaport, should be placed exactly as instructed by Juraj Dalmatinac, who agreed with the Rector and the Minor Council[227]. The following day, the 29th of March, the Minor Council allowed him to leave for Šibenik and remain there for fifteen days.[228] On the 5th of June, the Senate decided to keep him in the service and that the Tower of St. Catharine should be built according to his judgement.[229] This was the last mention of Juraj in Dubrovnik, which was threatened by another outbreak of the plague. The next mention of an engineer of the Republic was on 29 December 1465, when Paskoje Miličević entered the service of the Republic as a master of various arts.[230]

3.2.1.5 MICHELOZZI AND EARLY MODERN FORTIFICATIONS IN THE EASTERN ADRIATIC IN THE LIGHT OF CONTEMPORARY THEORY

In her analyses of the city walls of Dubrovnik, Ana Deanović compared the solutions by Michelozzo Michelozzi and Juraj Dalmatinac with slightly later Francesco di Giorgio Martini's designs[231]. It is essential in this research to establish what the two treatises in circulation at the time, Alberti's, and Martini's, recommended about fortifications. It is also interesting to look at later treatises to see how they perceived and presented the development of fortification at the end of the fifteenth century.

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[223] Beritić, *Utvrđenja grada Dubrovnika*, 95, note 592.

[224] Beritić, *Utvrđenja grada Dubrovnika*, 95, note 590.

[225] Beritić, *Utvrđenja grada Dubrovnika*, 95, note 596.

[226] Beritić, *Utvrđenja grada Dubrovnika*, 95, note 595.

[227] Beritić, *Utvrđenja grada Dubrovnika*, 95, note 599.

[228] Beritić, *Utvrđenja grada Dubrovnika*, 95, note 600.

[229] Beritić, *Utvrđenja grada Dubrovnika*, 96, note 603.

[230] Beritić, *Utvrđenja grada Dubrovnika*, 96, note 607.

[231] *Trattato di architettura civile e militare*, 263–265

For Francesco di Giorgio Martini, design was the most important part of a good fortification. In the chapter on *torroni*, he describes the problem of the enemy climbing into them and the dimensions to be considered when designing such fortifications. The design of these fortifications can be compared to the design of the Minčeta tower. Martini explains: "Similmente, perché spesse volte per ragione delle sonnolenti guardie ovvero traditrici, le fortezze sì perdono mediante gli scalamenti, massimamente quelle che per battaglia fussero inespugnabili, per ovviare questi errori, oltre l'altezza delle mura, alla quale sì debba avere avvertenza, perché nell'altezza grande (massime di quelle che sono scarpate) tutte le scale per ogni piccolo peso bisogna si fiacchino per la distanza che è dalla scala al muro: facciasi adunque, oltre di questo, i torroni con quelle condizioni di scarpe , beccatelli, parapetto e merli che è dichiarato di sopra; e oltre a questo, alcuni ricinti di riversi e mezzi bastoni, voltando la fascia piana di sotto , come è detto. Dopo questo si può fare altri recinti di gole, mezzi tondi e bastoni proporzionati alla grandezza delle torri: oltre a questo alcuni tondi concavi o convessi, e per contrario reversi, con cave o curve gole utili assai al medesimo fine. Similmente, per ostare alle scale si può fare la scarpa torrone volta a semicircolo, per la qual figura, le scale non potendosi accostare al torrone senza molto discostarsi dalle mura, bisogna che le scale per piccolo peso si rompano. Diverso da tutti questi modi un altro se ne può fare assai apparente, essendo sollo quest'apparenza non piccola utilità , cioè ponendo dal mezzo in su dei torrioni pietre conce in modo di triangolo trasportanti un piede, e come punte di adamante con una costa, lato o superficie piana di sotto, i quali triangoli siano in modo situati che sopra e sotto, infra due egualmente alti, siano situati gli altri, come appare per il disegno."[232] Martini also discussed the advantages of casemates, or *capannati*. It is not always convenient to build deep ditches, thick towers, and walls. Moreover, even where the location is favourable, there is not always enough money, resources, or time to build such fortifications. This is why Martini devised a defence against bombardments that required little effort, time, and material, in the form of a wooden structure called a *capannato*[233]. He accompanied his descriptions by designing several diverse forms of such structures.

Leon Battista Alberti was particularly involved in the positioning of the fortifications and relation of one to another, particularly of the citadels that must be neither outside nor inside of the town. If the Tower of Minčeta would be considered the main stronghold of the city of Dubrovnik, and somewhat of its citadel, it might follow Alberti's instructions: "Sono in dubbio

[232] *Trattato di architettura civile e militare*, 264–265.

[233] *Trattato di architettura civile e militare*, 265–266.

gli huomini sperti de la milita le sia più sicura la rocca nel piano, ò nel colle edificate. Quando che non si trovano per tutto colli, che non si possino assediare, ò spianare: e nel piano se no bene si fortifica, non si può difendere il luogo: Di questo io non disputo. Mettasi ogni industria, ne la commodità del luogo, e ciò che de la città dicĕmo, il tutto ne l'edificare la rocca s'osservi. Habbi la rocca espedite vie onde contro nimici, ò cittadini ò soldati, e vi si muovesse seditione, ò perfidia si possa uscire, e pigliare sussidio, ò mandar lo fuori per terra per fiume, per lago, ò per mare. Sarà di quella rocca il dissegno ottimo se le mura con le corna à guisa d'un C la littera O piglieranno, non la chiudano in mezzo, ma gli siano le mura come raggi da un punto deivati. Così la rocca, come dicemmo, non sarà ne la città, ne fuori di quella al tutto. E se dirà alcuno la rocca essere la fortissima parte di dietro à la città, non potrà egli venir ripreso. Ma sia, come vogliono de l'opera la più alta cima e nodo de la città. Debbe ella essere minaciosa, aspra, rigida, costante, vittoriosa, e picciola sia più sicura, che grande, per che con pochi fedeli si potrà, sendo picciola, mantenere."[234] The Tower of Minčeta presents the highest peak and node of the city of Dubrovnik, located at the junction of the northern and western sides of the city walls, an intersection of two defence lines. According to Alberti, such fortification must be threatening, harsh, rigid, constant, victorious, and better if it is of minor dimensions than the larger ones.

Bonaiuto Lorini, while describing the variety of defensive fortifications, also explains their causes, referring mainly to the gradual development of combat experience. For the design of the towers of Dubrovnik, the description of the first two phases is significant: "A prima difesa, overo inventione di fortificare fù fatta co' recinti di muraglie, e spesse Torri di forma quadra, risaltando il copro della sua grossezza tanto in fuori, che potevano difendersi l'una con l'altra, sendo ancora, come s'è detto, fattaci la sua strada, e ne' merli le balestriere, onde facilmente con le balestre, offendevano il suo nemico, quando di fuori vicino a quelle si voleva accostare, usando ancora gli sporti in fuori, e massime sopra le porte fatte co' suoi modiglioni, dove erano i vacui tra l'uno e l'altro, detti appiombatoi, per li quali facevano cascare pietre grosse, come qui di sotto si vede, cioè per le cortine DC; & i Torrioni AB.[235] (...) Mentre, che con la esperienza del combattere andavano crescendo le offese viddero, che le dette torri quadre non erano molto sicure per la faciltà, che era nel tagliare i suoi angoli, e farle rovinare, come anco per non potere difendere la sua faccia di fuori. Però cominciarono a usare i torrioni di forma rotonda, detti al presente meze lune, e di forma over diametro assai grandi, dando alla sua

[234] Alberti, *I dieci libri de l'architettura*, 93r.

[235] Lorini, *Delle fortificationi*, 138.

muraglia da basso tanta scarpa, e grossezza, che venisse sicura dall'essere tagliata, e fatta rovinare, & in cambio di merli ci fecero il suo parapetto pur dell'istessa muraglia, ma con spesse feritoie, come nel seguente disegno si vede. E si posero ancora ne gli istessi tempi in uso i Revellini, cioè torrioni a meze lune posti lontani dalla muraglia circa quattro passa, incontro le porte, come se ne veggono in assai luoghi, e massime a Brescia, Verona, Padova, & in altre Città d'Italia, e fuori."[236] The experience of the battles increased the attacks and revealed the obsolescence of the square towers. The latter, which still stand today, needed the external protection of the new fortress designed by Michelozzi. As Lorini pointed out, they were insecure, and it was necessary to defend their fronts in order to control the whole area more easily.

Michelozzo Michelozzi was invited to the Republic of Ragusa because they needed an engineer capable of fortifying the northern and western parts of the city towards the hinterland. The Republic had been considering strengthening these defences for several years. When Michelozzi arrived in Dubrovnik, the city was surrounded by monumental walls and towers[237]. However, these defensive structures could not withstand the new gunpowder weapons. During this transitional period in modern military history, fortification was driven by trial and error to successfully test the structures built.

Michelozzi began to work on the protection of the hinterland side of the city walls, constructing an outer wall with semicircular structures for the defence of medieval towers and a space for modern firearms. This was the period just after the fall of Constantinople under Ottoman rule and before the establishment of peaceful relations between the Republic of Ragusa and the Ottoman Empire. The Ragusan capital was in constant danger of attack because of its position on the border between the Republic of Venice and the Ottoman Empire. Since the Ottoman army, like all armies of the time, had not given up the use of pre-modern weapons, the fortifications had to respond to attacks with these and with firearms. The Republic was well aware of the Ottoman way of war. For this reason, the Ragusans continued to acquire enormous quantities of pre-modern weapons, in addition to firearms, and they wanted to avoid interfering with the height of the towers, even increasing them. In this way, these high towers could be used for individual defence[238].

[236] Lorini, *Delle fortificationi*, 139.

[237] Deanović, "Prilog Michelozza", 54.

[238] Deanović and Tenšek. "Predziđe dubrovačke Minčete", 304.

Michelozzi therefore preserved the older towers but had to find a solution for modernising them to withstand firearms. Firstly, he maintained the structural forms of their upper parts. Secondly, he reinforced the foundations of the lower parts of the walls and towers. The outer wall extended horizontally, parallel to the walls and towers, in straight or semicircular lines. At the same time, the square towers protected the lower level of the sloping outer wall. The latter also defended against mines and there were places where the low fire could be opened.[239]. A complex staircase system connected the levels between them. In addition to frontal defence, this enables the defence of the flanks and the mentioned ground floor from the lower levels of the towers that were filled in the interior to provide better strength.[240]

In this way, Michelozzi rejected the previous fragmentation of the defences by linking all the defences on the northern and western walls into a single horizontal and vertical unit, with numerous staircases at distinct levels. In this way, the individual defences on the lower part of the wall included only firearms, while the gun loops were used for individual defence against pre-modern combat weapons[241].

Michelozzi had to reconstruct the two individual fortifications on the western side of the walls at the highest points of the terrain. The heights around the town always posed a potential problem. The highest point in the city was Minčeta (Figures 14, 15), the highest tower in Dubrovnik at twenty-five metres,[242] which, besides the strategic, must have had symbolic importance.[243] In addition to being the highest point in the town, the Minčeta Tower is located at the junction of the northern and western sides of the town walls, at the intersection of two lines of defence. The way it was built and the way it had to resist attacks had to be well thought out. Minčeta can be considered as a fortification or a fortification system with a medieval predecessor,[244] The first was the *bastice supra Bersaglium*, connected by stairs on several levels and independent in its defence; it contains casemates spread around the circular corridor and closed inside the circular tower. The second was the *bastice supra Bersaglium*, located on the western side of the walls. According to Ana Deanović, at the time of Michelozzi's intervention in this part of the walls, this tower was called *Turetta Barsagli* because of its proximity to the

[239] Deanović, "Prilog Michelozza", 60.

[240] Deanović, "Prilog Michelozza", 59.

[241] Deanović, "Prilog Michelozza", 60.

[242] Deanović, "Prilog Michelozza", 55.

[243] Grujić, Nada. "Dubrovačke zidine u renesansi." In *Hrvatska renesansa, katalog izložbe*. Zagreb: Galerija Klovićevi dvori. 2004, 240.

[244] Deanović, "Prilog Michelozza", 64.

ground. Later it was called Zvjezdan until 1565, when it was called Bokar.[245] Strengthening and reconstructing these towers were Michelozzi's main tasks during 1461 and 1463, as well as the northern side of the city walls by adding outer walls and slopes. The latter was defending against the mines[246].

Michelozzi was commissioned to strengthen the existing Minčeta Tower and he designed its outer wall as a unique defence mechanism[247]. In the contract for Tower of Minčeta, he presented the idea with a wooden model, which was accepted by the Senate, but does not survive. He also built two walled corridors, one of which should have been uncovered.[248] The diagonal outer wall of the Tower became vertical, thus becoming what Ana Deanović defines as *torrione-braga*[249] (also mentioned *torrione*, *torretta*), since it was not typologically neither a *tower*, nor a defensive wall or *falsa braga* outside the main wall. It was the system of both. Since *turris* was the most commonly used term in the found documents, at least for the pre-Michelozzi structure, Minčeta will be referred to as the Tower of Minčeta in this thesis. Nevertheless, the reconstructions resulted in a complicated fortification system, which can be studied as a separate fortress. However, the terminological problems of Minčeta still require further research.

In addition to the exposed space at the top, the outer wall contains at least two other protected levels with circular corridors and casemates. Ana Deanović argues that this was the first and most advanced development of this type of fortification[250]. The only crenelation system found on Minčeta was strengthened by connecting it with corridors that allowed the passage of people and weapons[251].

Michelozzi separated the defence levels in the tower's interior. At the same time, the lower buried part connected the defences[252]. It was a new tower built on the preexisting one. The ground floor of the existing tower, which surrounds the buried foundations of Minčeta, follows the shape of the rocky terrain.

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[245] Deanović, "Prilog Michelozza", 65, note 11.

[246] Deanović, "Prilog Michelozza", 56.

[247] Deanović and Tenšek. "Predziđe dubrovačke Minčete", 306.

[248] Deanović, "Prilog Michelozza", 60.

[249] Deanović, "Prilog Michelozza", 60; 66, note 26.

[250] Deanović and Tenšek. "Predziđe dubrovačke Minčete", 308.

[251] Deanović, "Prilog Michelozza", 61.

[252] Deanović, "Prilog Michelozza", 60.

Next to the previous tower, in the corridor, there are traces of a wall, which probably dates from the time before Michelozzi's arrival. The semicircular corridor ends on the west side, in front of the walls. Another corridor from the centre of the semicircular corridor surrounds a part of the old Minčeta. It leads to the next outer ring corridor and goes around the outer bulwark defending the interior. The staircase leads to the second level, which is also a semicircular corridor. Nine funnel-shaped casemates open out from it, only four of which have preserved their original shape. Between the casemates in the corridor, there are eight rectangular niches for firing bombs[253].

Michelozzi's oval casemates in Minčeta reach a width of two hundred and thirty centimetres at the entrance to the cannon cell, thus achieving greater ease of swing and range of fire. Finally, the funnel-shaped casemates in Minčeta were divided into four parts. They included a corridor, a ventilation area, a cannon area, and a cell for loading weapons from the front or for defence against pre-modern combat weapons[254].

Deanović placed Michelozzi's casemates in the context of European fortifications of the time, insisting that twenty years before Baccio Pontelli's ellipsoidal casemate in the tower of Ostia, Michelozzi had designed an original type of casemate at Minčeta, Bokar and Puncjela. Michelozzi chose a funnel-shaped casemate, narrowing towards the gun emplacement and opening towards the corridor, to allow for proper and quick smoke evacuation. Each casemate also had a chimney to vent the smoke from the cannon fire[255]. Their detailed research showed that a comparison of the casemates at Minčeta and Bokar revealed the same construction principles and dimensions; they were connected by two circular corridors; they were funnel-shaped and opened radially to the corridors. The dimensions of the cannon loops were also the same. Deanović pointed out that their research suggested that the difference between Minčeta and Bokar was that in Minčeta there was a cell between the corridor and the casemate, while in Bokar there was none[256]. She speculates that this is because Michelozzi followed the configuration of the rock on which Bokar is located and aligned the fortification with it, creating only a semicircular corridor in the lower part, interrupted along the ridge line. The same funnel

[253] According to the detailed research of Minčeta by Ana Deanović and Ivan Tenšek published in: Deanović and Tenšek. "Predziđe dubrovačke Minčete", 310.

[254] Deanović, "Prilog Michelozza", 63.

[255] Deanović, "Prilog Michelozza", 60; Deanović and Tenšek. "Predziđe dubrovačke Minčete", 308.

[256] Deanović, "Prilog Michelozza"61.

shape was observed in the casemate, built to reinforce the base of the Puncijela tower, with a corridor of smaller dimensions[257].

For the other warfare practices, Michelozzi probably provided a gun loop that could be used for pre-modern fighting weapons and firearms. It provided a vertical firing range of about seventy-five centimetres in Minčeta and sixty-five centimetres in Bokar. In the lower part they were connected to a cannon embrasure with a diameter of thirty centimetres[258]. This is one of the reasons why the Republic of Ragusa did not allow the height of the medieval towers to be reduced[259].

The specificity of Michelozzi's Minčeta and Bokar is their verticality without protruding crowns and slopes and the finished smoothness of the architecture[260]. Michelozzi, contrary to previous warfare experiences, concentrated on the soldiers' movement on the outer walls[261]. By building the latter, he directed the defence in two directions, keeping the high towers and curtains intact, thus providing security to their foundations. The individual defence continued at the level of hitherto neglected outer walls[262]. In conclusion, latent and even lateral protection to the usual medieval vertical defence with firearms at the exterior walls' level covered not just the lower parts of the walls but also their terraces[263]. In this way, Michelozzo Michelozzi created a double defence system of fortifications in Dubrovnik.

Considering the designs of casemates, one might observe two different and opposite types in the Tower of Minčeta. Furthermore, at the juncture with the curtain wall, there is also the problem of the eastern corner of the abovementioned tower. The radial design of casemates around the corridor did not allow a firing trajectory along the curtain wall to cover the northern side of the city walls. One might speculate this is why it was necessary to modify the second casemate with the side curved space and the diagonal opening to make a firing trajectory possible along the curtain wall. Could such changes be examples of the trial-and-error method in Michelozzi's practice? Furthermore, the design of the Tower of Minčeta followed the practices of the time, as was later prescribed by Francesco di Giorgio Martini. Michelozzi adapted to the fortification site he found to protect it from various weapons. However, he did

[257] Deanović, "Prilog Michelozza", 62.

[258] Deanović, "Prilog Michelozza", 66, note 24.

[259] Deanović, "Prilog Michelozza", 59.

[260] Deanović, "Prilog Michelozza", 64.

[261] Deanović, "Prilog Michelozza", 305.

[262] Deanović and Tenšek. "Predziđe dubrovačke Minčete", 306.

[263] Deanović and Tenšek. "Predziđe dubrovačke Minčete", 306.

not follow the instructions of the time, and later ones, which were constantly warning on the endangering hill around the cities and its fortifications. Although his primary occupation was to modernise the city walls, no record is found in the discussions to fortify the hills near and above the city. One might wonder if this was because of the possibility of enemy occupation and direct attack on the city. However, Michelozzi was sent to Dubrovnik to protect the mainland and the possible attack from the hills, and he concentrated on the defensive points such as the tower of Minčeta, the northern and western city walls with their respective towers, which could be attacked primarily from these elevated positions. In addition, in Dubrovnik, the principle of the non-thickness of the wall, later argued by Francesco di Giorgio Martini, was promoted. Furthermore, his design of the ravelin in front of the city gates is questionable, as it was immediately neglected by Juraj Dalmatinac, who advocated its burial[264]. However, Martini described: "I rivellini innanzi alle porte devono essere situati per difensione di quelle, e fondati in luogo basso, in modo che dalle bombarde non possano essere maculati: e nientedimeno il muro richiede la medesima altezza delle mura, o circa, secondo la comodità, con un fosso attorno conveniente a quello con alcune delle parti dette di sopra. Puossi fare di sotto un corritoio con offese intorno coperto in volta: e similmente a quello si può applicare i capannati, più o meno, secondo il giudizio dell'architetto, e bisogno del luogo."[265] Juraj Dalmatinac saw Michelozzi's intervention as a risk of exposure and disconnection from the hinterland[266].

During and after Michelozzi's stay in Dubrovnik, numerous other masters worked on the fortifications, bringing innovative solutions and modernisations. However, even though the transitional period was rather wide and changing, Michelozzo Michelozzi's arrival in Dubrovnik and his innovative solutions in the already fortified city can be traced as a turning point in the transitional period of the development of fortification architecture in the Eastern Adriatic. However, it is a fact that the Tuscan architect, guided by his experience, introduced innovative solutions quite early, at a time when military science was not yet standardised and there were no exhaustive military treatises as there were in the second half of the sixteenth century. This supports the claims of the authors of late fifteenth- and early sixteenth-century treatises that practice/experience played the leading role in fortification construction and could not be based on traditional theoretical principles. Such examples of the application of

[264] Deanović, "Juraj Matejev Dalmatinac", 74.

[265] *Trattato di architettura civile e militare*, 263

[266] Deanović, Ana. "Juraj Matejev Dalmatinac", 74

knowledge over time led to the complete standardisation and development of Early Modern military theory.

3.2.2 THE IDEAL DESIGN AND STRIVING FOR HARMONY: UPGRADING ZADAR'S SOUTH-EASTERN CITY WALLS

3.2.2.1. INTRODUCTION

The architectural history of Zadar as the capital of the Venetian province of Dalmatia and Albania has been a subject of intense debate among scholars of various backgrounds. Since the role of this central Dalmatian city was of paramount importance for the Republic of Venice, being the direct representation of its power in the Eastern Adriatic, the fortifications of the city represented the ability to defend not only the so-called periphery of the *Serenissima*, but also its central power (Figs. 16, 17, 18). Historians of art and architecture have studied the history of Zadar's fortifications mainly because of the involvement of many prominent figures of Early Modern Europe, such as Francesco Maria della Rovere, Michele Sanmicheli with his family workshop, Sforza Pallavicino, Giulio Savorgnan, Bonaiuto Lorini, and so on. The involvement of these figures raises the question of the spread of knowledge about fortifications in a city that can be studied as a centre of power in the Eastern Adriatic, comparable to the city of Dubrovnik, the capital of the Republic of Ragusa.

What is the knowledge of fortification in Zadar, and how did it circulate and adapt? The sources for such an investigation could be numerous reports from the period. However, due to the limitations of this research, only some of them will be considered in order to testify to the adaptations that had to be made in a limited period of time, in the first decades of the construction of the south-eastern parts of the city walls. Thus, the main chronological point of investigation is the development of Zadar's fortifications from the late 1530s. What are the advantages and disadvantages of different approaches?

The case study of Zadar is approached according to several interesting features. First, as a provincial capital, it is characterised by the spatial grandiosity of the fortifications, not only the city walls, but also the outer fortifications-built decades after Sanmicheli's stay in the city. The Republic of Venice was heavily involved in the financial aspects of the fortification of the city, which it called the Fortezza di Zara, the city fortress that overlooked its Eastern Adriatic territories, and required the involvement of important military experts. In addition, the written legacy of the Zadar fortifications circulated in the military circles of the time; it was questioned and discussed by the prominent actors and all those involved in the governmental machinery that dealt with the Eastern Adriatic, which indicates the interest in designing and building a

fortification on the specific site and the importance of the city's fortifications. Even though Zadar was not directly threatened by war, the reports on the defensive needs prove that an attack was always on the agenda. The Republic wanted to fortify it intensively in order not to be besieged. In the end, the involvement of renowned actors led to the acquisition of innovative knowledge of fortification methods, which had to be adapted and harmonised with the fortification practices of the Eastern Adriatic. Can a particular regional centre influence future design, construction, and theoretical observations?

This chapter presents the legacy in Zadar and its distinctions in fortification experimentation and harmonisation with the emerging military theory is important for the border area of the Eastern Adriatic, where the proximity of war encouraged faster construction and better adaptation of fortification architecture to the overall circumstances. Several topics of interest will be discussed:

- Fortification designs of the southeastern part of city walls and their adaptation to the problem of the peninsula.
- The problem of design and execution was witnessed for decades in the unfinished project in the province's capital city.
- Porta Terraferma in Zadar, the most vulnerable part of the fortification, raises the questions of position and relation to the other parts of the southeastern part of the city walls.
- Reception of the design of the southeastern city walls.

3.2.2.2 THE CONTEXT: DESIGNING THE ZADAR'S FORTIFICATIONS

Michele Sanmicheli (1484-1559)[267] was in Zadar for the first time shortly before he was appointed engineer of the Venetian fortifications in the autumn of 1534. During his second stay in Zadar, from May to September 1537, he worked on the adaptation and modification of the project drawn up by the *Capitano generale delle milizie venete* Francesco Maria della Rovere, Duke of Urbino (1490-1538) for the south-eastern part of the Zadar fortifications. Giangirolamo

[267] See already cited scholarship in 1.2 State of the Art. For early works and influence of Antonio da Sangallo, also compare with Zavatta, Giulio. *1526. Antonio da Sangallo il Giovane in Romagna*.

Sanmicheli (1513? – 1559?), the son of Michele's cousin Paolo Sanmicheli, was also involved in the project[268].

We can assume that there was some kind of sketch that accompanied the instructions given to Michele, probably by Francesco Maria della Rovere. According to della Rovere's model, the gates were to be placed between two bastions in the centre of the curtain wall, equidistant from each other. In the case of Zadar, keeping the gates in their original position would have meant placing them closer to the St. Marcela bastion and not in the centre between two bastions. However, this project was not carried out, but the central bastion was added to the planned symmetry and the city gates were moved, as will be described in the following paragraphs. Francesco Maria della Rovere commented on these changes in his *Discourse on Dalmatia*, where he mentioned the planned work of stoning the previously earthwork bastion as unsatisfactory: "Non si resterà anche di dire, che avendo intesa la ruina successa più d'una volta di quel pontone a Zara, e non essergli stato fatto altro rimedio che rifarlo del medesimo modo, e che ora si pensa d'aiutarlo con una crosta di muro attorno. Si crede questa esser cosa molto vana, considerando che se il bastione carica innanti, il muro non sia atto a tenerlo, e non caricando sia atto a sostentarsi senza il muro, e che l'importanza in far che stia in piedi sia il buon fondamento di esso, e la conveniente scarpa, e le gagliarde legature; e fatto questo, il muro non faccia nocumento, ma senza questo anco non giova."[269]

3.2.2.3 THE PENINSULAR DILEMMA: FORTIFYING THE SOUTH-EASTERN PART OF THE CITY WALLS

Michele Sanmicheli's task in Zadar was to build a moat from the side of Santa Maria del Mare to the harbour, with a curtain wall and two bastions, one on each side, following Francesco Maria della Rovere's idea[270]. This side of the city of Zadar represents the entrance to the city

[268] Borić, Laris. "Dujam Rudičić, Sanmichelijevi", 41; Žmegač, Andrej. *Bastioni jadranske Hrvatske*. Zagreb: Institut za povijest umjetnosti, Školska knjiga, 2009, 34, according to Concina, Ennio. *La macchina territoriale*, 1983, 35: "inzegner, si per la cavation et bisogno di queste nostre lagune, si etiam per la fortificacion de li lochi nostri da terra et da mar."

[269] Franceso Maria I. della Rovere. *Discorso sopra le cose di Dalmazia*, Venice: Antonelli, 1846, 15.

[270] Concina, Ennio and Elisabetta Molteni. *La fabrica della fortezza*. Verona: Banca popolare di Verona, Banco S. Geminiano e S. Prospero, 2001, 116, according to ASVe, Senato Mar, reg. 24, c. 18v (5 maggio 1537) e c. 61v (8

from the south-east, as it is situated on a peninsula, creating a naturally enclosed harbour on the north-eastern side. The front part was therefore not only the mainland entrance to the city, but also its most vulnerable zone, the first point of attack and therefore of defence.

What Michele did was to change the shape of the ideal design, which shows the placement of the entrance according to the bastions. The city gates should have been centred between two equidistant bastions, forming a symmetry[271]. In the case of Zadar, however, as mentioned above, the position of the south-eastern walls was parallel and quite close to the naturally elongated junction of the peninsula with the rest of the mainland. During his inspection of the Dalmatian fortifications[272], Sforza Pallavicino (1519–1585), one of the most important military experts in Venetian military history, described the position of Zadar as its most unique value, worthy of attention[273].

The symmetry initially proposed would not allow control of the junction; the bastions would be too far apart from each other and from the central gates, thus rendering the protection ineffective[274]. The defensive architecture could not adapt its function to the actual defensive site. It was therefore necessary to adapt it to the circumstances. Michele had to produce a design that would protect the city gates and the two bastions on either side. He did this by adding another bastion, completely breaking the symmetry of the wall's extension. The bastion in question is marked on the plans as - Bastion Ponton (Fig. 19), the most central monumental bastion of the wall perimeter, adjacent on its south-eastern side to the main city gates of Zadar or Porta Terraferma. The southern bastion Grimani or Cittadella, following the disposition of the land, comes out slightly on its most eastern angles of the peninsula's perimeter; the northeastern one was bastion of St. Marcella or Marcela, overlooking the harbour and partially the southeastern city walls, was placed outside the northeastern perimeter of the peninsula. The bastions were separated from the rest of the land by a moat.

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ottobre 1537); Bertoldi, *Michele Sanmicheli*, 22–23; Puppi, *Michele Sanmicheli*, 75. See also Žmegač, Andrej. *Bastioni jadranske Hrvatske*. Zagreb: Školska knjiga. 2009, 32.

[271] Šverko, "Peripheral or Central", 43.

[272] See also Raukar, Petricioli, Švelec and Peričić. *Zadar pod mletačkom upravom*, 278–281; Deanović, Ana. "Prilog Sanmichelijâ utvrđivanju Dalmacije". In: *Utvrde i perivoji, Studije i monografije Instituta za povijest umjetnosti, knj. 21: Izabrana djela Ane Deanović* II, ed. Andrej Žmegač. Zagreb: Institut za povijest umjetnosti, 2001, 24.

[273] Žmegač, Andrej. "Sforza Pallavicino i Zadar." *Ars Adriatica* 12 (2022): 61. More on Sforza Pallavicino see in Zavatta, Giulio. "Da Verona a Venezia e ritorno: i disaccordi tra Francesco Malacreda e Sforza Pallavicino sulle fortificazioni del Lido". *Studi Veronesi* 5 (2020): 43–63.

[274] See Žmegač, *Bastioni jadranske Hrvatske*, 37.

Michele's challenge was to defend the south-eastern side of the city walls from all possible angels towards the junction of the peninsula, thus also securing the eastern part of the harbour and the south-eastern part towards the open sea. The placement of the massive Bastion Ponton in the centre made it possible to overlook the other two bastions and the city gates, which were placed next to the Ponton, which will also be described in more detail; it came out of the wall perimeter into the space between the south-eastern wall and the junction of the island.

It is worth remembering that this part of the city was once called *suburbius, burgus, borgo*, and in modern scholarship *Varoš of St. Martin*; it stretched from today's Foša to the area of Relja, between the city and the junction of the peninsula. This suburb was crucial for the development of Zadar's fortifications in the following decades. It is interesting here because of the questionable location of the church of St. Maria del Mare, from which Michele was commissioned to start the moat on the south-eastern side of the city walls. The area of Varoš of St. Martin had four important sacred buildings: the church of St. Matthew, sometimes called the church of St. Mary (because of the precious polyptych kept inside); the church of St. Martin; the church of St. Cross; the church and monastery of Santa Maria de Melta. The latter was built by the sea in the south-western part of Varos from St. Martin. Pavuša Vežić argued that it was actually the church of Santa Maria del Mare[275].

What was not mentioned, however, was that the arrangement of the bastions broke up the existing network of street axes in the city - the main east-west cross street had its end in the city gates that connected the city to the mainland and were located where Michele designed the Bastion Ponton[276]. He therefore had to replace them and design Porta Terraferma as a single gate made up of three openings, the central one being larger, higher, and wider than the two lateral ones on either side, as we shall see.

As a result, the new gates were no longer located on the main east-west road, but to the south of it, allowing for a general reorganisation of space in the south-eastern part of the city. However, the new gates were still close to the aforementioned main streets and those parallel to them. Pavuša Vežić noted that the only city gate on the mainland today was placed on the direct axis of the main east-west crossroads, which was determined only by adaptation to the actual functions of the city. Ana Šverko considers such a decision to be ideal, as it respects the

[275] Compare Vežić, "Srednjovjekovni Varoš", 152; Vežić, "Vrata Michelea Sanmichelija", 93, 94. See also the statements about other churches in Deanović, Ana. "Prilog Sanmichelijâ", 24; Žmegač, "Zadarske utvrde 16. stoljeća", 109. Žmegač, later in 2009, agreed with Vežić's hypothesis, as it is accepted in this dissertation; see more in Žmegač, *Bastioni jadranske Hrvatske,* 34.

[276] Šverko, "Peripheral or Central", 43.

existing topographical and urban constraints, and does not impose an ideal architectural scheme on the site[277]. On the other hand, Andrej Žmegač argues that the entire arrangement of the bastion belt should be seen as part of a complex project for the city's defence system, from the Citadel to the fifteenth-century Castello to the north. Moreover, the Ponton Bastion would also dictate the rhythm of all the subsequent bastions[278].

3.2.2.4 REPORTING ON ZADAR FORTIFICATIONS

In 1538, Girolamo Ciconi,[279] concluding the service as *Conte di Zara*, reported to the Venetian Senate on the construction works on the south-eastern side of the Zadar walls, especially on the Ponton bastion. The works were ending. Ciconi found the Bastion Ponton to be the most important "of all those fortresses", apparently referring to the fortifications of the other cities. He advices to preserve the Ponton bastion and to clad it with stone wall, using the plenitude of the material already available in the city. The plan was to fortify quickly, since the siege was expected, and the fortifications were about to be "tested"[280].

At the beginning of 1540, *Provveditore Generale d'Armata* Alessandro Contarini reported that the fortification of Zadar was progressing very well and that the construction of the Ponton Bastion would soon be completed[281]. With a little practice and instructions from various experts, it would become very strong. Therefore, the design should be followed. He urged the Venetian governors to pursue the project and to do so quickly. However, he would like to be informed of the opinions of Meser Valerio, the engineer Messer Zuanhierolimo, and the courageous Messer Agustin Cluson.[282]

Marc' Antonio Mula was *Conte di Zara* between 1540 and 1542 and also left a report. First of all, he stated that there was no need to discuss the costs, since the fortifications were intended to strengthen the city. However, he pointed out that the cost of fortifying Zara would be immense. Mula was not sure which method of fortification would be best. However, he praised

[277] Šverko, "Peripheral or Central", 43.

[278] Žmegač, *Bastioni jadranske Hrvatske*, 37.

[279] Appendix: Girolamo Ciconi

[280] Ljubić, Šime, ed. *Commissiones et relationes Venetae II (1525–1553)*. Zagreb: Sumptibus Academiae scientiarum et atrium Slavorum meridionalium, 1877., 146.

[281] Appendix: Alessandro Contarini.

[282] Ljubić, *Commissiones II*, 155.

any kind of fortification as long as there was some kind of defence because the worst thing would be to do nothing. The length of the peace was not yet known. Mula was displeased that the Republic had invested so much in Zadar in the past, and now the city and its fortifications were being left to the discretion of others who were not subject to the Republic. Time was wasted on fortifying the city, because the urgency caused money to be thrown away, and the work could never be done well. Mula surveyed it in 1535, when he was the *Sindico* of Zadar. And at present, with the faithful, diligent, and industrious engineer Zuan Jeronimo - Giangirolamo Sanmicheli - the situation may improve, because the bastions placed near the port are beginning to fall into ruins.

Giulio Savorgnan drafted a report on the fortification of Zadar on the 10th of January 1547[283]. During that particular visit, he was in the city just for day, accompanied by the *Governatore Colonello* Toso Furlano. The report was addressed to Marchio Michel and Alvise Gritti, current *Provveditori delle Fortezze,* once *Provveditore Generale* and *Capitano di Zara* in the Venetian-Ottoman war between 1537 and 1540. Savorgnan was sent to inspect the current state of the fortifications. He had three observations on the state of Zadar's fortifications.

The first was about the defensive points of the Cavalier of St. Marcella, the *mezzo-belloardo* of the Citadel, also of St. Nicholas, and for parts towards the harbour, which were built during the last war. It would be good to build small walls on these bastions (?) and to repair them with earth. After the war, the bastions were abandoned, and their parts fell into the sea. Two damages are visible: the first is the opening of the earth, and it is advisable to fill them with earth another time; the second is that part of the earthen material fell and was lost in the sea. The recipients of his report are well aware of the importance of this, as they have spent a great deal of effort, expense, and trouble to bring this earth from the outskirts of the city, even building bridges over the harbour.

The weakest bridges were built during and after the last war. This is particularly evident at Castel Vecchio, at the entrance to the harbour. If an Ottoman or even friendly division were to enter the bay, it would not be wise to leave the area unprotected. From the bastion of St. Demetrius to the Castello, ten to fifteen cannons should be placed on the ground, making the bastion a strong *batteria* on the other side of the harbour. It was necessary to protect the harbour from the possibility that the enemy could invade it with a galley of infantry soldiers or place a battery on the mainland on the opposite shore. To this end, Savorgnano proposed the construction of an earthwork with cannons outside Castello (on the north-eastern corner of the

[283] Appendix: Giulio Savorgnan.

Zadar peninsula), which could fire at both intruding boats and batteries on the opposite shore. He urged that some earth be brought there immediately, so that it could be used in case of need and, with the help of some gabions, would result in a particularly good battery. With the land there, the enemy would not be able to get in, and the batteria of earth would be out of the way. By securing the entrance to the harbour, the section of the wall from the bastion of St. Demetrius, Porta delle Beccarie to the bastion of St. Marcella will be secured. This would protect a third of Zadar's perimeter. On the western side, it is impossible to place even a cannon to attack the port entrance. It would also be necessary to lower the upper parts of the old towers of the castle so that the enemy could not stop the cannon fire and cause the fall of those who used the artillery in the aforementioned lower part of the *Castello*.

Bastion Ponton was such a high structure that it seemed more useful to finish it in an equivalent way. Whoever built it intended to place four or six pieces of artillery on each side facing the mainland, which seemed impossible during Savorgnano's visit. Moreover, there was no *cannoniere*, no parapet, no battlements of any particular size and no wall on which the *cannoniere* should have been built. They were not built because such a wall would have had to be built in the old moat, which was of significant importance and would have cost a lot. In fact, it is impossible not to do it. If these walls are built, it will be possible to use three cannons at the top and two at the bottom for each side, which is hardly possible now. However, it was necessary to complete the imperfect ponton and not leave it as it was, as it was not fully functional. The part of the trench between the bastion and the ground, through which the artillery was brought, could not be filled in. Therefore, in order to build these earthworks, it was necessary to build the walls between these terrepleins, the cannoniere, the battlements and the rest. Anyone who waited to build the walls on the front part of the bastion ponton would end up with the appearance of a fortified site rather than a real one.

Piero Pisani,[284] *Capitano di Zara* between 1548 and 1550, while reporting on the situation in the city, first informed in detail about the miserable state of the fortification structures and the soldiers serving them, and severe changes to acquire discipline and general security he imposed[285]. The part of the city overlooking the mainland was well defended, but the coast was not. However, this part of the city had no guards, even in the Ponton bastion, and they were only present between the Citadel and the Castello. But the term Castello was used for the northern fortification that overlooked the harbour. It could refer to the Captain's Tower behind

[284] Appendix: Piero Pisani.

[285] Ljubić, *Commissiones II*, 182–183.

the Bastion Ponton. Because of its height, it was the only remaining old tower used as a watchtower for the whole area[286]. The problem was that the curtain wall between the two fortifications was quite long, which posed a significant danger, especially as the walls were low on that side. In addition, houses were attached to the walls, making it easier to enter the city where there were no guards. It was impossible to get to the walls because they were bordered by gardens and small houses. Pisani reported that during his stay in Zadar, the curtain wall towards the citadel had been completed. Only the parapets were missing. He gives the exact dimensions of the curtain wall. It would be a good thing not to neglect the fortification of this particularly important city, instead of using all the care and skill that could be mustered, since perfection would cost time and money. Pisani proposed digging the moat of the bastion ponton and storing the stones for future use[287].

Sindico Giovanni Battista Giustinian[288], described the Bastion Ponton in his report of 1553 as "well built, strong and stretched like a cavalier". However, it was not fully equipped or finished and had already cost the state 80,000 ducats. Ponton did not have cannoneers, who, according to Giustiniani, were the soul of such machines. According to him, they had been forgotten during the construction of the bastion. The parapet was also missing. This would have cost the state another 15,000 ducats, not including the extra charges. There was also the Cittadella bastion, which had not yet been built. It was filled with earth and formed a barrier to the sea to the west and to the mainland to the east. The third bastion was Santa Marcella, to the north-east. It was built while Giovanni Battista Giustinian was in Zadar. He noticed that it had so much earth that it looked like a small cavalier. Its advantageous position made it possible to shoot at the enemy, who would camp below the city to attack it. Other earthwork bastions should be equipped with artillery. He suggests fortifying earthen ramparts because they could easily become cavalier or gun platforms for the enemy. It is not clear whether these earthen ramparts were along the city walls or were external works. In addition, a great deal of money was spent on fortifying the rented houses for the accommodation of the soldiers[289]. The necessary improvements of Zadar's fortifications were again summarised in a later report[290].

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[286] Raukar, Petricioli, Švelec and Peričić. *Zadar pod mletačkom upravom,* 282.

[287] Ljubić, *Commissiones II*, 184–185.

[288] Appendix: Giovanni Battista Giustinian.

[289] Ljubić, *Commissiones II*, 195–197.

[290] Ljubić, Šime, ed. *Commissiones et relationes Venetae III (1553–1571).* Zagreb: Sumptibus Academiae scientiarum et atrium Slavorum meridionalium, 1880, 37.

Sindico Antonio Diedo[291], who accompanied Giovanni Battista Giustinian, discussed the city's naturally suitable location in his report. The city walls are old but strong towards the sea, thanks to the *porporella* that surrounded the city from the port entrance in the north to the Cittadella bastion. A similar one was at the entrance to the port, leaving enough space to receive ships. This part was closed by a chain so that no piece of wood could enter or leave without opening it. However, they were not in the best condition. The part of the wall facing the mainland was very weak but was currently fortified by an extraordinarily strong bastion ponton. However, it was not fully equipped or finished. It lacked the bombardiers of the casemates, which are the soul of these machines. In their present state, they are useless. Part of the wall had to be destroyed during their construction. This shows that whoever ordered it knew little about the art of fortification. The parapet still had to be built, at a cost of around 25,000 ducats. So far, about 80,000 ducats have been spent. The construction of the St. Marcella bastion to the east will not be finished soon due to lack of money. The curtain wall between the bastions of Santa Marcella and Ponton was also not completed. The Cittadella bastion was also unfinished, only filled with earth. The city would become impregnable once these bastions on the mainland side were completed and built according to the model. In the summary of all the provisions to be made in the province of Dalmatia, there was a list of the necessary improvements to the fortifications of Zadar, which are the repeated demands of previous reports and the state that Sforza Pallavicino described after his arrival in the city[292].

There are many reports about the south-eastern part of the walls of Zadar. Nevertheless, a few have been selected to highlight the main characteristics of this part of the fortifications under discussion: the design carried out by the Sanmicheli workshop was praised, especially at the beginning of the works; the Ponton bastion was considered to be extremely strong, but its construction was unexpectedly slow and the costs were high; the construction of the other two bastions was constantly postponed, which led to the failure of the whole concept - Zadar did not have three fully developed bastions on the south-eastern side of the city walls to protect this most vulnerable part of the peninsula; the lack of cannoneers reinforced the negative opinions about the function and use of the Ponton, new works and more money were needed; there were not enough soldiers and guardhouses in the city; none of the mentioned defensive points was complete or well equipped. The design of the three-bastion city wall was well thought out, but

[291] Appendix: Antonio Diedo.

[292] Ljubić, *Commissiones III*, 18.

decades of delays in its implementation left the capital of the Venetian province vulnerable to attack.

In the early 1540s, Giangirolamo Sanmicheli is also mentioned as the person who worked on the site and was directly involved in the design of the south-eastern part of the city walls. At the same time, he was in charge of the design and work on the fortress of St. Nicholas in Šibenik, which will be discussed later. The engineer Giangirolamo was able to supervise the work on the fortifications of Zadar and St. Nicholas because of their proximity to each other. A letter from him states that after six years of collaboration with Michele on the fortifications of Legnago and Verona, he was sent to Dalmatia[293]: "alla revision delle sue terre et loci; dove disegnai con ogni diligentia possibile non solamente Nona, Zara, Obroazzo, Novegradi, Sebenico, Verpoli, Rachienizza, Daslina, Scardona, Trahu, Spalato et Catharo del modo che si ritrovavano, ma gli tirai etiandio in quella forma chè più per via di rassettamenti o di nova fortificatione si poterevano ridur in securità."[294] It can be assumed that his departure caused a lack of competent authority, which, together with the lack of many materials and workers, was one of the reasons why the fortification of Zadar was postponed. The situation was the same at the time of Sforza Pallavicino's arrival in 1565, so that about thirty years after the accepted plans, Sforza's arrival in Zadar marked the completion of this part of the city walls and finally inaugurated the works on the bastioned ring of the city.

Recent research by Andrej Žmegač on the south-eastern side of Zadar's city walls shows that at the time of Sforza Pallavicino's arrival in Zadar, only Ponton and curtain walls had been built, without the above-mentioned corner bastions, which he insists should have been designed[295]. This was written in his 1565 report. In another report from 1578, Sforza Pallavicino states that he is the author of the project of the abovementioned bastions, except the Bastion Ponton[296]. Therefore, the corner bastions have been built between 1565 and 1578. At the time, the Bastion Cittadella was named after *Provveditore Generale in Dalmazia e Albania* Alvise Grimani.[297] The Bastion Ponton, over time, took over the name Bastion Grimani, which is still in use

[293] Borić, Laris. "Dujam Rudičić, Sanmichelijevi", 41.

[294] Dated on the 20th of March 1556, according to Bertoldi, Antonio. *Michele Sanmicheli al servizio della Reppublica Veneta. Documenti tratti dal R. Archivio generale di Venezia*. Verona, 1874, 97–98.

[295] Ana Deanović mentions that Sforza Pallavicino finished the southeastern part of the city walls in Deanović, "Prilog Sanmichelijâ", 24.

[296] "... ancorche non sia fatto da me [Ponton] [...] il ballouardo di S. Marcella, et quello della cittadella, ch'io dissegnai", according to Žmegač, "Sforza Pallavicino i Zadar", 69, note 23.

[297] Žmegač, "Sforza Pallavicino i Zadar", 63, 64.

today.[298] Pallavicino pointed to the necessity to construct those bastions: in 1565, he stated it was because Ponton required protection[299]; in 1578, he informed that these two bastions were designed primarily for the protection of his new Fortress, named Forte, in the location of the Varoš of St. Martin. Forte required protection of its two corner sides. Thus, the bastions' faces will serve as flanks of Forte. Their secondary defence would include the defence line of the city walls.[300]

These statements may change the perspective of understanding the development of fortification architecture over the decades. The south-eastern side of the walls was not completed until thirty years after Michele's proposal, and only the central part was finished. Sforza Pallavicino played a decisive role in the completion of the south-eastern side of Zadar's walls and in strengthening their position by designing another fortress.

In addition, the reports on the state of the Zadar fortifications show how the *Serenissima* fortified Zadar when it was most threatened. If the fortifications of the capital of a province were abandoned, as several reports describe, the investments in the other cities of the Eastern Adriatic are even more questionable. Only Zadar would be a properly fortified, completely, and safely defended[301], stated Sforza Pallavicino after inspecting other Dalmatian towns. However, the completion of its fortifications depended on the possible increase in the risk of war, which finally coincided with the years of the Cyprus War (1570-1573). On the other hand, the beginning of its construction coincides with the Venetian-Ottoman war, fought between 1537 and 1540, during which the Ottomans defeated part of its hinterland. Alessandro Contarini explicitly wrote in his report that money was thrown away in urgent need and the work could never be done well. It can be argued that the fortifications of Zadar depended heavily on

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[298] Compare Žmegač, "Sforza Pallavicino i Zadar", 69, note 25; Petricioli, Mirna. "Gradski perivoj u Zadru." *Prilozi povijesti umjetnosti u Dalmaciji* 33 (1992): 543; Raukar, Petricioli, Švelec and Peričić. *Zadar pod mletačkom upravom*, 277.

[299] "... un certo pontone con due pezzi di cortina dalla parte di terra, il detto pontone resta però privo di ogni difesa sicura [...] far le due difese necessarie al pontone, dalla parte verso terra", according to Žmegač, "Sforza Pallavicino i Zadar", 69, note 22.

[300] "... non furono dissegnati da me con intentione principale di guardar la fronte vecchia, et le cortine del Pontone, ma ben con le sue fronti, che fanno otio di anco, di guardar la cortina del forte verso il porto, et verso il mare; et che secondariamente poi anco guardassero le cortine della fronte vecchia et del Pontone perche con la medesima spesa si poteva haver l'uno, et l'altro benetio", according to Žmegač, "Sforza Pallavicino i Zadar", 63; 69, note 24.

[301] Žmegač, "Sforza Pallavicino i Zadar", 62.

experimentation, as the initial theoretical approach was immediately abandoned as inapplicable to the site.

3.2.2.5 WHERE CIVIC MEETS MILITARY: PORTA TERRAFERMA

The façade of the Terraferma Gate (Fig. 20) is a rectangle divided vertically by four Doric half-columns; the outer ones paired with two pilasters of the same order and opened by three doorways. The central opening is larger and wider than the two lateral ones; on the keystone of its semicircular enclosing arch there is a relief of St. Chrysogonus (fig. 21), above which there is a monumental lion of St. Mark; the two lateral rectangular openings are of smaller dimensions, above which there are the cornice, the triangular gabled panels and the coats of arms. The lowest register of the gates corresponds to the bases of the columns, while the highest corresponds to a particularly rich Doric entablature with an interesting angular solution corresponding to paired half-columns and pilasters. St. Chrysogonus, one of the patron saints of the city, is in the centre of the rectangular city gates, although he is "hidden" by the monumental lion of St. Mark, symbol of the Republic of Venice and its power in the province of Dalmatia and Albania, guarding its capital, Zadar.

The drawing of Porta Terraferma by Michele Sanmicheli, kept in the Uffizi (Figure 22), contains a note addressed to Giangirolamo's father, Paolo Sanmicheli: *A m(aestro) Polo de San Michele cusin carissimo in Verona a San Tomaso al rio de i zorli*[302]. Scholars have concluded that this information, together with the similarity of the finished project to the sketches, removes the possibility of Giangirolamo's authorship of Porta Terraferma[303]. Others pointed out that Giangirolamo was too young to be entrusted with such a monumental project. Filippo Toso observes that in the case of Porta Terraferma in Zadar and Dalmatian architecture, it is easier to accept that Giangirolamo's intervention was limited to the simple execution and a few variations of Michele's project[304]. Giangirolamo was probably entrusted with organising the works for Bastion Ponton and Porta Terraferma, such as cooperation with local stonemasons and builders and preparing and delivering bricks and other materials from Veneto[305].

[302] Davies and Hemsoll. *Michele Sanmicheli*, 42.

[303] Borić, Laris. "Dujam Rudičić, Sanmichelijevi", 42; Borić, Laris. "I collaboratori dalmati dei Sanmicheli".

[304] Toso, "Porta San Martino", 61.

[305] Žmegač, "Utvrda Sv. Nikole", 92.

Exceptionally, Ponton was built with bricks, and the Venetian government did the same in the fortress of St. Nicholas, the other earliest such realisation in the Eastern Adriatic, but in later works they turned to local stones. Perhaps this attempt to use imported bricks influenced the slow construction and excessive cost of Ponton. Among the possible hypotheses, perhaps at the time of Michele's departure, all the projects had to be completed, so that the Uffizi drawing was part of the preparatory sketches[306]. Given that Paolo Sanmicheli's job was to make projects to scale, it could have been the reason behind the drawing sent to Verona from Zadar or Venice in 1537[307]. Paolo seems to have been entrusted with the supply of stone blocks, but he was rarely present on a building site[308]. The role of Michele as the designer and the head of the family business seems convincing.[309] Furthermore, Laris Borić attributed the lion of St. Mark from the Bastion to Paolo Sanmicheli.[310]

Thus, not only Porta Terraferma in Zadar but the majority of Sanmicheli's fortification projects are to be considered products of family business.[311] This is why the relatively young Giangirolamo Sanmicheli was entrusted with the design and building of the Fortress of St. Nicholas in Šibenik, as will be discussed later.[312]

The mentioned criticism by Giulio Savorgnan of Zadar's fortifications and the Sanmicheli's gates in general confirmed the decline of a cultural model, of a policy and of an era: "...noi, alla fortezza nostra faremo le porte che farano bisogno a megio [a metà del]le cortine, senza usir punto in fuori, sode et grosse da guerra. Et non porte da chiese con tanti ornamenti impertinenti, come han fatto alla città di Zara e Verona, che spendono più nell'ornamento di una porta, con tante colonne e frisi e capitelli, che fariano due baluardi con quella spesa"[313]. This change of

[306] Borić, Laris. "Dujam Rudičić, Sanmichelijevi", 42.

[307] Davies and Hemsoll. *Michele Sanmicheli*, 257. Discussed by Borić, Laris. "Dujam Rudičić, Sanmichelijevi", 42.

[308] Toso, "Porta San Martino", 61.

[309] Toso, "Porta San Martino", 61. Compare Davies and Hemsoll. *Michele Sanmicheli*, 54–60; Borić, Laris. "Dujam Rudičić, Sanmichelijevi", 43.

[310] Borić, Laris. "Dujam Rudičić, Sanmichelijevi", 43. Compare with Rizzi, Alberto. "I leoni di Venezia a 'Verona fidelis' e nel suo territorio". *Atti del Istituto Veneto di scienze, lettere ed arti. Classe di scienze morali, lettere e arti* 154,1 (1996): 624.

[311] Borić, Laris. "Dujam Rudičić, Sanmichelijevi", 41, according to Toso, "Porta San Martino", 61; Davies and Hemsoll. *Michele Sanmicheli*, 54.

[312] See Borić, Laris. "Dujam Rudičić, Sanmichelijevi", 41.

[313] Concina and Molteni. *La fabrica della fortezza*, 136.

heart is only confirmed in Sforza Pallavicino's motto "fortify usefully and not for show"[314]. As Ennio Concina concludes, the post-Sanmicheli gates will take on the practical forms soon to be codified as rustic but decoratively austere, more suited to the image of war than to civic identity[315].

In view of the earlier reports on the state of Zadar's city walls, one might wonder why such importance was attached to the decoration of the city gates during the war. Certainly, the Sanmicheli workshop had a long tradition of such projects. But they were also present in the Eastern Adriatic at the time of the Ottoman conquests. The logistics of serious architectural projects were extremely expensive, again given the ongoing war. However, in addition to the large project for the Bastion Ponton, the other completed and apparently finished element of the eastern part of the Zadar walls was the Porta Terraferma[316].

From an artistic and architectural point of view, one of the most exquisite portals on the Eastern Adriatic was designed and completed in 1543, shortly after the end of the war. On the other hand, its description and condition are mostly missing from the reports of the time. The emphasis was on the completion of the bastions. Nevertheless, they remain the only part of Zadar's fortifications to have been completed "on time", which explains the dissatisfaction of military experts such as Sforza Pallavicino and Giulio Savorgnano. It was not just a matter of a "change of perspective". It was a question of almost thirty years of not carrying out extremely costly fortification works, which did not provide the city with complete protection, thus depriving it of the main reason for its existence: defence.

3.2.2.6 ZADAR'S FORTIFICATIONS IN THEORY

Zadar, as the "hub" of the Adriatic routes and territorial dominion over Dalmatia,[317] may be studied in terms of the dual centre-periphery paradigm. Ana Šverko proposed a peculiar approach: from the perspective of fortification architecture, the periphery *is* the centre of architectural innovation[318], representing the first line of defence: "Fortification architecture

[314] Concina and Molteni. *La fabrica della fortezza*, 136.

[315] Concina and Molteni. *La fabrica della fortezza*.

[316] Compare Zaggia, Stefano. "Fortitudo e Maiestas Reipublicae".

[317] Concina and Molteni. *La fabrica della fortezza*, 43.

[318] An article about this matter will soon be published by the author of this dissertation.

shifts the concept of the centre"[319]. The architectural innovations and creativity of the Sanmichelis are most likely to be found on the eastern coast of the Adriatic. However, by mentioning the necessary secrecy in military architecture, Šverko supports it by concluding that the Sanmichelis did not leave any treatise or writings[320].

Although the issue of secrecy should always be considered, the rise of military theory and the fashion of writing and publishing military treatises was "heating up". However, the separation of military theory, which no longer depended on mere experimentation and publication, and the value of its writing began to be approached precisely at the time of Michele's work. Moreover, treatises served as manuals of knowledge. It was not necessary to include constructions in progress or to reveal certain secret results of these constructions. The standardised bases were formed around the possibilities on the building sites. A military treatise did not need to include secrets, and probably never did. The period of intensive writing and printing of treatises specialised in military architecture can be traced back to Sanmicheli's achievements. Nevertheless, it is worth considering why neither Michele nor Giangirolamo attempted to present their military knowledge in textual form.

A study of the reports shows that what was considered the 'periphery' was a place of experimentation, but also of dismissal. On the other hand, it is pleasing to note that the distance from the political centre provided freedom to adapt the design[321].

But this was not the only question that interested scholars. Francesco Tensini, in the second subchapter of his treatise, addressed this issue immediately after the introduction. After showing the arguments of those who wanted to fortify the borders and those who favoured the centre, using the examples of the ancients, Tensini proposed his point of view and supported it with the case of Venice in 1509: "Per risolvere questo particolare, si deve considerare prima la qualità, e lo stato del Prenciple, che vuole fortificare: perche, se il Prencipe è potente, & con uno stato grande, & ne habbia vicino un maggiore, overo uguale, à questo non solo stà bene di fortificare alle frontiere, ma ancora una città in mezo dello stato; la qualle può con ragione essere quella dove esso faccia la residenza. Vero è, che il Prencipe, havendo fortificato le frontiere, non haverà bisogno di mantener guarnigioni nelle Città in tempo di pace: deve ben conservare in essa ogni sorte di munitioni sì di guerra, come di vivere, per poterne souvenire alle occasioni tutte l'altre fortezze dello stato suo (…) Ciò provò molto bene la Sereniss[ima]

[319] Šverko, "Peripheral or Central", 40.

[320] Šverko, "Peripheral or Central", 40.

[321] Šverko, "Peripheral or Central", 53.

Signoria di Venetia, l'anno 1559 quando l'Alviano senza ordine di lei attaccò il fatto d'arme con i Francesi in Ghiara d'Adda, nel qual fù rotto, e preso."[322] Thus, although the question of borders always depends on the grandeur of the state, one must first consider fortifying the centre of its power and then the borders. This could be the reason why Zadar was only fortified during the war and in times of danger. The *Serenissima* had to assert its power over the most dangerous places, even if it meant losing parts of its territory.

Thus, it is questionable to focus on Zadar and the border territory as the centre of fortification and military power, even if it was suggested in the previous subchapter. From the scholarly point of view, it is an understandable study, and it might be considered as such. However, from the military point of view, the military power was in the centres. However, as the province's capital, Zadar is a particular case study, primarily because of the particularity of its fortification design, its sites, and its involvement in the fortification specialist literature by Bonaiuto Lorini. The experimentation of Michele Sanmicheli's design was a response to the virtual impossibility of realising the previous project. It was not a question of creating a standardised model, but of adapting to the disadvantages of the site. Initially praised, it soon revealed its drawbacks, which are recorded in various writings. These reports indicate a growing need to write about the fortifications, to inspect them and to identify all the viable solutions for their development. This growing need created a growing community of people who understood the importance of fortifications, their materials, equipment, inventories, and their relationship with the surrounding territory. The culture of writing about military matters developed.

The project of Michele Sanmicheli and his family workshop could be seen as an example of trial and error. However, since Sforza Pallavicino completed the project at the end of the 1560s and the beginning of the 1570s, we can witness the standardisation of knowledge about fortifications. The initial mistakes were soon understood and corrected, as was the case with the detailed instructions given by Giulio Savorgnano, who left dozens of pages on the necessary improvements to be made in the design, construction, equipment, and management of fortifications. The accumulation of knowledge over the years allowed the completion of the walls and their improvement at the end of the 16th century, coinciding with the specialisation of military knowledge.

Bonaiuto Lorini worked on the fortifications of Zadar in the 1580s and, in his treatise Delle fortificationi di Buonaiuto Lorini libri cinque, gave instructions in the form of a dialogue set in Zadar. Lorini insisted that the understanding of fortification was fundamentally based on the

[322] Tensini, *La fortificatione*, Libro Primo, 10–12.

knowledge gained from experience, such as his own, gained through many years of work and struggle, of how defence depended on the shape of the site and the nature of the enemy's attack. On his way to Venice, Lorini was forced to stay in Zadar due to harsh weather, where he had the opportunity to discuss military matters, especially fortifications. On the third day, the Count and the writer decided to discuss the city where they were staying. The Count began by describing the surroundings of the town, which was naturally well defended because of its location, and later its defence was supported by art, and he called it one of the strongest fortresses after all the fortification work that had been done. The author agrees that such a fortress must be strengthened by art and nature, because it is an example of a lonely Christian fortress that was constantly exposed to Ottoman attacks. Using Zadar's fortifications as an example, the Count and the author describe the necessities of the fortifications of that time, pointing out their advantages and disadvantages[323]. They also discussed the use of materials for construction.[324] This inclusion of a specific fortification in the treatise of one of the most important authorities on fortification at the end of the sixteenth century shows the urge to harmonise what is experimental in fortification knowledge and what can be identified as science. This is also the first topic of interest at the beginning of the dialogue between the Count and the author. The direct inclusion of the fortifications of Zadar as a comparable model in specialist literature, such as the treatises, indicates their importance in the author's work and the real change of perspective that fortification architecture represents and how it can be shaped, adapted, and developed. Finally, it allows us to witness the gradual change of the actors involved in the fortification process and how they saw themselves as the originators of certain models, starting from the Sanmicheli family to Sforza Pallavicino and Bonaiuto Lorini. Zadar, as a future case study of this evolving process of fortification adaptation in the war-torn borderland, thus represents the experimentation and standardisation of fortification knowledge. Not only did Lorini include Zadar in his treatise, but he also added information about its surroundings and its history at the time, allowing for the study of the social view of the Eastern Adriatic territories at the time, especially the capital of the Venetian province:

"[Author] Siamo già vicini all'hora del nostro solito ragionamento sopra le fortificationi; nondimeno potremo prima goder al quanto questa così dilettevole vista, che ne apporta il sito che è d'intorno a questa Città, e particolarmente questo così bel canale di mare, per dove

[323] Lorini, *Delle fortificationi*, 77

[324] Berti, Maurizio. *A heritage of coral stone*. Padua: Coop. Libraria Editrice Università di Padova, 2016.

passa[325]del continuo gran numero di navili per esser il passo di quelli, che vengono di Levante, & il simile di Ponente verso Venetia, benche le navi grosse passino alla larga fuori di quesi scogli per ischena del Mare di questo Golfo. Ma ditemi di gratia, come le piaccono questi paesi della Dalmatia? E particolarmente questo contado di Zara? [COUNT] Alla comparatione di questi altri paesi di Levante vicini à queste marine, à me pare che la Dalmatia sia commodamente fertile. Ma partendosi da'giardini dell'Italia, l'uno, & lo'altro pare sterile a sua comparatione, non solo per essere questi pesi aridi, e secchi per la carestia delle acque dolci, ma per essere la maggior parte sasso nudo. In quanto a questo contado di Zara (per quanto ho visto di là da questi Colli, dove è una larga, e spatiosa campagna, con assai castelli, e ville) lo giodico assai abondante, e dilettevole; per le belle caccie, che si sono d'ogni sorte d'uccelli, & animali; ma venendomi detto che tutta, overo la maggior parte di essa campagna vien posseduta dal Turco, e che il suo confine non è più lontano di due miglia, molto mi dispiace la miseria di questi poveri popoli, vedendogli così da vicino travagliati da così barbari nemici. [AUTHOR] Egli è più che vero quanto ella ha detto, perche del continuo gli vien tolto quel poco di residuo, che gli è restato, sendo dentro questi confini habitati da publici ladri, e da pessima generatione di huomini, vivendo di rapine, e senza rispetto di giustitia, né di religione, sendo Turchi, e Martellossi, e Scocchi; & massime di quelli che sotto il nome di eesi Scocchi fanno molti danni, facendo i veri Scocchi solo danno a Turchi, & a' suoi vassalli, per natura tra loro capitalissimi nemici…"[326]

As Lorini repeatedly mentions in his treatise - the unity of nature and art can create a perfect fortification. In his description of the various sites for fortifications, he also includes the flat site overlooking the sea, as can be read in the quote above, pointing out all the advantages of such a site. The greater perfection of the design can be achieved when the surroundings allow the natural security of the harbour, a connecting point with the mainland, thus making it the main defensive point, and the lack of elevations does not strategically threaten the city: "Se alla perfettione del sito (che per natura possa giovare alla Fortezza) si aggiungerà l'arte con gli avvertimenti detti, potremo con saldo fondamento dire essere arrivati a quel segno di potente difesa, che si possa defiderare; perche sendo sopra il mare, e da una parte a Terra ferma, haverà in se tutte le maggiori commodità, che le bisogna, sì per la difesa, come ancora per il beneficio de gli habitanti; peche sendo situata sopra scoglio circondato dal mare sarebbe bene assai più forte, e sicura dall'offese del nemico; ma non participerebbe di quel beneficio, che defiderano

[325] Lorini, *Delle fortificationi*, 64

[326] Lorini, *Delle fortificationi*, 65

essi habitanti, e quelli del paese per la libertà del transito, che si trova in Terra ferma, dove non si stà all'arbitrio della fortuna del mare. E però tanto quanto quella parte da Terra sarà più penisola, overo di sito ristretto, e che venga sicura dalla zappa, tanto sarà maggiore la sua perfettione…"[327] According to Lorini, after the square and round towers, the bastions were added, following the ideas of the Della Rovere of the time, leading to the fortifications with additional defences in the centre of the curtain wall: "Crescendo sempre più con la esperienza la malitia de gli huomini nell'offendersi, ponendo suo studio, & ingegno per ritrovare nove inventioni da offendersi l'uno con l'altro, si come furono l'artiglierie, aggiungendo potenza all'infatiabil voglie de' tiranni per soggiogare, e conculcare i popoli, ove fù poi dall'uso sempre più accresciuta l'offesa, dallaquale non si potendo i difensori difendere sì per la distanza de' baluardi, come per le piccole sue difese, che facilmente venivano impedite, restando le fronti di essi baluardi indifese; però fabricarono il cavaliere di dentro nel mezo della cortina, cioè alzarono una piazza quadra quella altezza, che potesse iscoprire il fosso, la quale sendo d'intorno circondata da una grossa muraglia, formava di sopra la piazza con le sue cannoniere, come nel presente disegno si vede per A nella cortina tra i due baluardi BC. (…) Era la difesa del soprascritto cavaliere molto commoda, e facile, se però si fusse pottuta conservare; sì come poi con l'esperienza si vede non potersi fare, sì per essere scoperta, e bersagliata dal nemico, come ancora sendo fatto, e difeso da muraglia, veniva facilmente ad essere esposto alla rovina con perdita delle difese, sendo cavate nella grossezza di essa sua muraglia, onde cascata a terra restava la piccola piazza scoperta, e fatta inutile. E però parve, che fusse assai meglio risaltare fuori nel fosso pur nel mezo della cortina, e formare un baluardetto, che pigliasse le difese da' due principali fianchi, e venendo di angolo ottuso lo addimandarono piatta forma, come si vede per il segnato D."[328]

The advantages of peninsulas were also pointed out by Francesco Tensini: "Certo il sito della Penisola sarà buonissimo per fortificare, più che ogni altra sorte di sito; havendo però la terra ferma lontana, & il suo sentiero, ò strada stretta; essendo questo buono, sì per offendere, come per difendersi, godendo le buone qualità, che gode quella del piano, e quella dell'Isola. Però si deve in queste procurare in ogni modo di havere qualche porto sicuro, per potervi tenere dentro vaselli armati, parte per scorrere con essi, parte per ricevere soccorsi, e danneggiare le riviere vicine, avvertendo di fare al capo della strada una buona tenaglia, che in tal modo questo sito sarà il migliore d'ogn'altro per fortificare, & tanto più, se sarà luogo grande, per la commodità

[327] Lorini, *Delle fortificationi*, 162

[328] Lorini, *Delle fortificationi*, 141.

del navigare, e sarà mercantile in tempo di pace, dal che i Prencipi cavano utlità grande."[329] In his subchapter on the quality of the fortification sites, Tensini concludes that peninsulas are naturally better for fortifying than any other site, and once more the importance of the port is emphasized. Considering such developments, the positioning of the city gates was of strategic importance, as seen the example of Porta Terraferma where the design of the Bastion Ponton led to its dislocation. Francesco Tensini, hundred years after such intervention, stated in his treatises in the chapter on the position of the city gates: "Per compimento della Fortezza mi resta à dimostrare il modo di fare le sue Porte; le quali sono state fatte, e situate di diverse forme, & in diverse parti. Alcuni le hanno fatte civino alla spalla: altri nel Fianco istesso del Balloardo, ma la maggior parte in mezo della Cortina, come faccio ancor'io, se non è per necessità di sito…"[330] The positioning of the city gates was discussed already in the late fifteenth century by Francesco di Giorgio Martini in his well-known treatise, where he mainly emphasised the essential elements of fortifications to ensure their design might cause disadvantages. That is why he devoted separately to each component of the fortifications of his time and their mutual relations. Regarding the relation of the wall with the moat, Martini states: "Il fondamento delle mura debba essere in fondo del fosso, dipoi tirato con alquanto di scarpa insino a due terzi della sua altezza."[331] In describing the relationship between city gates and walls, he listed several characteristics that should be considered. The gates must be positioned so that they are least vulnerable to bombardment. A ravelin should be built in front of the gates. The gates must not be simple and must have several different entrances. Among other characteristics, the gates must be defended as much as possible from the sides[332].

[329] Tensini, *La fortificatione*, Libro Primo, 18.

[330] Tensini, *La fortificatione*, Libro Primo, 73.

[331] *Trattato di architettura civile e militare*, 267

[332] *Trattato di architettura civile e militare*, 267–268

3.2.3 FORTRESS OF ST. NICHOLAS AND THE DEFENCE OF ŠIBENIK IN THE SIXTEENTH CENTURY

3.2.3.1 INTRODUCTION

Some thirty years after the construction works on the Fortress of St. Nicholas began, Sforza Pallavicino described the as rather small.[333] Even in this relatively brief period of time, attitudes towards defensive architecture have changed considerably. In the case of the fortress of St. Nicholas in Šibenik, what was once considered innovative and exceptional soon became inadequate and outdated. In addition, this fortress is specific because of its surroundings and layout - it is a triangular island fortress.

The most critical document about the St. Nicholas Fortress dates back to September 1540 is a report written by Giangirolamo Sanmicheli, member, as already noted, of a well-functioning family workshop[334]. The archival evidence seems to suggest that in Šibenik Giangirolamo had the most prominent role. It is uncertain whether the construction process had begun when he drafted the report, but he mentions a drawing that indicates the existence of a project already at that date.

Scholars, and in particular Andrej Žmegač, have pointed out that only minor changes have been made to the Giangirolamo's original idea[335]. It has a triangular plan, with a circular tower or *torrione* on the north side and semi-bastions on the other two corners. The entrance is on the eastern curtain wall. The entrance is hidden by an *orrechione* of the *torrione* and leads to the middle level of the fortress. The fort also has a lower level and an upper open terrace. The western wall differs from the description, while the *torrione* and the eastern wall are the same. The external height of the fort and the height of the cornices correspond to Giangirolamo's specifications. Its present volume and concept largely correspond to his original idea[336].

However, it is the typological specification of this fortress that makes it a fascinating case study, which made it a phenomenon in its design and construction, and that caused the most difficulties in its operation. In addition, military experts in the second half of the sixteenth century foresaw

[333] Žmegač, *Bastioni jadranske Hrvatske*, 55, according to ASVe, Mat. miste notabili, b. 8, fol. 115r.

[334] Borić, Laris. "Dujam Rudičić, Sanmichelijevi", 41, according to Toso, "Porta San Martino", 54.

[335] Žmegač, *Bastioni jadranske Hrvatske*, 55.

[336] Žmegač, *Bastioni jadranske Hrvatske*, 49–51; Žmegač, "Utvrda Sv. Nikole pred Šibenikom" 91–100.

that the layout could cause difficulties in defending it. An even greater problem was its location near water, which resulted in increased humidity.

The St. Nicholas Fortress in the St. Anthony's Channel in Šibenik is falls chronologically in the central part of the significant period when military architecture emancipated itself from civil architecture, and this is evident in the following features. Firstly, although the location of the island determines the layout of the fortress, its foundation on the island rock and the sheer size of its dimensions represent a monumental fortification in an isolated environment. The Republic of Venice had to invest a certain amount of money to build the fortress as quickly as possible because of the nearby Ottoman threat to Skradin, thus preserving the Šibenik hinterland through the course of the Krka River. Giangirolamo Sanmicheli was already established as a military engineer of the *Serenissima* and was appointed to work on this project. There is also a report by Giangirolamo Sanmicheli on the fortress. The report was accompanied by a drawing, now lost. The need to fortify this particular island had been documented in several reports prior to its construction. Over the centuries, various experts have written about the fortress. In addition, the fortress only survived a minor attack in 1647; it has never been under major siege, and it is questionable whether it would survive one. The Triangular and Island Fortresses have been a subject of interest in fortification practice and theory, mainly because of their defensive shortcomings. This information can be compared with various reports and gives an insight into the real disadvantages of the fortress under study. Finally, it is questioned whether this fortress could influence future projects.

In this subsection, the fortress of St. Nicholas is examined as a typologically specific case in the Early Modern fortification history of the Eastern Adriatic. Furthermore, it represents a rare but preserved example of military history in question. Thus, the main interest of this case study is to evaluate how contemporary military experts and enthusiasts of Early Modern warfare understood and approached the continuously developing knowledge of fortifications. What was their main interest in observing such an unusually designed fortress?

3.2.3.2 GIANGIROLAMO SANMICHELI'S DESIGNS AND REPORTS

Before the fortress was built, there was a Benedictine monastery and a church of St. Nicholas on the island of Ljuljevac. Due to the dilapidated state of the buildings, the monks lived in the

town during the fifteenth century[337]. So far, there is no information about the appearance of the church and the monastery, nor about the building materials. Žmegač hypothesises that under the sacral building there could have been an old church on the living rock that extends in the north-western part of the fortress[338]. There is also a theory that the remains of the monastery were located on the site of a large fortress cistern[339].

Although Giangirolamo Sanmicheli probably began work on the Šibenik fortifications as early as 1539[340], a report by the Venetian procurator Alessandro Contarini dated 8 January 1541 suggests that construction had begun[341]: "La fortezza fatta alla bocca di Sibinico è benissimo intesa, et più che neccessaria, et pocca cosa la riduria in perfettione; conforto vostre eccellentie non li manchi, per esser cosa di grandissima importantia."[342] On 3rd September 1540, Giangirolamo wrote the technical description of the Fortress of St. Nicholas, confirming his authorship, and he also attached a *disegno* (technical drawing of the fortress)[343] that has not been found so far. His authorship is also confirmed by the second report sent to the Venetian Senate on the 20th of March 1556, requesting a salary increase. He informed the Senate, where he was working on the fortifications, and emphasised that the fortress of St. Nicholas in Šibenik was built according to his project[344].

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[337] The main reason for their moving is the demolition of part of the monastery in the war from 1409 to 1412 during the Venetian conquest of Šibenik, see Ćuzela, Josip. "Pomorska Utvrda Sv. Nikole", 52.

[338] Žmegač, "Utvrda Sv. Nikole pred Šibenikom", 94.

[339] Braut, Majer Jurišić and Škevin Mikulandra. "Tvrđava sv. Nikole ", 76, note 11.

[340] Žmegač, *Bastioni jadranske Hrvatske*, 48; Glavaš, "Bilješke o mletačkoj i austrijskoj fazi", 25, 26, according to Glavaš, at the time when report was written, Giangirolamo was working for a year on its project; Braut, Majer Jurišić and Škevin Mikulandra. "Tvrđava sv. Nikole ", 62.

[341] Braut, Majer Jurišić and Škevin Mikulandra. "Tvrđava sv. Nikole ", 76, note 12. On the document is written the year 1540, as the Venetian time estimate started from the 1st of March. Days in January and February were part of the following year according to the Gregorian calendar.

[342] See previous note regarding the dates. "Relatio viri nobilis ser Alexandri Contareno procuratoris, reversi provisoris classis. Presentata die 8 ianuarii 1540." In Ljubić, *Commissiones II*, 155.

[343] Gian Geronimo di san Michiel. *Relatio* in Ljubić, *Commissiones II*, 150–152; Ćuzela, "Pomorska Utvrda", 53; Žmegač, "Utvrda Sv. Nikole", 92, 93; Žmegač, *Bastioni jadranske Hrvatske*, 80; Glavaš, "Marginalije o tvrđavi sv. Nikole", 132; Glavaš, "Bilješke o mletačkoj i austrijskoj fazi", 26; Braut, Majer Jurišić and Škevin Mikulandra. "Tvrđava sv. Nikole ", 62.

[344] *"Et secondo un disegno mio, che io feci allora di ordine di quella al tempo del Clarissimo General Mocenigo soprastetti per fabricar la fortezza de San Nicolò per quella fatta nella bocca del porto di Sebenico, la qual'e di quell'importanza et perfettione che si vede..."*, in Žmegač, *Bastioni jadranske Hrvatske*, 50; Braut, Majer Jurišić and Škevin Mikulandra. "Tvrđava sv. Nikole ", 76, note 4.

In the short but precise 1540 report Giangirolamo[345] uses both the term *castello* and *fortezza* for the building in question. The second piece of information is the name, which is the same as the patron saint of the Benedictine church and monastery that existed on the island before the fortress was built. Preserving the name was probably necessary because a chapel dedicated to the same patron saint was built inside the fortress on the open terrace. The third date is 1540. This is when Giangirolamo mentions that the Senate asked him to send a written report about the fortress at the entrance to the St. Anthony's Channel in Šibenik. Giangirolamo gives the exact dimensions of the fortress and describes the location of its parts and their exact distances. He begins with the foundations of the fortress and the dimensions of each wall, considering the height of the water. The height of the fort is also expressed in terms of distance from the water. Giangirolamo points out each *cannoniera* in the fort, its position, height, and width. These are made for all the lower *cannoniere,* and they are vaulted in the form of casemates. Their height will be fixed, and their length will be as desired since there will be space to accommodate them. On the curtain wall on the side facing the island of Zlarin, *cannoniere* will be placed to fire at the entrance to the harbour between the rocks and the opposite locality of St. Andrew on the mainland. *Torrion tondo* or *torrione* is at the entrance to the St. Anthony's Channel - Giangirolamo suggests that can be seen on the drawing. In the *torrione* he wanted to place seven *cannoniere*. Four should be at the height of the *sasso vivo*, and the others should be in the depth of the wall. In that way, one will defend the right flank of the seaside curtain wall, two will look upon the port's entrance between the rocks and St. Andrew, one will guard the Sicinica valley[346], two will be able to shoot along the Channel, and one will defend the curtain wall inside the port. In addition, as the Senate has seen, two more will be built in that curtain wall, which will extend to the St. Anthony's Channel towards Šibenik. Giangirolamo wrote down their dimensions. The mainland front of the fortress has two semi-bastions with *orrechioni* on the flanks - as shown in the drawing - which defend each other very well. Giangirolamo then described the open terrace on the highest level. In the open space of the fortress, it will be possible to place more than twenty cannons to defend the fortress very well. He reiterated that the Senate would have been able to see this feature in the design. The latter was probably more detailed, but needed more explanation because the fortress had a triangular ground plan and was located on an island. Giangirolamo again gave the date of 3 September 1540, so this time it was not just the year. He signed himself as "Gian Geronimo of San Michiel", different than it can be traced in the

[345] See Report by Giangirolamo Sanmicheli, 1540.

[346] This locality is nowadays known as Sićenica; see Žmegač, "La Fortezza Di San Nicolò", 149, note 11.

scholarship. Giangirolamo Sanmicheli mentioned his fortress design in the report four times, two times directly referring to *disegno*, one time to *opera*, and lastly suggesting that the Senate has seen the fortress.

Andrej Žmegač argues that the island was, as Giangirolamo pointed out, the highest in the northwest part of the island where the Church of St. Nicholas was once probably located. Furthermore, according to him, the position of that rock and the terrain might be why the *torrione* in the ground plan is slightly deformed and has no regular circular shape. These irregularities are adaptations to the conditions of the construction site.[347]

The fact that the whole of the existing fortress largely follows Giangirolamo's proposal suggests that his main concern was to adapt his design to the existing area of the island, guided by his knowledge of fortifications at the time. The crucial information is that the *torrione* ends with *orrechioni* and flanks that are pushed inwards and contain the cannoniere[348]. These elements are also repeated in the semi-bastions of the fort. The whole shape is therefore reminiscent of a *tenaglia* (pliers).

One should be aware that two fortress plans in the Municipal Library in Treviso[349] are rare examples of a thorough representation of both the lower level (Figure 24)[350] and the upper terrace (Figure 23)[351]. However, the question of their dating after the completion of the fortress and their possible attribution remains open. For example, Giangirolamo does not mention either the old convent church or the new chapel in his report. And the chapel is drawn on the plan of the upper level or the terrace. Nevertheless, these two plans are specific because they have survived as a pair, showing the ground plans of both levels. The ground plan of the lower level is the only known historical representation of the interior of the building[352]. It is worth noting that these plans outline the edges of the island on Ljuljevac where the fortress was built,

[347] Žmegač, *Bastioni jadranske Hrvatske*, 50.

[348] Žmegač, *Bastioni jadranske Hrvatske*, 52.

[349] Their signatures are: BCTv, ms. 019, cc. 66–67: tav. 32 (= BCTv, fondo cartografico, mappa n. 181) for the ground plan of the upper level and BCTv, ms. 1019, cc. 68–69: tav. 33 (= BCTv, fondo cartografico, mappa n. 182) for the lower level; Mano, Antonio. Le fortezze veneziane nel Seicento: una raccolta inedita di disegni nella Biblioteca Comunale di Treviso. *Il disegno di architettura* 2 (1990): 50; Žmegač, "Još jedan stari prikaz šibenske Utvrde sv. Nikole", 78, 79. Tosato, *Fortezze veneziane,* 148–151.

[350] Inscription on the design: Scoglio in bocca c del porto di Sebenico / La pianta di sotto. Tosato, *Fortezze veneziane,* 150.

[351] Inscription on the design: Tosato, *Fortezze veneziane.* 148.

[352] Žmegač, "Još jedan stari prikaz", 77, 82.

indicating the inadequacy of the natural ground[353]. Antonio Manno dates the ground plans to the seventeenth century[354], which is plausible.

3.2.3.3 FROM INNOVATIVE TO OBSOLETE: REPORTING ON THE FORTESS

Already in May 1542, the *Capitano e Conte di Sebenico* Jacopo Boldù (1539-1541)[355] reported that while the first administrator of the fortress, Luca Zorzi, was supervising the works, the external walls had been partially completed, but not the internal spaces and vaults, while the *chiesia antiqua* of S. Nicolò had not yet been demolished[356]. It is not known whether some parts of the old church were incorporated into the structure of the fortress or whether there was a deviation from Giangirolamo's original idea, since the new sacred building was located at the junction of the *torrione* and the triangle of the fortress, and communication was only possible by narrowing the presbytery (Figure 27)[357]. Boldù tells them that they will be able to shape and finish the *bombardiere* more quickly if Giangirolamo decides to demolish the old church of St. Nicholas. Moreover, it would be convenient to rebuild this church as a chapel, since the most important member of the abbey is Abbot Zorzi. The *torrione* overlooks the St. Anthony's Canal and, being an exposed area, it could not be safely defended from the fortress[358]. Boldù testified that the expert engineer Giangirolamo was primarily responsible for appointing and giving directions for the fortress. Giangirolamo had been in Šibenik for several months, considering that the report is dated on the 7th of May 1542. Boldù warns that the time has come for transfer. Therefore, they will need three thousand ducats to proceed and conclude the works in progress, since it will cost around 1500 ducats to make mortar, the other 1500 ducats would be for the payments since it is necessary to carry out the works every day. They also need to pay for the already finished work and to bring in new workers from Istria. Questions of transport and

[353] Žmegač, "Još jedan stari prikaz", 82.

[354] Manno, "Le fortezze veneziane nel Seicento", 50.

[355] Appendix: Jacomo Boldù.

[356] "Relatio viri nobilis ser Jacobi Boldù reversi comitis et capitanei Sibinici. Presentata die 7 maii 1542." In Ljubić, *Commissiones II*, 155–159. Žmegač, "Utvrda Sv. Nikole", 92; Glavaš, "Marginalije o tvrđavi sv. Nikole " 132; Hilje, Emil. "Uz nekoliko arhivskih podataka o gradnji šibenske lože." *Ars Adriatica* 10 (2020): 73, note 26; Braut, Majer Jurišić and Škevin Mikulandra. "Tvrđava sv. Nikole ", 77, note 18.

[357] Žmegač, "Utvrda Sv. Nikole", 93.

[358] Žmegač, "Utvrda Sv. Nikole", 97.

security take up a large part of Boldù's report, as do the exact quantities of materials and their costs. After praising the work ethic of Giangirolamo Sanmicheli and Luca Zorzi, Boldù suggests that if so many "rooms" were needed, it would be necessary to send a greater quantity of material for the fortress and to adjust the locations of the nearby fortifications so that the horses could remain there for the safety of the workers in the countryside, as they had done before the war. Boldù suggested that the loss of Šibenik and its port could be considered as the loss of all shipping for the Republic of Venice. For this reason, he recommended the fortification of St. John's Hill, which overlooks the whole town, and of the Castello (assumingly the fortress of St. Michael). Furthermore, it would be necessary to send guards with a faithful leader, who would remain stationed in the Fortress of St. Nicholas with a few pieces of artillery and ammunition. Their rooms should be finished quickly, and they should also make sure they have their regular payments. In recent times, the regular payments have not been sent to the army on time, which can cause discontent.

In 1547, Zuan Alvise Venier, *Capitano e Conte di Sebenico*, drafted a report about the city in which he briefly mentioned the fortress of St. Nicholas: „Quanto alla fabrica del castel san Nicolò l'è in bon termine, ma bisogneria solicitar, cui vol, che la sia finida, perchè penso, chel anderà ducati 20,000 et piui de fornir l'opera. Et bisogna, che le signorie vostre fazia provision de monetion, perchè hormai sé puol dir esser in fortezza, si ben ge manca un pocho de parapetti, et maxime la banda da terra, che quella banda non ha defesa alchuna. Non so la causa, ma quelli, che se intende, dice, che bisogneria defese, perchè sul desegno over modello non è defesa alcuna. La signoria vostra farà quella provision parerà a quelle sì in questa matera come in ogni altra materia cerca zio… "[359]. Unlike Boldù, Venerio refers to San Nicola as a *castello*, not a *fortezza*. The work went well, but someone had to be found to finish it. Money was important, however, because the building finally looked like a real fortress, even if some parapets were missing, but the side facing the mainland was still unprotected. Venerio's concluding remarks indicate that no defence of this part was included in the design.

Giovanni Battista Giustinian,[360] in his 1553 report, provided a detailed description of the fortress, which was still not completed[361]. He states that "on the terrace, there was a small

[359] Ljubić, *Commissiones II*, 177.

[360] See Appendix, Giovanni Battista Giustinian.

[361] Ljubić, *Commissiones II*, 200–202; Ćuzela, "Pomorska Utvrda Sv. Nikole", 57 and note 17; Ćuzela, *Šibenski fortifikacijski sustav*, 78. Glavaš, "Marginalije o tvrđavi sv. Nikole", 24 states that there is no indication in the description that any vital part of the fortress was unfinished, meaning the semi-bastions while having minimal objections to the defence capabilities of the fortress.

church, a *piazza*, a well of a large cistern with excellent water and buildings for the accommodation of the crew, while inside there are large and spacious casemates with numerous artillery that is stronger than the one in the upper part".[362] Giustinian said that Šibenik was on a rock where St. Michael's fortress was built. However, the Church of St. John on the nearby mountain posed a danger if it were conquered. It would have been necessary to fortify the town or build a fortress, and both would have been extremely expensive. At the entrance to the port, two miles from the town, is the newly built Castello de San Nicolás, extraordinarily strong and impregnable. It was built on a rock cut with a chisel, and is entirely on the island, except for the mainland side, where a small stone room was built on dry land. According to the plan, this part had to be removed and carved into a pit. This fortification is triangular and has three defensive points. The first is at the entrance to the harbour, between the west and the north. Giustinian calls it un *bastione belissimo*, round in shape, strong against enemies and a guardian of the entire entrance to the port. On the bastion there is a small square and a small church. To the east was a cistern and *lozetta*, *corpo della guardia*. The other buildings are the quarters of the magnificent castellan Benetto Belegno and of the soldiers. This is the entire upper level of the fortress. Under the vaults there are very well constructed casemates. There is as much capacity for long cavities below as above. There are also many artillery pieces. Those on the lower level that attack the harbour are much larger. An infinite amount of ammunition of all kinds was stored. The main gate of the fortress was on the lower level, facing east towards Šibenik (Fig. 31). These gates were closed at that time and the usable ones were connected to the mainland until the rest of the buildings were completed. It is said that a noble Venetian castellan lives inside with the pain of never leaving. Besides him, Captain Pompeo di Pompei from Verona was there with a company of twenty-five infantry soldiers. They usually cost the Republic seven hundred and forty-four ducats a year, not enough to guard St. Nicholas. Not counting the corporal, two men, the drummer, and the chaplain. So, the remaining twenty of twenty-five. The rest were divided into two groups: ten per troop, of which ten were divided into two guard corps, i.e. five to one, leaving one of the three corps unguarded. It was therefore necessary to increase the number of infantries to ensure that a fortress of such importance was well defended. Captain Pompei guarded the fortress carefully and commanded his soldiers, who were strong and organised. In addition, there are five bombardiers in charge of the artillery, which is beautiful and well maintained, and on which the Republic spends two hundred and eight ducats

[362] Braut, Majer Jurišić and Škevin Mikulandra. "Tvrđava sv. Nikole", 63; Compare with Ćuzela, "Pomorska Utvrda Sv. Nikole", 57.

a year. The precautions that had to be taken were to dig the moat where the dry land was and *cannoniere* from below towards the east. The latter were lacking and had to be well equipped. Antonio Diedo[363] reported that the two towers at the entrance to St. Anthony's Channel were unnecessary because a beautiful fortress of St. Nicholas had been built. The towers cost the Republic four hundred and seventy-three ducats a year. They could easily be conquered, which would endanger the city of Šibenik and the fortress of St. Nicholas. The *castello* of St. Nicholas lies at the entrance to the port, two miles away from Šibenik. It was built on a rock that flows into the sea, except on the mainland side where there is a small space of solid stone. According to the disegno, it functioned as a moat. Its demolition should begin immediately in order to make the fortress safer and more impregnable, although it will be expensive. Corridors had to be built so that it could be walked around and defended. A fortress of such importance and cost required an abundance of equipment and other necessities, as there was not much ammunition inside. The fortress crew of twenty-five infantry soldiers included the chaplain, the drummer and two soldiers who came to the battles to leave only twenty-one. These twenty-one men were divided into two groups of ten each, who guarded two guardhouses of five each. This is why one corner of the triangular fortification remains unguarded at night. The fort had three bastions. Diedo suggests that the number of men should be increased to at least thirty-five in order for such a fortress to be considered well-guarded. The fortress was built not only to protect the city of Šibenik, but also to prevent it from being overrun by the enemy.

In 1557, Zuanne di Garzoni[364] described the fortress as a particularly important *fortezza* del *castel* of St. Nicholas: located at the port's entrance was a beautiful and impregnable fortress, which lacked nothing other than being equipped with every kind of ammunition. Garzoni provided the inventory of equipment and munitions. If needed, soldiers could not climb the walls, much less lead the artillery to defend that side. The most eminent captain was commissioned to send a galley with the crew. Marin Pisani was in charge as a supervisor but could only work for ten days because he was disarmed. After him came the Zuan Battista Contarini, who had worked for another four days. Then, it was necessary to go to Istria for Don Ferrante Gonzaga. The main gates were to be opened. Leaving the fortress in that state was endangering. The castellan at that time was Zuan Surian, and after him came Thoma Donado. There were two captains with forty infantry soldiers each: Pompeo of Pompeii and Julio de Naldo.

[363] Appendix: Antonio Diedo.

[364] Appendix: Zuanne Di Garzoni.

Sindici Michiel Bon and Gasparo Erizzo wrote about the fortress in 1559[365]. The beautiful fortress of St. Nicholas, since the pontoons were all filled with earth, could be nominated as a perfect one. Bon and Erizzo warn that, from what they had seen of the design, it had to be carved. They agreed that such a beautiful and robust castle must have better artillery. The fortress did not have a storehouse there, and it was necessary to have one made. And where the captain lived was appropriate since his room would be built in another part of the fortress. Captain Tullio Naldo had forty ordinary infantry and twenty recently recruited all in good order. However, they did not receive their pay on time.

Sforza Pallavicino authored a report during his tour of Dalmatian towns in 1559. Pallavicino was a condottiere, a military commander, and a designer of fortifications. His opinions on fortifications must have been taken seriously. As Žmegač pointed out, he was one of the most influential figures of the sixteenth-century Venetian military establishment. His remark that the city of Šibenik "cannot defend itself either a little or a lot"[366] was probably one of the reasons for the future rise of interest in the city's defences and more negative remarks. Pallavicino initially stated that the fortress was as small as a *mezzo balouardetto*, having only one cannon hole each. Furthermore, he warned that the vaults in the interior could collapse in the event of a bombardment. The most serious remark was about hollow cannon casemates and vaults, which could fall during bombing. "é tanto il voto come il pieno".[367] Moreover, there was too much void inside the *torrione*, which could easily be bombarded from the other side of the strait. Unlike the side facing the mainland, which could be improved, Pallavicino did not find a solution for the opposite side of the fortress because, as he says, the *torrione* was built on the edge of a cut-off rock. Adding more cannon holes would not solve the problem, as there would be no place to attack the enemy[368]. Sforza Pallavicino considered most of the fortresses on the Eastern Adriatic to be weak and not worth investing in strengthening. Kotor was described as threatened and badly located, but the fortress of St. Nicholas in Šibenik and the fortifications of Trogir could become satisfactory or mediocre with appropriate modernisation interventions. Only Zadar is fortified optimally for the defence.[369]: Vostra Serenità in quella provintia ha queste terre presidiate (oltra l'isole di Liesena, et Corzola) cioè Almissa, con suoi tre castelli, Spalatro, Trau, Sibenico con il suo castello, et quello di Sto. Nicolo, Zara, et Heugradi, li quali

[365] Appendix Michiel Bon and Gasparo Erizzo.

[366] "… la città di Sebenico non si puol diffendere ne poco ne assai... ", Žmegač, "Sforza Pallavicino i Zadar", 60.

[367] Žmegač, "Sforza Pallavicino i Zadar", 59–70.

[368] Žmegač, *Bastioni jadranske Hrvatske*, 55, according to ASVe, Mat. miste notabili, b. 7, fol. 56r, 56v.

[369] Žmegač, "Sforza Pallavicino i Zadar", 62.

(eccetuata Zara, la quale reducendosi a perfettione si potrà sicuramente dffendersi, et il castello di Sto. Nicolo, il quale agiuttandolo un poco potra passar mediocremente e Trau, il quale con grossa spesa però si puotrebbe ridur in assai buon termine) sono indefensibili da qualsi voglia forza…"[370]

As in Pallavicino's case, other crucial figures in fortification architecture of the second half of the sixteenth century did not find the Giangirolamo Sanmicheli's project being particularly successful[371]. For example, Giulio Savorgnan[372] points out as disadvantages of the fortress its small size and still lacking parapets.

The same expert was also involved in the demolition of the towers at the entrance to the St. Anthony's Channel. He also pointed out that he could have two thousand infantry soldiers in Šibenik immediately to take the top of the mountain near the town to fortify it. The digging was postponed to the next day at 3 o'clock p.m., as the hoes (agricultural tools) were not available. The Count returned to the General and a written mandate was sent for clarification. Before leaving, however, Savorgnano reminded them of their obligation to start the excavations. On his return from Split, Savorgnano discovered that the Count had stopped the work after Stella had started it, and had the unfinished part rebuilt with dry stones. Camillo Stella was right to obey his superior. Savorgnan therefore warned the Count that he would be forced to write down everything that had happened, but first he wanted to give him time to defend himself. The day before he wrote this letter, Savorgnan knew that nothing had been done. Why were the towers demolished? According to Savorgnan, if the enemy went around them, they would take them and stay inside, thus creating an obstacle in the channel. Boats and galleys would not be able to pass. The people of Šibenik asked the *Generale da Mar* to stop the works, as it was a civil dispute. Savorgnano concluded that there was no point in demolishing the old towers before the new one (the fortress) was in good condition. Therefore, His Excellency the General could not suspend their demolition.

Apart from this particular episode, Savorgnano's main concern during his stay in Šibenik was the general defence of the Venetian territories. The fortress was useful but obsolete. It had a special role; it was in good condition, but not good enough .It was crucial to finish it so that he would not be accused of overlooking it. These Savorgnano's indications were written down

[370] Žmegač, "Sforza Pallavicino i Zadar", 69, note 14, according to Biblioteca del Museo Correr, Venice, PDc 581, 149v.

[371] Žmegač, *Bastioni jadranske Hrvatske*, 55.

[372] Appendix: Giulio Savorgnano.

around twenty years after the works on the fortress had begun, in the crucial decades for changing perspectives on military theory and required knowledge.

In 1572, Provedittore Generale Jacopo Foscarini submitted a report to the Senate, in which he expressed his concern about the highly vaulted areas of the fortress, which could easily collapse due to the firing of the cannons inside. At the beginning of his report on the city of Šibenik, Foscarini mentioned that the St. Anthony's Channel was somewhat protected by the fortress of St. Nicholas, which was not far from its entrance, and that it was not reasonable for the enemies to think of fortifying themselves so close, as they could be attacked in many ways. The small island fort has two semi-bastions facing the mainland. Judging by its design, the fortress appears to have been carved out of stone and placed on the island. At the front, to the west, is the rocky entrance, from which you can see the whole channel. A pontoon, which acts as a bastion, is placed in this place or fort. The fortress is placed entirely above the vaults. On the mainland side is a collection of beautiful bronze artillery. The power of the artillery could do more damage to the vaults than enemies from the outside. However, experience suggests otherwise, and there is no embankment above, nor any parapet other than a wall, which would be ruinous to anyone defending it with a battery. He concludes that the building looks more like a fortress than it is. The building has a large cistern in the middle to store water, which is not enough even in summer for the normal garrison of seventy soldiers that was kept there during this war. In the end, it is a completely empty stone machine, unless it is constantly stocked up for every need. Šibenik was of significant importance, and it would make the city much stronger than it is if it were fortified. The city has a port of great capacity for any large army. Strengthening the city can be considered in two ways: first, to build a fortress on the hill of St. John, which will serve as the city's cavalier, from which it can be dominated and defeated. The second is to fortify the peninsula of Mandalina in the Gulf.

In 1575, *Conte di Sebenico* Agostino Moro[373] briefly reported on the fortress, saying its imperfections were evident and that he only wished to inform that it must be in better condition and equipped with various necessities, either food, gunpowder, or everything a fortress should have. Otherwise, if it remains in its current state and without munition, something might happen to it.

In 1576, Andrea Giustinian[374] wrote that the fortress of San Nicola was more beautiful than useful and was built at great expense on a rock. It is a small and narrow place that can be beaten

[373] See Appendix: Agostino Moro.

[374] Appendix: Andrea Giustinian.

from the ground, although it can hardly be attacked. According to him, the unwelcome news is that the fortress of St. Nicholas is similar to that of St. Nicholas on the Lido in Venice. Practitioners believe that the walls and vaults could be opened by gunfire, causing the entire fortress to collapse.

Vicenzo da Canal drafted a report in 1577 on his return from the city, where he had been a count and captain for two years. As far as the fortress is concerned, it is known how suitable it was for the security of the city, because of its position, preventing the enemy from entering. De Canal expressed his concern that the fortress might collapse if it came under frequent fire, especially from the larger artillery on the terrace above the soldiers. He also feared that the fortress could be attacked from the ground on three sides. The fortress had to be filled in with earth, and the cannons and artillery emplacements had to be built above it[375].

Giovanni Antonio Foscarini presented on the 26th of August 1583 a report[376] about the city of Šibenik after his return, where he served as *Capitano e Conte di Sebenico*. The information found in his report are crucial for the research of weaponry inventories, number of soldiers, etc., but he does not provide any opinion on the fortress. At the time, *Capitano di Fortezza* was Mutio Singritico.[377]

On the other hand, Luca Falier provided a distinct perspective[378] on the fortress's appearance in 1587. He served as *Capitano e Conte di Sebenico* for two years and presented the report upon his return on the 9th of October 1587. The fortress represents the main security of the city's channel. Falier described it as very well defined, strong, and of great safety. Afterwards, he lists the fortress artillery, thirty-two pieces in total. Every two years, the Republic sends a noble person to be castellan of the fortress.

In 1591 *Provveditore Generale in Dalmazia e Albania* Ferigo Nani, drafted a report to the Senate. Among many other details, he made a brief but pertinent mention of the fortress. The fortress of St. Nicholas, because of its smallness and the fact that it is quite unique, is not considered by intelligent people to have the strength that others appreciate. In other words, those who know the fortress do not appreciate it; and it is appreciated by those who do not know it. Ferigo Nani lists the number of soldiers in the city and their total annual cost.

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[375]Appendix: Vicenzo da Canal.

[376] Novak, Grga. *Commissiones et relationes Venetae IV (1572–1590)*. Zagreb: Sumptibus Academiae scientiarum et atrium Slavorum meridionalium, 1964., 316–321.

[377] Novak, *Commissiones IV*, 320.

[378] Appendix: Luca Falier.

Antonio da Cha da Pesaro mentioned the fortress for the first time in 1593, stating that this particularly important fortress lacked ammunition. The fortress is completely vaulted, and as water constantly seeps through the vaults, it ruins the surroundings. The wooden cannon stands are rotting from the damp, and the waves are pounding the fortress from all sides. These inconveniences cost the Republic money all the time. Especially as the artillery becomes unusable. It was necessary to find a covered and dry place to store it, such as the captain's house.[379]

Nicolò Brigadin only informed that the fortress was very well guarded and that, in order to be in full order, it would be necessary to equip it with the necessities previously requested, in particular the boxes for the conservation of the powder[380].

Vettor Dolfin in his report from the 29th of December 1597 did not find his opinion of the fortress to be particularly important, since it was inspected so many times by several experts: "Della fortezza di S. Nicolò, che è alla bocca di quel porto, le dico essendo stata tante volte veduta da diversi Ecc.mi Capitani intelligentissimi delle perfetioni et imperfetioni sue, non mi par di doverne poner altro del parer mio, se non indirle che come è diligentemente custodita dal m.to Ser. Domenego Marcello, che ui è castellano con molta sodisfatione di quella militia, così non ha dentro alcuna cosa, se non quanto dalla città si somministra giornalmente per il viver a quelle genti"[381]. Andrea Soranzo did not inform about anything undiscussed by now about the fortress[382].

As can be seen from a series of reports during the sixteenth century, the problems of the fortress were noticed very quickly and repeated in the reports. It was the same in the following years. In 1620, *Conte e Capitano di Sebenico* Piero Morosini[383] reported on problems with humidity and leakage occurring in the vaulted parts, destroying the wooden cannon stands as Antonio da Cha da Pesaro reported in 1593. Morosini also requested that the upper level be paved with sloping stone and drainage channels[384]. Pietro Morosini gave an in-depth description of all the needed repairments, such as replacing the old and already poorly capable *bombardiere* with

[379] Novak, Grga. Commissiones et relationes Venetae V (1591–1600). Zagreb: Sumptibus Academiae scientiarum et atrium Slavorum meridionalium, 1966, 86–87.

[380] Novak, *Commissiones V*, 145.

[381] Novak, *Commissiones V*, 230.

[382] Novak, *Commissiones V*, 270.

[383] Appendix: Piero Morosini.

[384] Ćuzela, "Pomorska Utvrda Sv. Nikole" 69; Braut, Majer Jurišić and Škevin Mikulandra. "Tvrđava sv. Nikole", 64.

new ones and supplying the fortress with sufficient food and wood, proposing to change superiors in the fortress, etc. According to Morosini, one commander should be enough. However, the number of soldiers was insufficient, and they were badly housed. It was also necessary to appoint a permanent priest because of the spiritual strength of the soldiers. A priest arrived on Sundays to celebrate Mass. But sometimes the weather kept him away. Morosini pointed out the problem of keeping the Blessed Sacrament in the church without its guardian and administrator. Moreover, people died in the fortress without receiving the last sacraments. These data are valuable for the study of everyday life in the closed defensive buildings with the permanent crews. It gives an insight into the architectural, spatial, artistic and many other overlapping aspects of the sacred and the military.

In 1647, Zacaria Salamon reported the poor state of the fortress and the ill crew (of which there were already too few). There were still problems with damp, and the lack of wood meant that all the buildings needed urgent repair[385].

A report on the conquests of *Provveditore Generale in Dalmazia e Albania* Leonardo Foscolo in Dalmatia in 1647 and 1648 also mentions the siege of Šibenik in 1647 and briefly mentions the fortress, but not in the way it describes the importance of the new fortresses of St. John and Barone[386].

3.2.3.4 SIGNIFICANT FEATURES OF THE FORTRESS OF ST. NICHOLAS

Reading the reports on the condition and (dis)advantages of the fortress of St. Nicholas (Figs. 25, 28, 29, 30) in Šibenik reveals its peculiarities.

The location - the island of Ljuljevac - has always been a problem. Not only because of the geological characteristics of the soil and the shape of the island, but also because of its surroundings. The fortress was far away from the town (Fig. 26) and difficult to reach, as evidenced by the fact that the priest did not come on Sundays. The island is located at the end of the canal, where it opens out into the sea. As a result, the island is subject to all sorts of weather conditions, with copious amounts of water and waves, which, according to reports, are

[385] Braut, Majer Jurišić and Škevin Mikulandra. "Tvrđava sv. Nikole", 64 according to HR-DAZD*1, box 20, fol. 298, 299.

[386] Novak, Grga. *Commissiones et relationes Venetae VII (1620–1671)*. Zagreb: Sumptibus Academiae scientiarum et atrium Slavorum meridionalium, 1972, 67–73. See Appendix: Sebenico assediato.

probably due to the winds that blow in these areas. As mentioned above, the island is still close to the mainland, which makes it easier for the cannons to reach it. The shape of the island also determined the triangular shape of the fortress, making it even more difficult to defend as there were only three points of defence. These defensive points are difficult to readapt for possible adaptations - a torrione and two semi-bastions are located on the island, surrounded by water in the narrow passage of the canal, which was also discussed in the reports. The function of the fort was to defend the passage to the channel, a maritime fortress, which also determined the shape and position of the defensive points, as mentioned above.

The island determined its tenaglia shape, placing the orrechioni on the strategic defensive points and at a higher level of the main entrance, the portal designed by Giangirolamo Sanmicheli. The portal was much studied and compared to Porta Terraferma in Zadar as it was the rare possibility for ornament[387]. However, reports indicate that the main portal has been closed for years and is no longer used because of the potential danger. The rear portal, facing the mainland, was used by workers and soldiers. Also, because of its proximity and connection to the land, the main portal faces the canal and the city.

Another interesting element is the open terrace, with all its disadvantages. As already mentioned, humidity was one of the most serious problems of the fortress, as it made gunpowder, weapons, and their accessories unusable, and the breaking of the vaults threatened the possible collapse of the fortress. The energy released when the weapons were fired made this even more likely. Contrary to the previous statements, the reports did not mention that the considerable number of buildings on the fortress terrace certainly contributed to its instability and easier leakage. The chapel was placed on the terrace, and, if the graphic sources are to be trusted, it even had a belfry. However, the presence of the belfry, which can be seen in several depictions of the fortress, can be problematic and poses a real strategic problem in the event of an attack. Their reliability is therefore questionable. It is a fact that sacred buildings had bell towers to call the faithful to worship and to warn of danger. The latter is particularly important on a remote island. At the same time, their function could be extended from sacral to defensive, as the belfry took on the role of tower and watchtower. It is possible that the bell tower of the

[387] Deanović, "Prilog Sanmichelijā"; Deanović, "Utvrđena Dalmacija"; Ćuzela, "Pomorska Utvrda Sv. Nikole": Žmegač, "Utvrda Sv. Nikole"; Ćuzela, *Šibenski fortifikacijski sustav*; Žmegač, "La fortezza di San Nicolò"; Žmegač, *Bastioni jadranske Hrvatske*; Žmegač, "Još jedan stari prikaz šibenske Utvrde sv. Nikole"; Borić, Laris. "Dujam Rudičić, Sanmichelijevi"; Glavaš, "Marginalije o tvrđavi sv. Nikole"; Glavaš, "Barutane (polveriere)"; Glavaš, "Bilješke o mletačkoj i austrijskoj fazi"; Braut, Majer Jurišić and Škevin Mikulandra. "Tvrđava sv. Nikole"; Šverko, "Peripheral or Central".

previous church also had such a role, given that the fortress is located at the entrance to the Saint Anthony's Channel, the closest to the waterway, and its main function is to control the coast of the sea entrance to the city.

3.2.3.5 THE TRIANGULAR ISLAND FORTRESS IN FORTIFICATION THEORY

Unlike later authors, Francesco di Giorgio Martini considered the triangular design well-planned if a fortification site can be attacked from only one side. Furthermore, this type of design might not cost a lot because of the unnecessary additional towers, as he described: "Fasciasi la circonferenza triangolare (equilateral o simile, ovvero isoscele) della quale un angolo si volti ver la parte debile, e questo sia massiccio, ossia pieno pedi 25 in 30: poi nelle line laterali si facciano piu reverse dove si lochino le offese per lato, e similmente degli altri angoli s'intenda: e fra questi altri sia locata la porta, dopo la quale sia una torre maestra con ricetti e parti a lei convenienti...".[388] As can be seen from the description, the position of the gates should be in the centre of the curtain wall, which in the case of the Fortress of St. Nicholas is on the side facing the mainland, which was the most vulnerable part of the fortress for the placement of the main gates.

Bonaiuto Lorini mentioned in his treatise the fortification design of a triangular floor plan with three *torrioni*. Though Lorini's design example is not of the same design as the Fortress of St. Nicholas, it may be understood that the triangular form provides the weakest and narrowest fortification site of any other, since it is formed of only three lines: "Potendosi fabricare le fronti de' detti baluardetti nel taglio del monte, si che la zappa, né le batterie non le possino rovinare, apporterrano difesa assai buona, benche tal forma di triangolo ne apporti il più debile, e stretto sito di qual si voglia altra, per essere formata con tre linee sole; e non si potere con maco formare alcun'altro corpo, ò superficie."[389]

In the first part of his treatise, Francesco de Marchi proposed designing the fortifications on an island[390], presenting its design with three bastions on each of its angles with cavaliers in the book's third part.[391]

[388] Trattato di architettura civile e militare, 279–280.

[389] Lorini, *Delle fortificationi*, 150.

[390] De Marchi, *Della architettura militare*, Libro Primo, 2v.

[391] De Marchi, *Della architettura militare*, Libro Terzo, 125-125v.

Francesco Tensini, while describing the various fortification sites, also mentioned the island ones: “Il fortificare l’Isole à me piace grandemente, tanto quelle di mare, quanto quelle di fiume, e di Lago: e tutte in generale saranno migliori, quando l’Isola non sarà molto grande, e che la fortificatione l’occupi tutta, overo la maggior parte; perche, se ciò non fusse, e fusse tanto grande, che in essa potesse capire un’essercito, non la stimerei tanto, facendo bisogno in tempo di sospetto, di havere molta guarnigione per vietare il disbarco al nemico, & il poter mettere piede in terra. La fortezza in Isola di mare, la stimo quasi inespugnabile, havendo le sopradette qualità; & quando bene non fusse fortificata tutta l’isola, sarà nondimeno fortissima, non potendosi dismontare, né mettere piede in terra, facendo perciò bisogno haver’ ancora una buonissima armata in mare: & non potendosi espugnare con la pura forza, il volerla espugnare col lungo assedio, e con l’armata, è quasi impossibile, sopravenendo il verno. Non dico però, che ancora queste non si possano havere per forza, ma è cosa lunga, e difficile, come io dimostrarò nella loro espugnatione. Se parlaremo poi delle fortezze sopra dell’Isole de’fiumi…”[392] According to his description, the first quality of the fortress of St. Nicholas is the size of the island of Ljuljevac, or the natural rock, which is not exceptionally large. Secondly, the fortress occupies the entire surface of the island. Such a position does not allow the enemy army to exceptionally large only position that could be questionable in the case of the Šibenik island fortress is the part of the mainland overlooked by the tenaglia of the fortress and the location of St. Andrew overlooked by the torrione of the fortress. As mentioned in previous reports, these could be the defensive points at risk. If we compare the fortress with Tensini's praise, the island's fortresses in the sea are the most impregnable, even if the island is not well fortified.

[392] Lorini, *Delle fortificationi*, 17.

3.2.4 BETWEEN THEORY AND PRACTICE: ANTOINE DE VILLE IN PULA

3.2.4.1 INTRODUCTION

„Figura ordinaria, modus fabricae inventum novum, meum, à nullo alio aut dictum, aut scriptum: habet enim & venustatem architectura civilis, & fortitudinem militaris."[393]

The military engineer Antoine de Ville (1596-1656/1658/1674) wrote several texts on architecture, a treatise on fortifications and a description of the city of Pula[394], where he designed the main fortress around 1630[395]. Born in Toulouse in 1596, he began to work as a military engineer at a noticeably early age in the service of France, later the Duke of Savoy and the Republic of Venice. Cardinal Richelieu had him ennobled[396]. Within the military hierarchy he reached the rank of *maresciallo di campo*[397].

The Uskok War (1615-1617) forced the Venetian government to fortify its territories in Terraferma and Istria. The first inspections were made and Pietro Matteacci, in his report to the Venetian Senate in 1625, concluded that the most suitable western Istrian port was Pula. It is possible that there were some projects for the fortification of the city, attributed to the military expert and writer Francesco Tensini (1581-1638)[398].

As in the previous case studies, the fortress in Pula is also characterised by the arrival of a well-known military expert in charge of a project. In addition, the author of the plans for the fortress left behind numerous reports and even treatises on fortifications[399]. What is also special about De Ville's approach, as he explains in his published description of the city of Pula, is that he

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[393] "Descriptio portus et urbis Polae. Ab Antonio De Ville equite Gallo Venetiis." *Istra* 119 (1991), 6.

[394] See more about Pula in the Early Modern period and De Ville's influence in Gudelj, *Europska renesansa antičke Pule*, 14–22, 76–77.

[395] Žmegač, "Ingegnero francese", 553.

[396] Armand Jean du Plessis, 1st Duke of Richelieu (1585–1642), French statesman and clergyman.

[397] "L'ingegnere è un francese, noto in Europa, il Cavalier 'Viles', ossia Antoine de Ville, nato a Tolosa, maresciallo di campo, gentiluomo del cardinale di Richelieu, alle cui soluzioni avrebbe guardato anche il grande Vauban", Morachiello, "Da Lorini a De Ville", 46; Bertoša, "Tutamen civitatis&provinciae", 33; Žmegač, "Ingegnero francese", 553.

[398] More on Tensini's life, as well as the exact years of his birth and death Hale, "Post-Renaissance Fortification", 11, 21.

[399] Compare Medvedkova and Orgeix. *Architectures de guerre et de paix*.

chose to interpret the fortress design using the structure of the classical architectural order. It is therefore useful to contextualise this particular case study within the circulation of knowledge about fortifications.

3.4.4.2 PLANS TO FORTIFY PULA

Today's fortress is located on the former site of the Castropola family castle on a hill above the town.[400] The site was described on the 21st of May 1561 by *Conte di Pola* Luca da Chà de Mezzo in a following manner[401]: The castle is located on the top of a hill in the middle of the city. The wall surrounding the *rocha*, or castle, is ruined in several places, although the interior has been completely filled in with earth up to the level of the walls. There are no houses of any kind. There are some traces of a large temple without a roof, just the wall. On the eastern side there is a building in the shape of a *turione*. The locals say it was once a windmill. There are visible traces of four gates; the western and northern gates were largely destroyed, while the eastern ones were completely intact. At the top there is a square turione made of rustic stone. Next to this door, towards the centre of the building, was another small door that led down to the cistern. The southern door was in a bad state. Inside the barbican there was a cavalier filled with earth and not ruined in any part. The castle dominated and ruled the whole town, the large and spacious harbour, and the whole countryside.

On the 13th of November 1618, the Venetian Senate elected Antonio Barbaro as *Provveditore sopra le ordinanze di Terraferma e dell'lstria*. He was entrusted with all critical tasks related to the defence of the Istrian territory and coast.[402] He was allowed to take one or two engineers and Camillo Cattaneo to advise him on the defensive works and the ports, especially those of Pula and Porto Rose, near Piran[403]. Two years after the end of the Uskok War, in 1619, the Venetian government decided to fortify the most strategic points of the city - the island of St. Andrew and the hill above the city. On 13 April 1619, the Senate informed Antonio Barbaro that it had examined the proposals of Antonio Candido and Francesco Tensini for the defence of the port of Pula. However, since these projects were not compatible, other proposals should

[400] More about Castropola family, see in: Benussi, *Povijest Pule u svjetlu municipalnih ustanova do 1918. godine*. Pula: Zavičajna naklada Žakan Juri, 2002; Caprin, *L'Istria nobilissima*, 152, note 1.

[401] Appendix: Luca da Chà de Mezzo.

[402] Budicin, "Considerazioni sulle strutture", 46.

[403] Budicin, "Considerazioni sulle strutture", 47.

be considered in order to complete the works quickly and at low cost, and to reconsider the fortification of St. Andrew[404]. Ten days later, on the 23rd of April 1619, the Senate emphasised the need to fortify the port of Pula[405].

Francesco Tensini was in the service of the Republic of Venice from 1617: "... sent to the war zone in Friuli, where his service with the artillery, his skill in scouting and mapping the enemy's positions, and his effectiveness as a garrison commander earned him an enthusiastic testimonial from the Republic's commander-in-chief, Giovanni di Medici".[406] Francesco Tensini, known for his treatise of 1624 and various writings on fortifications, was even considered by some to be the entrepreneur of the fortifications designed in Terraferma[407]. In his first report, he supported the system of large fortresses and small permanent forces on the grounds that large armies were subject to sudden political change and disease. He rejected the view that captured fortresses were more dangerous to their former masters than open cities would have been[408]. However, the Republic's considerable efforts should be devoted to fortifying the border, since the populated cities could be relied upon to provide their own resistance'. It is suggested that the garrisons should be fortified only in the event of war[409]. Tensini produced another report in 1632 when he surveyed and described the state of the fortifications at Terraferma, suggesting improvements and providing illustrations[410].

During his stay in Istria in 1619, Tensini made drawings of the Istrian towns of Koper, Rovinj, Pula, Veruda and Medulin. There are two depictions of Pula from this period, one by Tensini and the other by Antonio Candido (Figure 32).[411] In the case of Tensini, the fortress was located on the islet of Uljanik, defending the harbour. Four islands in the bay near Pula were of strategic importance: Uljanik, St. Andrew, St. Peter, and St. Catherine. Tensini's drawing shows the entire bay, the town with the old fortress on the hill, the city walls, and the aforementioned fortress, which provided a circular surveillance of all vulnerable points[412]. In the example

[404] Budicin, "Considerazioni sulle strutture", 48; Atti e memorie della Società istriana di archeologia e storia patria 7 (1891), 43.

[405] Atti e memorie della Società istriana di archeologia e storia patria 7 (1891), 43–44.

[406] Hale, "Post-Renaissance Fortification", 12.

[407] Hale, "Post-Renaissance Fortification", 11. See also Žmegač, "Ingegnero francese", 552.

[408] Hale, "Post-Renaissance Fortification", 13.

[409] Hale, "Post-Renaissance Fortification".

[410] Hale, "Post-Renaissance Fortification", 11.

[411] The drawings were published and analysed in Žmegač, "Ingegnero francese", 552.

[412] Žmegač, "Ingegnero francese", 552.

attributed to Candido, the fortress was located on the islet of St. Andrew[413]. It is marked with the letter K: “il scoglio di San Andrea dovi si pensa far un forte”. So, its protection is right in the middle of the bay, between its entrance and the city. The islet of St. Andrew, with its fortress, is connected to the islet of St. Catherine (marked with the letter M) with wooden pieces that have to be moved from one islet to the other at night because of the high tide. The same structure can be seen on the islet of St. Peter. In the centre of the town, surrounded by the walls, is the position (marked with the letter B) "la Rocha hovero Castello".

Although Tensini and Candido had well-thought-out plans for the defence of Pula, their projects were probably more expensive. The Senate proposed to Barbaro the construction of a fortress on the island of St. Andrew. The same proposal had been rejected a year earlier by the General Superintendent of Istria, Bernardo Tiepolo. [414]

Accompanying Barbaro was probably military expert Pietro Matteacci[415], who drafted several reports about Istria. In 1620 “Raccordo novissùno dell'Istria” he writes about the disarmament of the militias and the opportunity to repopulate the urban centres through demobilised troops[416]. Neither in this text nor in that of 1625 did he mention the drawings of Tensini and Candido[417]. In his 1625 report,[418] He described the city and its harbour in detail. The harbour was capable of managing any large army and could accommodate all the armies of the rulers of the universe. It is safe from all winds and has plenty of firewood and supplies. If the Republic decides to build a fortress on St. Andrew’s, a hundred soldiers can stay there, at least with a castellan and a captain of the militia. An enclosure should be built for the Senator's residence in the castello, which overlooks a hill. A house could be built there to house the soldiers. Bringing their wages to Pula would be especially useful for housing. Both St. Andrew's and the castello would become healthy spaces in every season of the year.

Provveditore in Istria Francesco Basadonna announced in 1625 that he had seen the sites for the construction of the fortifications. One was St. Andrew's at the entrance to the port, where a

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[413] Municipal Library in Treviso, signature BCTv, ms. 1019, cc. 58–59: tav, 28 (= BCTv, fondo cartografico Mappa n. 177). Tosato marked Tensini in the brackets, while Žmegač attributes the drawing to Candido, compare: Tosato, Fortezze veneziane, 136–137; Žmegač, “Ingegnero francese”, 553.

[414] Budicin, “Considerazioni sulle strutture murario-difensive”, 49.

[415] Budicin, “Considerazioni sulle strutture murario-difensive”, 47.

[416] Ivetic, Egidio. “La classe dirigente veneta e i piani di risanamento dell’Istria – ruoli e prospettive di sviluppo per Pola in un discorso del primo Seicento.” *Atti* 22 (1992): 287.

[417] Budicin, “Considerazioni sulle strutture murario-difensive”, 48.

[418] Appendix: Pietro Matteacci.

fort would be necessary to control the entrance. The other was on the hill in the city where the castle was, above which another fort would have to be built to defend the city and the port, as the enemy could attack from the mainland. Since the promontory served as a cavalier of the port, its conquest could endanger it[419].

In 1629, the Senate sent Count Marcantonio Pugliana to restore all the existing military works in Pula. To assist him was the invited Iseppo Cavriolo, who was working on the fortifications of Palmanova. Decisions were to arm the castello, the entrance to the port, Uljanik and St. Andrew, and to reinforce the tower built for this signalling purpose[420]. On the 15th of September it was decided that the models for the fortresses had to be made first. The engineers who are deemed sufficient will be assigned to the work. With the assistance of the Captain of Rašpor[421] or of another public representative, the castello of Pula, which has good cisterns and dominates the surrounding area, should be fortified according to the orders of this Council. This would reduce the defence on St. Andrew and prevent entry into the port.[422] The water source had to be further defended, so the *fortino* had to be built nearby, even though the castle already protected it. All the buildings around the castle that could endanger it were demolished[423]. The

[419] "Ho veduto li siti sopra quali si può fondare le fortificationi. Uno è lo scoglio di Sant'Andrea posto nell'entrata del porto, dove sarebbe necessario un forte per poter co'l cannone impedire l'ingresso alla bocca principale, potendosi l'altro ingresso tra detto scoglio, et quello di Santa Cattarina serrare col fondare due Arsili. L'altro dalla parte di terra è un colle dentro la Città, dove anticamente era il Castello, sopra la qual eminenza è pure di necessità formare un altro forte che abbia a servire a difesa della città, et del medesimo porto, perchè occorrendo che il nemico se ne impatronisse per la parte di terra, stando detta eminenza a cavalliero del porto, potrebbe offendere li Vascelli di Vostra Serenità che si ricoverassero in esso. La qualità della fortificatione, et la quantità della spesa sia rimessa alla peritia d'Ingegneri; ma io credo che per ponerlo semplicemente in difesa, non dovesse essere di tanta importanza", in *Atti e memorie della Società istriana di archeologia e storia patria* 5 (1889), 1–2, 103. See also Žmegač, "Ingegnero francese", 562; Budicin, "Considerazioni sulle strutture murario-difensive", 62.

[420] Caprin, *L'Istria nobilissima,* 152.

[421] Captain of Rašpor, head of the Captaincy of Rašpor (settlement in Istria). A high Venetian official and important rector of the Venetian administration in Istria. See more in Bertoša, Slaven. *Rašpor i Rašporski kapetanat: povijesni pregled*. Pazin: Katedra Čakavskog sabora za povijest Istre, 2005.

[422] "... prima li modelli, con le misure et altre operationi… necessarie, et per ciò habbia il Collegio nostro autorità di valersi dell' opera di quei Ingegneri che saranno stimati sufficienti et atti, et coll'assistenza del Capitanio di Raspo o d'altro publico Rappresentante sia fortificato secondo li ordini di questo Consiglio il castello di Pola, che ha cisterne capaci, et che domina all'intorno tutta quella parte… et insieme ridurre in difesa il scoglio di S. Andrea… per impedire l' ingresso nel porto", in Atti e memorie della Società istriana di archeologia e storia patria 7 (1891), 72.

[423] Atti e memorie della Società istriana di archeologia e storia patria 7 (1891), 72.

Captain of Rašpor was instructed to order from the engineer Capi, under the direction of Poiana, to make models, projects, and estimates for the fortifications of Pula.[424] On 27 November 1629, *Provveditore in Istria* Giovanni Paolo Contarini was asked to urge engineer Capi to perfect the expected design of Pula[425].

3.2.4.3 THE APPROVED PROJECT: CHALLENGING THE IDEAL DESIGN

On 4 March 1630, due to the indisposition of *Provveditore* Giovanni Paolo Contarini and his preoccupation with the salt affairs, the Senate decided to entrust the supervision of the fortifications of Pula to the *Capitano del Golfo*, Andrea Zulian(o). He was ordered to sail immediately to Pula with at least three galleys and, with the help of Count Marcantonio Poiana, to help with the construction of the two forts "sopra l'eminenza del monte" and above the islet of St. Andrew. The construction of the *forte della città* was the most urgent. *L'ingegnero Francese* was sent on the Captain's orders. The *Provveditore* Giovanni Paolo Contarini was informed of this decision and was to transmit to *Capitano del Golfo* all the orders previously given to him regarding the said fortifications, the people involved, other necessities and the money needed. The captain could determine the wages of the crews employed in the works. *Provveditore* would pay the engineer thirty scudi a month and 100 ducats for travel and expenses.[426] The engineer Antonio De Ville was commissioned to draw up plans for a castle to be built on the site of the remains of Castropola. On 24 May 1630, the plans were approved, and five galleys were sent with two teams of stonemasons, with the order that the crews be employed to transport the materials[427].

Reports indicate that two fortresses were to be built - one above the town and the other on the island of St. Andrew, which was never built. The fortresses were designed as squares with pointed, elongated bastions at each corner. The fortress on St. Andrew was to be larger than the fortress city. Due to the limited space on the hill, the fortress of the city could not be designed in the desired larger dimensions.

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[424] On the 2nd of October 1629, see Atti e memorie della Società istriana di archeologia e storia patria 7 (1891), 72.

[425] Atti e memorie della Società istriana di archeologia e storia patria 7 (1891), 73.

[426] Atti e memorie della Società istriana di archeologia e storia patria 7 (1891), 76; Bertoša, "Tutamen civitatis&provinciae", 28.

[427] Caprin, *L'Istria nobilissima*, 153, note 2.

Digging of the foundations began in the second half of April and the first stone was laid on May 1st, 1630[428]. Construction began on the fort at St. Andrew's Island but was soon halted as it was impossible to build both forts at the same time[429].

De Ville's description of the fortress in the context of other monuments in Pula is among the most significant for this research[430]. The writing was "presented" to the Doge of the Republic of Venice, who ordered him to reinforce the city with a fortress[431]. The port of Pula, De Ville writes, faces west and is a safe place for any ship, as it is rarely hit by storms. The larger island in the Pula Bay, St. Andrew, was supposed to be the site of one of the Republic's fortresses. This fortress would have had four bastions to protect the harbour.

In the middle of the town there is a hill where an ancient castle once stood, but all that remains of it is an egg-shaped rim around the earthen pit. There are also a few half-built towers left, which De Ville says have been razed to the ground, along with other useless ruins, only to be levelled for the construction of a new fortress.

Due to the site, this new fortress is small, but second to none in terms of beauty, ornamentation, and defence. It has four long and pointed bastions defending the flanks. The junction of the ramparts closes off the four fortified areas and is defended by a lunette. The third earthen wall was to be built. Then there were the quarters of the commander or *provveditore*, the armoury, the prison or guard rooms and the ammunition. There would also be an open space for the training of the soldiers. A cistern was built underneath to ensure an adequate water supply. All these structures, except the embankment and the parapet, were built with huge square stones. This fortress will last forever if it can. If the whole hill does not collapse, it will not be demolished by time.

De Vile claims that the form of the fortress is ordinary, but its method of construction is newly discovered, his own. No one else has said or written about it, because it has both the beauty of civil architecture and military strength. Its zones correspond to a classical Tuscan architectural order that extends continuously and uniformly along the perimeter of the fortress. The entrance to the fortress is no different. It has three entrances; the main one is in the centre, under the arch; two are next to a false arch for symmetry. The spaces in between have four columns made

[428] Žmegač, "Ingegnero francese", 558, 562, note 24, according to ASVe, Dispacci Rettori Istria, fz. 24.

[429] Žmegač, "Ingegnero francese", 562, note 19.

[430] The used version was published in "Descriptio portus et urbis Polae. Ab Antonio De Ville equite Gallo Venetiis." *Istra* 119 (1991), following the second edition published in Leiden in 1722. For an insight into their minor differences, see Križman, "Antički uzori i izvori", 46–53.

[431] In 1633, the Doge of the Republic of Venice was Francesco Erizzo (10 April 1631 – 3 January 1646).

of common stone, and the capitals of the columns, the epistles and other higher parts are decorated with Greek marble. At the top of the building is the Lion of St. Mark, made of stone and decorated with gilding and pediments. Many fences give the fortress its strength. This is not the reason for acquiring more soldiers, as the inner parts remain safe while these outer parts are defended. The fortress could not expand because the cliffs are steep, otherwise the houses would have been exposed. In the latter case, it would not have been possible to live in them during the war, and they were built for that purpose. A commander or *provveditore* runs the fortress and supervises the army and the construction. A magistrate called the Count or Podesta governed the town.

Andrej Žmegač pointed out that the book depicts the barracks on three sides of the fortress, the main building in its intended location on the northern side, but no sacral building on the eastern side[432]. Considering the Tuscan elevation at the junction of the southern curtain wall and the portal, De Ville's adaptation of the zoning of the curtain wall to the model provided by the composition of the portal (Figs. 37, 38) was a specificity of his fortification design[433]. Žmegač astutely observed that the columns, as part of the portal, coincided with the central horizontal zone of the rampart rising to the cornice. The latter does not correspond to the capitals of the portal, as described, but extends to the columns in the form of their sub-capital ring. Thus, the former capitals were at the height of the parapet zone of the adjacent wall. The different heights of the walls also suggest that the execution was not as described[434].

With regard to the illustration of the fortress in the book, De Ville presented the view from the south in a specific environment, not only providing the layout but also highlighting the problematic aspects of its location. It is immediately apparent that the monumental geometric complex is situated on an uneven, sloping, and steep hill. Moreover, the straight lines and geometric surfaces of the fortress accentuate the unevenness of the terrain, even suggesting an inadequate shortening of the lines in the representation. There is also an empty space in the background, suggesting that this is the top of the hill. However, the whole view seems to be slanted towards the foreground and does not show the importance of the defended area, i.e. the elevation above the seaport. There is a ravelin in front of each curtain wall. The southern one was placed in front of the main entrance to the fort. The portal was accessed via a bridge that extended from the ravelin. The emphasis seems to be on the prominent display of the geometric

[432] Žmegač, "Ingegnero francese", 556.

[433] Žmegač, "Ingegnero francese", 558.

[434] Žmegač, "Ingegnero francese", 559.

body in a given space. Possibly De Ville's drawing is not entirely credible, as it shows the portal in the wrong proportions and notes, for example, that the side door openings are raised like windows. The southern portal of the fort is incompletely preserved[435].

The construction was already underway in July 1630[436]. In April 1631, the columns, arch, and capitals were made, and the architrave, frieze and cornice were still missing[437]. De Ville's illustrations represent the fort as complete, but in 1633, it was not yet in such a state[438].

In the Treviso Civic Library, in addition to the illustration attributed to Candido, there are drawings of the fortresses of Pula by Antoine de Ville (fig. 33). In fact, there are several drawings on one sheet of paper, divided into two pages with three axes or themes of interest. On the right, there is a map of the port of Pula, which has a strip with a scale and the author's signature at the bottom: A. DE VILLE EQUES. The left page is divided into two parts. On the left are the plans of the two fortresses: forte Guiliano (sic!) and forte del Scoglio San Andrea. The cross sections of the fortresses are between the plans and the perspective view of the harbour. These two fortresses are well visible from the harbour perspective. On both sides the Forte Giuliano is smaller than that of St. Andrew, especially in the central square.

De Ville played with geometric figures in his plan of the fortress on the hill (Figure 34). It can be seen that the central point A (the centre of the courtyard inside the square and the centre of the irregular circle of the old castle wall), corner P (bastion Marcello) and corner I (bastion Giuliano) form a triangle which also passes through corner B (the corner of the square on the same axis as corner I). This junction forms a triangle that can be repeated on all four sides, connecting the corners of the bastions to the central point A of the fortress. Four such triangles thus form another square, the third outer one. This outer, invisible square has two existing squares that make up the fortress inscribed. One square can be seen by joining the lines from corner B (A-B is a half-diagonal of the square). The second square forms the interior of the fortress, where the main rooms are located. Finally, all four points of the corners of the bastion, which are also the outer corners of the square, are extended to the irregular circular wall of the former fortification. In this way, De Ville's plan of the fortress is made up of three squares inscribed in an irregular circle. The plan of the Fortress Giuliano is as described above, except that the drawing shows that there was a ravelin in front of the northern curtain wall.

[435] Žmegač, "Ingegnero francese", 560.

[436] Žmegač, "Ingegnero francese", 560, according to ASVe, Provveditori Terra e Mar, fz. 348.

[437] Žmegač, "Ingegnero francese", 560, according to ASVe, Dispacci Rettori Istria, fz. 24.

[438] Žmegač, "Ingegnero francese", 560.

On the left, in the drawing of the island fortress, you can see the outline of the island and a drawing of the smaller fortress-like structure. Žmegač argued that it was a kind of exercise for a building adapted to the diagonal layout of the islet, turning the outer square into a rhombus, while the inner square would remain for the display of buildings. Two diagonally placed bastions would have to be extremely long to ensure complete surveillance, recalling the principle of flanking. Both fortresses had a planned modular arrangement of quarters in the central part of the fortress, extending 'concentrically' along the central empty part of the square. In addition, a sacred building is shown in each plan. In both cases, it was placed on the axis of the centre of the square, occupying two pairs of modules. Above the hill, it was to be located to the east; in St. Andrew's, it was to be located to the south, since the main entrance was to be located to the east. At the front, on the façade, a step-like arrangement emerges from the perimeter of the wall, recalling the crepidoma of the ancient temples. Both religious buildings were designed with a single nave and a semicircular apse and were practically formed into two pairs of modules. In addition to the sacred buildings, there is another building of a prominent position and size. It could be the commander's quarters[439]. Opposite this building was the main southern gate of the fortress. Today the entrance is through the western gates of the fortress.

In both forts, the cisterns are drawn outside the walls. In the Islet Fortress, however, the cistern is next to the south-west curtain wall and the Pugliana bastion. At the same time, the cistern of the Giuliano Fortress is located to the east, between the Marcello and Giuliano bastions, next to the curtain wall of the old fortress. This could be the cistern described by Count Luca da Chà de Mezzo in his report. As a reminder, the eastern gate of the old castle was completely intact and above it there was a square turione made of rustic stone. Next to this eastern door was another small door that led down to the cistern: “dove si entra in una belissima cisterna di longezza de piedi 42 et larga piedi 31 fatta in volto, sopra octo volti edificata, di altezza de piedi tredece in quatordice; Ben è vero che al presente pocha acqua si vi attrova per non esser curata.”[440] In his analysis of the fortress, Andrej Žmegač drew attention to the unusual location of the cisterns outside the fortress. He suggested that they could be those of earlier buildings, used temporarily until new ones were dug inside and filled with water from the roofs and the middle area[441]. There, indeed, was an intention to excavate a cistern. On the 8th of November 1634, it was decided that among the earth filling the bastions, raising the parapet, and forming

[439] Žmegač, “Ingegnero francese”, 556.

[440] See Appendix Luca da Chà de Mezzo.

[441] Žmegač, “Ingegnero francese”, 557.

the moat, to "costruire la cisterna… stimata molto necessaria"[442]. How the building looked like is still unknown, but they were wooden and perished in a fire in 1645[443].

The text also indicates the names of the bastions. They are the same for both fortresses: the north-eastern bastion Marcello, the north-western bastion de Ville, the south-western bastion Pugliana and the south-eastern bastion Giuliano. The names of the bastions have been studied in detail by Andrej Žmegač and will therefore be presented only briefly. The western bastions of the hill fort, facing the seaport, were the first to be built[444]. They were named after Antoine de Ville and Marcantonio Poiana.[445] The southeastern bastion was probably first named after Andrea Zuliano but was later renamed after Paolo Emilio Canal (*Provveditore di Fortezza* 1633–1634). The northeastern bastion was named Marcello but was later renamed after Girolamo Priuli (*Provveditore di Fortezza* 1635–1636). The names are inscribed on each bastion. On the tops of the bastions, at the foot of the former guardhouses, there are longer inscriptions and coats of arms. Giovanni Paolo Contarini's coat of arms is on the southern portal and above the small walled door in the eastern curtain wall[446].

Therefore, two main problems were detected in executing this fortress design. As mentioned, the main problem was the limited external dimensions because of the steep hill above the city. However, De Ville designed the building according to the requirements of the flanking principle. This is why the central inner square, or the core, had to be reduced, and the bastions remained larger. The abovementioned description pointed out how he dealt with geometrical forms, which also allowed him to establish the bastions by drawing construction lines diagonally from the bastion flanks, the same way the firearms monitor them.[447]

Two main problems were therefore identified in the construction of this fortress. As mentioned above, the main problem was the limited external dimensions due to the steep hill above the town. However, De Ville designed the building according to the requirements of the flanking principle. As a result, the central inner square or core had to be reduced and the bastions

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[442] *Atti e memorie della Società istriana di archeologia e storia patria* 14 (1898): 296.

[443] Žmegač, "Ingegnero francese", 555–556. Caprin, *L'Istria nobilissima*, 157; *Atti e memorie della Società istriana di archeologia e storia patria* 8 (1892), 148.

[444] Bertoša, "Tutamen civitatis&provinciae", 34.

[445] Žmegač, "Ingegnero francese", 560, according to ASVe, Provveditori Terra e Mar, fz. 348.

[446] Žmegač, "Ingegnero francese", 557–558. For the coats of arms on the fortress see also Krnjak, Ondina and Giovanni Radossi. "Notizie storico-araldiche di Pola." *Atti* 26 (1996): 115–206.

[447] Žmegač, "Ingegnero francese", 555–556. Caprin, *L'Istria nobilissima*, 157; *Atti e memorie della Società istriana di archeologia e storia patria* 8 (1892), 148.

remained larger. The above description shows how he dealt with geometric forms, which also allowed him to establish the bastions by drawing construction lines diagonally from the bastion flanks, in the same way as the firearms monitor them.

Another problem was his decision to interpret the fortification in terms of the structure of the Tuscan Order, so he had to arrange the horizontal zones according to its main elements. Thus, for security reasons, he raised the portal to a certain height. In addition, the zoning meant that the perimeter of the fortress was marked by the level of the courtyard, which scholars immediately pointed out was unusual[448]. De Ville obtained a high lower zone by marking the fortress at this level, which he treated as a separate zone from the upper surface and executed without chamfering[449].

However, what distinguishes de Ville is his ability to write and his need to express himself through words. Paolo Morachiello concludes that Antoine de Ville put into verse a specific knowledge theorised by Lorini and even more so by himself in Les Fortifications. He was an operational soldier and a mathematician-engineer, with an increasingly comprehensive and well-founded theory of defence and the general rules of warfare derived from systematic meditation on the field and historical examples[450].

3.2.4.4 FORTESS, INTERRUPTED

The fortress remained unfinished (Fig. 36). On the evening of 20 November 1645, a fire accidentally broke out in the soldiers' barracks and accelerated by the bora wind, set fire to the church and convent of St. Francis[451]. Moreover, after the end of the Thirty Years' War (1618–1648) the Republic of Venice lost interest in fortifying these territories (Figure 35)[452]. Work on the fortress eventually stopped. The wooden quarters inside survived at least until the fire of 1645. Bertoša tells us that in October 1667 the people of Pula managed to repel the attack of a pirate ship. However, it was easier for the Republic to distribute the firearms and the rest to the people and to place an armed galley in the harbour than to undertake expensive and complicated

[448] Žmegač, "Ingegnero francese", 559.

[449] Žmegač, "Ingegnero francese", 560.

[450] Morachiello, "Da Lorini a De Ville", 47.

[451] Caprin, *L'Istria nobilissima*, 157, note 1.

[452] Bertoša, "Tutamen civitatis&provinciae", 38.

construction work to complete the fortress[453]. In 1669, Koper Podesta and Captain Agostino Barbarigo informed the Senate that the fortress, left unfinished and neglected, had lost its character, appearance, and name. It was not equipped to protect or defend. Nevertheless, it was the only fortress of the Republic of Istria. In 1677 local farmers and a corporal replaced the mercenaries. One of the reasons for the abandonment of the project, apart from the aforementioned change in the war zone, could have been the calmer general conditions in most of the centres of Venetian Istria, which led to the fortification projects being abandoned in favour of more intensive building development[454].

Count Giovanni Battista Polcenigo gave a detailed report on the state of the fortress on 22 October 1701. On a hill overlooking the city, where once there was an ancient castle, stands the fortress in the shape of a square with four small bastions. It was a system and structure of Antonio de Villa, who served the Republic in 1634. It is a special fortress because of its architecture and the stones used for its construction, all solid and equally worked by hand.

However, time has damaged it. As a result, many parts need to be restored, starting with the soldiers' quarters, since some of the wooden ones have already been destroyed by fire. The remaining parts need to be repaired, including the rotten roof, which was in danger of collapsing. The most expensive restoration will be that of the commander's house. But it is a small building, and with the quarters it should not cost more than two hundred ducats.

Then he described the bastions. They were unfinished and they, as well as the curtain walls, needed terrepleins. Polcenigo suggested that in order to reduce the cost, the two terrepleins of the two curtain walls facing the city and the bastions should only be completed on the sides facing the countryside. The ground plan had to be levelled. Open the pipes that bring water to the cistern in the middle of the square. There is water in it, but not as much as would be needed for an event. The large gates were bricked up, and others that were in use were opened without regulation after construction. There was also a *porta di sortita* in the middle of each curtain wall. There is no moat outside the fort. In many places the earth rises up to a third of the wall, but it can be used to build the terrepleins. The road surrounding the fort on three sides must be taken very seriously. It is low and cannot be sufficiently uncovered; it should be covered with ridotti. After these arrangements, the fortress will need a large artillery service. The fortress did not have any powder or the necessary depot to store it. The square was too narrow to build one.

[453] Bertoša, "Tutamen civitatis&provinciae", 38.

[454] Budicin, "Considerazioni sulle strutture murario-difensive", 63.

Polcenigo suggested using the many stone piles or ancient sarcophagus in Pula to keep the powder dry.

Polcenigo considered the walls around the harbour to be in good condition, but those facing the mainland needed repair. The wall facing the mainland has twenty-four towers, unevenly exposed and in no defensive position. Pula can be attacked from all sides as it is surrounded by many hills. The harbour of this town is one of the most important in the country for its size and for the safety of the ships. It has five islets in the middle, and on one of them the Republic began to fortify it around 1630. The work was stopped because of the possibility of an attack from the lateral hills, which would allow the enemy to get closer to the port. Polcenigo proposed the resumption of the fortification works on the islet of St. Andrew, because of the vast number of stones and other materials available in the city, with two cisterns and underground vaults to protect the militia from bombardment.

3.2.4.5 DE VILLE'S DESIGN BETWEEN THEORY AND PRACTICE

Like the other authors, Antoine de Ville considered various fortification sites that could be considered before designing a fortification, pointing out their advantages and disadvantages, but also giving numerous examples of fortifications that could be placed in each category. He pointed out that the best fortifications were those near the sea, with a harbour on the coast, because they could always be rescued with new soldiers and replenished with ammunition: "Les Places qui ont la mer, & un Port d'un costé, sont les meilleures de toutes les precedentes, à cause qu'elles peuvent estre toujours secourues de nouveaux Soldats, & rafraichies de munitions principalement lors que ceux de la Ville sont les plus forts sur la mer..."[455]

In his treatise, De Ville classified fortifications according to their regular or irregular shape. The regular ones have equal sides and angles, with corresponding equal bastions on the angles. On the other hand, irregular is those that do not have the aforementioned equality, sides, or bastions. De Ville points out that these are most fortifications: "Les Places regulieres sont celles qui ont les costez & les angles esgaux, & les Bastions qui sont sur iceux angles, esgaux aussi, & la force esgale par tout. Les Places irregulieres sont celles qui n'ont point l'égalité susdite, ou des costez, ou des Bastions, ou de la force; de ceste façon sont la plus part des Places." Both types of fortifications are considered modern fortifications that are characterised by flanking:

[455] De Ville, *Les fortifications*, 14–15.

“A la moderne, sont celles qui sont flanquées par tout : & les corps flanquans & flanquez sont tellement solides & de telle matières, qu’ils peuvent resister au Canon.”[456]

As seen in his *Descriptio portus et Urbis Polae*, De Ville stresses that the shape of the fortress is ordinary, based on a square. At each corner of the square there are long, pointed bastions. The bastions were defended by their flanks, the side walls. The curtain walls connecting the bastions enclose four sides of the fortress. The design, which had to be conducted in this way, corresponded to the regular fortifications he had introduced at *Les Fortifications*.

One important detail must be considered. Giovanni Battista Polcenigo, in his report of 22 October 1701, stated that: “Venendo poi a Bastioni ho trovato che l’opera non è ancora stata finita mancandovi così a questi come alle Cortine bona parte de terrapieni, onde considerata la minor spesa sarebbe mio riverente parere di finire lì due terrapieni delle due Cortine che guardano fuori di Città et loro bastioni dalle parti solo che sono veduti dalla Campagna, et li parapetti per l’angustia de’ medesimi Bastioni non si possono far più grossi di 10 et al più 12 piedi, perchè altrimenti non vi resterebbe piazza capace per postarvi l’Artigliaria. Il piano del detto Forte ha bisogno di essere eguagliato…”[457] Not only was the fortress not completed, but it did not follow the main characteristic of De Ville's design. This statement of Polcenigo's is critical, while it informs that the fortress of Pula was too small to be effective. In other words, it was so small that the parapet could not be too thick and thus strong enough to defend the soldiers. Otherwise, as Polcenigo mentioned, there would not be enough space to place and move the artillery on the bastions. The plan of the fortress had to be the same, which was the main characteristic of De Ville's regular fortifications.

In his treatise, De Ville did not look favourably upon the fortification of the fortress on the high ground, because there was truly little earth and too many mixed stones, which were not suitable for working. Anyone wishing to fortify these places would have to bear the cost of transporting the earth from nearby places. As for the enemy, his inconvenience might be that, if he wanted to approach, he would not have the means to run: “Aux montagnes & rochers il se trouve fort peu de terre, & celle qui y est a trop de pierres meslées, qui ne sont aucunement propres à faire les ouvrages. Ceux qui veulent fortifier enc es lieu se doiuent resoudre a la dépense de fair charrier la terre des lieux plus proches qu’on la trouve: l’ennemy aussi à cette incommodité que voulant s’approcher il n’a pas dequoy se couvrir.” [458]

[456] De Ville, *Les fortifications*, 2.

[457] See Appendix Polcenigo.

[458] De Ville, *Les fortifications*, 14.

Although he had to design two fortresses for the different fortification sites, De Ville approached them in an equivalent way, designing two floors of close dimensions and leaving the base the same. In this way, he overlooked the disadvantages of the terrain he wrote about in his treatise and concentrated on a well-proportioned design to suit his regular fortifications. The importance of design in his view of fortifications can be seen in the following quotation: "C'est chose commune à tous Arts, qu'auuant que commencer l'oeuvre, l'Artiste fait premierement vn Modelle, ou Type, sur lequel il voit les commoditez, ou inccomoditez qui se trouuent à son dessein, accommode les defauts s'il y en a, & le trauaille iusques qu'il l'a reduire à sa perfection, pour s'en seruir d'exemplaire qui le guide iusques à l'accomplissement de son ouvrage. Il est d'autant plus requis à la Fortification, qu'elle est de plus grande importance que tout autre oeuure qu'on puisse faire, puis que par icelle les Estats sont maintenus & defendus des forces des ennemis, & le repas & le falut public entierement conservé. Plusieurs ont doneé diuerses sortes de Fortifier ; pour moy i'ay tasché à réduire la Fortification en methode très facile, obseruant tout ce que i'ay veu estre practiqué le plus souvent, & aux licux où l'on estime les Places estre les mieux fortifiees."[459] Therefore, an artist sees the convenience or inconvenience of his design and takes into account the defects that arise, solving them until he has reduced them to perfection. This makes it possible to use it as an example to guide him until his work is completed. In practice, the construction of the fortress according to the design was not completed, not because of the imperfection of the design, but because of the imposition of a perfect and ideal design, which followed geometrical principles and reduced the importance of the fortification site. Nature prevailed over art.

[459] De Ville, *Les fortifications*, 16.

3.2.5 TESTING THE FORTIFICATIONS: BESIEGED FORTRESSES IN ŠIBENIK AND SPLIT DURING THE WAR OF CANDIA

3.2.5.1 INTRODUCTION

Two important Dalmatian cities, the aforementioned Šibenik and Split, which grew up around Diocletian's Palace, experienced difficult period during the years of the War of Candia (1646-1669), which prompted extensive fortification campaigns. The imminent danger from the Ottoman hinterland and the hilly surroundings led to the construction of fortresses overlooking both cities, which responded to the challenges of siege and attack.

The first building studied is the fortress of St. John in Šibenik during the decisive siege of 1647 and the less dangerous attack of 1646; the second is the fortress of Gripe in Split during the multiple attacks on the city in 1657. The persistence of the inhabitants of Šibenik and Split forced the rapid construction of these fortresses. One might ask how the defensive architecture was able to react to the siege and test its main function. Therefore, this subsection focuses on the architectural elements of the fortifications that were crucial in such events.

The St. John's Fortress in Šibenik (especially when paired with the Ridotto Barone) and the Gripe Fortress in Split are both buildings of considerable dimensions and monumental examples of fortification architecture, located on strategically important defensive points of the city they protect. Secondly, the urgent need for financial support from the Republic of Venice for the rapid construction of the fortresses, which was a matter of panic and haste due to the justifiable imminent threat of war, was most often pointed out at the time. Moreover, these projects involved well-educated and established military experts, who were not as celebrated as other learned actors such as Michelozzi, the Sanmichelis and De Ville. The latter had a say in the fortifications of Split in the 1630s. Moreover, reporting and writing on military matters and battles was widespread during the War of Candia. This was not due to the peculiarity of this war, but to the general culture of the time and the interest in the design and construction of fortifications. This is why there are several accounts of Dalmatian battles during the War of Candia. It should be remembered that the fortification of the nominated hills of St. John and Gripe was a requirement that was witnessed years before the start of the construction works by various military experts, who indicated the instructions of their previous colleagues. The focus of the study of these fortifications is to test their main function - defence - during a siege or attack and its outcome. These fortresses were designed and built at a time when interest in

military science was widespread, and the acquisition of military books was in vogue. The main actors in their design and construction were military men who were well versed in contemporary fortification practice and theory. Finally, besieged fortifications were a subject that was predominantly studied in military science.

Writings reporting on the battles will be examined to show what can be said about the role of fortifications in different cases of defence and attack. The studies carried out on the two fortresses are also presented, showing the different stages of development of the fortresses before the sieges. The restoration after the siege will be briefly mentioned since the emphasis is on the state of these buildings at the time of the siege tests. In both cases studied, the attacks on the fortresses resulted in victory for the defenders. The question is how much the final outcome depended on the fortifications and how much on the other circumstances.

3.2.5.2 ŠIBENIK AND SPLIT IN DANGER

Although the question of the defence of Dalmatia and its hinterland worried the Venetian government, the beginning of the War of Candia was a decisive factor in the final fortification of larger settlements and better armament. The proximity of the Ottoman territory allowed frequent movements and incursions. It was therefore essential to secure all strategic points in and around the cities, especially the ports and the heights.

Such similarities can be seen in Šibenik and Split. These coastal cities were highly dependent on their maritime trade, the protection of the seaports and the fortification of the positions that threatened them. At the same time, they are surrounded by rocky terrain, especially towards the northern parts of both cities. Considering the latter and the existing Ottoman settlements near their borders, they had difficulties in ensuring their protection.

Šibenik relied on its walls, which needed constant modernisation, and on the fortress of St. Michael. The latter was located close to the sea on the hill above the city. However, the town with its fortifications was surrounded by hills (Figures 39, 40), which directly overlooked the St. Michael's Fortress, the town walls and the St. Anthony's Channel. The most dangerous of these was the hill on which the church of St. John stands. Another dangerous hill was in its vicinity, named St. Vitus in some sources. Although Split, as a Roman city, had a different urban development than Šibenik, it was also surrounded by walls, with a fifteenth-century castello on its perimeter. However, these fortifications were constantly threatened by the

surrounding hills, the most threatening of which was Gripe, which overlooked the city and the entrance from the east.

The fortress of St. John in Šibenik was built as part of the new defensive system of the city. According to some scholars, this new system reached its peak in the second half of the 17th century, when the above-mentioned fortress, the Barone fortress and the bastions of Bernardo and St. Catherine (an integral part of the eastern city walls) were built[460]. The citizens of Šibenik were frightened and lobbied hard for the fortification of the city, especially the hill of St. John. Apparently, there was a widespread awareness of how dangerous this hill was for Šibenik. Such similarities could also be observed in Split. The cooperation between the citizens and the governmental and military authorities during the difficult years of the War of Candia showed that the Republic of Venice could offer salvation against the Ottoman army[461].

However, the Venetian government was always interested in strengthening the control of its territories and sent experts to inspect the defensive structures in Terraferma and Stato da Mar. In 1524, for example, Malatesta Baglioni considered the position of Split to be precarious, with so many hills surrounding the city that he even considered moving it to another location. In addition, the construction of modern fortifications and their auxiliary external structures in Split was difficult due to the disadvantageous location on a rocky base and the lack of land. At the same time, the Count of Šibenik, Bernardino de Cà Taiapietra, warned the Venetian Senate of the danger threatening the city of Šibenik from the hill of St. John. He proposed the construction of a fortress there and thought it would be appropriate to build a fortress with four towers on a triangular ground plan[462]. More than a hundred years before the siege of Šibenik, in 1540, Giangirolamo Sanmicheli pointed out the problem of defending the city if the enemy occupied the hill with the church of St. John[463]. In the following years there were several reports on the importance of fortifying the hill of San Giovanni, such as Jacopo Boldù in 1542; Giulio Savorgnano in 1570; Jacopo Foscarini in 1572, who warned of the danger of the hill because of its proximity to the city and the fortress of San Michele; Agostino Moro in 1575; Andrea Giustinian in 1576, and many others[464].

It would be unfavourable for Split if the enemy took the hills that could determine its defence. Antoine de Ville was the first of the experts who worked on the project of modernising the

[460] Glavaš, Karađole and Pavić. "O tvrđavi Barone", 49.

[461] Žmegač, *Bastioni jadranske Hrvatske,* 96–97.

[462] Žmegač, *Bastioni jadranske Hrvatske*, 92–93.

[463] Žmegač, *Bastioni jadranske Hrvatske*, 95; Glavaš and Pavić. "Tvrđava Sv. Ivana u Šibeniku", 92.

[464] See the Appendix.

fortifications of Split (Fig. 41). In 1630, after analysing the situation of the city, De Ville proposed solutions for its defence. He emphasised the hill of Gripe, "collina di San Rocco",[465] as particularly important because it was situated east of the city's central part, supervising its access.[466] Thus, he proposed the construction of a fortress in a form of *tenaglia*: "fortino sopra quella collina, che sarà una tenaglia"[467]. De Ville also referred to the hill of Marjan, stating that he did not consider it necessary to fortify it, as the distance was too great for the effective use of artillery[468]. The fortification system, which was still in its final stages after the War of Candia, consisted of three parts: the fortification of the city centre with a ring of bastions, the fortress of Bačvice in the eastern part of the city harbour and the fortress of Gripe[469]. Fortifying only the core of the city would be pointless, as the enemy could damage the city by capturing Gripe[470].

As pointed out in previous studies, the Battle of Šibenik in 1647 was a battle for the fortress of St. John, just as the Battle of Split in 1657 was a battle for the fortress of Gripe[471].

3.2.5.3 BEFORE THE SIEGE

Šibenik

In 1646 the Ottoman army conquered the city of Novigrad in Dalmatia. Following this event, the Republic of Venice sent the engineer Antonio Leni to Šibenik to design the fortress that would stand on the hill of St. John above the city, where the Church of St. John the Baptist stood. (Figure 42)[472].

In his hagiotopographical study, Anđelko Badurina marks the sacral building dedicated to St. John on the site of the later fortress of St. John from the fifteenth century, which was demolished during the construction of the fortress in 1646[473]. This sacred building is shown in the

[465] Žmegač, *Bastioni jadranske Hrvatske,* 81.

[466] Perojević, "Tvrđava Gripe u Splitu", 5; Kečkemet, *Utvrde Splita*. 214.

[467] Žmegač, *Bastioni jadranske Hrvatske*, 81.

[468] Perojević, "Tvrđava Gripe u Splitu", 5.

[469] Perojević, "Tvrđava Gripe u Splitu", 2–13.

[470] Perojević, "Tvrđava Gripe u Splitu", 5.

[471] Žmegač, *Bastioni jadranske Hrvatske*, 97. See also Glavaš, Karađole and Pavić. "O tvrđavi Barone", 49.

[472] Glavaš and Pavić. "Tvrđava Sv. Ivana u Šibeniku", 97.

[473] Badurina, *Hagiotopografija Hrvatske*.

illustrations of the city before the construction of the Fortress of St. John. On the other hand, archaeological research has shown that the sacred building of the Fortress of St. John was located on the southern side of the fortress, a few metres from the entrance. In fact, it has confirmed the accuracy of the visual sources found in the archives, which show that the Fortress of St. John had a sacred building in front of the entrance. It was probably a building with a single nave and apse. The name of the newly discovered fortress and the patron saint of the sacred building are the same as the patron saint of the demolished church that stood on the hill before the fortress was built. Presumably, it was necessary to preserve the sacred place.

After Antonio Leni's arrival in Šibenik, the first thing to be done, with the help of the whole town, was to build a small star-shaped dry-stone fortress around the Church of St. John[474]. But the building was not strong enough. A larger number of soldiers was also requested for the defence. Instead, Leonardo Foscolo sent two hundred infantry soldiers to the fortress of San Nicola and appointed Baron Massimiliano d'Erbestain as chief weapons inspector[475].

The Šibenik Council, which consisted of public representatives and military commanders, did not agree to the construction of the St. John's Fortress, but they did not forbid it either. Therefore, with the blessing of the bishop, the citizens started the construction of the fortress on the 1st of August 1646, and it is said that it was built within two months[476]. Leni's project was presented as a simple symmetrical fortification with a *tenaglia*, two bastions towards the city and a *speroncino* to defend the gates towards the city, flanking the eastern and western curtains[477]. This was the original design of the fortress. There were no parapets on the southern side, facing the town, because the attacks were expected to come from that side[478].

Before the archaeological excavations and research of the last decade, it was thought that the fortress was not built entirely according to Leni's design, but that it was built in a slightly different way[479], for example, the original symmetrical shape was transformed into an irregular structure with altered proportions and a different semi-bastion[480]. However, scholars have been able to prove the existence of Leni's phase of the fortress by means of the 1646 drawing by the

[474] This information are questionable, but still give an insight into the understanding of fortification architecture at the time.

[475] Difnik, *Povijest Kandijskog rata u Dalmaciji*, 85.

[476] Difnik, *Povijest Kandijskog rata u Dalmaciji*, 86.

[477] Glavaš and Pavić. "Tvrđava Sv. Ivana u Šibeniku", 97.

[478] Žmegač, *Bastioni jadranske Hrvatske*, 98–99.

[479] Glavaš and Pavić. "Tvrđava Sv. Ivana u Šibeniku", 97.

[480] Žmegač, *Bastioni jadranske Hrvatske*, 98–99.

engineer Giovanni di Namur, backed up by the archaeological discovery of a well-preserved corner of the north-western semi-bastion[481].

The fortress and the outer elongated *tenaglia* that was designed according to project of the city's defence commander Count Ferdinando Scotto, were built a few days before the Ottoman attack on Šibenik between the 7th and the 13th of October 1646[482]. The outer elongated tenaglia, as the new main defence point of Šibenik, withstood the first short siege of the city on 7 October 1646. After the Ottomans left, Count Scotto proposed that the new fortification, also called a tenaglia, be widened to the west and extended to the north. This new, second tenaglia turned its façade towards the first[483].

For scholars, this posed a terminological problem that had a direct impact on understanding the typology of the fortress, as the northern part of the fortress (*Hornwerk*) was planned to be built towards the outer *tenaglia*[484]. The existence of "three" *tenaglie* caused confusion in the interpretation of the events during the Ottoman siege of 1647[485], since the most important attacks, as we shall see, were fought for the defensive point described (Figs. 43, 44).

Fortified with northern structures, the Fortress of St. John was prepared for the second siege from the 17th of August to the 16th of September 1647. At the end of August, the Ottoman forces invaded the outer elongated *tenaglia*[486].

Therefore, considering the drawings by Leni, Namur and Blaeu, as well as the terminological inconsistencies and the previous studies, some observations should be made. Firstly, in 1646, the central part of the fortress, the Piazza Grande del Forte, had a tenaglia shape on its northern perimeter. It consisted of two semi-bastions and a curtain wall, as shown, and written on Leni's drawing. This can be considered the first *tenaglia*. Secondly, between the beginning of the works and the attack of 1646, a fortified structure was built towards the northern part of the hill of St. John. This was the so-called second, Scotto's or outer *tenaglia*. Finally, the third one was built after the Ottoman attack of 1646, between October 1646 and August 1647, as a fortification adjoining the original Leni fortress structure and connecting it to the outer elongated *tenaglia* that extended to the north. Of course, its position partially coincides, but in

[481] Žmegač, *Bastioni jadranske Hrvatske*, 98.

[482] Glavaš, Ivo and Josip Pavić. "Tvrđava Sv. Ivana u Šibeniku – nove spoznaje i istraživanja". *Godišnjak zaštite spomenika kulture Hrvatske* 40 (2016): 97.

[483] Glavaš and Pavić, "Tvrđava Sv. Ivana", 98.

[484] Glavaš and Pavić, "Tvrđava Sv. Ivana", 97, note 48.

[485] Žmegač, *Bastioni jadranske Hrvatske*, 99.

[486] Glavaš and Pavić, "Tvrđava Sv. Ivana", 98.

a different asymmetrical form, with the fortification elements in Leni's drawing, such as *Piazza bassa piena di mine* and *Baloardi per crescimiento di Forte*.

On the nearby hill of the Forte San Giovanni, there were several small fortresses that served as support or additional fortifications. However, one of them was "raised" to the status of a fortress and is now known as the Barone or Degenfeld Fortress (Figure 45). The hill on which it stands was quickly fortified during the accelerated fortification of Šibenik in the late summer of 1646.[487] Anđelko Badurina stated that there was a 10th century church on the site, which was demolished in 1648 due to the construction of the fortress. It was dedicated to St. Vid/Vitus. However, scholars disagree about the existence of a sacred building before the construction of the fortress. No archaeological or historical records have yet been found.

As mentioned, the Fortress Barone was initially built as a minor fortified position, *Ridotto del Baron*,[488] one of a series of minor fortified positions within the Šibenik fortification system. As will be seen, this series of fortifications was crucial during the 1647 siege. It was named after Baron Christoph Martin von Degenfeld, a German mercenary in the Venetian service from 1642 to 1649.[489] Von Degenfeld was one of the prominent figures during the Siege of Šibenik and its defence. *Ridotto del Baron* became a fortress because of its dominant strategic position over Šibenik, and its remains have also been confirmed in archaeological excavations. It was built in the fortress after the siege of Šibenik, when Antonio Bernardo (1656–1660) was the *Provveditore Generale in Dalmazia e Albania*, as it is stated in the inscription that used to stand above the entrance gate to the fortress, which says that Antonio Bernardo strengthened and made it more secure in 1659[490].

The main function of the Barone Fortress was to control the eastern defensive lines, the approaches to the city and the valley on the northern side[491]. The fortress is divided into two levels, reflecting its defensive characteristics. The main defensive elements were located on the upper level to the north-east: two semi-bastions connected by a curtain wall. The plan was that the artillery mounted on the semi-bastions would simultaneously cover the area and target

[487] Glavaš and Pavić, "Tvrđava Sv. Ivana", 49.

[488] More about the terms *ridotta*, *ridota*, *reduta*, *redut*, *redutto* see in Papeš, "Terminologija", 80, 93. Compare with: Glavaš, Karađole and Pavić, "O tvrđavi Barone", 51; Žmegač, *Bastioni jadranske Hrvatske*, 99.

[489] Glavaš, Karađole and Pavić, "O tvrđavi Barone", 50.

[490] Glavaš, Karađole and Pavić, "O tvrđavi Barone", 57.

[491] Glavaš, Karađole and Pavić, "O tvrđavi Barone", 49.

distant hills where enemy encampments were located. The quarters for soldiers and military equipment were located on the lower south-western level of the fortress, facing the city[492].
A report on the conquests of *Provveditore Generale in Dalmazia e Albania* Leonardo Foscolo in Dalmatia in 1647 and 1648 informed about the siege of Šibenik in 1647, describing the importance of the new fortresses of St. John and Baron[493].

Split

Snježana Perojević proposed separate phases of the construction of the Fortress Gripe between 1647 and 1682[494]. The first two stages until the Siege of Split in 1657 are crucial for this research.
In 1625, Nicolino Candido informed the Venetian Senate that the Ottomans could approach Gripe Hill rather easily, thus urging a construction of a fortress there. Furthermore, he advised building an addition between the Lazaret[495] and the sea to secure it and the city from attack. But the Senate refused it so the Ottomans would not get suspicious[496].
Antonio Pisani delivered the report by military engineer Antoine de Ville to the Venetian Senate on the 5th of June 1630[497]. De Ville was also working on the project for the Giuliano fortress on the hill above Pula. In addition to this proposal, there was also a design for the modernisation of the fortifications of Split. Alessandro Magli made a drawing in 1648 (Fig. 53) which may be similar to De Ville's ideas. Scholars consider Magli to be the author of this first project of the Gripe fortress. Snježana Perojević argues that his co-author must have been the military engineer Vicenzo Benaglia[498].

The first stage, 1647–1651

When Leonardo Foscolo arrived in Split in 1647 to take Klis from the Ottomans, the citizens pleaded for additional fortifications of the city, especially the construction of a fortress on the

[492] Glavaš, Karađole and Pavić, "O tvrđavi Barone", 49.

[493] Appendix: Sebenico assediato.

[494] Perojević, "Tvrđava Gripe u Splitu", 5.

[495] On the construction and importance of Lazaret in Split, see: Strunje, "Blagajnički spisi", 251–26; Bilić, *Inženjeri u službi Mletačke Republike*; Perojević, "Izgradnja lazareta u Splitu", 119–132.

[496] Difnik, *Povijest Kandijskog rata u Dalmaciji*, 160

[497] Duplančić, *Splitske zidine*, 9.

[498] Perojević, "Tvrđava Gripe u Splitu", 7.

hill of Gripe[499]. The project was finally accepted. At the end of 1648, Alvise Cocca wrote in his report that only two bastions and a curtain wall had been built from the front. The design of the fortress was a modified form of a simplified tenaglia, consisting of two sides joined at an obtuse angle, created by the intersection of two adjacent lines of defence. The building on the Gripe had two more sides and a curtain wall between them. In 1649, the traverse was built to provide a link between the town and a place for the soldiers to retreat and receive reinforcements. In 1651, the fortress was only partially completed, lacking walls, parapets, a moat, a platform for operations and cannons, as well as sheltered approaches connecting it to the city. The estimated cost was about 330,000 ducats, and the fortress had a capacity of four to five hundred soldiers[500]. Evidence that the first phase of construction was carried out as proposed by Magli can still be seen on the eastern side of the wall, particularly on the south-eastern bastion. (Figure 46)[501].

The second stage, 1656–1657

Pierre Mortier is the possible author of the drawing of the entire fortification of Split, including the fortification of Bačvice, from the end of the 1650s. This phase of construction lasted until 1657, when the city was attacked, and the fortress briefly taken. However, later reconstructions removed the traces of this construction phase on the northern side. As a result, Mortier's drawing cannot provide complete certainty about the shape of the fortress at the time of the 1657 attack. Most important were the corrections of Mortier's and other drawings published by Snježana Perojević, which made it possible to visually distinguish several stages of construction (Figure 47)[502].

Concerning the access roads, the dominant direction of a possible attack was from the north[503]. It could be assumed that the northern part of the fortress had already been built before the construction of the southern curtain wall began. Perojević argues that on Mortier's drawing an *orrechione* was placed on the western side of the southern part of the fortress, but there is no evidence of its construction. Perojević, however, includes it in the second stage of the correction of the drawing, based on the representation of two identical elements in the later drawing by Onofrio del Campo. The position of one of them coincided with the position of Mortier's *orrechione*. Considering the date of Mortier's drawing and the statement made by *Provveditore*

[499] Difnik, *Povijest Kandijskog rata u Dalmaciji*, 160

[500] Perojević, "Tvrđava Gripe u Splitu", 7.

[501] Perojević, "Tvrđava Gripe u Splitu", 8.

[502] Perojević, "Tvrđava Gripe u Splitu", 9.

[503] Perojević, "Tvrđava Gripe u Splitu", 8.

Generale in Dalmazia e Albania Antonio Bernardo in June 1657 that the fortress of Gripe was still unfinished, although its construction had begun years before. This coincides with the arrival of General Gonzaga, who, together with Maglia and Benaglia, worked on the so-called third phase of the fortress. However, the fortification element on the plan does not appear to be an *orrechione*, but rather a flank, in the sense of an element that protrudes from the curtain wall to house the cannons that defend the same curtain wall. This theory may therefore be questionable.

3.2.5.4 THE SIEGE(S) OF ŠIBENIK 1646–1647 AND THE FORTRESS OF ST. JOHN

The attack of 1646 and the month-long siege of Šibenik in 1647 are described in the work of its contemporary historian Franjo Difnik, Francesco Difnico (1607-1672). This section presents the events that took place during these two years in the history of the city of Šibenik (Figures 48, 49, 50).

When Leonardo Foscolo arrived in Šibenik in 1646, the fortress of St. John was completed and ready to respond to attacks. Under the fortress, terrepleins and fences were placed to prevent the enemies from climbing. Count Ferdinando Scotto noticed that on the north side of the hill where the fortress was located, a narrow rocky spur blocked the view to that side of the valley. He decided to build a long dry-stone tenaglia. The border part of the tenaglia, at the very end of the hill, would allow a view of the valley and of enemy movements. In this way, the newly built long tenaglia and the Ridotto Barone, a few metres away, overlooked the entire valley, which until then had been inaccessible to the defenders. The attack began on 7 October with the arrival of the Ottoman cavalry, which conquered several hills around the city[504].

The greater fight occurred on one of the hills where Magli positioned another *ridotto* near Barone, and the Ottomans failed to conquer it.[505] On the 13th of October, the enemies approached the Fortress of St. John from the western side while planning to occupy the hill of Križić/Crisic positioned north of Šibenik. From there, they would be able to shoot at the fortress. Count Scotto went towards the hill of Križić. On his way to the hill, he was protected by "his" *tenaglia*. The Ottoman army retreated after their defeat on the hill of Križić.[506]

[504] Difnik, *Povijest Kandijskog rata u Dalmaciji*, 99

[505] See more in Pavić, "Inženjer Magli", 137–144.

[506] Difnik, *Povijest Kandijskog rata u Dalmaciji*, 100.

After the retreat of the Ottoman army, Leonardo Foscolo persuaded the councils to agree to the enlargement of the small fortress of San Giovanni, which the citizens had hastily built. However, none of the councillors present immediately agreed to the construction of a proper fortress, due to the narrowness of the site, surrounded by cliffs. Antonio Leni presented a project for another tenaglia at a lower level of the fortress, which would function as a front and an extension of the remaining space. In this way, the long external tenaglia of Scott could be defended from this building, creating a double defence. All the members of the Council except Count Scotto accepted the proposal. He believed that the construction of the outer tenaglia was necessary precisely so that the cover of the hill would not protect the enemy and he could not set up a battery to shoot the flank of the right bastion (sic!). Losing the right bastion would mean losing the defence of the left bastion. The left bastion was lower and could be attacked from three sides if the right bastion were lost.

Count Scotto therefore proposed to extend the new Tenaglia to the west and to extend it to the north. The façade of this new building would face the outer tenaglia. In this way, the defenders would not be exposed to enemy cannon and could place their battery in the middle of the curtain wall. Scotto worked with Daniele Difnico (Difnik) to design such a fortress. After demonstrating their proposal to the members of the Council and proving the possibilities of Scotto's plan, the design was sent to the Senate. After the design was approved, construction began on 8 November 1646 and was completed before the siege of Šibenik in August 1647[507]. Ottoman Pasha Tekieli gathered an army and marched from Drniš to Šibenik on 17 August 1647[508]. Another Ottoman troop of equestrians also appeared in the vicinity of the city. In Šibenik, the military commanders armed the city and its outskirts. The siege began on the 21st of August, when the Ottoman army reached the town, and the attack was continuous. The Ottomans soon managed to set up a battery on the northern side of the valley of St. John, the same one that Count Scotto wanted to overlook from the Tenaglia. From these positions they fired on the fortress. Soon they placed a second battery, closer to the fortress than the first. On the 26th of August, the Ottoman army attacked the Malipiero bastion, but without causing much damage. At the same time, they tried to dislodge the soldiers who were in tenaglia. They had to reinforce the first battery with additional firearms. The plan was to capture the tenaglia of the outer Scotto and other positions closer to the fortress, in order to set up another battery. At the

[507] Difnik, *Povijest Kandijskog rata u Dalmaciji*, 101–103.

[508] In the scholarship referred to as Tekieli-Pasha. Kečkemet in his edition of Difnik informed his full name was Pasha Husein Tekieli, see Difnik, *Povijest Kandijskog rata u Dalmaciji*, 401.

same time, they attacked several defensive lines around the city, even up to the canal of St. Anthony, where the cannons of the fortress of St. Nicholas immediately defeated them. However, the Ottomans soon conquered the hill of Križić, which they failed to do in 1646. They set up a third battery there, from which they shot and destroyed the houses. Obviously, the town could not be conquered until the fortresses of St. John and Baron were taken. On the other hand, St. John's Fortress can only be captured once its tenaglia has been captured and the passage to the fortress is clear. In addition, if they want to take Baron's Fortress, they must first take Oglavno Hill, which was placed on top of it. They failed to do the latter. At the same time as they failed to take Oglavno Hill, they attacked the tenaglia of St. John's Fortress, where there were forty soldiers.

In this attempt, the Ottoman army managed to conquer the tenaglia of the fortress, but immediately retreated due to direct bombardment. The defenders were ordered to take up positions in the passageway between the tenaglia and the fortress, which was used for the retreat. A regiment was placed on the lower side of the walls. But the Ottomans drove the defenders out of the passage and were still positioned in front of the tenaglia that Scotto had prepared to watch the surroundings. The Ottomans dug openings in the living rock from which they could fire at anyone who approached.

Since there was a spy in the Ottoman camp, it was up to the town council to decide whether to attack the enemy army - either in a poorly guarded position, or by trying to disable and free the cannon of the nearest batteria, or by concentrating on recapturing the head of the Tenaglia. The majority agreed on the third option and to try to disable the battery on Križić hill at the same time. They tried to take the front of the Tenaglia but were unsuccessful. At the same time, several barrels of gunpowder caught fire in the St. John's and Barone's fortresses, and several soldiers were burnt. The Ottomans continued to fire from all four batteries and made many holes in the walls of the fortress. They also prepared ladders and wool for the final assault on the fortress. The defenders had to close the holes quickly during the night. However, the constant bombardment of the fortress created a large opening in the Contarini wall and in the curtain wall facing the Tenaglia, which was enough to climb onto the fortress.

Fearing a possible conquest of the San Giovanni Fortress, all available material was used to defend it. The military engineer Giovanni di Namur replaced Daniele Difnico due to his illness. The Pasha insisted on an attack to breach the walls. Finally, on the night of 8 September 1647, the Ottomans prepared enough material for the final assault. However, the authorities in Šibenik were informed. The Ottoman army attacked the defensive lines and the outer fortifications. The aim was to gain the tenaglia to climb over the opening in the wall. But both armies had the same

problem - heavy rain made it impossible to use most of the weapons. Therefore, the defenders, who were better protected by the fortress, kept many flammable materials, and used them at key moments. The battle lasted six hours and the Ottoman army finally retreated. In addition, the news that Leonardo Foscolo was about to arrive with a large army forced the Pasha to continue his attacks on the fortresses of St. John and Barone. The army finally reached Šibenik on 11 September and the Ottomans, realising that they would not be able to conquer the city, retreated to Drniš on 16 September[509].

After the departure of the Ottoman army from Šibenik, the fortress of St. John and the fortress of Baron were completely modernised (Figs. 51, 52). However, it was not planned to be the subject of this research.

The Ottoman army concentrated on the southern parts of Dalmatia, especially the area around Split. In addition, the successful defence of Šibenik caused massive damage to the Ottoman army, and the immediate modernisation of the fortifications further repelled the enemy. Scholars have divided the development of Šibenik's fortifications after the siege into two phases. The first began immediately after the liberation of the city, with the fortification additions by the military engineer Giovanni di Namur, focusing on the central part of the fortress, which lasted until 1649[510]. For the next fifteen years, during the second phase, the authorities concentrated on the construction of the outer fortifications of the city, in particular the works carried out by the *Provveditore Generale in Dalmazia e Albania* Antonio Bernardo and the military engineer Onofrio del Campo. These parts were removed around 1660 and the outer space was closed with the construction of a new horn-work and a mezzaluna in the western part of the fortress[511].

3.2.5.5 FORTRESS GRIPE DURING THE 1657 SIEGE OF SPLIT

The same Franjo Difnik reports that in 1646 the people of Split forbade the removal of artillery from the city, but this decision was soon revoked. It was also allowed to repair the tower on the south-eastern corner of Diocletian's palace, in order to create a space from which to fire on the

[509] Difnik, *Povijest Kandijskog rata u Dalmaciji*, 143–157.

[510] Glavaš and Pavić. "Tvrđava Sv. Ivana u Šibeniku", 98–99.

[511] Glavaš and Pavić. "Tvrđava Sv. Ivana u Šibeniku", 99–101.

hill of Gripe in case it falls in the Ottoman hands[512]. In March 1657, the new Bosnian Pasha Seid Ahmet (1656-1659) came to Sarajevo[513]. Fearing an attack on the Dalmatian towns, General Camillo Gonzaga ordered them to be prepared for defence. Four infantry detachments were sent to Split (Figs 53, 54) because of its proximity to the Ottoman border[514].

The Ottomans soon attacked and occupied the hill of Sućidar overlooking the fortress of Gripe. The aforementioned opinion of Antoine de Ville was confirmed in 1657. The first attack from the Sućidar hill on the Gripe fortress took place on 13 June. However, the citizens resisted and forced them to retreat. The next day they attacked again, setting fire to several houses, and moving towards Marjan hill. The citizens again resisted and forced them to retreat[515]. During the Battle of Marjan, part of the Ottoman army came to Klis under Venetian rule. The commander of the fortress, Agostino Lando, tricked the Ottomans into approaching the town, attacked them and won the battle[516]. In these events of the siege of Split, General Camillo Gonzaga arrived on the 15th of June with galleys and an army. The Ottomans, however, continued to burn the fields around Split and Solin in order to destroy the food supplies and to prepare the ground for the capture of the fortress of Gripe in order to make it easier to attack the city. They had already prepared several cannons in Rupotine for this purpose[517].

The detailed but quite artistic description of the siege of Split *Spalato sostenuto contro l'ottomana potenza* was written by Giovanni Giorgio Nicolini and published in Venice in 1665. Nicolini described how the Ottomans surrounded Split from all sides, except the sea, in order to close all land passages and create shortages. When Pasha Seyid Ahmet saw the walls, he built encampments for the army to make his attacks more secure and occupied the nearby hills with infantry and cavalry. They also kept up a constant bombardment of the suburbs. At the same time, small arms were used to break through the defences. The defenders continued to resist. Nicolini told them that the imminent arrival of Camillo Gonzaga gave them hope. The Ottomans inflicted considerable damage on the city's fortifications from a certain height; this is probably where the attack on the city from Gripe is described. The people of Split decided to retake their position. Infantry soldiers, supported by artillery, led the attack. The Ottoman army was defeated, and they were driven to a more distant position, probably Sućidar, from where

[512] Difnik, *Povijest Kandijskog rata u Dalmaciji*, 75..

[513] Difnik, *Povijest Kandijskog rata u Dalmaciji*, 241.

[514] Difnik, *Povijest Kandijskog rata u Dalmaciji*, 242; Kečkemet, *Utvrde Splita*, 170.

[515] Difnik, *Povijest Kandijskog rata u Dalmaciji*, 242.

[516] Difnik, *Povijest Kandijskog rata u Dalmaciji*, 242–243; Kečkemet, *Utvrde Splita*, 170–171.

[517] Difnik, *Povijest Kandijskog rata u Dalmaciji*, 243.

they continued to inflict merciless damage on the city. Nicolini wrote that on the liberated hill, according to the wise idea of the most enlightened and respected Antonio Bernardo, the fortress of Gripe was built[518].

Josip Posedel, in his study of Nicolini, argues that previous research has shown that there were no significant battles for twelve days. The decisive attack began on 18 June, when the soldiers from Hvar had already arrived and attacked the fortress of Gripe with 1,200 Ottoman infantry and six hundred cavalries, and the next day with 2,000 infantry and 400 cavalries. On 21 June, Antonio Bernardo arrived. The battle lasted from 10 am to 6 pm and the Ottoman army retreated in the evening[519].

Snježana Perojević reported that on the 19th of June the Ottomans managed to capture the fortress of Gripe and hoist four flags. They were repulsed the same day and continued to attack for several days, but finally, on the 22nd of June, they were defeated. Perojević concludes that this battle clearly showed that the Gripe fortress was well fortified in its second phase[520].

The Venetian historian Girolamo Brusoni in his *Historia dell'ultima guerra tra' Veneziani, e Turchi* from 1673 informed that on the 13th of June when the Ottomans attacked the city and took over Sućidar, the Fortress was just built[521]: "... occuparono il posto di Succidar Collina dominante il Forte di Grippe nuovamente fabricato dagli Spalatini all'incontro della Città".[522] However, the locality of Gripe was captured on the 19th of June, 1657. However, it is written: "... e superato il posto di Grippe non ancora cinto di Reale fortificazione, vi piantò quattro bandiere."[523] This information casts further doubt on the execution of Mortier's project. Obviously, the fortress was not finished, especially the bastions facing the city; they may not even have been started, which would have been advantageous in this case[524],. It is questionable which parts were completed at the time of the Ottoman conquest and how much was destroyed during the siege.

[518] Posedel, "Opsada Splita", 94.

[519] Posedel, "Opsada Splita", 100.

[520] Perojević, "Tvrđava Gripe u Splitu", 12.

[521] Kečkemet, *Utvrde Splita*, 172.

[522] Brusoni, *Historia dell'ultima guerra tra' Veneziani, e Turchi*, 27.

[523] Brusoni, *Historia dell'ultima guerra tra' Veneziani, e Turchi*, 28.

[524] Kečkemet, *Utvrde Splita*, 216.

3.2.5.6 SIEGING THE FORTESS IN THEORY

Elevated fortifications and the vulnerability of elevated places were common topics in fortification treatises. The construction of fortifications on hills, mountains and rocks was common before the development of gunpowder weapons. This is one of the reasons why the treatises questioned the adaptation of old fortifications, the incorporation of new ones or the symbiosis of designs. There was also the question of strategically vulnerable or endangered positions, such as in the case of Šibenik and Split, the hills above the main defensive points of a city.

Bonaiuto Lorini had a positive view of elevated fortifications. Using the example of his fortifications in Brescia, he also proposed the ideal example of fortifications on hills with exact dimensions. He also argued that by following such a design, the strongest fortress could be built: "Si che accommodato il proposto sito con le di già dette difese, e commodità, si potrà con verità dire di haver formato una Fortezza per natura & arte delle più gagliarde che si possino fare, non essendo le sue difese esposte alla rovina per batterie, ò zappa, e stando i difensori sempre a cavaliere del suo nemico, stante che hanno per l'altezza del sito notabilissimi vantaggi, prima nel coprirsi da' tiri del nemico, dove ogni piccola grossezza di difesa gli può salvare, perche venendo fatti essi tiri da basso all'altro le palle passeranno sopra la testa di essi difensori, restando coperti nel ritirarsi solo un passo in dentro, che all'opposito avviene al nemico, perche tanto quanto si verrà allontanare dalle sue difese, verrà più scoperto stando però in piano"[525]

However, he reminds us of the need to control the nearby heights that could be fortified by the enemy. As for the fortress on the mountain exposed to the attack of another mountain, it should not be considered imperfect, especially if there was a valley between them. The wider and deeper it is, the more it will serve as a safe trench and defence of the fortress[526].

De Ville, as we have seen, favoured coastal fortifications, i.e. fortifications by the sea with a harbour on the coast, because they could always be rescued with new soldiers and replenished with ammunition. This statement directly corresponds to what happened in Šibenik and Split during the sieges. The arrival of the army from the sea was a final moment that forced the enemy to retreat to the hinterland, together with the previous battle losses[527]. De Ville also outlined the importance of external fortifications, such as tenailles, *hornwerks* and *demi-lunes/mezzalunes*.

[525] Lorini, *Delle fortificationi*, 158.

[526] Lorini, *Delle fortificationi*, 160.

[527] De Ville, *Les fortifications*, 14–15.

The location of the St. John's Fortress and the Baron's Fortress in Šibenik could be significant for studying the various examples of Francesco Tensini on the (dis)advantages of elevated fortification sites, and even more so, the exemplary sieges of various fortification sites, especially hills, the use and acquisition of ridotti and batterie, and tenaglie, which were the prominent sites of attack and defence during the siege(s) of Šibenik. Francesco Tensini was very critical of the elevated fortifications, introducing the topic with the practices of the ancients, and pointing out that today they are still used: "I moderni però, che lodano il fortificare sopra i monti, dicono, che difficilmente vi si possono dar trinciere, & che con grandissima fatica, & spesa si può condrr'ad alto l'artiglieri, sì per battere le mura, come per levare le difese alte, & basse."[528] Fortresses built on the mountains can be conquered much more quickly and with less casualties: "che hoggidì si è talmente facilitato il maneggio dell'artiglieria, che con poca fatica si conduce in ogni luogo, per alto, ed erto che sia, oltre che le fortezze sopra monti si possono espugnare assai più presto, & con manco morte d'huomini senza artiglieria".[529] Tensini was against fortifications on high ground because of the poor soil, the lack of water and food and, above all, the impossibility of making a moat full of water,[530] which is, as Bonaiuto Lorini mentioned, one of the most crucial fortification elements. However, the mountains can be used to build small fortresses to spot the enemy from a distance and prevent them from entering the city: "Si che per le ragioni da me addotte, & altre, che per brevità tralascio, non farei mai fortezza reale sopra monti; ma bene mi servirei d'essi monti, quando fussero sopra passi, per farvi sopra qualche fortezza picciola, à fine di scoprire il nemico da lontano, & per vietargli di entrare nel mio paese à scorrere, e far preda, altrimenti non eleggerei mai il sito del monte per fare fortezza grande; quando persò non fossi più che constretto della necessità del luogo."[531]

The third part of Tensini's treatise is devoted to attacks on fortifications. He begins with the already seen question of the legality of war and how the prince should approach it: the surprise attack, new forms of scaling, various instructions on how to attack by day and by night, the involvement of citizens and other actors in an attack; Tensini points out that the enemies should not have time to fortify and attack quickly, which did not happen in Šibenik or Split, as the counterattack took place after the siege, after the arrival of the army.

[528] Tensini, *La fortificatione*, Libro Primo, 15.

[529] Tensini, *La fortificatione*, Libro Primo, 15.

[530] Tensini, *La fortificatione*, Libro Primo, 15.

[531] Tensini, *La fortificatione*, Libro Primo, 15.

Tensini gives instructions on how to position and attack trenches and batteries, and on the correct use of mines. In particular, he discusses the siege of mountain strongholds and long sieges due to lack of food and other necessities. What Tensini does in these chapters is to guide the reader through the illustrations. Each of these attack scenarios, thirty-nine in all, is accompanied by illustrations of the layout of the fortress during an attack. Tensini marks each strategic point of the defenders and attackers with a letter, in order to provide possible stories to study the art of warfare. It is difficult to compare such "ideal" siege scenarios with actual sieges, mainly because of the fortification designs that strive for perfection in the treatises.

The case of Šibenik and Split was far from perfect; the lack of money, materials, soldiers, labourers, and time led to the rapid construction of buildings that took on their more developed form after the sieges. They were not even finished at the time of their execution, and the victory was mainly due to the army involved, especially in the case of Split.

The descriptions and illustrations in the treatises thus provide theoretical knowledge for studying the basic rules of conducting a siege and defending during one. They also prove that the fortifications designed and used in the sieges of Šibenik, and Split were theoretically studied and developed in the ideal case.

The disadvantages of hill forts were well known to military experts. However, they were crucial if they were elevated above the populated city and its fortifications. Thus, the fortification of hills had a double purpose. It was to be avoided because of the lack of resources, the complex connections and possible surrounding elevations that could make it easier to attack. However, it should always be considered as an additional defence for the central fortification. In such cases, it will always be the first line of attack, and its capture will allow the other structures to be attacked. According to Tensini, the most important consideration when attacking hill forts is to vary the shape of the trenches and the method of conquest: “Con forme alla varietà del sito, dove è posta la fortezza, fa di mestieri variare sì la forma delle trinciere, come il modo dell’espugnatione…”[532].

[532] Tensini, *La fortificatione*, Libro Terzo, 111–114.

4 EXPERT MILITARY FORTIFICATION TERMINOLOGY– THE TOOL OF THE CIRCULATION OF KNOWLEDGE

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The study of fortification architecture requires familiarity with various scientific disciplines. This is particularly true in the Eastern Adriatic, where the coexistence of several languages has influenced the understanding and adaptation of new knowledge. The specificity of the architectural language has resulted in a wealth of terms for different architectural types and elements. While this enriches the language, it can also create research problems.

Typology is based on terminology, so the inconsistency and non-uniform use of terminology pose significant research problems in the study of Eastern Adriatic fortifications.

Researchers identified inconsistencies in the definitions of certain architectural structures or elements that were repeated in different books, articles, chapters, or paragraphs. They encountered specific terminological research problems, including difficulties in identifying appropriate terms in architectural and art historical studies. The abundance and synonymity of terms, as well as the uncertainty regarding their etymology, definition and use in the creation of typologies, led to the need for equivalent wording and precise terms in scientific papers on fortification architecture. It is crucial to establish a common language to ensure clear communication and understanding among scholars. Many different languages have been used as official languages in the re-divided states over the centuries, including Italian, German, Hungarian, Ottoman Turkish and French. This is due to the historical and political factors that have shaped the linguistic landscape of these regions.

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4.1 THE EXPERT TERMINOLOGY RESEARCH. THE FIRST PHASE: CROATIAN TERMS

4.1.1 TRACING THE CORPUS

During the preliminary research phase, the expert terms used in scholarship where extrapolated from the following studies: Deanović (1978), Kruhek (1995), Žmegač (2000), Žmegač (2009), Miletić (2012), Horvat (2014)[533]. Moreover, expert terms were also extrapolated from dictionaries and reliable online sources[534]. Ana Deanović proposed a first systematic historical terminological corpus of fortification architecture for Croatian language, while the other mentioned authors organised a glossary in the appendix[535].

Ana Deanović's work on the terminology of fortification architecture was pioneering. Based on accessible historiography and historical documents, Deanović compiled a corpus of over three hundred fortification terms in Greek, Byzantine, Latin, Italian, German, French and historical versions of the Croatian language. In the glossary, each term is accompanied by a designation of space, time, and language. The absence or rarity of these structures in historical parts of modern Croatia throughout the centuries allows for a chronological reconstruction of the development of military architecture. It also shows that most of the terms were repeated due to synonyms and were listed mainly in foreign languages.

Deanović argued that it may be exaggerated to list terms recorded primarily in foreign languages when researching Croatian fortification architecture. This directly corresponds to the second phase of research presented in the dissertation. However, the author also points out research problems and makes explicit and valid criticism of the careless and discontinuous use of fortification terms. Deanović calls for their future, more harmonious use. It has been noted that the uniqueness of names in foreign languages, especially in the Mediterranean area, is the result of a fusion of diverse cultures and the noteworthy influence of the local environment.

[533] Deanović, "Glosar naziva"; Kruhek, *Krajiške utvrde*; Žmegač, *Bastioni kontinentalne Hrvatske*; Žmegač, *Bastioni jadranske Hrvatske*; Miletić, *Plemićki gradovi kontinentalne Hrvatske*; Horvat, *Burgologija*.

[534] Papeš, "Terminologija", 8–9.

[535] Papeš, "Terminologija", 8–9.

One can even compare the term Kastellon and its derivatives that were in use (*kastellon*, *castellum*, *castello*, *kostel*, *castel*, *château*, *kaštel*, *castelletum*, *castillerium*)[536].

At the same time, Deanović repeatedly emphasises the importance and significance of the field of research, almost as if to justify the study of names from different languages by pointing out their belonging to the European context. Finally, she emphasises that the glossary can serve as a guide for further research, helping to understand the wealth of expressions and alerting the reader to the diversity of meanings[537].

The following pages contain a rewritten version of Ana Deanović's corpus of terms, which was originally part of her scientific article from 1978. Due to the lack of detailed information on Deanović's methodological process, the author of this dissertation refrains from hypothesising on the origin and possible confirmations of the sources. However, a better understanding can be gained through further study of her archives, lists of terms and selected bibliography.

4.1.2 CORPUS OF TERMS BY ANA DEANOVIĆ IN HER 1978 "GLOSAR"

The database was created by rewriting Deanović's corpus on separate sheets to make it more searchable. The terms and their definitions are presented as in Deanović's work, with only the language references translated. The English definitions have not been included.

Table 3 Corpus of fortification terms used in present-day Croatia by Ana Deanović. ("Glosar naziva")

Greco-Byzantine	**DEFINITION**
KASTELLON	manje utvrđeno naselje plemena
KASTRON	utvrđeno naselje plemena
Latin	
ALLOGIAMENTUM	vojnički konak
AMBULUM	hodnik za obilazak straže
antemurale	Predziđe
ANTIMURALE	predziđe
APODIUM	potporanj uz prsobrane
ARBERIUM	obrambeni doksat
ARCHIVOLTUS	luk na konzoli koji nosi prsobran
ARGERE	obruč od suhozidina u moru do razine površine ispred luke ili uokolo zidina, ali u određenoj udaljenosti, kako bi se spriječilo približavanje neprijateljskih galija
Argerus	obruč od suhozidina u moru do razine površine ispred luke ili uokolo zidina, ali u određenoj udaljenosti, kako bi se spriječilo približavanje neprijateljskih galija
ARSANA	spremište za galije i prostor za popravak
arsenatus	spremište za galije i prostor za popravak
Arx	utvrđena rezidencija
ARX	glavni obrambeni toranj grada
ARX	utvrđeno naselje

[536] Deanović, "Glosar naziva", 39; See more in: Papeš, "Terminologija", 2.

[537] Deanović, "Glosar naziva", 35.

arx	feudalni grad
ARZELLA	(drveno) branište na zidini
BALESTERIA	branište na zidini
BALESTRIERIE	Strijelnice
bancus	klupa uz parapet ili u niši puškarnice
BARBACANUS	snažna utvrda za obranu gradskih vrata
bastia	obrambeni toranj u sklopu gradskih zidina
BASTITA	obrambeni toranj u sklopu gradskih zidina
BATIFREDUS	drveno branište na zidinama istaknuto poput doksata
batteglirias	drveno branište na zidinama istaknuto poput doksata
BATTIFOLLUM	drveni utvrđeni toranj za obranu gradskih vrata
bertesca	drveni obrambeni doksat
BERTESCA	doksat nad ulazom za obranu vrata
CANTENERIUM	prostor za popravak lađa
canton	uglovni toranj
CANTONATA	uglovni toranj
CAPSETTA	stražareva kućica na zidu ili utvrđenom položaju
CARCER	Zatvor
case macte	kazamata, obrambena ćelija u zidu okrugle kule ili bastiona
CASTELLARE	područje s utvrdama
castelletum	mala utvrđena rezidencija sa zaseokom
castelletum	mala utvrda
castelletum	Osmatračnica
castelletum	Zbjeg
CASTELLUM	obrambeni toranj unutar grada
CASTELLUM	Tvrđava
castellum	utvrđena rezidencija sa zaseokom
castellum	utvrđeno naselje
castellum	feudalni grad
castellum	utvrđena rezidencija
CASTELLUM	utvrđena rezidencija unutar grada
castillerium	Tvrđavica
Castrum	utvrđeno naselje
castrum	feudalni grad
CASTRUM	Tvrđava
castrum	utvrđena rezidencija
castrum	utvrđena rezidencija unutar utvrđena naselja
castrum	Tvrđava
castrum	utvrđeni samostan
CASTRUM	utvrđena rezidencija unutar grada

CATENA PORTUS	lanac obješen između zidina i lukobrana koji je sprečavao nekontrolirani pristup luci
CELLARIUM	Žitnica
cinctus	pojas zidina
CIRCUITUM	pojas zidina
CISTERNA	Cisterna
CIVITACULA	mala utvrda unutar grada
CIVITADELA	glavna utvrda grada
civitarula	mala utvrda unutar grada
corrator	hodnik za obilazak straže
CURREDONUM	hodnik za obilazak straže
denti	zubac kruništa
denti	konzole na zidinama
erchirium	obrambeni doksat
focea	gradska graba (jarak)
FONTIGUM	žitnica
FORTALITII CONFINI	lanac utvrda na granici
FORTALITIUM	utvrđena rezidencija unutar grada
FORTALITIUM	tvrđava
FORTILITIUM	obrambeni toranj unutar grada podignut od privatnika
FORTILITIUM	obrambeni toranj u sklopu gradskih zidina
fortilitium	mala utvrđena rezidencija
fortilitium	zbjeg (utvrđeni)
fossa d'aqua	jarak ispunjen vodom
fossatum	gradska graba (jarak)
FOVEA	gradska graba (jarak)
iaculum bombarde	otvor za provjetravanje dima
imbordescando	Prsobran
IMBORDESCARI	strijelnice na prsobranima
MACERIA	obrambeni pojas u suhozidu
MAGAZENUM	Spremište
magna turris	ulazni toranj u sklopu zidina
MANTELLUM	drvena pomična zavjesa koja štiti otvor između dva zupca kruništa
masserie	obrambeni pojas u suhozidu
merletus	zubac kruništa
MERLI	Krunište
merli & antipeti	Krunište
merli & arcus	Mašikuli
MERLUS	zubac kruništa
MOENIA	Zidine
MURA	Zidine

mura & fortilitia	zidine s tornjevima
murus	zid (obrambenog pojasa)
murus & turres	zid s tornjevima
PALIZZATUM	obrambeni pojas od šiblja
pallada	obrambeni pojas od šiblja
pallificata spirata	obrambeni pojas od šiblja
parapectum	Prsobran
partegete	Prsobran
PIETRE MERZE	obruč od suhozidina u moru do razine površine ispred luke ili uokolo zidina, ali u određenoj udaljenosti, kako bi se spriječilo približavanje neprijateljskih galija
PONS LEVATOR	pomični most
porporella	obruč od suhozidina u moru do razine površine ispred luke ili uokolo zidina, ali u određenoj udaljenosti, kako bi se spriječilo približavanje neprijateljskih galija
porta magistra	gradska vrata
PORTA MAIOR	gradska vrata
porta rivelini	obrambeni toranj pristaništa s prolazom na gradska vrata
PORTELETTA inter merlos	otvor između dva zupca kruništa
portella	sporedna gradska vrata
PORTICUS	snažna utvrda za obranu gradskih vrata
posterla	sporedna gradska vrata
POSTERULA	sporedna gradska vrata
PROPUGNACULUM	snažna utvrda za obranu gradskih vrata
purperia	obruč od suhozidina u moru do razine površine ispred luke ili uokolo zidina, ali u određenoj udaljenosti, kako bi se spriječilo približavanje neprijateljskih galija
PURPURELLA	obruč od suhozidina u moru do razine površine ispred luke ili uokolo zidina, ali u određenoj udaljenosti, kako bi se spriječilo približavanje neprijateljskih galija
PUTEUS	Bunar
RASTRELLA	pomična rešetka ulaznih vrata
RECHIONI	kamene ušice na zupcima kruništa u koje je utaknuta prečka drvene pomične zavjese koja pokriva otvor između dva zupca kruništa
REDUCTUM	zbjeg (utvrđen)

REVELIN	toranj za obranu pristaništa i najčešće za obranu gradskih vrata
ROCCA	glavni obrambeni toranj u sklopu zidina
ROCCA	feudalni grad
ROCCA	utvrđena rezidencija unutar grada
rocha	Tvrđava
SARACINESCA	pomična rešetka ulaznih vrata
SPIRONE	toranj sa šiljem
spirone	šilj tornja
SPONIA	Cisterna
TABULATUM	drveni podij na zidini za stražara
terreleum	Jarak
TORRICELLA	branište na zidini
TRINCEA	zid određenog smjera i dužine sa ili bez jarka
trincea	utvrđivanje rovova izvan obrambenog vanjskog prostora
TURRIS	obrambeni toranj unutar grada podignut od privatnika
TURRIS	obrambeni toranj u sklopu gradskih zidina
turris	glavni obrambeni toranj grada
TURRIS	zaseban obrambeni toranj
turris delapena	Zatvor
TURRIS MOLI	obrambeni toranj na zidinama pristaništa
ZETTO	obruč od suhozidina u moru do razine površine ispred luke ili uokolo zidina, ali u određenoj udaljenosti, kako bi se spriječilo približavanje neprijateljskih galija
Italian	
castello	utvrđeno naselje
allogiamento	vojnički konak
andito	zaštićeni prolaz kroz povišeni prostor između jarka i zidina
antimuraglia	Predziđe
antimuro	Predziđe
antipetti	Prsobran
aperto	otvor za provjetravanje dima
archetti	lukovi koji nose prsobrane
archi	lukovi koji nose prsobrane
archibuseria	Puškarnica
arsenale	spremište za galije i prostor za popravak
BALUARDO	Bastion
banca	klupa uz parapet ili u niši puškarnice
banchetta	klupa uz parapet ili u niši puškarnice
BASTIONE	bastion (peterokutna kula u bastionskom sistemu zidina)
bocca di cannoniera	otvor za topove
bombardiera	puškarnica, otvor za topove

cabiola	zaštićeni prolaz ili mjesto u opkopu
cabione	zaštićeni prolaz ili mjesto u opkopu
cannoniera	puškarnica, otvor za topove
carcere	Zatvor
casa matta	kazamata, obrambena ćelija u zidu okrugle kule ili bastiona
casetta	stražareva kućica na zidu ili utvrđenom položaju
casola	stražareva kućica na zidu ili utvrđenom položaju
casotta	stražareva kućica na zidu ili utvrđenom položaju
CASTELETTO	snažna utvrda za obranu gradskih vrata
castello	Tvrđava
castello	utvrđena rezidencija sa zaseokom
castello	feudalni grad
castello	utvrđena rezidencija
cavalier	povišeno mjesto iznad parapeta
cavaliero	kavalir, povišeno branište iznad platforme bastiona
CAVATA	Graba
certacca	zaseban obrambeni toranj osmatračnica
chamata	kazamata, obrambena ćelija u zidu okrugle kule ili bastiona
chiusi	parapet, prizid u službi prsobrana
cisterna	Cisterna
cittadella	glavna utvrda grada
coltrina	zid između bastiona
contrafosso	vanjski jarak
contramina	podzemni prolaz ispod vanjskog obrambenog sustava – lagum
contrascarpa	skoša na suprotnom dijelu jarka
cordina	zid između bastiona
cordone	kordonski vijenac koji odvaja ziđe od parapeta platformi, ili kordonski vijenac koji u više obruča opasuje zid kule
corona	vijenac obrambenog parapeta
CORTINA	zid između bastiona
cuneta	graba u jarku
CUNETA	graba unutar jarka
DARDANELLE	par tornjeva na ulazu u morski tjesnac
dente	lomljeni, zupčani smjer zida
feminellas	drveno branište na zidinama istaknuto poput doksata
feritoia	puškarnica
feritora	puškarnica
fianchi	bočne strane uz šilj bastiona
fontico	žitnica
FORTE	Tvrđava
fortezza	Tvrđava
fortezza	utvrđeni vojnički logor
fossa incamisciata	jarak obložen kamenom

fosso	Jarak
fosso	gradska graba (jarak)
GALEA	zaštićeni lukobran
galerola	zaštićeni lukobran
gola	okrugli otvor za veće vatreno oružje
guardiola	stražarnica na zidu
levador	pomični most
magazen	Spremište
manteletto	drvena pomična zavjesa koja štiti otvor između dva zupca kruništa
maschio	glavni obrambeni toranj u sklopu zidina
merlatura	Krunište
merlo	zubac kruništa
mezzaluna	mali polumjesečasti bastion unutar opkopa bastionskih zidina
monitura	oplata jarka
MULO DEL CASTELLO	utvrđeno pristanište
munimenta	braništa na zidinama
munitio	utvrđenje na zidu
mura & baluardi	zidine i baluardi (okrugle kule)
mura & mezzobaluardi	zidine i polukružne kule
mura & torri	zid s tornjevima
mura & torrioni	zid s tornjevima
Orecchi	kamene ušice na zupcima kruništa u koje je utaknuta prečka drvene pomične zavjese koja pokriva otvor između dva zupca kruništa
orecchioni	ušice bastiona (između kurtine i bastiona)
palizzata	obrambeni pojas od šiblja
parapetto	prizid u službi prsobrana
PIAZZA	platforma bastiona
piede del vallo	podnožje zida
pontone	najveći bastion u sistemu bastionskih zidina
recinto	pojas zidina
redutto	zbjeg (utvrđen)
REPARO	pojas zida
ridotto	utvrđeni zaselak
ridotto	mala utvrda
ROCCA	utvrđena rezidencija
rocca	Tvrđava
rochetta	Osmatračnica
rochetta	stražarnica na zidu
sboradori di bombarde	otvor za provjetravanje dima
scarpa	skoša, skarpa
sentinella	stražarnica na zidu
soleri	parapet, prizid u službi prsobrana
sortita	sporedna gradska vrata
SORTO	sporedna gradska vrata

spalte	unutrašnji zidovi bastiona koji se spajaju s kurtinom
spalto	povišeni prostor nad jarkom oko zidine
sperone	šilj na skoši
sperone	šilj bastiona
spiracolo	otvor za provjetravanje dima
SQUERI	prostor za popravak lađa
tenaglia	oblik bastiona: dvostruki bastion s dva šiljka
terrapien	zatrpani donji dijelovi srednjovjekovnih tornjeva radi zaštite od vatrenog oružja
terrapieno	zemljani nasip uz bastion
tole	talus, kosina
torre	utvrđena rezidencija
TORRE	utvrđena rezidencija unutar grada
torre de canton	uglovni toranj
torre della porta	gradska vrata
torre della porta	ulazni toranj u sklopu zidina
TORRE maistra	glavni obrambeni toranj grada
TORRE MAISTRA	glavni obrambeni toranj zidina
torre per guardia	stražareva kućica na zidu
torresella	utvrđeni mlin
torresella	stražarnica na zidu
torretta	osmatračnica
TORRETTA	snažna utvrda za obranu gradskih vrata
trincea	zid određenog smjera i dužine sa ili bez jarka
trincera e spianata	ravni, brisani prostor iznad jarka određenog smjera
trincerament o	utvrđivanje rovova izvan obrambenog vanjskog prostora
turrianzello	utvrđenje na zidu
turricula	stražareva kućica na zidini
turrioncello	stražareva kućica na zidu
VALLO	pojas zida
volti	zaštićeni prolaz kroz povišeni prostor između jarka i zidina
German	
cardack	zaseban obrambeni toranj osmatračnica
castel	feudalni grad
castel	Tvrđava
GRÄNZFES TEN	lanac utvrda na granici
thurm	obrambeni toranj u sklopu gradskih zidina
French	
château	feudalni grad

Croatian, Old Church form	
Ysterna	Cisterna
Croatian, Dalmatian-Roman form and the remain	
Gula	okrugli otvor za veće vatreno oružje
Mažera	obrambeni pojas u suhozidu
Močira	obrambeni pojas u suhozidu
Croatian, Dalmatian-Roman and Istro-Roman form	
Ćelega	obrambeni pojas u suhozidu
kostel	feudalni grad
Turan	zaseban obrambeni toranj
Turan	utvrđena rezidencija
Turan	obrambeni toranj u sklopu gradskih zidina
Croatian, Istro-Roman remain	
fojba	gradska graba (jarak)
Gusterna	Cisterna
žusterna	Cisterna
Croatian, Proto-Slavic origin of the form	
GRAD	utvrđeno naselje
Grad	feudalni grad
Croatian, Italianism	
Fundik	Žitnica
fusat	gradska graba (jarak)
Kaštel	tvrđava i tvrđavica
Kaštel	utvrđena rezidencija sa zaseokom
kaštel	utvrđena rezidencija
Magacin	Spremište
municion	utvrđenje na zidu
Croatian, Turkism of Arabic origin	
bedem	pojas zidina

BEDEN	pojas zidina
HAMBAR	Žitnica
KULA	obrambeni toranj u sklopu gradskih zidina
KULA	zaseban obrambeni toranj
kula	utvrđena rezidencija
sarampo	predziđe
Croatian, Turkism of Arab-Persian origin	
ČARDAK	zaseban obrambeni toranj osmatračnica
Croatian	
archel	obrambeni doksat
ARK	gradska graba (jarak)
aruk	gradska graba (jarak)

Barbakan	snažna utvrda za obranu gradskih vrata
bastaji	Bastioni
bastha	Bastion
buka	otvor na braništu
buklo	otvor na braništu
Čatrnja	cisterna
Četrna	cisterna
Dverce	snažna utvrda za obranu gradskih vrata
Erkel	obrambeni doksat
Farkyl	obrambeni doksat
GRABA	gradska graba (jarak)
habernik	obrambeni doksat
miri, mir	zidine, zid
parapet	prizid u službi prsobrana
puč	bunar
rastel	pomična rešetka ulaznih vrata
raštio	pomična rešetka ulaznih vrata
Serkel	obrambeni doksat

4.1.3 RESEARCH METHODOLOGY

The methodology had to be developed and the searchable corpus of terms had to be deconstructed in order to provide a basis for the present study. The cited glossary provided a partial corpus. Other relevant scholarship was sought and supplemented. The main idea was to show which terms were used simultaneously in the construction of fortifications. The dictionaries were considered to be the first usable multilingual sources in which Croatian and other languages were included at the pre-unification level. By the end of the sixteenth century, most of the lexical-semantic relations and the foundation of professional and scientific terminologies could be observed. The dictionaries were the main source of unfamiliar terms and their explanations for pre-unification professional linguistic written works. The source material consisted of twenty-three selected dictionaries from the fifteenth to the twenty-first century. The last version included thirty-eight German, ninety-seven Latin, one hundred and five Italian and ninety-three Croatian terms.

Table 4 List of consulted historical dictionaries

HEADWORDS LANGUAGE	DICTIONARY	Datation
Latin	Faust Vrančić: *Dictionarium quinque nobilissimarum Europae linguarum Latinae, Italicae, Germanicae, Dalmaticae et Ungaricae*	1595
	Petr Loderecker: *Dictionarium septem diversarum linguarum, videlicet Latine, Italice, Dalmatice, Bohemice, Polonice, Germanice & Ungarice una cum cuiuslibet linguae registro sive repertorio vernaculo in quo candidus lector sui idiomatis vocabulum facile invenire poterit / singulari studio & industria collectum a Petro Lodereckero Prageno, Bohemo &c.*	1605
	Pavao Ritter Vitezović: *Lexicon Latino-Illyricum*	manuscript *1700
	Ivan Belostenec: *Gazophylacium, seu Latino-Illyricorum onomatum aerarium*	1740
	Andrija Jambrešić and Franjo Sušnik: *Lexicon Latinum interpretatione Illyrica, Germanica et Hungarica locuples & index illirico sive croatico-latinus*, Typis Academicis societatis Jesu, Zagrabiae	1742
Italian	Petar Lupis Valentiano: *Opera nuova che insegna a parlare la lingua schiavonesca alli grandi, alli picoli et alle donne*	1527
	Ivan Tanzlingher Zanotti: *Vocabolario di tre nobilissimi linguaggi, italiano, illirico e latino s podnaslovom Con l'aggiunta di molti erbe semplici e termini militari*	manuscript *1704
	Ardelio della Bella: *Dizionario italiano, latino, illirico s gramatikom Istruzioni grammaticali della lingua Illirica*	1728

	Dragutin Antun Parčić: *Vocabolario italiano-slavo /illirico/*	1868
German	Ivan Mažuranić and Jakov Užarević: *Deutsch-illirisches Wörterbuch*	1842
	Bogoslav Šulek: *Deutsch-kroatisches Wörterbuch*	1860
*Croatian	Bartol Kašić: *Hrvatsko-talijanski rječnik*	manuscript *1599
	Jakov Mikalja: *Blago jezika slovinskoga*	1649
	Juraj Habdelić: *Dictionar ili Réchi Szlovenszke zvexega ukup zebrane i red poſtaulyene...na pomoch napredka u diachkom navuku skolneh mladenczeu horvatszkoga i szlovenszkoga Naroda*	1670
	Ivan Belostenec: *Gazofilacij*	1740
	Joso Voltić: *Ricsoslovnik (Vocabolario-Wörterbuch) illiricskoga, italianskoga i nimacskoga jezika s' jednom pridpostavljenom grammatikom illi pismenstvom*	1803
	Joakim Stulli: *Rjecsoslòxje u komu donosuse upotrebljenia, urednia, mucsnia istieh jezika krasnoslovja nacsini, izgovaranja i prorjecsja*	1806
	Dragutin Antun Parčić: *Riečnik ilirsko-talianski polag najnovijih izvorah*	1858
	Bogoslav Šulek: *Hrvatsko-njemačko-talijanski rječnik znanstvenog nazivlja osobito za srednja učilišta*	1874 – 1875
	Rječnik hrvatskoga ili srpskoga jezika	1880 – 1976
	Vladimir Anić: *Rječnik hrvatskoga jezika*	1991
	Rječnik hrvatskoga jezika	2000
	Školski rječnik hrvatskoga jezika	2012
	Veliki rječnik hrvatskoga standardnog jezika	2015

4.1.4 FEW WORDS ON THE DEVELOPMENT OF THE CROATIAN LANGUAGE IN THE EARLY MODERN PERIOD

Croatian is a South Slavic language spoken in the southwest of Europe. Historically, it was also referred to as *ilirski* and *slovinski*. The name of the Slavic language community comes from the words *slovo*, *sloviti*, meaning 'to speak' or 'to communicate with language'.[538] After the name *Slaven* began to be used for Slavs according to the Latin language, Slavic names were derived from the word *slava*, *slavni* meaning 'famed'. In the Slavic linguistic tradition, the word *jezik* meant both 'language' and 'nation'.[539] In addition to Latin, Croats used the Croatian redaction of the Old Slavic language, writing in three scripts: Glagolitic, Cyrillic, and Latin.[540]

In 1604, Bartol Kašić published the first grammar of the Croatian language, *Institutiones lingua Illyricae*, in Rome. Kašić also authored a handwritten dictionary. Additionally, Faust Vrančić's *Dictionarum*, a five-language dictionary published in 1595, is considered highly significant.

The two dictionaries mentioned represent the start of Croatian severe lexicography. The Bosnian Franciscans also played a significant role in standardisation by publishing numerous pious folk works.[541]

The decisions of the Tridentine Council had a significant impact on the development of the standard Croatian language. According to Radovan Katičić, the sudden importance of Slavic languages was due to the possibility of compensating for the losses in the north caused by the dominance of Protestantism in their territory, as well as in the east and south-east of Europe. In the south-east it was necessary to support the Catholics[542]. In 1540, a new Jesuit Order began operating on the borders of the Ottoman Empire. They played a crucial role in the history of the Croatian literary language and its standardisation[543]. In 1580, the Illyrian College was established in Loreto. Later, in 1599, the Academy of the Illyrian Language was founded in the Jesuit College in Rome. The Croatian language was systematically nurtured and taught there.[544]

Although the Reformation and Catholic revival supported the use of Glagolitic and Cyrillic

[538] Bratulić, "Hrvatski jezik", 9.

[539] Bratulić, "Hrvatski jezik", 10.

[540] Papeš, "Terminologija", 29. On the history of Croatian language see Frančić, "Onomastička svjedočenja o hrvatskome jeziku".

[541] Katičić, "Hrvatski jezik na pragu novovjekovlja", 43.

[542] Katičić, "Hrvatski jezik na pragu novovjekovlja", 40.

[543] Katičić, "Hrvatski jezik na pragu novovjekovlja", 41

[544] Katičić, "Hrvatski jezik na pragu novovjekovlja", 43.

scripts, Latin gradually became dominant.[545] Marko Samardžija stated that it has been possible to trace the development of basic lexical-semantic relationships since the sixteenth century. Visible foundations can be identified upon which much of Croatian professional and scientific terminology was formed two hundred years later.[546] The influential Jesuits founded several gymnasiums in the seventeenth century: Dubrovnik in 1604, Zagreb in 1607, Rijeka in 1627, Požega in 1632, and Varaždin in 1698. They committed to developing Croatian lexicography, along with the Order of Saint Paul the First Hermit[547].

4.1.5 RESEARCH RESULTS OF THE FIRST PHASE: FORTIFICATION ARCHITECTURE TERMS IN CROATIAN BILINGUAL AND MULTILINGUAL DICTIONARIES WITH LATIN, ITALIAN, AND GERMAN HEADWORDS

DICTIONARIES WITH THE STARTING LATIN HEADWORDS[548]

Faust Vrančić's *Dictionarium quinque nobilissimarum Europae linguarum Latinae, Italicae, Germanicae, Dalmaticae et Ungaricae* was published in 1595 in Venice. It is considered the beginning of Croatian lexicography[549].

Dictionarium septem diversarum linguarum, videlicet Latine, Italice, Dalmatice, Bohemice, Polonice, Germanice, & Ungarice by Petar Loderecker's is the second edition of Vrančić's dictionary, and it was published in Prague in 1605. Loderecker added a Czech and Polish column to Vrančić's dictionary[550].

Lexicon Latino-Illyricum by Pavao Ritter Vitezović is a manuscript dictionary kept in the National and University Library in Zagreb. Vitezović's work was supposed to establish the

[545] Katičić, "Hrvatski jezik na pragu novovjekovlja", 45.

[546] Samardžija, "Hrvatski leksik i leksikografija", 458.

[547] Samardžija, "Hrvatski leksik i leksikografija u 17. i 18. stoljeću", 429. See more in: Katičić, "Hrvatski jezik na pragu novovjekovlja", 30–32.

[548] Katičić, "Hrvatski jezik na pragu novovjekovlja", 34.

[549] The 1992 edition was used: Vrančić, *Dictionarium quinque nobilissimarum Europae linguarum*.

[550] The 2005 edition was used without German, Hungarian, Czech, and Polish equivalents: Loderecker, *Sedmerojezični rječnik*. See more in: Papeš, "Terminologija", 34.

lexical fund of the Illyrian language. Illyrian was a synonym for *Slovinski* or Croatian. His graphic solutions were the forerunner of the Illyrian graphic reform[551].

Gazophylacium, seu Latino-Illyricorum onomatum aerarium (I.) and *Gazophylacium Illyrico-Latinum* (II.) by Ivan Belostenc was published in 1740 in Zagreb. Belostenec was a monk of the Order of Saint Paul, the First Hermit[552].

Lexicon Latinum interpretatione Illyrica, Germanica et Hungarica locuples is a four-language Latin-Croatian-German-Hungarian dictionary by the Jesuits Andrija Jambrešić and Franjo Sušnik. The dictionary was printed in Zagreb in 1742, and *Index illyrico, sive, Croatico-Latinus* and a few other texts were added. It is primarily intended for school needs[553].

DICTIONARIES WITH THE STARTING ITALIAN HEADWORDS[554]

Opera nuova che insegna a parlare la lingua schiavonesca alli grandi, alli picoli et alle donne was an Italian-Croatian dictionary attributed to Peter Lupis Valentiano. It was published in 1527 in Ancona. This is the first lexicographic work in the history of Croatian lexicography. The Czech Slavist Jan Petr first described it in *Slavia* 42 (1973), and he discovered it in the Bavarian State Library in Munich. Valentin Putanec also analysed the language and lexicon and offered a reverse Croatian-Italian dictionary in the text "Italian-Croatian and Croatian-Italian dictionary of Petr Lupis Valentiano (Ancona, 1527)", which was used for the research. In the preface, Valentino states that *Schiauone/cho*, which Putanec translates as a Slavic language and equates with Croatian, was spoken not only in the Slavic Land but also in Serbia, Albania, Turkey, Hungary, the Czech Republic, Italy and elsewhere[555].

Vocabolario di tre nobilissimi linguaggi, italiano, illirico e latino is one of the manuscript dictionaries of Ivan Tanzlingher Zanotti, dated in 1704. It is kept in Padua and was digitized as

[551] The second volume with transcription and processing of the dictionary published by ArTresor (2010) was used: Ritter Vitezović, *Lexicon Latino-Illyricum*.

[552] Belostenec, *Gazophylacium*.

[553] Šojat, "Latinsko-hrvatsko-njemačko-madžarski rječnik", III. The 1992 edition was used: Jambrešić and Sušnik. *Lexicon Latinum interpretatione Illyrica*.

[554] Papeš, "Terminologija", 41–42.

[555] Putanec, "Talijansko-hrvatski i hrvatsko-talijanski rječnik Petra Lupisa Valentiana (Ankona, 1527)." *Filologija* 9 (1979): 101–106.

part of the project *Digitalizacija i mrežna objava Tanzlingherova rječnika "Vocabolario di tre nobilissimi linguaggi, italiano, illirico e latino"*[556].

Dizionario italiano, latino, illirico was the work of the Italian Jesuit Ardelio della Bella, published in 1728 in Venice. It is the first Croatian historical dictionary based on the idiom characteristic of Dubrovnik's idiom, the Eastern Adriatic dialects, and writings by the sixteenth and seventeenth centuries authors. Della Bella intended the *Dizionario* for future Italian missionaries in Slavic countries to make learning the Croatian language easier[557].

There were three editions[558] of Dragutin Antun Parčić's Italian-Croatian dictionary: *Vocabolario italiano-slavo/illirico/* was published in Zadar in 1868, *Vocabolario italiano-slavo /croato/* was published in Senj in 1886, and *Vocabolario italiano-slavo (croato)* was published posthumously in Senj in 1908[559].

DICTIONARIES WITH THE STARTING GERMAN HEADWORDS[560]

Deutsch-illirisches Wörterbuch or *Němačko-ilirski slovar* by Ivan Mažuranić and Jakov Užarević was published in Zagreb in 1842. It was the first modern Croatian bilingual dictionary[561].

Deutsch-kroatisches Wörterbuch or *Němačko-hrvatski rěčnik* by Bogoslav Šulek is a two-volume dictionary published in Zagreb in 1860. The basis of Šulek's dictionary was *Slovar* by Ivan Mažuranić and Jakov Užarević.

These confirmations will be excluded from this research.

DICTIONARIES WITH THE STARTING CROATIAN HEADWORDS[562]

The Croatian-Italian dictionary handwritten by Jesuit Bartol Kašić, who is considered the father of Croatian grammar and the first Croatian scientific linguist, is the first complete Croatian-

[556] The digitised version was used during the research: Tanzlingher Zanotti, Ivan. *Vocabolario di tre nobilissimi linguaggi, italiano, illirico e latino con l'aggiunta di molt'erbe semplici e termini militari*. The digitalised edition is according to the manuscript from 1699, http://tanzlingher.filosofia.sns.it/index.php?id=6.

[557] Della Bella, *Dizionario Italiano, Latino, Illirico*.

[558] Parčić, *Vocabolario italiano-slavo (croato)*.

[559] Samardžija, "Hrvatski leksik i leksikografija u 19. stoljeću", 492.

[560] Papeš, "Terminologija", 50.

[561] Samardžija, "Hrvatski leksik i leksikografija u 19. stoljeću", 480.

[562] Papeš, ""Terminologija", 53.

Italian dictionary and the first to use Croatian as the starting language.[563] The manuscript is kept at the Franciscan monastery in Dubrovnik, and the Croatian-Italian dictionary edition from 1990 was used.

The trilingual dictionary *Blago jezika slovinskoga* by Jesuit Jakov Mikalja has Croatian as the source language and Italian and Latin as the target languages. The dictionary was printed in a thousand copies, initiated by the brothers Giovani and Paolo Serafini in Loreto in 1649 and completed by Ottavio Beltrano in Ancona in 1651.[564]

Dictionar ili Réchi Szlovenszke zvexega ukup zebrane i red poſtaulyene...na pomoch napredka u diachkom navuku skolneh mladenczeu horvatszkoga i szlovenszkoga naroda is a dictionary of the Jesuit writer Juraj Habdelić, which was published in Graz in 1670.[565]

Ricsoslovnik (Vocabolario-Wörterbuch) illiricskoga, italianskoga i nimacskoga jezika s' jednom pridpostavljenom grammatikom illi pismenstvom was published in 1803 in Vienna by Jose Voltić and includes an attached grammar. It is a trilingual Croatian-Italian-German dictionary with Croatian as the starting language.

In 1801, the first part of Joakim Stulli's trilingual *Lexicon latino-italico-illyricum* was published in Buda. Its second part *Rjecsoslòxje* was published in Dubrovnik in 1806. The third part, *Vocabolario italiano-illirico-latino*, was published in 1810.[566]

There are three editions of Dragutin Antun Parčić's Croatian-Italian dictionary published in Zadar in 1858, 187, and 1901. In the 1901 edition, used in the nomenclature analysis, the author includes terms from about twenty professions and scientific disciplines.[567]

The Croatian-German-Italian dictionary *Hrvatsko-njemačko-talijanski rječnik znanstvenog nazivlja osobito za srednja učilišta* by Bogoslav Šulek is a bilingual dictionary published in Zagreb in 1874 and 1875.[568]

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[563] Kašić, *Hrvatsko-talijanski rječnik*.

[564] Mikalja, *Blago jezika slovinskoga*.

[565] Habdelić, *Dictionar ili Réchi Szlovenszke*.

[566] Stulli, Joakima Stulli Dubrocsanina Rjecsosloxje u Dubrovniku MDCCCVI, Vol. I. edited by E. Fekete. München: Verlag Otto Sagner, 1985; Stulli, Joakim. Joakima Stulli Dubrocsanina Rjecsosloxje u Dubrovniku MDCCCVI, Vol. II edited by E. Fekete,. München: Verlag Otto Sagner, 1985; Stulli, Joakim. Joakima Stulli Dubrocsanina Rjecsosloxje u Dubrovniku MDCCCVI, Vol. III., edited by E. Fekete, E. München: Verlag Otto Sagner, 1987.

[567] Parčić, *Vocabolario italiano-slavo (croato)*.

[568] Šulek, *Hrvatsko-njemačko-talijanski rječnik znanstvenog nazivlja: osobito za srednja učilišta, tiskom Narodne tiskare dra Ljudevita Gaja*. A–N; Šulek, *Hrvatsko-njemačko-talijanski rječnik znanstvenog nazivlja: osobito za srednja učilišta, tiskom Narodne tiskare dra Ljudevita Gaja*. O–Ž.

The nineteenth- and twentieth-century dictionary confirmations are not presented because they are not crucial for the current research. The Italian terms are crucial for the present research, as well as the Latin and Croatian terms for possible comparisons. Therefore, they are rewritten in the following pages[569].

Table 5 Italian confirmations

natuknica	**Valentiano, 1527.** (Putanec, 1979.)	**Tanzlingher Zanotti, 1699.** (online izdanje rječnika: http://tanzlingher.filosofia.sns.it/index.php?id=6)	**Della Bella, 1728.** (izd. iz 1785.)	**Parčić, 1887.** (izd. iz 1908.)
alloggiamento	x	**Alloggiamento** - x - x **Alloggiamento de' soldati** - Boijmçkè, Obzide – Castra	**Alloggiamento de Soldati**. Caſtra, trorum. n. p. Bójnicke óbʒide, illi tvàrghje, vojnijcka pribivaliſcta. Scjattori, raa. m. p. Tábor, ra. m.	**Alloggiamento**, m. stanište, kvartir; (alloggio) stan, *konak; (accampamento) tabor.
andito	x	**Andito** - Stazà, Klaanaç – Semita	X	**Andito**, m. hodnik, prohodište; (viottolo) uličica; (adito) ulaz.
antimuraglia	x	X	X	x
antimuro	x	**Antimuro** - Parsobran - x **Antimuro** - Pridgradye – Propugnaculum	X	**Antimuro**, m. predzidje.
antipetti	x	X	X	X
archibuseria	x	X	X	**Archibusiera**, f. i Archiera, f. puškarnica, mazgal.
arciera	x	X	X	**Arciera**, f. (feritoja) puškarnica.
arsenale	x	**Arsenale** - Brodogradischyè, Brodonischyè, Brodarniçà – Navale	**Arſenale**, luogo dove ſi fano i navigli, & altre coſe neceſſarie alla navigatione. Navale, lis. Brodárniza, ze. F. Drjevoshraniſcte, ſcta. n. Orsân, na. m. Shranìſcte òd Brôdaa.	**Arsenale**, m. (pomorska) oružana, brodarnica, arsenali (sala d'armi) oružana.
balestriera	x	**Balestriera** - Lukoloptischyè, Poloxnischyè, Podboyaçniçà, Puskariçà - Ballistarium	**Baleſtriera**, feritoia, buca nelle muraglie per donde ſi baleſtra il nemico di fuori. Baliſtrarium, rij. n. Puſckariza, ze. f.	**Balestriera**, f. (feritoja) puškarnica, mazgal.
baluardo	x	**Baluardo** - Obalà, Zaagradyà, Braanijk, Naasap, Taabor, Braniscte – Propugnaculum	***Baloardo**, riparo delle fortezze. Propugnaculum, li. n. Brániſcte, cta. n.	***Buluardo** (sic!), m. branište, branik; fig. (difesa) zaštita, obrana. ***Baloardo**, v. Baluardo.
barbacane	x	***Barbacan** - Pridzidyè, Pridgradyè, Podpor od mira – Fultura	**Barbacane**, contrafoſſa, ò ſperone per ſicurezza del muro. Anteris, ridis. f. g. Podpòr òd mîra, illi òd ʒída.	**Barbacane**, m. bedem na pokos il. na poškalj, baba, babac.
bastione	x	**Bastione** - Ukripagn, Naaxap, Beden, Taabor, Zaaschita - Propugnaculum **Bastione** - Naasap, Naspinna, Beden, Branijlnik, Yarak, Zaspuutyè - Terreus, Agger	**Baſtione**. Propugnaculum, li. n. g. Brànìſcte, ſcta. n.	**Bastione**, m. bastija, bedem. ***Bastìta**, f. branište, tvrdjavna gradba.
bertesca	x	**Bertesca** - Zaapor, Zaaprik, Zasad, Suukrix, Zaaporniçà - Castellum, Propugnaculum	x	**Bertesca**, f. spustni turnić, krunište na tvrdjavici.
bombardiera	x	X	x	**Bombardiera**, f. kumbarica (-ladja).
cannoniera	x	X	x	**Cannoniera**, f. (apertura da sparare) puškavica (od topa), *mazgal; (barca) (ladja-) topovnica.
caponiera	x	X	x	x

[569] Compare Papeš, "Terminologija", 36–69.

casa matta	x	X	x	***Casamatta**, f. zemunica (svodna).
casotta	x	X	x	***Casotto**, m. (da guardia) stražnica; (tugurio) pojata, kućerak.
casteletto	x	**Castelletto** - Vessarcich, Tuarxdich, Bradçich, Graadaç, Dizdich, Gradçich, Pijrçich – Oppidulum	**Caʃtelletto**, e **caʃtellucio**, caʃtello piccolo, quantità di caʃe circondate di mura. Caʃtrum, tri. n. Grâdaz, âdza. m.	***Castellotto**, m. priličan gradić; tvrdjavica.
castello	x	**Castello** - Braad, Graadaç, Dizd, Tuarxd, Vessa, Varas, Sagradstuò, Kossarra - Oppidum	**Caʃtello**, citadella, fortezza per difeʃa delle Città. Arx, cis. f. g. Tvàrghja, ghje. f.	**Castello**, m. (paese murato) obzidano mjesto; grad; (fortezza) tvrdjava; (rocca) vis, tvrdjavica, *kula; - delle navi, tavan na brodu; (battipali) bijača, malj; far -i in aria, zidati kule po oblaku, po vjetru snovati.
cavalier	x	***Cavaliere** - Saanaç, Saançè, Saançà – Agger	***Cavalliere**, alle volte ʃignifica rialto di terra ʃopra le muraglie. Agger mœnibus impoʃitus. Nâʃap, pa. m.	x
cavaliero	x	X	x	x
cavata	x	**Cavata** - Vaddyenyè, Koppaanyè, Izduoorenyè, Dubglyeenyè, Yammukoppanyè, Yarugganyè	x	**Cavata**, f. (fosso) izkop, jama; (...)
chiusi	x	X	x	x
cisterna	x	**Cisterna** - Rooù, Çeternyà, Çeteruyà, Bunaar, Gusteerna, Hladenak, Studenaç, Gustijrna, Bunaar - Cisterna	**Ciʃterna**, ricettacolo d' acqua piovana. Ciʃterna, næ. f. Guʃtjérna, ne. f. Shranna, alliti Póhrana vodená. Jamma vodená. Vodohranna, ne.	**Cisterna**, f. daždjavac, nakapnica, bistjerna, gustjerna, počuo, čatrnja, acqua di - kapnica, kišnica.
città	x	**Città** - Graad, Varasc – Civitas	**Città**, inteʃo di luogo, che habitano i cittadini. Urbs, bis. f. Grád, da. m. **Città murata**. Civitas muris armata. Grád obʒijdan. **Cittadone**, città grande. Civitas magna. Proʃtranni Grád. Velikí Grád.	**Città**, f. grad, *varoš; di -, (agg.) gradski.
cittadella	x	**Cittadella** - Varassaç, Varasçich, Graadaç, Graadak, Graadçaç - Oppidulum **Cittadella** - Tuarad, Braad, Turrigyà – Arx	**Cittadella**, città piccola. Civitacula, læ. f. Grâdaz, dza. m. **Cittadella per fortezza**. V. Caʃtello.	**Cittadella**, f. (dim. di città) gradić; (rocca) tvrdjavica.
civitacula	x	X	x	x
coltrina	x	X	x	x
contraforte	x	X	**Contraforte**. V. Barbacane.	***Contrafforte**, m. podporni zid; podporanj.
contrafosso	x	X	x	**Contrafosso**, m. predrov.
contramina	x	***Contrammina** - Sprotxayaamka, Sprotlaguna, Sprotkepina, Sprotlaguzna, Sprotlaguzniçà, Pramalagun	**Contramina**. Cuniculus contrarius. Prokòp ʃupròch prokòppu.	***Contrammina**, f. protukop; suprotivni podkop; - fig. protivna varka.
contrascarpa	x	X	**Contraʃcarpa**. V. Barbacane.	**Contrascarpa**, f. spoljašni nasip il. odkos, protustrmen.
coprifaccia	x	X	x	x
cordina	x	X	x	x
corno	x	**Corno** - Roogh, Drinak, Rogh – Cornu	x	**x** ***Cornuto,** agg. rogat; argomento -, dvoratni izum.
corte	x	**Corte** - Duor, Obijtegl, Aulyà, Sukya - Aula **Corte** - Sukuchyà, Duoor - Impluvium, Cavaedium	**Corte**, caʃa, ò palazzo di gran Signore. Aula, læ. f. Dvôr, ôra. m. Dvoròvi, òd dvorôvaa. m. pl. Dvôri, raa. m. pl. **Corte di Rè**. Aula regia. Krâgljevi Dvôri.	**Corte**, f. dvor; (cortile) dvorište, *avlija; - di cassazione, ukidni sud;
cortile	x	**Cortile** - Sukucchya, Duor, Aulya - Atrium, Cavaedium	**Cortile**. Atrium, trij. n. Dvôr, ra. m. Pridvórje, ja. n.	**Cortile**, m. dvorište, *avlija; (chiuso) oblok.

cortina	x	**Cortina** - Polyueryà - Cortina	**Cortina**. Velarium, rij. N. ʒaʃtórniza, ze. f.	**Cortina**, f. prevjes, zastor; - da letto, postjeljna zavjesa, *perde (fpl.); (arch.) krilo.
cuneta	x	X	x	x
dardanelle	x	X	x	x
falconiera	x	X	x	x
falsabraga	x	X	x	***Falsabraca**, f. prednji odkop.
feritoia/feritora	xx	***Feritoja** - Podbooi, Ustrijlniçà - Ballistarium x	***Feritura**, ò **feritoja**, buca nelle muraglie donde ſi feriſce il nemico di ſuora. V. Baleſtriera. x	***Feritoja**, f. puškarnica, mazgal, mazgala.
forte	x	**Forte** - Tuard, Baltà, Brambà, Braana – Propugnaculum	x	**Forte**, m. (fortezza) tvrdjava; - dell' esercito, jezgra vojske;
fortezza	x	**Fortezza** - Tuarx, Braad, Turrigyà, Tuargyauà, Baltà, Obalà, Graadçaç, Varassaç, Braamba, Tuarxdinna, Braana - Arx, Propugnaculum	**Fortezza**, cioè Rocca. V. Rocca.	**Fortezza**, f. (luogo fortificato) tvrdjava; (nel vestito) podstava;
fortificamento	x	**Fortificamento** - V'yaaçanyè, Yaaçanyè, Tuargyanyè, Tuardyeenyè, Pokrijpglyenyè, Utuardyeenyè, Graadyenyè, Braanyenyè, Obgraadyenyè, Varlyaanyè, Utaborrenyè, Taborrenyè - Munimentum, Munitio	**Fortificamento**, ò fortificatione. Munitio, munitionis. f. Tvardìſcte?, ſcta. n. óbrana, ne. f. Utvardjènje, nja. n. Tvàrghja, ghje. f.	**Fortificamento**, m. utvrdjivanje.
fortificatione	x	***Fortificazione** - x – x	**Fortificatione**. V. Fortificamento.	***Fortificazione**, f. utvrdjivanje; gradba; (le opere di -) ogradba, utvrdba; utvrde (pl.); branište.
fortino	x	X	**Fortino**, overo fortezza piccola per difeſa dei ſoldati accampati. Caſtellum, lli. n. Meteriʒ, iʒa, m. Maala Tvàrghja. Meteriʒ propriamente recinto di pietre ſenza calce.	**Fortino**, Fortilizio, m. tvrdjavica.
fossa	x	**Fossa** - Raazroù, Rooù, Yarugà, Yammà, Lokuaagn, Obrou izkop, Prokop, Graaba, Xlijb - Fovea, Fossa	**Foſſa**. Scrobs, bis. f. Jamma, me. f. Ruppa, pe. f. **Foſſa intortorno à Forte, ò Città**. Foſſa, ſæ. f. Prokòp, ppa. m. Obròv, va. m. **Foſſa, terreno cavato in lungo per vallar campi, ò per ricevere, e ſcolar l' acque**. Foſſa, ſæ. f. Prokòpniza. Potòk, kka. m. Illir. barb. Endèk, kka. Berèk, kka. m. **Foſſa d' acqua**. Foſsa, ſæ. f. Lokâgn, gna. m.	**Fossa**, f. jama; rupa; - di scolo, odtoka; (canale naturale) jaruga: (e artificale) jarak, *endek; - di limite, prierov; (sepolcro) grobnica; (per le viti) zarov; scavar -e, jamičati, jamati; roviti.
fossato	x	**Fossato** - Potoçak, Potoçaç, Hendk – Torrens	x	**Fossato**, m. jaruga; (di seperazione) prerov; (fossa) jama.
fosso	x	X	x	**Fosso**, m. jarak, *endek; - naturale, jaruga; (de' campi) prierov; (di fortezza) obrov, obkop, šanac; cinger di -, obroviti, obšančiti.
guardiola	x	X	**Guardiola**, luogo, dove ſtà la guardia. Specula, læ. f. Straaxniza, ze. F., Straxanizza, ze. F.	***Guardiòlo**, m. (**stanzino di g.**) stražnicu (sic!) ***Contragguardia**, f. branište.
magazen	x	***Magazzino** - Kleet, Stragnà, Straagn, Gotoougnak, Targohran – Promptuarium	***Magazzino**, ſtanza, dove ſi ripongono graſcie, ò mercanzie. Apotheca, ce, f. Shranna, nne, f. Stràgn, gna. m. ***Magazzeno di grano**. Horreum, rei. n. Xitniza, ze. f. Illir. barb. Hambâr, âra. m.	***Magazzino**, m. spremište, skladište, spravište, magaza.

merlatura	x	**Merlatura** - Çipkçinà, Resciçinà, Reescgnà - /	x	**Merlatura**, f. obrub kruništem; (di vestito) obšav čipkama. ***Merlata,** f. krunište (na kuli).
merlo	x	**Merlo** - Beden, Però, Bedeni, Zaurisci, Zaurisc - Minae, Pinna	**Merlo ornamento delle muraglie, e difeſa**. Pinna, næ. f. Krunnìſcte òd mîraa. **Merlo piccolo inteſo di muro**. Pinnula, læ. f. Maalo krunniſcte òd mîraa.	**Merlo**, m. (uccello) kos, kosovac; (di torre) kruna; (coll.) vršci od sgrada, krunište; (merletto) čipka, picilj.
mezzaluna	x	X	**Mezzaluna termine militare**. Munimentum ſemilunare. Karnobranìſcte, ſcta. n.	x
mir	x	X	**Mîr**, ra. m. Ill. barb. Dvár, ra. m.	x
moschettiera	x	X	x	x
munimenta	x	X	x	x
munitio	x	X	x	x
munitione	x	***Munizione** - Utuardxbinà, Taborrinà, Tribnà, Tribouatnà - Munitio, Opus	**Munitione**, fortificamento. Munitio, nis. f. Tvàrdja, dje. F. Tvardìſcte, ſcta. n. Utvardjènje, nja. n. **Munitione da guerra**. Inſtrumentum militare. Bójnijcka ſpravva.	***Munizione**, f. ogradjivanje, utvdjivanje (sic!) (da guerra) strelivo, prah i olovo; *džebana; (da bocca) živež, hrana, zaira; (magazzino) skladište, spremište.
muraglia	x	**Muraglia** - Zijd, Mijr, Graadyà – Murus	**Muraglia**. V. Muro.	**Muraglia**, f. zidje, zidovi (pl.), zidine (pl.); zid; bedelo; (all' intorno) obzidje. ***Muraglione**, m. zidina.
muro	***muraro**, karmenar [obrat, V. Putanec: kamenar (piše: karmenar)] 2v [97]	**Muro** - Zijd, Duhar, Mijr, Graadyà – Murus	**Muro**, muraglia. Murus, ri. Ʒijd,da. m. **Muro di Città**. Mœnia, niorum. n. pl. Ʒidi gráda. Gradskí Ʒijd. **Luogo ſotto le mura della Città**. Pomærium, rii. Podmírje, ja. n. **Circondar di muro**. Muro cingere. ObƷîdati, dam, doſam. Obſtrjêti mîrom. **Mura che circonda**. Murus circumdans. óbƷida, de. f. **Circondato di muro**. Muro cinctus. ObƷijdan, na, no. óbſtart mîrom. **Muro forte**. Murus firmus. Ʒijd tvardí. **Muro vecchio, e mezzo rovinato**. Parietina, nae. F. Ʒidina,ne. F. Mirina, ne. F. **Muro a ſecco ſenza calce, diceſi ancora macera**. Maceria, riæ. f. Ʒijd ù súho. Mêghja, ghjee. f.	**Muro**, m. zid, platno, *duvar, *mir; (di macigno) stiena; - a di città, zidine, zidovi (pl.); - a secco, ograda, gromača; - divisorio, pregrada; - fig. (difesa) zaštita, zaklon. ***Murata**, f. tvrdjava, gradba. ***Muramento**, m. zidanje; (le mura) obzidje.
palizzata	x	X	x	**Palizzata**, f. kolje, ograda koljem, tarabe (pl.)
parapetto	x	**Parapetto** - Parsobran, Meteriz – Crepida	x	**Parapetto**, m. prislon, odboj, okana; muro di -, zidac; (mil.) prsobran.
piazza	x	**Piazza** - Stagna, Gassa, Poglyannà, Staghnà, Staza, Targouischyè, Tarxischyè, Kaampà - Platea, Forum	**Piazza** luogo ſpazioſo della Città. Platea, tee. f. Tàrgh, ga. m. Targòviſcte, ſcta. n. Proſtòr òd gráda.	**Piazza**, f. (pubblica) trg, plokata, pijaca; - da mercato, tržište, trgovište; - forte, utvrdjeno mjesto; tvrdja; (posto) mjesto, prostor; letto a due -e, za dvie osobe; comando di -, mjestno zapovjedništvo; maggiore di -, mjestni četnik; (negozianti) trgovci (-vacâ); prezzo di -, mjestna ciena; cambiale pagabile sulla -, mjestna mjenica; dar - ad uno, ukloniti se komu; far -

				razčistiti; metter in -, raztrubiti; izbrbljati; tener - , izložiti trgovinu; pazariti.
pontone	x	X	x	x
propugnacolo	x	**Propugnacolo** - Baltà, Braanà, Brambà, Tuarxd, Obran – Propugnaculum	**Propugnacolo**. Propugnaculum, li. n. Braniʃcte, ʃcta. n. V. Baʃtione.	**Propugnacolo**, m. branište, branik.
recinto	x	**Recinto** - Obzidina, Obgradas - Septum **Recinto** - Obkrugh - Ambitus	**Recinto**, riparo intorno à qualche coʃa. óbgrada, de. f. ógrada, de. f. óbʒida, de. f. **Recinto**, cioè circuito. Ambitus muri. obkrúgh, krúga. m.	**Recinto**, m. (luogo chiuso) oplotnica, obor, zagaj; (il circuito) ograda, oplot, ogradnja; (di muro) obzid; (di fosse) obrov; obkop; in questo -, u ovoj kući, u ovom prostoru.
redutto	x	X	x	x
reparo	x	X	***Riparo, che ʃi fà con legni, terra, e ʃimili**. Ager, geris. m. Nâʃap, ʃapa. m. ʒáʃtava, ve. f. Naamèt, eta. m. ***Riparo intorno**. Vallum, li. N. Ograda, de. F.	x
ridotto	x	**Ridotto** - Pryaatnischyè, Konak, Gostijniçà, Skupischyè, Sborrischyè, Sbirrischyè, Saborrischyè - Receptaculum, Perfugium, Confugium	x	**Ridotto**, m. (luogo di convegno) ročište, prikupište, sbježište; (convegno) stastanak; (albergo) stan; boravište; (da giuco) igračnica; (da ballo) plesalište; (crocicchio) razkrstnica.
rivellino	x	X	**Rivellino**, ʃorte di fortificatione. Portæ propugnaculum. Braniʃcte òd vrâtaa.	**Rivellino**, m. (mil.) predkop; - fig. ukor; batine (fpl.).
rocca	x	**Rocca** - Tuarxd, Graadçaç, Turrigyà, Braad, Obalà, Varascaç – Arx	**Rocca**, coll' o largo, val Fortezza, ò Cittadella. Ars, cis. Tvàrdja, dje. F. Kûla, lee. F. Parola barbara. **Rocca molto ben munita**. Ars munitiʃʃima. Tvàrdja dòbro oruxána. **Rocca inespugnabile**. Ars invictissima. Tvàrdja nepridobîta. Tvarghja nepridobijtna.	**Rocca**, f. (forte) vis, tvrdjavica; kula; (da filare) preslica; - del camino, dimnjak, vrh od dimnjaka.
rochetta	x	X	x	x
ronda	x	**Ronda** - Obhodda, Obhodyenyè – x	**Ronda**. Luʃtratio excubiarum. óbhoda, de, f.	**Ronda**, f. oblaz, okolka; far la -, oblaziti.
saettiera	x	X	**Saettiera**, apertura nelle muraglie da ʃerire coll' archibugio. Balliʃtarium, rij, n. Púʃckariza, rize, f.	x
saracinesca	x	X	**Saracineʃca**, ʃtromento noto da difender le porte. Cataracta, ctæ. ʒâtvor ʃpuʃteechi, ʒáʃtava, ve, f.	**Saracinesca**, f. spustna rešetka, zapornica.
scarpa	x	X	**Scarpa della muraglia**. V. Barbacane.	x
sentinella	x	**Sentinella** - Vahtarra, Straaza, Bdyà, Vahtaar, Straazanin, Chyutnik, Straaxanin, Straxdeniça, Bdyaaç, Bditegl, Straaxnik, Pudaar - Vigiliae, Exubiae, Vigiles, Exubitor	**Sentinella**, luogo dove i ʃoldati fanno la guardia. Stráxniza, ze. f.	**Sentinella**, f. straža, stražar; far la -, stražiti, stražu čuvati.
soleri	x	X	x	x
sortita	x	**Sortita** - Probijk, Prolaz, Izhod, Prolazenyè, Izhaayanyè, Izhodyenyè – Eruptio	**Sortita**, termine militare l' uʃcir fuori aʃʃaltando all' improviʃo il nemico. Eruptio, onis. f. Naʃarnùtje nenàdno, tja. n.	**Sortita**, f. (scelta) izbor; (assortim.) obir, izbir; (mil.) provala, nasrt; - cieca, noćna provala; (germoglio) izdanak, babica.

sorto	x	X	x	x
spalte	x	X	x	x
spalto	x	X	x	**Spalto**, m. (pavimento) pod; (sotto i tetti) strešnica; (sporto) bočina; (muro a pendio) pokos, odkos; (mil.) prsobran, sbjeg.
sperone	x	X	**Sperone**, appogio che ſi fà agl' edificij. V. Barbacane.	**Sperone**, v. Sprone. ***Sprone**, m. ostruga, (d' un muro) podporanj, upornjak;
tanaglia/tenaglia	x	**Tanaglia** - Klisteniçà, Klijschyà, Klijske, Klijschyà - Forceps **Tenaglia** - Kliskà, Kliskè, Klisteniçà – x	**Tanaglia**, e **Tenaglia**, ſtrumento noto. Forceps, cipis. c. Kljêſcta, ſctaa. n. p. Kljêſctichi, chjaa. m. p. diminutivo.	**Tanaglia**, f. kliešte (fpl.); pigliar colle - e, uhvatiti klieštima; - fig. gužbalo; a foggia di -, klještast. **Tenaglia**, v. Tanaglia.
terra	*sta **tera**, grad: ovi grad [obrat, V. Putanec] 3r [70]	**Terra(ª)** - Graad, Vees, Possada, Tuarxd, Varas, Brad, Obala, Graadaç, Vessa - Urbs, Oppidum	x	x
terrapien	x	X	x	x
terrapieno	x	**Terrapieno** - Tuarxdobran, Tuarxdobranna, Brambà, Balta, Naascap – Agger	**Terrapieno**. Agger, geris. m. Nâſap, Nâſapa. m.	**Terrapieno**, m. nasip, sip, *meteriz.
torre	*** tore**, turim [obrat, V. Putanec: turin (piše: turim)] 3r [281]	**Torre** - Pirçih, Pirçihà, Vessa, Pirçak, Stolp, Tuarxd, Stulp, Toranna - Turris ***Torricciuola** - Pirçah, Pirçihiçà, Pirçakçich, Pirçaakgnak, Vessiçà, Pirçaxiçà, Pirçaxich, Turigijçà, Torianiçà – Turricula	**Torre coll' o ſtretta**. Turris, is. f. Tóran, rna. M. Kûla, lee. f. parola barbara, ma molto im uſo. **Torre di legno**. Turris lignea. Tóran darvení.	**Torre**, f. toranj; turan; - di chiesa, zvonik; - fortificata, kula; (carcere) tamnica.
torresella	x	X	x	x
torretta	x	X	**Torretta**, torricella. Turricula, læ. f. Tórnich, chja. m. Kûliza, ze. f. parola barbara,	**Torretta**, f. tornjić, turnac, zvoničić.
torrione	x	**Torrione** - Pirçakçinà, Tuarxdininà, Vessaçinà – x	**Torrione**, quella mezza Torre, che ad ogni tanto ſpatio ſi fà nelle muraglie delle Città. Propugnaculum, li. n. Braniſcte, ſcta. n.	**Torrione**, m. kula.
traversa	x	**Traversa** - Nasukrixak, Sukrixgnaak, Nakrixak, Sukrixak, Prijpor, Zaaporniçà, Poprika - x **Traversa** - Sukrixgnà, Opaçinnà, Pryeka, Prijka – x	**Traverſa**, ſbarra. V. Barra. ***Barra**, e sbarra, tramezzo, che ſi pone per impedire, ò ſeparare un paſſo. Obex, cis, m. g. Príprjeciſcte, ſcta, n. Prîpricje, ca, n. Príprjeka, ke, f. g.	**Traversa**, f. (legno traverso) priečnica, popriečnica; prečaga; prievornica; (mil.) prikop; (sciarpa a traverso) opasac preko ramena; (strada che attraversa) poprečna ulica; (avversità) protivštine (fpl.); alla -, poprieko, prečimice.
trincea	x	**Trincea** - Saançà, Meteriz, Sançà, Ostrogh, Ograda, Oghrada, Tabor, Obrana - Vallum, Agger	**Trincea**, fortificatione, Munitio, onis. f. óbrana, ne. f. Tábor, ra. m. Meterìʒ, ʒa. m. Voce del volgo. ógrada, de. f.	**Trincea**, f. obkop; *šanac; (fossa di -) obrov; (rialzo di -) nasip; (riparo) branik; obrana.
trinceramento	x	X	x	**Trinceramento**, m. obkop.
trinciera	x	X	**Trinciera**. V. Trincea	**Trinciera**, v. Trincea.
troniera	x	X	x	**Troniera**, f. puškarica.
turrianzello	x	X	x	x
turricula	x	X	x	x
turrioncello	x	X	x	x
vallo	x	X	x	**Vallo**, m. obkop; nasip; (riparo) branište, bedem.
volti	x	X	x	x

Table 6 Latin confirmations

natuknica	Vrančić, 1595. (izd. 1992.)	Loderecker, 1605. (izd. 2005.)	Vitezović, 1700. – 1709. (izd. 2010. [sv. 2])	Belostenec, 1740. (izd. 1998.)	Jambrešić/Sušnik, 1742. (izd. iz 1992.)
aedificium	**Aedificium**, Edificio, Eingebevv, Zidanye	**Ædificium**, Edificio, Zidanye	**Ædificium** .. grádja. / zidina. /	**Aedificium**, ij. g. n. 2. Ztanye napravlyeno budi kakvo god, taksze imenuje.	**Aedificium,** ii, n, Cic. Sztánye, Gradgya, Zidina,? c. s. Gebäu : Epület.
agger	**Agger**, Argine, Ein ſchütte, Naßap	**Agger**, Argine, Naſsap	**Agger** .. naſip. naſap. ſip. obrov. **Agger aquam cohibens** .. gât. gáta.	**Agger**, ris. g. m. 3. choma. Naſzip, y breg, koiſze dela okolu vód, daſze dalye nerazlevaju po polyu. 2. omnem coacervationem lapidum, aut terrae ſignificat. Gomulya, Gromacha, kùp kamenya, ali zemlye. 3. Naſzìp okolu varaßa vkup zidmi. 4. Oſzredëk on mèy puti vißi iz kamenya, pokomſze peſicze hodi. 5. Naſzip on, iliti gromacha, iz koje vu varas hitaju, gdaga podſzedu.	**Agger,** eris, m, Cic. Naſzip, Gât. e. Zuſammenhauffung. Toltés, Gát. 2. V. Vallum, Munimentum.
aggestus	x	X	**Aggestus, a, m** .. naſippan, naneſen, zagaťen, a, o.	**Aggeſtus**, ûs. g. m. 4. Náſzip ſzkuplenye, vkup ſzpravlenye. Prineßenye. 2. Obſzipanye dreva ſzadovnoga.	**Aggeſtus,** ûs, m, Quint. Kup, Naſzip. r. Hauffe. Rakásba h/bordás?, Rakás.
allogiamentum	x	X	X	x	x
ambulum	x	X	X	x	x
antemurale	x	X	X	**Antemurale**, lis. g. n. 3.p. p. v. Promurale. ***Promurale**, is. n. p. p. predzid. ſeu Antemurale.	x
antimurale	x	X	X	x	x
antipeti	x	X	X	x	x
apodium	x	X	X	x	x
arberium	x	X	X	x	x
argere	x	X	X	x	x
argerus	x	X	X	x	x
armamentariu m	***Armamen tariu**, Arſenale, Ein Zeughauß, Miſzto-od oruſya	***Armamenta riŭ**, Arſenale, Misſto od oruſya	**Armamentarium** .. Tarnica. oru/ž/na hi/ž//ž/a.* *Nije pronađen odgovarajući grafem.	**Armamentarium**, ij. g. n. 2. Repoſitorium armorum. Meſzto, hiſa, bolta orusna, ſzraniſche orusno. Orusnicza, t. j. gdeſze orusje polaſe, y chuva.	**Armāmentārium** , rii, n. Cic. Tarnicza, Orusjà biſa. s. Zeighaus. Fegyveres b/ház. 2. pro bellum, fraus. Conſilium. Virg.
arx	**Arx**, Caſtello, Schloß, Braad	**Arx**, Caſtello, Graad	**Arx** .. Tvyrdjava.	**Arx,** cis. g. f. 3. Pri Horvateh, y Szlovenczeh Grád, pri Dalmatineh, y Primorczeh Kaſtel, y Fortecza veliſze, ili Tvargya. ut: adrianæ molis arx. Adrianſzka tvergya. Tac. invictiſſima arx. grád neobladan. 2. Transl. hâc voce utimur, cùm tutiſſimum, ac validiſſimum præſidium ſignificamus. Za vſzako jako, y ſzegurno, nit lëhko obladano vtekaliſche, y Zavjetje vzetiſze more. Prov. arcem ex clovea facere. je Duguvanye malo vredno veliko vchiniti, ali nepreſtimanoga chloveka hteti nogu izviſziti.	**Arx,** cis, f. Cic. Grad, Tvêrdina, Tvêrdgyava. s. Schloſs. Vár, Erößég. 2. V. Perfugium, Præſidium, Roma arx omnium gentium. Cic.
arzella	x	X	X	x	x
aula	**Aula**, Corte, Ein Hoff, Dvor	**Aula**, Corte, Dvor	**Aula** .. Dvór. Kraľevſki Dvór.	**Aula,** ae. g. f. 1. Dvor. ut: aula Pontificia, Dvor Papinſzki. Regia, Dvor Kralyevſzki. 2. Palacha, ſetaliſche odperto. Athe. aulae Praefectus, Prefectus dvora, poſztavlyen nad goſzpodarſztvom dvora. aulae Capitaneus. Kapitan dvora. Chaſztnik nad dvorjaniki. ſupremus aulae magiſter, nayveksi dvorjanik. 3. aula Virginis, ſzkrovnoſzt divojachka. Chryſ. 4.	**Āula** , ae, f. Cic. Dvor. r. Hoff. Udvar.

				aulam antiqui ollam dicebant, lonëcz. aulula, Dim. lonchecz.	
balesteria	x	X	x ***Balistarium** .. Banestrelnica. puskarnica.	x	x
balestrierie	x	X	X	x	x
barbacanus	x	X	X	x	x
bastia	x	X	X	x	x
bastita	x	X	X	x	x
batifredus	x	X	X	x	x
batteglirias	x	X	X	x	x
battifollum	x	X	X	x	x
bertesca	x	X	X	x	x
canton	x	X	X	x	x
cantonata	x	X	X	x	x
capsetta	x	X	X	x	x
carcer(e)	x	X	**Carcer** .. Tamnicca. jeça. adj. Tamniçni, a, o. (...)	**Carcer**, ris. g. m. cuſtodia, latomicae, arum, plur. num. phylaca promptuaria, demotexion, demoterium. Temnicza, vuza. Janitor carceris, vratar temnicze. Cic.	**Carcer,** ěris, m. Cic. Vúza, Temnicza. r. Kercker. (...)
case macte	x	X	X	x	x
castellare	x	X	X	x	x
castelletum	x	X	X	x	x
castellum	**Caſtellum**, Caſtello, Ein Caſtel, Kaſtel/Grad	**Caſtellum**, Caſtello, Kaſtel/Grad	**Castellum** .. Gradac. Gradec. Dvor. dvóri.	**Caſtellum,** li. g. n. 2. Kaſtel, grád, Gradich, tvergya pomenſa, [D.] metericz. Parvus vicus muris circundatus, oppidum. v. Caſtrum. munitum caſtellum, Kaſtel, gradich naſzipom, y vodum utvergyen, feſztunga. Front. 2. Caſtella, orum, zdencha hiſicza zboltana, zkoje voda po ſlebeh ſzpelyavaſze na verte, &c. Paul.	**Caſtellum,** li, n. â Caſtrum, Cic. Gràd Vojnichki, Jacbina, Kaſtely, Tvêrdgyava. e. Veſtung. Kaſtély, Vár.
castillerium	x	X	X	x	x
castra	**Caſtra**, Campo, Kriegs-Leger, Tabor (mađ. Tabor)	**Caſtra**, Campo di ſoldati, Tabor	**Castra** .. Tabor. Tabor poľni.	**Caſtra**, orum. g. n. pl. nu. Tabor, voynichka prebivaliſcha, boyne obſzede, ſatori. Cic. ſtativa caſtra, tabor vſztanovlyen, y obſanczan. Caeſ. caſtra navalia, l. nautica, na ladjah, ili brodeh tabor, brodſzki tabor, gdaſze na vode vojuje. Jul. Caeſ. caſtra locare, utaboritiſze, zabiti tabor, razpeti ſatore. 2. caſtra deſignant totam rem bellicam. Polyb. 3. locus & initium urbis. Caeſ. 4. caſtra apium, vulnyak, vuliſche, meſzto gdeſze pchele roje. Pall. 5. Proſztor. quartis caſtris, Liv. legitur apud Non. Caſtra, ae. in. g. f.	**Caſtra,** orum, n. plur. Cic. Tábor. s. Feld-Lager. Kriegs Lager. Tábor.
castrum	**Caſtrum**, Caſtello, Ein Burg, Grad	**Caſtrum**, Caſtello, Grad	**Castrum** .. Tabor. Tvyrdjava. **Castrorum locus. In quo castra metata fuerant** .. Taborisće. **Castrum doloris. Oranementum sepulchri** .. Nagrobje.	**Caſtrum**, ſtri. g. n. 2. Locus muris munitus, Kaſtel, Grád, Feſztunga. Cic. v. Caſtellum. caſtrum munitum, Grád obſanczan, vtvergyen kaſtel. Cic. 2. caſtrum novum, Novigrád ú Horvatſzkom Orſzagu. caſtrum doloris, gruſt ú czirkve na diku, y poſtenye mertveh tel zmoſne Goſzpode podignyen, gruſt ſzmertnoga obſzluſavanya, ili ſaloſzti. Latinius. mater honorarij tumuli.	**Caſtrum,** tri, n. Cic. Grad, Tverdina, Tverdyava. e. Veſtung, s. Schloſs. Vár, kaſtély.
cellarium	**Cellarium**, Cantina, Keller, Pivnicza	**Cellariu**m, Cantina, Pivnicza	**Cellarium**. Vide **Cella.** ***Cella** .. Klit. komora. konoba. podrum. pivnica.	**Cellarium**, rij. g. n. 2. cella vinaria, pevnicza, (D.) podrum, alij Konoba. Plin. 2. Promptuarium, pannarium, Diſpenſa, ſafarnicza, tarna komora. Plin.	**Cellarium,** ii, n. Vid. Penus ità Plin. 2. V. Penarium. & Cella per totum.

			ſtrań.; **Cella penaria** .. komora.; **Cella vinaria** .. Pivnica.; **Cella vinearia in Vineis sita** .. klit. klet.		
cinctus	**Cinctus**/a/um, Cinto, Vmbgürtet, Oppaßan	**Cinctus**, a, m., Cinto, Oppaſsan	**Cinctus[1], a, m** .. opaſſan, a, o. obſtyrt, a, o.	**Cinctus**, a. um. g. o. Opaſzan, prepaſzan, na, no. latus enſe cinctum, paloſem prepaſzan, na, no. Ovid. cinctus ferrô, ſzablyum prepaſzan. vitijs cinctus, hudoben chlovek, malovrednyak. Claud. ma lè cinctus puer, zlocheſzt dechak. Svet. 2. Popreſen, na, no. veliſze od konya, &c. 3. Obſztert, ogragyen obſzochen. cinctus ab hoſte, obſzert od nepriatela. Ovid. cincta agna lupis, obſzochena ovchicza od vukov. Idem. 4. cinctu indutus. V. Inferius.	x
circuitum	x	X	X	x	x ***circŭĭtus,** ûs, m. Cic. Obbod, okol-bod. R. Umgang, Umlauf.
cisterna	**Ciſterna**, Cisterna, Ein Ciſtern, Sztudenacz	**Ciſterna**, Ciſterna, Sztudenacz	**Cisterna** .. ſtudenac. Bunar. Kapniçńak. Bunar, ù kogaſe ſpravl'a voda godińa. Kalić.	**Ciſterna,** æ. g. f. 1. Sterna, Zdenecz prez zviraliſcha, vu kojega deſgyevje iz krovov zczejaſze, ſzramba vodena. ciſterna ſicca, jama prez vode, ſzramba vodena prazna. Ulp. 2. Sleb, ali ſtubel pod kapniczum poloſen, daſze vu nyega voda iz kapicha ſzpravlya.	**Ciſterna,** æ, f. Plin. Nákapnyak, Desgyenicza, Sztudenacz, Zdenecz deſgyeni, vu kogaſze voda ſczéja. peregr. Cheternya. e. Ciſtern, Waſſer Behalter, Regen-Brunn.
civitacula	x	X	X	x	x
civitadela	x	X	X	x	x
civitarula	x	X	X	x	x
civitas	**Ciuitas**, Città, Ein Statt, Grad/Mißtò	**Ciuitas**, Citta, Grad/Miſstò	**Civitas** .. Grad. Meſto. Varos. (...)	**Civitas,** tis. g. f. 3. p. c. polis urbs. Varàß. jus civitatis, pravicza varaska. civitatem amittere, purgarſzku praviczu pogubiti. Cic. libera Imperij civitas, ſzlobodni Czeſarſzki varas. civitas municipalis, Herczeski varas, ali ladanye. Jur. Con. Civitas noſtra, domovina, narodni, domorodni varas. idem quod Patria. Liv.	**Cīvĭtas**, ātis, f. Cic. Váraſs. e. Stadt. Város. (...) ***Cīvĭtātŭla,** ae, f. Senec. Váraſſecz, máli váraſs. s. Städtlein. Városotska.
corrator	x	X	X	x	x
curia	**Curia**, Corte, Hoff, Dvor	**Curia**, Corte, Dvor	**Curia** .. Dvor. (…)	**Curia,** æ. g. f. 1. Parœcia. Hiſa obchinſzka, vu koje tolnach, ſzúd biva. Vechnicza. Cic. 2. Dvór. ut: curia hoſtilia, dvór kojega je zezidal Hoſtilius Kraly Rimſzki. 3. lyucztvo. Plaut.	**Cūrĭa**, ae, f. Cic. Vechnicza, Palacha zatolnachcnye. s. Rathhaus. (...) 2. accipitur pro aede ſacra. Varro. 3. Dvor. r. Hof. Udvar. Curia Imperialis. Ceſzarſzki Dvor. r. Kayſerliche-Hof. (...)
curredonum	x	X	X	x	x
erchirium	x	X	X	x	x
focea	x	X	X	x	x
fontigum	x	X	X	x	x
fortalitium	x	X	**Fortalitium** .. jaçava.	**Fortalitium**, ij. g. n. 2. Tvergya, meſzto tverdno proti nepriatelu. Wilhel. de Pod.	**Fortālītĭum,** ii, n. Gràd, zavetje, Jacbína, ogragya za obrambu. E. Veſtung, beveſteter Orth...
fortificatio	x	X	X	**Fortificatio**, onis. g. f. 3. Jachenye. Plaut. 2. it. architectura militaris, tvergyenye, jachenye voynichko. idem.	x
fortilitium	x	X	X	x	x
fossa	**Foſſa**, Foſſo, Gruben, Yama	**Foſsa**, Foſso, Yama	**Fossa** .. [# jamma.] kôp. grabba. jarak.	**Foſſa**, æ. g. f. 1. Graba, jama. Colum. foſſas munimine cingere, tverditi vokol grabe. Ovid. foſſæ labrum, kray, vuſzta jame, ali grabe. Cic.	**Foſsa,** æ, f. Cic. Fŏvĕa, eæ, f. Plaut. Graba, Jama. e. Grub r. Graben...
fossatum	x	X	X	**Foſſatum**, ti. g. n. 2. p. p. Graba id. Plin. 2. Sancz. Veg.	x

fovea	**Fouea**, Foſſa, Grueben, Yama	**Fouea**, Foſsa, Yama	**Fovea** .. jamma. (…)	**Fovea**, æ. g. f. 1. Jama, duplye. Plaut. (...)	**Fŏvĕa,** eæ, f. Plaut. Vid. Foſſa. 2. Vid. Fraus (/)
imbordescando	x	X	X	x	x
imbordescari	x	X	X	x	x
maceria	x	X	**Maceria. Maceries** .. gromaççа. týn. ſuhi zid. **Maceriâ munire, cingere. Maceriam erigere** .. gromaççiti. **Maceriâ munitus, a, m** .. ogromaççen, a, o.	**Maceria**, æ, & Maceries, ei, f. s. Szuhi zid prez morta. v. Gomila in Illyr. Zid okolu vinograda, ali verta. Col. 2. red zubih vlaloke (?). 3. quod maceratio.	**Māčĕrĭa,** æ, f. Cic. Maceries, ēi, f. Adran. apud Non. Zìd prez vapna. y péſzka ſztojechi; ſzuhi iz ſzamoga kamena nanizani zìd; okolo Terſzja zìd, ogradja, oberßje. e. Mauer von trockenen Steinen, ohne Pflaſter oder Kalck; e. Weinberg-Mauer.
magazenum	x	X	X	x	x
mantellum	x	X	X	x	x
masserie	x	X	X	x	x
merletus	x	X	X	x	x
merli	x	X	X	x	x
merlus	x	X	X	x	x
moenia	**Mœnia**, Muraglie, Die ringmaur, Gradzki zidi	**Moenia**, Muraglie, Gradzki zidi	**Mœnia**, orum [→ ium] .. bedeni. mîri. gradſki zîdi. naſipi.	***Mœne,** is. plur. Mœnia, ium, n. Zid, zidi. Enn. apud Feſt. mœnibus cingere, zido opaſzati. it. poſtanye, baſte, ſanczi ivergye.	**Mœnĭa,** ĭum, n. plur. Cic. Zídi okolo Varaſſa, gradzki zídi, kamenzka gradya. e. Stadt-Mauer, Ring-Maur. ***Moene,** is, n. Ennius apud Feſtum. Vid. Murus.
municipium	x	X	**Municipium** .. Grad. Meſto. Varos. Ki ima pravice od Poglavnika.	**Municipium,** ii. n. Meſzto, kô oſzebuyne pravicze ima. 2. vkup purgarſztvo. J. C.	**Mūnīcĭpĭum**, ii, n. Cic. Gràd, Meſzto, Varaß ſzvoje pravicze y ſzudni ſztol imajuchi, ſzamo kralyu ſzvômu podloſen. 2. Varaſſanſztvo. Ein Flecken oder Stadt, ſo das Burger-Recht und ſein eigen Gericht hat, die einem Fürſten oder König untervvorffen iſt. 2. e. Burgerſchafft. (...)
munimen	x	X	X	**Munimen**, nis, n. p. p. Tvergya, jachina, braniſche. (D.) obrana. Veger.	**Mūnīmen**, ĭnis, n. Virg. Tverdyava, báſta, obramba, zavetje, (?)achína, ogradya za obrambu. peregr. Feſztunga. r. Schirm, Schutz, e. Veſtung, Paſtey, Schantz, s. Bollvverck. (...) Vid. Vallum, Fortalitium
munimentum	**Munimentum**, Reparo, Bevvarung, Brana	**Munimentum**, Reparo, Brana	**Munimentum** .. brana. obramba. tvyrdjava. jaçara. zagradja. tvyrdja. tvyrdína.	x	**Mūnīmentum**, ti, n. Caſ. Vid. Munimen.
munitio	**Munitio**, Munitione, Veſte/bolvverk, Tvardina	**Munitio**, Munitione, Tvardina	**Munitio** .. tvyrdjenje. brańenje. zagradjanje.	**Munitio**, onis. v. Munimentum. Sall.	**Mūnītio**, onis, F. Cic. Vid. Munimen.
mura	x	X	X	x	x
murus	**Murus**, Muro, Maür, Zÿd	**Murus**, Muro, Zijd	**Murus** .. Zid.	**Murus**, ri, m. Zid. [D. it.] mir. 2. Met. obramba. it. Defenſor. Ovid. 3. vuza. Concil. hinc immurare, zazidati, ú vekivechnu vuzu poſztaviti.	**Mūrus,** i, m. Cic. Zìd. E. Maur.? 2. Transl. V. Præſidium, tutela, agger &c.
oppidum	**Oppidum**, Cittadella, Statt, Graad	**Oppidum**, Cittadella, Graad	**Oppidum** .. Meſto. Grad. Varos.	**Oppidum,** di. n. p. c. Menſſi varas, purga priproſzteja, tergoviſche. cingere oppida muris, varaſzce obzidati. Vir. 2. quod carcer equorim in circo. Var.	**Oppĭdum**, i, n. Cic. Tergoviſche. r. Markfleck. Város. Vid. Urbs, Civitas. ità Cic. (...)
palizzatum	x	X	X	x	x
pallada	x	X	X	x	x

pallificata spirata	x	X	X	x	x
parapectum	x	X	X	x	x
partegete	x	X	X	x	x
pietre merze	x	X	X	x	x
posterla	x	X	X	x	x
posterula	x	X	X	**Poſterula**, ae, f. p. c. Zadnyi vrata. Amia. per poſterulam excedere, chez zadnya vrata vun ziti.	x
praesidium	**Præſidium**, Guardia, Schirm, Brana	**Præſidium**, Guardia, Brana	**Præsidium** .. zasćit. zasćitje. zasćita. bramba. obramba.	**Præſidium,** ii. n. Tvergya, ſancz, gragya. collocare armatos in præſidiis, vu tvergye poloſiti oboruſne. Cic. præſidium agere, na ſztraſe ſztati. Tao. 2. Met. obramba, pomoch. firmo amicorum præſidio regi, dobru obrambu, od priatelov imati. Cic. præſidium gerere, dati pomoch. Plin. præſidium ſenectus is, ſztaroſzti pomoch, palicza.	**Praesĭdium**, ii, n. 1. Vojniki, ali kupchina vojnikov za ſztrá?u y chuvanye gráda &c. e. Besatzung, Guarnison. (...)
propugnaculum	**Propugnaculum**, Forte, Veste/Boll-vverch, Brana	***Propugnaculŭ**, Fortezza, Brana	**Propugnaculum** .. Tár. basta. brana. tvyrdjava.	**Propugnaculum**, li, n. p. c. Baſta, braniſche. propugnaculum contra hoſtium impetum, baſta, ſancz proti nahrupe nepriatelſzke. Cic. 2. propugnaculo alicui eſſe, na pomoch obrambu nekomu biti. Cic.	**Prōpugnācŭlum,** i, n. Cic. Braniſche, Zavetje, Bálta. e. Veſtung, s. Bollvverck, e. Paſtey. Várta, Báſtya. v. Præſidium N. z. Hinc Transl. V. Defenſio, præſídium N. z. Alicui eſſe propugnaculo. Cic. Kômu za obrambu biti. Eines Schutz und Schirm ſeyn. (...)
puteus	**Puteus**, Pozzo, Brunnen, Sztudenacz	**Puteus**, Pozzo, Sztudenacz	**Puteus** .. zdenac. ſtudenac. kalić. izvar. (...)	**Puteus**, ei, m. & Puteum, ei, n. apud. Non. Zdenecz. (D) bunar, ſztudenacz, proprië zkopan v-zemlye, kiſze neoteche. Puteus altus, glubok zdenecz. perennis jugis aquæ, nepreſzußni zdenecz.? ? aquam de puteo, zajeti vodu iz dencza, temnicza. V. Carcer. Plaut.	**Pŭtĕus,** ĕi, m. Cic. Zdenecz, ſztudenacz, zvirajuchi vàn pak metekuchi zdenecz. r. Sod-Brunnen, Zieh-Brunnen.
rastrella	x	X	X	x	x
reductum	x	X	X	x	x
revelin	x	X	X	x	x
rocca	x	X	X	**Rocca**, ae, f. Grad na pechine zezidan. Leo Oſtar.	x
rocha	x	X	X	x	x
saracinesca	x	X	X	x	x
sponia	x	X	X	x	x
suburbium	**Suburbium**, Borgo, Vorstatt, Varos	**Suburbium**, Borgo, /	**Suburbium** .. podmeſtje. podgrádje. **Suburbium ante civitatem vel arcem** .. predmeſtje. predgradje. pridgrad. pridgradi. **Suburbium post Civitatem vel arcem** .. Zagrad. Za(d)gradje. Zameſtje.	**Suburbium,** ii. n. podvaras, zvunſzki varas. in ſuburbium ire, ú zvanſzki varas iti. Cic.	**Sŭburbĭum**, ii, n. Cic. Zvunzki Varaß, Predvaraß, Podvaraßje. e. Vorſtadt. Hóſtát.
terreleum	x	X	X	x	x
torricella	x	X	X	x	x
trincea	x	X	X	x	x
turris	**Turris**, Torre, Turn, Turan	**Turris**, Torre, Turan	**Turris** .. Kula. baſta. turran. **Turres. ad Turres** .. Cirkvenica. Crikvenica. **Turris, ex qua in urbem aqua deducitur** .. Vodarnica.***Turri**	**Turris**, is, f. in acc. turem, l. turrim. Turen. Gell. ***Turricula,** ae, f. p. c. dim. Turnichek. Pall.	**Turris**, is, f. Cic. Turen. r. Thurn. Torony.***Turrĭcŭla,** æ, m. Turnar. r. Thurner. Tornyos. ***Turrĭcŭla,** æ, f. Vitruv. Turníchek, turnecz. Kleiner Thurn.

			cula .. Kulicca. bastica. turnac. turnić.		
urbs	**Vrbs**, Città, Statt, Graad	**Vrbs**, Città, Graad	**Urbs** .. Grad. Meſto. Varos. **Urbs excisa, eversa** .. Varos zatyrt.	**Urbs,** bis. f. Varas okolu obzidan. urbs vetuſtate famáque conditorum inclyta, ſztar glaſzoviti varas. Curt. urbs urbium, ſztalen varas. Flor. 2. quod Civitas, l. cives. Vir.	**Urbs**, bis, f. Cic. Varaß obzídan, Gràd. e. Stadt. Kerített város. (...)

Table 7 Croatian confirmations

natuknica	**Kašić, 1599. (izd. 1990.)**	**Mikalja, 1649./1651. (izd. 2012.)**	**Habdelić, 1670. (izd. 1989.)**	**Belostenec, 1740. (izd. 1998.)**	**Voltić, 1802. – 1803.**	**Stulli, 1806. (izd. 1985. – 1987.)**	**Parčić, 1858. (izd. 1995.)**	**Šulek, 1874. – 1875. (izd. 1990.)**
barbakan	x	x	X	X	x	x	x	***Barbacane**, arch. babica.
bastion (baluardo, bastha, bastaji)	x	x	**Baſta**. Propugnaculum. li. n.	**Báſta**, Braniſche. Propugnaculum, li. Munitio. 2. v. Szamar.	x	x	x ***Bastija**, f. bastione.	***Bastione**, hist. bránište. **Baluardo**, hist. bránište. **Baſtei**, Baſtion, arch. bránište.
bedem / beden	x	x	X	X	x	**Beden**, ena, m. Matt. mura della città, mœnia civitatis.	**Bedem**, m. muro (di città); bastione. **Beden**, m. muro (di città); bastione.	**Bedem**, hist. lat. allum, Wall, frc. côte rivage; egl. mound, shore, tal. vallo.
brana	**Brânà**, aé, f. brana. Diffesa.	**brana**, braniteljstvo – difesa, protettione – patrocinium, ii; defensio, onis	**Brana**, Occa, a, f. Brana, obramba. Defenſio, is f. Tuitio, is, f. Tutamen, nis, n.	**Brána**. Occa, æ. cratis, is. 2. bràna, obrana, obramba, braniſche, [D. it.] obara. propugnatio, onis, propugnaculum, li, munimentum, præſidium, tutamen, tuitio, defenſio. v. Branenye.	**Brana**, ne, f. obramba; braniscte - difesa, bastione, fortezza - Festung, f.	**Brana**, e, f. Gund. difesa, patrocinio, è anche istrumento de' villani, con cui spianano i solchi, defensio, patrocinium, tutela, propugnaculum, præsidium, irpex, crates occatoria.	x (različito značenje) ***Branba** , f. difesa.	**Brana**, mech. arch. slap, Überfallswehr, Streichwehr, tal. steccaja, frc. fleur d' eau, egl. waste-weir; brana s ustavom, Überfalls=Schleuſenwehr; uzporna brana, Stauwehr.
branič-kula	x	x	X	X	x	x	x	x
bránište	x	**bránište** – riparo, difesa – propugnaculum, i; munimentum **bránište od kra(j)ine** – frontjera – propugnaculum, i.	***Branituo**. Patrociniu m, ij, n.	x	x	**Braniscte**, a, n. Del. bastione, fortezza, forte, riparo, propugnaculum, munimen, terreus, vel saxeus agger. ***Branisctvo**, a, n. Gjorg. bastione, fortezza, forte, riparo, propugnaculum, munimen,	**Bránište**, a, n. bastione; riparo; prsno -, diaframma. ***Bráništvo**, a, n. 1) patrocinio, tutela; 2) difesa. ***Branik**, m. 1) baluardo, trincea;	**Bránište**, arch. Vertheidigungswerf, frc. ouvrage défensif, egl. defensive work; Baſtion, Baſtei, Bollwerk, tal. baluardo, bastione, egl. frc. bastion.

						terreus, vel saxeus agger...		
burg	x	x	X	X	x	x	x	**Burg**, hist. grad.
cisterna (čatrnja, četrn(j)a, gusterna, isterna/ysterna, žusterna)	x	**čatrnja**, **žl(i)jeb** – canale – canalis, is. ***gustirna** - cisterna - cisterna, ae.	**Cheternya**. Ciſterna, æ, f.	**Guſterna**. v. Vodoſzrana.	x	***Gustjērna**, Del. V. vodoshranna.	**Čatrnja**, f. (it.) cisterna, pozzo. **Gusterna**, f. V. Gustierna. ***Gustierna**, f. (it.) cisterna.	***Cisterne**, mech. čatrnja; v. Waſſerbehälter. **Čatrnja**, arch. mech. Ciſterne, frc. cisterne, egl. cistern; v. Vodnjak.
citadela	x	x	X	X	x	x	x	x
čardak	x	**čardak**, stražak – poggjolo, logetta – moenianum, ni; podium, ii; lygellum, li; solarium, ii **čardak od dasak** – solajo di legno – tabulatum, i.	***Cherdak**. Solarium, ij, n. Pergula, æ, f.	**Chardák**. Priſztroſsek zrachni radi razvetrenya, (D. ſètnicza, ſzunchenicza. Pergula, altana, ? ſolarium.	**Csardak**, ka, m. – altana, balcone, poggiuolo – Altane, f.	**Csardàk**, àka, m. solajo, loggetta, tabulatum, contabulatio, contignatio.	**Čardak,** m. 1) balcone, altana, terrazza (sul tetto); 2) capanna sui pali; loggetta da guardia; 3) granajo (pel formentone).	**Čardak**, arch. kladara, Blockhaus, egl. loghouse, tal. casotto.
doksat (archel, erkel, farkyl, habernik, serkel)	x	x	X	X	x	**Doksat**, sara, m. Buk. I. scala, scalæ.	**Doksat**, m. altana, poggiuolo; solajo. **Habernik** (i Haberdak i Haberdar), m. 1) schioppo o canone d' allarme;	**Doksat**, arch. Balkon, tal. balconata, balcone.

dvor/dvori	x	**dvor**, pridvorje – corte, entrata di casa – atrium, ii; oecus, ci; impluvium, ii; cavum aedium; cauedium, ii; **dvor kraljev** – corte del principe – regia, ae; aula; ae; **dvor općenski za činiti viće** – corte, luogo da consultare le cose publiche – curia, ae; **dvor od polača** – foro del palazzo – forum, ri	**Dvor**. Aula, æ, Curia, æ, f ***Dvor orʃzachki, ali varaski.** Prætorium, ij, n. Aula. Curia civica, æ, f. ***Dvor kralyeuʃzki.** Regia, æ, f. ***Dvorno meʃzto.** Curia nobilitaris.	**Dvór**, plur. Dvori, (D. it.) Dvorovi. Aula, curia, æ. 2. dvor Papinʃzki, (D.) Papini dvori, aula pontificia. 3. dvor kralyevʃzki, (D.) kralyevi dvori, aula regia. 4. dvor orʃzachki, ali varaski, prætorium, ij, curia civica. 5. dvor plemenʃzki, curia nobilitaris. 6. dvor, pridvorje, ili dvoriʃche, atrium, ij, area, æ. 7. prædium, ij.	**Dvor**, ra, m. – corte, cortile, e reggia – Hof, u? (m/n), Pallast, m.***Dvorje**, ja, n. – cortile – Hof, m.	**Dvōr**, ōra, m. Palm. palazzo, curia, corte, palatium, ædes, curia, aula, regia.**Dvōri**, orū, m. pl. portone, ingresso, cortile, atrio, corte, aditus, ingressus, introitus, porticus, a rium (sic!), cavædium, regia.	**Dvor**, m. (pl. dvori e dvorovi) 1) corte, cortile; 2) reggia; palazzo sontuoso (reale): -fig. (coll.) persone componenti la corte del re, i cortigiani; nebeski -, curia celeste; na -, (di moto) fuora; na -u, (di quiete) fuori; s -a, dal di fuori.	**Dvor**, hist. Schloß, tal. castello; držanje dvora, Hofhaltung.
dvorac	x	x	X	X	x	**Dvōrac**, ōrca, m. V. dvorìch. Dvorich, ika/iha?, m. corticella, corticino, parvum impluvium, parva aula.	**Dvorac**, rca, m. (dim.) villa, casino di campagna, masseria.	**Dvorac**, arch. frc. maison de campagne, mésuage, egl. rural mansion, tal. campagna, villa, Landhaus.
erker (izljevnica, mašikuli, pechnase)	x	x	X	X	x	x	x ***Izljevak**, vka, m. colatojo della gronda.	**Erker**, Erkerfenʃter, arch. frc. fenêtre en saillie, fenêtre en tribune, egl. compass-window, somin, jut-window, pomolak sl.
eskarpa	x	x	X	X	x	x	x	**Escarpe**, arch. v. Böʃschung. Böʃschung, mech. arch. Cf. Schräge, Schmiege, Abdachung, frz. escarpe, adossement, talus, egl. sloping, poškalj, pokos, pošik, strmina; ocied (f.)
falsabraga	x	x	X	X	x	x	x	x
fasa	x	x	X	X	x	x	x	x
flanka	x	x	X	X	x	x	x	x

fleša	x	x	X	X	x	x	x	x
fontik / fundik	x	x	X	X	x	x	x	x
fortifikacija	x	x	X	X	x	x	x	**Fortificamento**, Fortificazione, arch. hist. utvrdjivanje, utvrdba. Fortification, hist. arch. utvrdjivanje, utvrdba. ***Fortezza**, hist. tvrdjava; di fortezza, tvrdjavni, tvrdjavski; stil. krepkoća, snažnost; čilost.
glasija	x	x	X	X	x	x	x	x
graba (ark, aruk, fojba, fosa, fovea, fusat)	***endek**, prokop oko grada – fosso – vallum, li; agger, is; fossa, ae	x ***endek**, prokop oko grada - fosso - vallum, li; agger, is; fossa, ae.	**Graba**. Foſſa, æ, f. Foſſatum, ti, n. *Graba potochna. Alveus, ei, m.	**Gràba**. [D.] prokop. Foſſa, æ, Foſſatum, Foſſa, & agger, vallum, & foſſa. 2. graba potochna, [D.] prokop od potoka, foſſa fluvialis, Alveus, ei. v. Slèb.	x	x	**Graba**, f. (ted.) fossa, canale.	**Graben**, mech. arch. lat. fossa, rov, jarak. **Fossa**, arch. (canale naturale), jaruga; (artificiale), jarak, rov; fossa di fondamento, jama za temelj; fosse degli occhi (pl.), zool. v. Orbita. **Fovea**, bot. jama; f. nectarifera, medovište, zool. f. articularis, glenoidea, v. Gelenkgrube, f. axillaris,...
grad	**Grád**, da, m. grad. Città.	**grâd**[1], mjesto – città – urbs, bis; civitas, is; oppidum, di **grad glavni** – città principale, metropoli – metropolis, lis **grad obzidan mirima** – città murata – urbs muris armata **grad, tvrda, tvrdava** – fortezza, castello – haec arx, cis; castrum, i	**Grád**. Arx, cis, f.	**Gràd.** v. Tucha. 2. Grâd. [D.] Tuargya. Arx, cis, caſtrum, tri. prov. ki na zraku grade zida, videtie malo prida. Ritt. 3. Kay ſzlovenczi, y horvati imenuju grad, to dalmatini, y primorczi zovu, y derſe za varas, kaytiſze ù nutre grade, tak imenuju grad, kaſtel. 4. gràd utvergyen zidmi. Arx,	**Grád**, da, m. – città – Stadt, f. **Grad glavni** – metropoli, capitale – Hauptstadt, f.	**Grād,** āda, m. Lex. r. città, civitas, urbs - grād glàvni, città principale, metropolis, civitas princeps - grād razvāliti, shàrati, satârti, distruggere la città, urbem devastare - na grād ùdriti, grādu jurisc datti, grād ârvati, na grād nastūpiti, Gund. assaltar una città, urbem oppugnare - grād doârvati, assaltar, e prender la città, urbem expugnare.	**Grâd**, m. 1) castello; 2) città (cinta di mura); - fig. popolazione, abitanti di città; glavni -, la capitale. Gradac, dca, m. castello (in luogo elevato).	**Grad**, hist. Burg, tal. castello, rocca; ggr. stat. eine befeſigte Stadt, tal. città fortificata. Cf. Varoš; primorski grad, Seeſtadt, tal. citta marittima; rudarski grad, Bergſtadt; glavni grad, Hauptſtadt, tal. capitale, metropoli; glavni grad pokrajine, Provincialhauptſtadt, tal. capitale; (prie-) stolni grad,

				l. eivitas muris armata, & munita, &c. 5. gràd poglavit, përvoſztoln i. metropolis.				priestolnica, Resſidenzſtad t, tal. dominante; slobodni grad, Freiſtadt.
gradina	x	**gradina**, ograda – steccato, luogo circondato de siepi – septum, pti; sepimentu m, ti.	X	X	x	**Gràdina**, e, f. steccato, luogo circondato d? siepi, rocca grande vecchia, vallum, septum, septio, munimentum, arx magna vetus.	**Gradina**, f. 1) rovine di antico castello;	Gradina, hist. (Burg=) Ruine, tal. rovine (di castello); gradine (pl.), Ruinengruppe .
hambar	**Hamb ar**. hambar . Granar o.	**hambar**, žitnica - granajo - hoc horreum, ei; cella frumentaria .	**Hambar**. Cella frumentaria , Conſervator ium frumenti, Granarium, ij, n.	**Hamba**r, ſitnicza. Granarium, ij, Ænopolium , Cella frumentaria , Conſervator ium frumenti.	**Hambar**, bara, m. – granajo – Scheune, Kornboden, m.	**Hambar**, ara, m. Mul. V. xìtnica.	**Hambar**, m. V. Ambar co' deriv. Ambar, bra, m. (it.) ambra.	**Hambar** (vulg.), arch. V. Žitnica.
jama	**Yama**, f. jama. Fossa.	**jama** - fossa - fovea, ae; hic et hae scrobs, bis / jame za držati žito - fosse per tener il granp - siri, orum.	**Iama**. Foſſa, æ, f. Foramen, nis, n. Fovea, æ, f. Scrobs, bis, m/f ***Podkop**. Suffoſſio, onis, f. Minæ, arum, f. Cuniculus, li, m.	**Jàma**, Rupa. Foſſa, æ, foramen,fo vea, ſcorps, ſpecus. (...)	**Jamma**, me, f. – fossa, spelonca, vuoto sotterraneo – Graben, m., Kluft, f.	**Jamma**, e, f. fossa, met. insidie, frode, fovea, fossa, fossatum, met. fraus, dolus, insidiæ - jammu iskopatti, izdūbsti, far una fossa, foveam excavare - jammu komu izdūbsti, macchinar inganno a qualcheduno, insidias alicui parare - jamma bezdna, abisso, fovea, fundo carens (idest maxima profunditas).	**Jama**, f. 1) fossa, buca nel terreno; - fig. abisso, baratro;	**Jama**, arch. Grube, tal. fossa; jama za temelj, Grundgrube, tal. fossa di fondamento; (…)

jarak	x	**Jarak**, brazda za vodu - canale - incile, is; incilis, is; canalis, lis; aquagium, ii; sulci aquarii; elices / jarak, nasap - bastione - vallum, i; propugnaculum, i; agger, is / činiti jarak, nasap - far bastione - aggero, as.	X	**Jarëk**. Vallis, is. 2. jarek med ſzlogmi, Razgon, gda plug brazdu od meche (D.) Griblya. Sulcus, ci, procijſſio terræ. A negda y brazdaſze zove. 3. jarek herbteni med plechi. Inter ſcalpilium, ij. 4. jarek vodeni. (D.) Prokop, Canalis, is, aquagium. v. Graba.	**Jarak**, rka, m. – solco, canale, acquidotto – Wasserleitung, Rinne, f.	**Jàrak**, ārka, m. bastione, propugnaculum, terreus, vel saxeus agger.	**Jârak**, rka, m. canale secondario, gora, fossato; - fig. grinza, solco (sulla pelle).	**Jârak**, (subst.) arch. (Straßenb.), (rov), Straßengraben, tal. rigagno, rigagnolo, frc. ruisseau de rue, rigole de pavé, egl. gutter, trench; Graben, frc. fossé, tranchée, egl. ditch, trench; (iz)kopati jarak, Graben ziehen, tal. tirar un fosso.
kaponir	x	x	X	X	x	x	x	x
kastrum/castrum	x	x	X	X	x	x	x	x
kaštel	x	**kaštio**, kula - castello, rocca - arx, cis	**Kaſtel**. Caſtellum, li, n.	**Kaſtel**. (D.) Metericz, mala tvergya. Gradich. Caſtellum, li, caſtrum, ſtri.	x	x	x	**Castello**, hist. grad, dvor; mec. bijača, zabijalo. Kaſtell, hist. ggr. vis.
kavalir	x	x	X	X	x	x	x	x (razl. značenje) ***Cavallatura**, arch. rogovlje.
kazamat	x	x	X	X	x	x	x	**Casamatta**, arch. (svedena) zemunica. **Caſematte**, arch. (svedena) zemunica.
kineta	x	x	X	X	x	x	x	x
kontra(e)skarpa	x	x	X	X	x	x	x	x
kontrabedem	x	x	X	X	x	x	x	x ***Contrammuro**, arch. pozid.
kontrafosa	x	x	X	X	x	x	x	x
kontragarda	x	x	X	X	x	x	x	x
kontramina	x	x	X	X	x	x	x	x
kortina / kurtina	x	x	X	X	x	x	x	x
krunište	x	x	X	X	x	**Krunnìscte**, a, n. merlo, parte superiore delle muraglie, pinna.	**Krunište**, a, n.merli (sulle torri).	**Krunište** St., arch. Zinne, tal. merlo, corona.

kula	x	**kula**, kaštio - castello - castrum; haec arx, cis; castellum, i	X	**Kúla**, braniſche. Propugnaculum, li.	**Kula**, le, f. – torre – Thurm, m. ***Kulica**, ce, f. – torretta, torricella, torruccia – Thürmchen, n.	**Kula**, e, f. Och. castello, rocca, torre, castellum, oppidum, arx, turris. ***Kulica**, e, f. Del. castelletto, castelluccio, oppidulum, parvum oppidum, parva arx, turricula.	**Kula**, f. torre, castello; brbljati na kule na vile, tessere una tiritera; obećati zlatne -e, promettere mari e monti.	**Kula**, hist. Zwinger.
kurija	x	x	X	X	x	x	x	x
lagum	x	x	X	X	x	x	x (različito značenje)	**Lagum**, arch. (gat), Bergkeller;
lineta	x	x	X	X	x	x	x	x
magazin (magacin, magazen)	x	**magacin**, mjesto gdi se stavljaju trgovine - magazeno - promptuarium, ii; cella promptuaria.	**Magazin**. Promptuarium, ij, n. Cella promptuaria, communiter pro ſale conſervando.	**Magazín**. Promptuarium, ij, pennuarium borreum, promptuaria cella, conſervatorium rerum venalium, præcipuè ſalis.	x	x	x	**Magazin**, merc. frz. magasin, spremina, spremište, vulg. magaza; phys. magnetiſches M, magneće. Magazzino, merc. spremište, spremina;
meteriz	x	x	X	X	x	**Metèriz**, iza, m. Gund. castello, forte, castellum.	**Meteriz**, m. 1) trincea, terrapieno; 2) imboscata.	x
mir	**Mîr**, rà, m. mir = zid. Muro.	**mir²**, zid - parete, muro - hic paries, tis; murus, ri / **mir gradski** - muraglja della città - moenia, ium / **mir tvrdi** - muraglja forte - murus firmissimus / **mir star** - muro vechjo - parietina, ae (...)	X	X	x ***Mirine**, nā, f., pl. – casaccia, mura diroccate – eine alte baufällige Mauer.	**Mīr**, īra, m. (...) Ragn. muro, muraglia, murus, mœnia, ium - mīre tvârditi, fortificar le muraglie, mœnia firmare (...)	x ***Mirina**, f. muraglia in rovina, muraccio; -e (pl.) rovine, ruderi (di edifizj antichi).	x
municion	x	x	X	X	x	x	x	x
munimenta	x	x	X	X	x	x	x	x

nasip	x ***Nasap**. nasap = nasip. Argine.	**nasap**, zasutje - bastione, belluardo - vallum, i; propugnaculum, i; agger, ris	**Naſzip**. Agger, ris, m. Aggeſtio terræ. Vallum, li,n. *Breg ali náſzip ki vodu zderſava, daſze nerazleje. Choma, tis, n	**Naſzip**. Agger, aggeſtio, ſeptum, vallum, ſubſtructio. k-naſzipu ſzpadajuchi, vallaris, e. naſzip chinim, aggero, aggerem ſtruo. z-naſzipom obgragyen, Convallatus.	**Nasip**, pa, m. – terrapieno – Erddamm, m.	**Nasìp**, Br. gl. V. nasàp. Nasàp, àpa, m. Gund. argine, agger, vallum, septum.	**Nasip**, m. V. Nasap. Nasap, spa, m. 1) terrapieno argine; 2) interrimento, rinterro (per alluvione).	**Nasip**, arch. (sip, gat), Damm, frc. barrage, jetée, levée, egl. mole, bank, dam, tal. argine, diga; riparo, chiusa; plosnat nasip, platter Damm; kamen nasip, Steindamm, Steindeich; frc. digue de pierre, egl. pier, mole; nasip za silu, za nevolju, Rothdamm.
ograda	**Ogràda**, ae, f. ograda. Munitione. ***Obvala**, ae, f. obvala = ograda. Branco, Bastione.	**ograda** - riparo d' intorno - vallum, i	X	x ***Ogràja**. Conſeptum, vallum, perybolus.	**Ograda**, de, f. – steccato, cancello – Verschluss, m.	**Ogràda**, e, f. Palm. riparo d' ogn' intorno, recinto, septum - pòd ogràdom gradskieh mirā pustòscna se spilla vidi. (isto piše i za: Ogrād, àda, m. Gjorg.; piše i: Ogràja, Hab. V. ogràda).	**Ograda**, f. 1) ricinto; balaustrata; 2) chiudenda, riparo fatto con siepe; campo cinto da muro; 3) cortile; - oko mjeseca, alone (intorno alla luna).	**Ograda**, arch. (zagrada), frc. enceinte, Einfriedigung, tal. ricinto; chiudenda, chiusa, v. Zagrada; (pregrada), Schranke, frc. barre, egl. bar, tal. barriera; (…)
opkop	x	x ***prokop**, obrov - fosso - vallum, i; fossa, ae; agger, ris / **prokop suproć prokopu** - contra mina - cuniculus aduersus.	X	X	x	x	x	x
oružarnica	x	*oružje (…) **mjesto gdi se oružja drže** - armamento - armamentarium, ii.	***Orusja meſzto**, Zachuvanye, puskarnicza. Armamentarium, Armorum conſervatorium, ij, n.	***Orusnìcza**. Puſkarnicza. Armentarium. za oklopje, zaboria.	***Oruxnica**, ce, f. – armería – Zeughaus, n.	***Oruxjeshranìscte**, &c. V. oruxìscte &c. ***Orūxnica**, e, f. Lex. r. oruxìscte. ***Oruxìscte**, a, n. armamentario, armamentarium.	**Oružarnica**, f. armeria, arsenale di armi.	***Oružana**, stat. oružaona, Zeughaus, tal. arsenale, frc. egl. arsenal, tal. arsenale, rſenal; v. Oružaona. ***Oružaona**, stat. Zeughaus, egl. frc. arsenal.

palača	**Polaca**. polača = palača. Palazzo.	**polač**, dvor - palaggio - palatium, ii / polač cesarov - palazzo dell' imperatore - domus Augusta; Augustale; belica / polač kraljev - regja, palzzo del re - regia, ae, aula regia; domus regia / polač sudca - palagjo del podestà - praetorium, ii.	**Palacha**,. Palatium, ij, n.	**Palàcha**. Palatium. v. Polacha.	**Palacsa**, cse, f. – palazzo – Palast, m.	**Palàcsa**, Hab. V. polàcsa. Polàcsa, e, f. Gund. palazzo, ædes, palatium - jednakose od nje tlacse siromàscke kuchàrice, i kraljevske polàcse.	**Palača,** f. (it.) palazzo.	**Palača**, arch. lat. palatium, Palaſt, frc. palais, egl. palace, tal. palazzo, palagio. Palaſt, arch, lat. palatium, frz. palais, egl. palace, palača.
palanka	x	x (različito značenje)	X	**Palányek**. Palanka. Vacerro, vallus, palus. ograja iz palankov, palifacatio, palamentum, palitium, cervi, cervuli, ſudes præfixæ, cippi, palifacata.	x	x	**Palanka**, f. castello, borgata.	x
palas	x	x	X	X	x	x	x	x
palisada	x	x	X	X	x	x	x	x
podgrađe	x	x	X	X	x	**Podgràdje**, a, n. territorio d' una città, borgo, suburbanum, suburbium.	**Podgradje**, a, n. suburbio.	x
polubastion	x	x	X	X	x	x	x	x
polukula	x	x	X	X	x	x	x	x
ponton	x	x	X	X	x	x	x	x (različito značenje)
predzide	x	x	X	X	x	x	**Predzidje**, a, n. antemurale.	x
propugnakul	x	x	X	X	x	x	x	x
prsobran (parapet, prizid)	x	x	x	x	x	x ***Prizidānje**, a, n. fabbrica del muro di mezzo, parietis intermedii constructio.	**Prsobran**, m. 1) parapetto; 2) pettiera.	**Parapet**, arch. tal. parapetto, Bruſtwehr, perut Sb.; (Parapetmauer), zidac; v. Geländer. Parapetmauer, arch. zidac. Parapetto, arch. naslon, zabralo, perila (pl.); perut,

								parapet; (di muro), zidac.
puškarnica	x	x	**Puskarnicza**. Armamentarium, ij, n.	**Puſkarnìcza**. Armamentarium, balijſtariu, officina armorum, muralium tormentorum conditorium, veterarium, zaboria.	**Pusckarnicza**, ce, f. – armería – Zeughaus, n.	**Pusckàrica**, o Puskārnica, e, f. feritoja, barestiera, buco nelle muraglie, per dove si tira al nemico, foramen in muris ballistis igneis aptandis, collocandis.	**Puškarnica**, f. 1) feritoja, fuciliera; 2) fabbrica di fucili.	x
rastel / raštio	x	x	X	X	x (različito značenje)	x	x	x (različito značenje)
ravelin / revelin	x	x	X	X	x	x	x	x
reduta	x	x	X	X	x	x	x	x
redvi	x	x	X	X	x	x	x	x
refugij	x	x	X	X	x	x	x	x
rog / roglje	x	x (različito značenje)	X	x (različito značenje)	x	x (različito značenje)	x	x (različito značenje)
roka (rocca)	x	x	X	X	x	x	x	**Rocca**, hist. ggr. višegrad; tec. preslica.
rondel	x	x	X	X	x	x	x	x
skoša / skarpa	x	x	X	X	x	x	x	x
stražarnica	x	***stražak**, mjesto odkle se pazi - vedetta - specula, ae..	***Straſnicza**. Specula, æ, f. Vigilia, æ, f.	X	***Straxnica**, ce, f. – guardia – Wachstube, f.	***Straxànica**, e, f. 1. vedetta, o veletta, (luogo dove stà la sentinella, specula, vel vigiliarum casa ***Straxaniscte** &c. a, n. vedetta, o veletta, (luogo, dove stà la sentinella,) specula, vel vigiliarum casa. ***Straxìscte** &c. V. straxanìscte. ***Strāxnica**, Gjorg. V. straxanica.	***Stražarnica**, f. V. Stražara. ***Stražara**, f. capanna di guardia; (mil.) guardiolo, garetta (della sentinella).	***Stražara** (željeznička), arch. Wärterhaus (Giſenb.), frc. maison de gardes, egl. watchman's house; Wächterhäuschen, frc. guérite de garde, egl. watch-box.
strijelnica	x	x	X	X	x	***Strjeljnica**, e, f. Lex r. argine, bastia, agger.	**Strielnica,** f. feritoja.	x
suhozid (mačera, masera, mažera, močira, ćelega)	x	x	X	X	x	x	**Suhozid**, m. i Suhozidina, f. muro a secco.	**Suhozid**, Suhozidina, arch. Landmauer, Trockenmauer, tal. macerie, muro a secco.
šanac	x	x	**Sancz**. Vallum, li, n. Agger adverſus oppugnatores.	**Sáncz**. (D.) Sanacz. Vallum, agger, mœnia, munimentum, munitio, propugnaculum, præſidium, caſtrum,	x	x	**Šanac**, nca, m. (ted.) trincea, riparo, (nelle fortificaz.).	x

				clauſtra, murus, peribolus. **ſancz na ſzpodobu zvezde**. munitio ſtellata.				
tabor	x	**tabor** - steccato, bastione, riparo - septum, ti, vallum, li; agger, ris; propugnaculum, li.	**Tabor**. Caſtra, orum, n. ***Tabor megy ſanczi.** Stativa, orum, n. ***Tabor ſanczi obſztrechi.** Caſtra vallo cingo. .	**Tábor**. Caſtra, orum. 2. tabor vſztanovlyen med ſánczi, caſtra ſtativa, ſtativa, orum. 9. tabor ſanczi obſztiram, caſtra vallo, cingo, aggero. tabor giblyem, caſtra moveo. v. Voyſzka.	**Tabor**, ra, m. – accampamento – Lager, n.	**Tabor**, ora, m. Kemp. trincea, trinciera, vallum.	**Tabor**, m. 1) accampamento: - vojske, corpo d' esercito; **Taborište**, a, n. luogo di accampamento.	**Tabor**, hist. (okol), Lager, tal. campo, frc. egl. camp.
tanalja / tenalja	x	x	X	X	x	x	x	**Tanaglia**, tec. kliešte (pl.)
toranj	***Turan**, rna, m. turan = toranj. Torre.	***turanj**, turan - torre - haec turris, is.	***Turen**. Turris, is, f. *Turnichek. Turricula, æ, f.	***Turen**. Turris, pyrgus. turna ſpicza, turrile, is. pun turnov, turritus. ***Turníchek**. Turricula, æ.	x	**Toran**, orna, m. Gund. torre, turris.	**Toranj**, rnja, m. (it.) torre, o campanile. Turanj, rnja, m. 1) torre; 2) torchio.	**Toranj**, arch. lat. turris, frc. tour (d' église), egl. tower, steeple, (Kirch=) Thurm, tal. torre; jabuka od tornja, frc. boule, pomme, egl. ball, pomel, Thurmknopf, tal. mela (di torre); krov od tornja, Thurmdach, tal. tetto di torre.
trincea	x	x	X	X	x	x	x	**Trincea**, hist. mil. obkop, obrov, prikop, prirov.

tvrđa / tvrđava	x	x	X	**Tvërgya**. Arx, propugnaculum, oppidum munitum, caſtrum, caſtellum, valentiſſĭmum oppidum, locus munitus, acropolis. tvergye jachenye, munitio, communitio, circummunitio, ſolidatio arcis. tvergya iz palankov, palitium, ii.	**Tvardja**, e, f. – fortezza – Festung, f.	**Tvârgja**, e, f. fortezza, arx - trjeskati u tvârgju, batter la fortezza a breccia, tormentis bellicis mœnia quatere - tvârgja spletena od xicce, giacco, lorica. **Tvârgjica**, e, f. piccola fortezza, parva arx.	**Tvrdja**, f.3) fortezza, piazza forte; **Tvrdjava**, f. fortezza (edifizio). ***Tvrdjavica**, f. dim. di Tvrdjava, cittadella. ***Tvrdjel**, i, f. (mil) fortino, cittadella.	**Tvrdja**, ggr. hist. Feſtungswerk, frc. egl. fortification, tal. fortificazione. **Tvrdjava**, hist. stat. Feſtung, tal. fortezza, frc. forteresse, egl. fortress. ***Tvrdjavica**, ggr. stat. (tvrdjica), Fort, tal. castello, frc. egl. fort. ***Tvrdjica**, ggr. stat. (tvrdjavica) Fort, tal. castello, frc. eng. fort.
utvrda	***Tvardinà**, aé, f. tvrdina = utvrda. Munitione (!), munizione.	***utvrđen'je** (…) utvrđen'je koga grada - fortificamento - munitio, is; munimentum, i. ***tvrdina** (…) tvrdina od grada - fortezza di città - munimentum, ti ***tvrdište** - fortificamento - munimentum; munitio; propugnaculum, i; vallum, li.	X	X	x ***Tverdiscte**, ta, n. – trincéa – fester Ort	**Utvârd**, ârdi, f. V. utvârgja. Utvârgja, e, f. Br. gl. fortificazione, solidità, fermezza, munitio, munimentum, firmamentum &c. ***Utvârdjēnje**, a, n. Br. gl. fermezza, firmamento, appoggio, confermazione, prova, fortificazione, munizione, base, firmamentum, firmamen, confirmatio, adprobatio, munitio, munimen, fundamentum. ***Tvârdina**, e, f. Rus. durezza, fermezza, forza, fortezza, fermamento, duritia, durities, duritas, soliditas, vis, fortitudo, firmamentum, propugnaculum. Tvârdja, V. tvârgja ***Tvârdiscte**, a, n. fortificazione, munitio, munimentum, munimen.	**Utvrda** i **Utvrdba**, f. (leg.) convalidazione; (mil.) opere di fortificazione. ***Utvrdina**, f. (mil.) opera di fortificazione.	***Utvrdba**, Utvrdjivanje, hist. arch. Fortification, tal. fortificazione, egl. frc. fortification. ***Tvrdina**, arch. feſter Untergrund, gemachſener Boden, tal. sodo

varoš	**Varosc**. varoš. Borgo.	**varoš**, mjesto - borgo, castello - castellum; oppidolum; terra, ae / varoš oko g[r]ada - borgo della città - suburbium, ii.	***Varas**. Civitas, tis, f. **Varas perv**i, glauni u orʃzagu. Metropolis, lis, f. **Varaʃecz**. Civitatula. Urbecula, æ, f.**Varas zvunʃzki**, **Oʃtat, Podvara**s. Suburbium, ij, n.	**Váras**. Civitas, urbs, oppidum, reʃpublica, municipium, aʃtu. 4. varas kotarni, urbs finitima, limitanea. 5. varas glavni, ʃztolno meʃzto ú orʃzagu, metropolis. 9. podvaras, zvuneʃʃnyi varas, ʃuburbium.	**Varosc**, sca, m. – città o borgata – Stadt, f.	**Varosc**, osca, m. borgo, suburbium, vicus.	**Varoš,** m. e -i, f. borgo; borgat, città aperta.	**Varoš**, ggr. stat. Stadt, tal. città, Cf. Grad.
vučja jama	x	x	X	X	x	x	x	x
zagrada	**Zagrada**. zagrada = bedem. Bastione.	x	X	**Zagràda**. Conʃeptum, i. v. Ograja.	**Zagrada**, de, f. – fabbrica, edificio – Gebäude, n. ***Zagradje**, ja, n. – borgo, castello – Markflecken, m.	**Zagrada**, e, f. Lex. r. porta, o finestra murata, il metter un riparo, il circondar di steccato &c. janua, vel fenestra muro obstructa,repagulis, septis circumdare, subst. ***Zagradje**, a, n. subborgo, suburbium.	**Zagrad,** m. i Zagrada, f. siepe, barriera; luogo cinto da siepe (o da muro). ***Zagradja**, f. V. Zagrada. ***Zagradje**, a, n. sobborgo, borgata (dietro la città).	**Zagrada**, arch. Einfriedigung, Befriedigung, Umfoʃʃung, frc. enceinte, enclos, clôture, circuit, egl. enclosure, inclosure; stil. V. Zaporka, tal. chiudenda, chiusa.
zamak	x	x	X	X	x	x	x (različito značenje)	x
zbjeg	x	x	X	X	x	**Zbjeg**, ega, m. 1. fuga di molti all' istesso tempo, multorum fuga eodem tempore, 2. rifugio, refugium.	x	x
zid	**Zid**. zid. Muro.	**zid, mir** - muro - paries, tis; murus, ri / zid gradski - muraglja della città - maenia, um	**Zid**. Murus, ri, m. *Zid varaski, gradʃzki. Mœnia, orum, n, pl.	**Zíd**. (D.) Mír. Murus, mœnia, munimen, camentitia ʃtructura. zid ʃzuh prez morta zezidan, maceria, maceries.	**Zid**, da, m. – muro, muraglia – Mauer, f.	**Zìd**, ida, m. Gjorg. muro, muraglia, murus - priko zidā pripētise, uspētise, saltar sopra le muraglie, montar l' assalto, dar la scalata, ad, vel in muros evadere.	**Zid**, m. (pl. -di e -dovi), mure, parete. Zidje, a, n. (coll.) muraglie.	**Zid**, arch. Mauer, Wand, tal. muro, muraglia, frc. mur, egl. wall; (…)
zidina	x	**zidina, mir star** - muro vecchjo - parietina, ae.	X	***Zidi varaʃki, ali gradʃzki**. Mœnia, ?rum.	**Zidina**, ne, f. – muragliaccia – schlechte Mauer	**Zidìna**, e, f. muraccio, parietinæ, arum. Zidje, a, n. muraglia, murus.	**Zidina**, f. aum. di Zid; -ne (pl.) avanzi o rovine di mura antiche.	**Zidine**, (pl.), arch. altes Gemäuer, frc. masure, egl. decayed walling.
žitnica	x	**žitnica**, gernal, rupa od žita - granaro,	x	x	**Xitnica**, ce, f. - granajo - Scheuer, f.	**Xitnica**, e, f. Br. gl. V. xitniscte. Xitniscte, a, n.	**Žitnica**, f. 1) granajo; 2) specie di gramigna.	**Žitnica**, arch. (vulg. hambar), lat. granarium,

		magazino di grano - horreum, ei; cella frumentaria .				granajo, granarium.		frc. grenier, grange, egl. granary, corn loft, tal. granajo, Getreide=Speicher, Schüttkaſten, Schüttboden, Fruchtſpeicher.

4.2 DEVELOPMENT OF EXPERT TERMINOLOGY RESEARCH. THE SECOND PHASE: FOCUS ON NON-CROATIAN TERMS

4.2.1 THE RESULTS OF THE FIRST PHASE AS THE FOUNDATION FOR THE SECOND PHASE

In the sixteenth to eighteenth centuries, the most common terms were in Latin, Croatian and Italian. General terms were easier to trace than specialised terms, due to the nature of the source material. As expected, more terms were found as the dictionaries moved closer in time to the twenty-first century. Therefore, dictionaries from the nineteenth, twentieth and twenty-first centuries had the most confirmed terms. The majority of terms in German-Croatian dictionaries from the nineteenth century were confirmed because only two dictionaries from this period were consulted.

General terms such as *city*, *fort*, etc., were confirmed mainly in historical and contemporary monolingual dictionaries. The biggest, but also quite contemporary sources of confirmation were the monolingual so-called *Great Dictionary* (*Veliki rječnik hrvatskoga standardnog jezika*)[570] from 2015, as well as the historical *Dictionary of the Croatian or Serbian language* (*Rječnik hrvatskog ili srpskog jezika*),[571] published from 1880 to 1976 as a dictionary of references from literature and legal texts, thus especially having conformations from general terms extrapolated from the literature.

The corroborations show how the language(s) have changed over the centuries. Analysis of the data led to certain conclusions about the frequency, duration, and choice of words, as well as the accepted vocabulary for fortifications. Correspondence was found for many specific buildings and related architectural elements. The research has shown that the main cause of terminological problems in Croatian historiography related to fortification architecture is a general lexicographical problem.

One conclusion of the research was the need to acquire several treatises written between the fifteenth and eighteenth centuries in order to analyse the terms comparatively. This would involve comparing linguistic sources with specialist literature. In addition, it was recommended

[570] *Veliki rječnik hrvatskoga standardnog jezika*.

[571] *Rječnik hrvatskoga ili srpskoga jezika*.

that traceable archival sources on fortifications be collected in order to extend the existing multilingual corpus. The acquisition of a sufficient number of comparable terms may lead to further research in other dictionaries, including specialist dictionaries from the relevant period. A possible initiative for future research is to reconstruct the historical multilingual terms that have influenced the Croatian corpus through their circulation, in order to unify them in the standardised language.

In this process, Croatian literature from the sixteenth century and non-consulted Croatian dictionaries from the nineteenth century will be crucial. Literature is the most important transmitter of written and commonly used words, which directly demonstrates the extraordinary range and richness of a language, which could have been better achieved at the official level. Nineteenth-century dictionaries are linguistic sources that reflect the standardisation of the language at that time. The majority of the data confirmed in the *Rječnik hrvatskog ili srpskog jezika* support these conclusions and show how literature has served as a guardian of the spoken word throughout the centuries. Direct confirmations from verses or lines in literary works have helped to preserve the language to this day. Literature is an inconspicuous but widespread transmitter of the language.

4.2.2 THE EVOLVING CORPUS: NEW RESEARCH PROBLEMS

As was previously mentioned, *Glosar* was not Ana Deanović's first work on terminological specificities, but it was the first where she published the data. This data, which consisted of the lists of terms, was expanded during the second phase of this doctoral research at the Institute of Art History in Zagreb and is now part of the Ana Deanović Archive.[572] The Ana Deanović Archive comprises twelve archive boxes, ninety-seven folders, and three photo albums, including a donation of four hundred ninety-five books. The archive is stored according to its original systematisation.[573] Thirty-one out of the thirty-four selected files were identified as

[572] This research will also be published during 2024 in a separate article in Croatian language.

[573] Signature IPU-ADO-AAD. Arhiv Ane Deanović. Property of the Institute of Art History. A primal inventory list was prepared for the collection; the last edition was on July 26, 2017. Irena Šimić created the list with her colleague Ana Marija Sever, and recording began on May 20, 2008, by Andrej Žmegač and Iva Cvitan. In the instructions, it was noted that Ana Deanović separated the material into units that follow the developmental stages of her work.

necessary for future research on fortification architecture in the Eastern Adriatic. Some folders include lists of fortification terms. The twenty-fifth folder[574] contains manuscripts in which Deanović linked the fortifications to the corresponding terms referring to the buildings or their elements. She accurately listed the references where they were used, along with the year and shorter notes for some examples. There is little information on French terms, while many texts have extensive notes on Latin and Italian terms. However, there are only two short typescripts for Croatian terms. Deanović has recorded the documents and literature from which she collected the corpus.

However, while the bibliography following the published glossary contains valuable sources of historical terms, the author could have provided a more detailed description of her methodological framework. As this was the first study of historical fortification terms and the author was not a linguist, more precise data on the sources of individual terms and the reasons for choosing certain synonyms would greatly facilitate understanding and future research. She referred to the centuries when certain terms began to be used with specific meanings but did not provide any further context[575].

Although Deanović had a noteworthy influence on this initial research, a closer examination of the source material, particularly archival records, revealed a unique perspective on the use of French terminology in the Eastern Adriatic. Deanović suggested that French fortification terminology was the second most influential after Italian, especially after the implementation of Vauban's system[576]. However, she only provided one example of a French term, *château*. The language barrier was not the reason for the problem, as most of her traced article drafts and several published articles were in French. In addition, several of her letters were found to be written in French. Deanović was fluent in French and had written extensively on fortifications, which forced her to use the necessary terms. The archives on the eastern Adriatic coast contain numerous collections of material from the years of French rule at the beginning of the nineteenth century. At that time, French terms were used because of the need to strengthen and adapt the fortifications. However, Deanović's glossary only covers the period between the tenth and seventeenth centuries, the latter of which was heavily influenced by the French. Although she

[574] IPU-ADO-AAD folder 25 “Dr. Ana Deanović, ostavština, pripreme za terminologiju”, (Dr. Ana Deanović, inheritance, preparations for terminology).

[575] Papeš, Karla. “Povjesničarka umjetnosti Ana Deanović i njezin doprinos povijesti fortifikacijske arhitekture”. *XVII. Dani Cvita Fiskovića: Žene u/o umjetnosti*. Zagreb: FFPress, 2024. [forthcoming]

[576] Deanović, “Glosar naziva”, 37.

acknowledged this, she did not include it in her glossary due to her self-imposed limitations based on the stylistic categories of 'medieval' and 'renaissance'.
Deanović suggests that Renaissance fortifications require the terminology of that specific period. This conclusion is debatable. However, it raises the question of whether Croatian fortification terminology is representative of a particular historical period. In addition, she notes that Italian terminology was increasingly replacing Latin vocabulary and concludes that the introduction of foreign engineers was associated with the construction of fortifications, which led to the emergence of updated terms. The people responsible for introducing these fortification terms were military experts. Finally, the 16th century is characterised by the richest and most precise terminology for fortifications, even on the territory of present-day Croatia[577].

4.2.3 COMPARISON OF TERMINOLOGICAL STUDIES

As early as 1984, several years after Deanović's article, Marina Marasović-Alujević published an article summarising her master's thesis defended in Belgrade, entitled "Romanizmi u graditeljskoj terminologiji u Dalmaciji"[578] ("Romanisms in Architectural Terminology in Dalmatia"), without the addition of sources, bibliography, or dictionary[579]. Although she did not focus on fortification architecture, she brings a significant corpus of more general terms to be compared with the existing ones, mainly because they represent the majority of confirmations in the dictionaries. In addition, her research focused on the Eastern Adriatic and its relations with the Romans over the centuries. For each term, Marasović-Alujević gives its Croatian definition, the year, and the document in which it is found. This method facilitates research. The original master's thesis must be studied for a fuller understanding.
In her 2012 doctoral dissertation, "La rappresentazione dell'architettura militare nei trattati cinquecenteschi", Sara D'Amico[580] emphasised the importance of understanding fortification terms in dictionaries[581] and how treatise writers described the novelties they presented. Although her focus was on two case studies - treatises by Lorini and Puccini - she provided a

[577] Deanović, "Glosar naziva", 37.

[578] Marasović Alujević, "Romanizmi u graditeljskoj terminologiji".

[579] Marasović Alujević, "Romanizmi u graditeljskoj terminologiji", 100.

[580] D'Amico, "*La rappresentazione dell'architettura*".

[581] D'Amico, "*La rappresentazione dell'architettura*", 5–16, 111–116. She presented the examples from several historical Italian dictionaries.

clear and concise introduction to the topic. At the end of the dissertation, the author presents five additional examples of dictionaries in which she has identified terms of interest. Three of these examples are nineteenth-century specialist dictionaries on the military and artillery, and the 1841 edition is even a bilingual Italian-French dictionary.

"Terminologija konzerviranja i restauriranja predmeta kulturne baštine u suvremenoj hrvatskoj leksikografiji" ("Terminology of Art Conservation and Restoration in Contemporary Croatian Lexicography") is a title of scientific article by Lucijana Leoni[582]. Noting the importance of terminological studies, her research attempted to determine the presence of art conservation and restoration terminology in selected contemporary editions of Croatian lexicography. In addition, she evaluated the expertise and relevance of the definitions within the profession and assessed the cultural appropriateness of the selected entries[583]. Although the collected corpus was not demonstrated, the results indicate that out of 544 entries analysed in the field of conservation and restoration, 73% (398 entries) were recorded in all five lexicographic editions. The remaining 27% (146 entries) were not recorded in any of the lexicographic editions studied[584].

Although not dealing directly related to the fortification architecture, Dalibor Vrgoč's 2020 doctoral dissertation *Terminološki aspekti stvaranja hrvatskoga vojnoga nazivlja* (*Terminological Aspects of The Creation of Croatian Military Terminology*), presents noteworthy findings on the military terminology used in the Croatian language.

Such terminological studies emphasise the significance of multilingual studies in developing terminologies for each language. Vrgoč and Bernardina Petrović published an article titled "Juxtaposing the Croatian Military Terminology of Two Groundbreaking 19th Century Dictionaries", highlighting the importance of Croatian terminological matters. Historical dictionaries are often used to understand terminological inconsistencies and provide solutions. This has become a significant method. It should be noted that prior to Vrgoč's research, Barbara Štebih conducted a study on military terminology in specific dictionaries in her work "Vojni terminološki germanizmi u rječniku hrvatskoga kajkavskoga književnog jezika" ("Germanisms of military terminology in Dictionary of Croatian Kajkavian standard language")[585] in 2000.

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[582] Leoni, "Terminologija konzerviranja i restauriranja", 115–132.

[583] Leoni, "Terminologija konzerviranja i restauriranja", 131

[584] Leoni, "Terminologija konzerviranja i restauriranja", 128

[585] Štebih, Barbara. "Vojni terminološki germanizmi u rječniku hrvatskoga kajkavskoga književnog jezika." *Rasprave Instituta za hrvatski jezik i jezikoslovlje* 26 (2000): 245–260.

Mile Mamić in "Hrvatsko vojno nazivlje u rječniku Juridisch-politische Terminologie" ("Croatian Military Terminology in the Dictionary Juridisch-politische Terminologie")[586] in 2007. Specific research focused on the literature was the topic of Frano Stojić's "Jezik hrvatskoga preporoditelja Relkovića i rječnik vojnih pojmova"[587] (Language of the Croatian Reformer Relković and Dictionary of Military Terms). Stojić analyses Relković's influential poem and focuses on the military terms that originated in German expressions and their corresponding Croatian terms.

In 2020, another critical article on terminological aspects of architecture and urban planning was published in Croatian scientific journals. Neda Borić, in her article "Analiza tvorbenih načina u hrvatskome nazivlju arhitekture i urbanizma s osobitim osvrtom na značenje" (Analysis of types of word formation in Croatian architecture and urban planning terminology with special emphasis on semantics), presented another corpus-based research with a special focus on some unique features that characterise architectural terminology. The research provides insight into the semantic aspects involved in these processes and shows that morphological and semantic patterns in term formation are closely intertwined and inextricably linked to the specific cognitive macro-context[588].

Research in the archive of Ana Deanović revealed a typewritten text on architectural and urban terminology by Ivan Martinčić. The first chapter (and the only one found) consists of twelve subchapters, which present the principles of processing for the terminological dictionary. Martinčić provided a list of sources, some of which correspond to the dictionaries analysed in the first phase of this research[589], and also mentions Vitruvius's *De architectura libri decem*[590]. The author emphasises the importance of accurate citation when using specific terminology. Additionally, they suggest that the planned dictionary should be multilingual[591], highlighting the expressive connections between Croatian and other languages such as German, English, French, Italian, and Russian[592]. The dictionary would contain keywords from both languages.

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[586] Mamić, "Hrvatsko vojno nazivlje", 55–60.

[587] Stojić, Frano. "Jezik hrvatskoga preporoditelja Relkovića i rječnik vojnih pojmova". *Kroatologija* 8, 1–2 (2017): 215–228.

[588] Borić, Neda, "Analiza tvorbenih načina" 48.

[589] See the table of used dictionaries; *Gazophylacium*/*Gazofilacij* by Belostenec; *Rječnik znanstvenoga nazivlja* by Šulek; *Rječnik hrvatskoga ili srpskoga jezika*.

[590] Martinčić, "Arhitektonsko i urbanističko nazivlje", 16.

[591] Martinčić, "Arhitektonsko i urbanističko nazivlje", 25.

[592] Martinčić, "Arhitektonsko i urbanističko nazivlje", 25–26.

Although the aforementioned research has contributed to the understanding of different corpus and methodologies for data acquisition and management, Ana Deanović remains the only researcher who has mainly focused on the historical terms of fortification architecture. She has published a groundbreaking corpus of terms for future research[593].

4.2.5 EXPANDED CORPUS OF TERMS

The table below shows the terms from the first phase of the research. The French term château was excluded because it was the only term suggested by Ana Deanović in her glossary. However, more French terms were collected in the second phase and will be presented in the following chapters.

Table 8 Corpus of terms for the second phase of the research

LAT	**IT**	**GER**	**FR**	***CRO**
aedificium	Alloggiamento	Altan	château	Barbakan
agger	andito	Artillerie		bastion (baluardo, bastha, bastaji)
aggestus	Antimuraglia	Bastei		bedem / beden
allogiamentum	Antimuro	Bollwerk		Brana
ambulum	Antipetti	Brustwehr		branič-kula
antemurale	archibuseria	Burg		Branište
antimurale	Arciera	Festung		Burg
antipeti	arsenale	Festungsbau		cisterna (čatrnja, četrn(j)a, gusterna, isterna/ysterna, žusterna)
apodium	Balestriera	Festungswerf		citadela
arberium	baluardo	Geschütz		Čardak
argere	Barbacane	Glacis		doksat (archel, erkel, farkyl, habernik, serkel)
argerus	bastione	Graben		dvor/dvori
armamentarium	Bertesca	Hof		Dvorac
arx	bombardiera	Hornwerk		erker (izljevnica, mašikuli, pechnase)
arzella	cannoniera	Kastell		Eskarpa
aula	Caponiera	Kehle		Falsabraga
balesteria	casa matta	Kornboden		Fasa
balestrierie	Casotta	Kriegsbaukunst		flanka
barbacanus	Casteletto	Mauer		Fleša

[593] Martinčić, "Arhitektonsko i urbanističko nazivlje", 26.

bastia	Castello	Mauerkrone		fontik / fundik
bastita	cavalier	Mauerwerf		Fortifikacija
batifredus	cavaliero	Pallast		Glasija
batteglirias	cavata	Rechen		graba (ark, aruk, fojba, fosa, fovea, fusat)
battifollum	chiusi	Ringmauer		Grad
bertesca	Cisterna	Schanze		Gradina
canton	Città	Scheune		Hambar
cantonata	cittadella	Schloss		Jama
capsetta	Civitacula	Schlossgarten		Jarak
carcer(e)	coltrina	Schlosshof		Kaponir
case macte	Contraforte	Schlossturm		kastrum/castrum
castellare	Contrafosso	Stadt		Kaštel
castelletum	contramina	Stadtgraben		Kavalir
castellum	contrascarpa	Stadtmauer		Kazamat
Castillerium	Coprifaccia	Turm		Kineta
Castra	cordina	Waffenhaus		kontra(e)skarpa
Castrum	corno	Zeughaus		kontrabedem
Cellarium	corte	Zisterne		kontrafosa
Cinctus	cortile	Zitadelle		kontragarda
Circuitum	cortina			kontramina
Cisterna	cuneta			kortina / kurtina
civitacula	dardanelle			krunište
civitadela	falconiera			kula
Civitarula	falsabraga			kurija
Civitas	feritoia/feritora			lagum
Corrator	forte			lineta
Curia	fortezza			magazin (magacin, magazen)
Curredonum	fortificamento			meteriz
Erchirium	fortificatione			mir
focea	fortino			Municion
Fontigum	fossa			Munimenta
fortalitium	fossato			nasip
Fortificatio	fosso			Ograda
Fortilitium	guardiola			Opkop
fossa	magazen			oružarnica
fossatum	merlatura			palača
fovea	merlo			palanka
imbordescando	mezzaluna			palas
imbordescari	Mir			palisada

Maceria	moschettiera			podgrađe
magazenum	munimenta			polubastion
Mantellum	munitio			polukula
Masserie	munitione			ponton
Merletus	muraglia			predziđe
Merli	Muro			propugnakul
Merlus	palizzata			prsobran (parapet, prizid)
moenia	parapetto			puškarnica
Municipium	piazza			rastel / raštio
Munimen	pontone			ravelin / revelin
Munimentum	propugnacolo			reduta
Munitio	Recinto			redvi
mura	redutto			refugij
murus	reparo			rog / roglje
oppidum	ridotto			roka (rocca)
palizzatum	rivellino			rondel
pallada	Rocca			skoša / skarpa
pallificata spirata	rochetta			stražarnica
parapectum	Ronda			strijelnica
partegete	saettiera			suhozid (mačera, masera, mažera, močira, ćelega)
pietre merze	saracinesca			šanac
posterla	scarpa			tabor
posterula	sentinella			tanalja / tenalja
praesidium	soleri			toranj
propugnaculum	Sortita			trincea
puteus	Sorto			tvrđa / tvrđava
rastrella	Spalte			utvrda
reductum	Spalto			varoš
revelin	sperone			vučja jama
rocca	tanaglia/tenaglia			zagrada
rocha	Terra			zamak
saracinesca	terrapien			zbjeg
sponia	terrapieno			zid
suburbium	Torre			zidina
terreleum	torresella			žitnica
torricella	Torretta			

trincea	Torrione			
turris	Traversa			
urbs	Trincea			
	trinceramento			
	Trinciera			
	Troniera			
	turrianzello			
	Turricula			
	Turrioncello			
	vallo			
	volti			

4.3 CONFIRMATIONS OF ITALIAN TERMS IN THE SELECTED TREATISES

In the second phase of the research, the selected fortification treatises were studied in order to confirm the terms found in the historical dictionaries. The treatises selected for analysis were written by Bonaiuto Lorini, Francesco de Marchi, Pietro Sardi, Francesco Tensini for Italian terms, while Antoine De Ville and the French translation of Adam Freytag's treatise for French terms. The terms were analysed for both Italian and French, as mentioned above. The papers confirmed most of the terms and identified new ones. At this stage, however, the sources for each confirmation have not yet been presented, although they are registered in the existing database for probable future reference. The treatises are a form of specialist literature on fortification architecture and contain a wealth of fortification terminology. It would be unnecessary and impractical to list every instance of confirmation found. However, it may be crucial for future research to determine the specific treatise author's use of a particular term, which is another reason for tracing it in the aforementioned database.

The tables present confirmations from the Italian treatises of Bonaiuto Lorini, Francesco de Marchi, Pietro Sardi and Francesco Tensini. However, the treatise by Francesco di Giorgio Martini, at the beginning of the rise of the fortification theory, did not provide as many confirmations in its terminology, making it less searchable in the corpus. Confirmations were more frequent in the treatises of the second half of the sixteenth century and the first half of the seventeenth century. In Martini's treatise the following terms appear: *battiponte, capannato,*

casematte, fondamenta, fortezza, fosso, maschio, muro, pone corritoio, ponte levatoio, porta, porto, recinto, rivellino, rocca, saracinesca, torre maestra, torricino, torrone.

Table 9 Confirmations of Italian terms in the selected treatises

ITALIAN TERMS FROM THE CORPUS CONFIRMED IN THE TREATISES	
PRE-EXISTING CORPUS	**CONFIRMATIONS**
Alloggiamento	Alloggiamento
Arsenale	Arsenale
Baluardo	Baloardo Baluardo Belloardo
Barbacane	Barbacanone
Bastione	Bastione
Bombardiera	Bombardiero
Cannoniera	Cannoniera Canoniera
Casa Matta	Case matte Casse matte Cassematte
Castello	Castello Castello vecchio
Cavalier	Cavalier Cavalier
Cavaliero	Cavaliere
Cisterna	Cisterna
Città	Città
Cittadella	Cittadella
Contraforte	Contraforte
Contramina	Contramina
Contrascarpa	Contrascarpa
Cortina	Cortina
Cuneta	Cunetta
Falsabraga	Falsa Braga

Feritoia/Feritora	Feritoia
Forte	Forte
Fortezza	Fortezza
Fortificatione	Fortificatione Fortificatione reale Fortificatione non reale
Fortino	Fortino
Fossa	Fossa
Fosso	Fosso
Merlo	Merloni
Mezzaluna	Mezzaluna Mezzeluna
Munitione	Munitione
Muraglia	Muraglia
Muro	Muro Le Mura
Parapetto	Parapetto
Piazza	Piazza
Pontone	Pontone
Recinto	Recinto Recinto, Esteriore
Redutto	Redutto Reduto
Rivellino	Rivellino Revelino
Rocca	Rocca
Ronda	Ronda
Saracinesca	Saracinesca
Scarpa	Scarpa
Sentinella	Sentinella
Sortita	Sortita Sortita Di Notte
Sperone	Sperone

Tanaglia/Tenaglia	Tanaglia Tenaglia
Terrapieno	Terrapieno
Torre	Torre
Torrione	Torrione
Traversa	Traversa
Trinciera	Trinciera Trincera
Volto	Volto (Delle Porte)

The second table presents the additional terms identified as expert fortification terms during the study of fortification treatises. These terms were repeated, and their definition and description were presented separately in the treatises, highlighting their significance.

Table 10 Confirmations of new Italian terms in the selected treatises

ITALIAN TERMS CONFIRMED IN THE TREATISES THAT WERE NOT IN THE CORPUS	
	Abitatione
	Alone
	Arena
	Baluardetto Balvardetto
	Barcaponte
	Batteria
	Bossola
	Calcina
	Cannoniera Reale
	Capannato
	Cataratta
	Cordone
	Denti (nelle cannoniere)
	Denti forbice

	Faccia (del baluardo)
	Facina
	Fondamento
	Fronte (del baluardo)
	Gabbione
	Gola (del baluardo)
	Lotta
	Maschio
	Mina
	Opera fortificatoria
	Piattaforma
	Piazza (del baluardo)
	Piazza (della Fortezza)
	Piazza d'Armi
	Piazza bassa (nelle Fortezze)
	Piazze del Fianco
	Piedamento
	Ponte
	Ponticello
	Porporella
	Porta
	Porto
	Prigione
	Quartero
	Quartiere
	Quartiero
	Rastello
	Scala
	Scalaponte
	Soccorso
	Spianata
	Stelle
	Strada coperta

	Strattagema
	Terra rossa
	Terraglio
	Trauersa

4.4 CONFIRMATIONS OF FRENCH TERMS – FORMATION OF A NEW CORPUS

In order to build up a corpus of French fortification terms, two treatises by Antonie de Ville and Adam Freytag were studied. One may question why the first French treatise chosen was not that of Jean Errard de Bar-le-Duc[594]. In the first phase of the research, it was necessary to have a corpus of French terms to study in the treatises. In the absence of such a corpus, it was necessary to begin by collecting a considerable number of terms. Since Antoine de Ville was directly involved with the Eastern Adriatic and left a special memoir on the monuments of Pula and the fortress he designed, and Adam Freytag worked in close proximity to De Ville, they probably corresponded in their knowledge and use of fortification terms. This terminology was already shaped by the French and influenced by their fortification practices. The study of the terms used by these two authors facilitates the approach to one of the most important French treatises and others, particularly because of the comparison of original French treatise and a translated one, and the identification of the origin of certain terms. These steps will be used in the following stages of the research, in particular in Bar-le-Duc's treatise.

Table 11 Confirmations of French terms in the selected treatises

FRENCH TERMS CONFIRMED IN THE TREATISES	
	Angle retiré
	Approche
	Barricade
	Barrière
	Bastion
	Bastion coupé

[594] For more information about Jean Errard de Bar-le-Duc see Métin, "La formation de Jean Errard".

	Bastion double
	Bastion, demi-bastion
	Baterie
	Batterie
	Cannonier
	Caualier/Cavalier
	Cavallier
	Casemate
	Cittadelle
	Contr'Approche
	Contre-mine
	Contrescarpe
	Contrescarpe
	Corne
	Corps de garde
	Corridor
	Couronne
	Courtine
	Demi-lune
	Demy-lune
	Embrasure
	Escalades
	Esplanade
	Estoile
	Faces des Bastions
	Faussebraye
	Flanc
	Fort
	Forteresse
	Fortification
	Fortification irrégulière
	Fortification régulière
	Fossé

	Frise
	Gabion
	Galerie
	Garnison
	Gorge du Bastion
	Ligne de Defense
	Maison
	Merlon
	Mine
	Muraille
	Orillon
	Ouvrage de Corne/Ouvrage de Corne
	Pallissade
	Parapet
	Piece destachée
	Place basse
	Place d’armes
	Place haute
	Plate forme
	Platte forme
	Pont
	Pont-leui/levi
	Rauelin/Ravelin
	Reden
	Redoute
	Rempar
	Rempart
	Rue
	Sortie
	Tenaille
	Tour quarrée
	Tour ronde
	Tranchée

	Traverse
	Tranchée
	Voute

4.5 DISCUSSION

“Le voci delle Fortificazioni. Cap. XXXVI.
Non è dubbio, che è necessario saper, che cosa sia Fortezza, & li nomi loro, & intendere le voci de tutti li membri, che in esse si contengono.”[595]

The first phase of the research on fortification terms focused on Croatian terms in order to investigate the inconsistencies in scholarship. As part of this process, multilingual dictionaries containing Latin, Italian, and German confirmations were analysed, as a corpus was formed on the basis of Deanović's findings. This provided an insight into the relationships and influences of these languages in contemporary Croatia, as well as opening up a discussion on language translation and adaptation. The study produced tables of selected terms in three languages, along with confirmed definitions for some of them.
These tables serve as a research tool for understanding previous studies and as a model for future ones. However, the selection process for these terms was not clearly defined, which may have led to different interpretations by different researchers at various stages of data collection. In addition, general terms describing fortification elements have entered the language of the field. The shortcomings of the primary corpus were revealed by several non-confirmations in the dictionary analyses. Therefore, the corpus analyses and confirmations have highlighted these problems.
Therefore, the second phase of the research required the use of simple distributional methods. First, potential sources of Croatian Early Modern scientific fortification or general military literature were identified. Second, to select treatises on fortification architecture, preferably in the languages already examined in the dictionary analysis. Finally, analyse the selected treatises for relevant information. Identify any relevant sources that provide updated terms for

[595] “There is no doubt that it is necessary to know what the Fortress is and its names, and to understand the voices of all the members that are contained within it”, in De Marchi, *Della architettura militare*, Libro Primo, 10v.

fortifications, as well as fortification designs with inscriptions. If possible, focus on case studies from Dubrovnik, Zadar, Šibenik, Pula and Split, as well as other traceable fortifications from the eastern Adriatic coast. These will be the main sources for the next phases of research, especially those prior to the nineteenth century. The existing corpus was compared with the terms found in the selected treatises. All the updated terms collected during the research, especially from the treatises, were recorded.

This is where the scientific literature had a crucial role. The possibility of Croatian scientific literature on fortification architecture needs to be excluded. For now, it was not found. However, Lukša Beritić's mentioned the work by Michielle Hraniaz from 1617[596] , which can be studied as a report originating from the Eastern Adriatic, despite being written in Italian. Hraniaz's work needs to be transcribed, translated, and published to enable thorough examination for terminological and other studies[597].

Military matters were the responsibility of the ruling states, and official communication was conducted in languages other than Croatian. As a result, traceable documents in the archives were not written in Croatian. State documents in the Republic of Ragusa were written in Latin and Italian, which were also the main languages of the most famous Early Modern treatises.

Although military studies had not been carried out extensively in the Eastern Adriatic, the terminological studies did not anticipate the wealth of data found in the initial phases of research. In order to achieve the desired results, years of research and analysis of all planned sources are required. The following are the research problems encountered, which also serve as steps for the management of future research phases:

1. The research began with over thirty found treatises and the aim is to create a comprehensive database of all military treatises published in Europe from Alberti to the Napoleonic Wars. This would provide a vast and respected corpus of knowledge for study and comparison. Despite this ambition, even a pair of treatises is complex for the initial stages of research.
2. Most of the treatises exceed one hundred pages, some even eight hundred.
3. Treatises differ from dictionaries in that the terms they contain are not easily traceable and require careful reading of each page to confirm.
4. They are usually found in libraries, but many are now available online, which is a great advantage.

[596] Beritić, *Utvrđenja grada Dubrovnika*, 169–172.

[597] Arhiv HAZU I. d-130 *Fortificatione della Città di Ragusa*.

5. Tables of chapters and indexes are differentiated as separate categories to facilitate terminological and overall doctoral research on the dissemination of knowledge.
6. These tables can sometimes exceed tens of pages per thesis, and each entry must be re-checked for possible errors, including illegible words. Inserting their data takes a considerable amount of time, which exceeds the limits of this research. It should be divided into several phases of data entry.
7. Not all the works analysed have chapter tables and indexes. Some have both, some one or the other, and some none.
8. While chapters and indexes can be helpful tools during research, they provide only a brief description of the chapter's topic or the location of the term. They do not give the exact location of each term in the treatises.

The research identified several needs. Firstly, papers should be analysed individually, page by page, to build a database of terms used. Second, general data from papers should be available in searchable databases. Thirdly, illustrations from papers should be digitally linked to their textual references in the chapters (illustration-text links). The databases should contain general information, searchable tables of contents and indexes directly linked to the dictionary of fortification terms. This will allow for definitions and cross-referencing with other papers, dictionaries, and bibliographies. In addition, illustrations can be included as an illustrative dictionary.

In this way, written knowledge is transformed into a digital medium that can be searched on multiple levels. This second phase of terminological research made it possible to rethink the creation of databases and data processing. However, this research requires a considerable amount of time due to various obstacles, such as the abundance of information. The impact and influence of military science, including its literature and terminology, has so far been underestimated. In the Eastern Adriatic, there is a lack of studies on the terminological problems of fortification, with only one traceable scientific article available. This suggests that the problem is not the lack of data, but the studies themselves. It has become clear that an interdisciplinary approach is needed to understand both the dissemination of knowledge in a particular field and the re-evaluation of its terminology.

The main drawback of the corpus was its lack of structure. Initial research revealed a wealth of terms relating not only to fortification architecture, but also to materials, construction, warfare, weapons and the army in the 16th and 17th centuries. In order to improve comprehensibility and logical structure, it is recommended that such terms be separated into a separate corpus for future research. The study focused on the terminology used in chapter titles, indexes and certain

paragraphs that defined the terms used. These terms are currently only recorded in the database and will be presented in later stages of the research when the issue of definitions can be examined. The problem of expressing the latter was already identified in the previous phase. It is difficult to access specific meanings in modern times without knowledge of their historical context. In addition, inconsistencies in translation between Croatian and other languages further complicate matters.

The research shows that the authors of the treatise, who were military engineers, introduced a new terminology for fortification architecture, which became widespread in the Eastern Adriatic. The presence of numerous engineers and military personnel on the eastern Adriatic coast probably influenced this. In order to understand the process of Croatisation of terms, further research is needed, especially on the lexicography and literature of the nineteenth century. The overall focus of the research on Croatian terminology is to update the corpus of terms. The inclusion of fifty-two new Italian and seventy-five new French terms will help to achieve this goal. In the future, it is recommended to continue the collection of terms related to fortification architecture from the treatise.

The fortifications of the Eastern Adriatic region have an exceptional collection of terms found on illustrations and plans. Although it was originally planned to research these terms in connection with this phase of the study, it became clear that they were mostly variations of the terms already researched.

In treatises, language and technical terminology play a significant role in disseminating information and new knowledge, while illustrations play a supporting role, serving to visually evoke textual descriptions and understanding. Therefore, due to the distinct roles of terms in these two cases, the extraction of terms from various illustrations and plans of fortifications on the Eastern Adriatic, which are already partially included in the database, should be studied as a separate category, comparable to the existing corpus.

The research made it possible to isolate the French corpus of terms related to fortification architecture and to analyse them in dictionaries and other literature in order to study their influence on Croatian terms. It is noteworthy that the French administration in present-day Croatia had a significant impact at the beginning of the nineteenth century. This corpus will support future archival, lexicographic, and literary research. The corpus clearly shows that the Italian language had a major influence on French, with synonyms appearing in both languages. Finally, the necessary corpus was defined, and the methods and next steps were differentiated and organised. In addition, the comparison of the collected scholarship on the general terminological problems of Croatian and multilingual approaches facilitates the implementation

of the interdisciplinary approaches necessary for such a study. Four types of sources are crucial for the research of historical Croatian fortification terms: pre-standardised dictionaries (including multilingual and Croatian ones), Croatian literature (which is an underestimated but lively source, especially on war topics and enlightening texts), scientific literature (excluding Croatian, but available in several languages), and a re-evaluation of archival documentation in order to uncover potential Croatian traces. These methods are also crucial on an international level and can be used in any terminological study of fortification architecture. In addition, scholars may find it relevant to study the spread of a particular language at the official level of the state, while the majority of literature is still produced in the unofficial language of the masses, as was the case in the Eastern Adriatic. The formation of corresponding terms in Croatian was most likely directly influenced by scientific literature and other traceable sources, such as reports and inscriptions of fortification plans, written in the above-mentioned languages. The Croatian language was certainly in use. Research in the Historical Dictionary, which contains confirmations from legal texts and literature, made it possible to understand that the most accessible source of information about the language was literature. Moreover, Croatian literature flourished in the 16th century. Its strong anti-Ottoman orientation emphasised that war was a constant theme, along with military development. Several dictionaries have shown the need for translation and standardisation of terms from other languages. The question now is how to proceed with the third phase of research. The second phase revealed many possible avenues and highlighted the wealth of material available. It is no longer a question of Croatian terminology, but of an international study of the dissemination of knowledge.

5 CONCLUSIONS

The vast Eastern Adriatic region has been explored as a frontier zone between the 1450s and 1650s. It was a vulnerable area in war and peace, so it was fascinating to understand how its defensive systems worked. Thus, as mentioned in the introduction, eight criteria were established to determine which fortifications were the most significant. As a result, five case studies were selected. The exact period of their fortification history of interest was always related to a crucial event, mainly the arrival of a mostly famous architect or military expert, or, as in the fifth case study, the most important event a fortification had to respond to, its attack or siege.

The five case studies analysed therefore have in common the study of a specific moment that shaped them and the subsequent responses to it. In addition, the design and construction planning of these case studies took place over several years. The final execution may indeed have taken years or may not have been completed. However, the latter provides crucial feedback on the significance of these monuments during and after their design and construction.

Written sources were the most valuable for this research for this research, whether they were government correspondence, political reports or official reports by the military experts, military engineers and authors of these projects, or specialist literature containing these examples.

The growing interest in contemporary ballistics and fortifications was evident in Early Modern fortification treatises, which reviewed traditional and existing models and proposed new ones, both written and illustrated. Thus, the possible mention or even exemplary inclusion of fortifications from the Eastern Adriatic was considered in the treatises, taking into account their specific position, especially during the Ottoman wars. Even if no such traces were found, the authors of the treatises, such as Bonaiuto Lorini, Francesco Tensini and Antoine de Ville, were directly linked to the eastern Adriatic coast. It was therefore interesting to examine their theoretical approaches to fortification and their decisions to fortify the war zone. Furthermore, going back to the earlier examples, the presence of famous architects such as Michelozzo Michelozzi or the Sanmicheli family must have had a particular influence, new knowledge, and the spread of terminology at the end of the fifteenth century and the first half of the sixteenth century.

In fact, in the second half of the fifteenth century, the form of fortifications was determined above all by the need to resist attacking artillery. In the sixteenth century, on the other hand, the innovative approach ignored resistance and emphasised the need for flanking fire. Defence

was only possible through flanking fire. The aim was to put into practice the insights and justifications of earlier theories. Once the basis of design in flanking fire had been established, practice could not alter the basic theory. However, this thesis argues that while practice could not change the general theoretical framework of military architecture, it could improve it with new experimental design solutions that perfected the existing one. Practice could not invent innovative design principles for fortifications, but it could design innovative solutions with the given principles.

With regard to the latter, two out of three hypotheses have been formulated. First, fortification architecture in the Early Modern Eastern Adriatic depended on the hypothetical designs of influential military experts. If their theories were not proven, these fortifications were left as mere experiments and non-functional structures. The problems of experimental designs were a defining point in the history of fortifications in the Eastern Adriatic. Secondly, the Eastern Adriatic fortifications, as the structures directly related to the ever-present war, directly witnessed the changes in fortification science. Located in the war zone, these fortifications were polygons for the confirmation of hypotheses, thus defining new theoretical solutions modified by practice.

This was the case with the city walls of Dubrovnik, where Michelozzo Michelozzi, in the 1460s, had to maintain the existing medieval structures, but still managed to design new ones that provided protection against pre-modern combat weapons and modern gunpowder weapons. He overcame the previous fragmentation of the defences by linking all the defences on the northern and western walls into a single horizontal and vertical unit, with numerous staircases at various levels. The individual defences on the lower part of the wall consisted only of firearms, while gun loops were used for individual defence against pre-modern combat weapons. In addition, the peculiarity of its newly designed towers and a funnel-shaped casemate, which narrows towards the gun loop and opens towards the corridor, allowed for proper and quick smoke evacuation. Probably one of the first examples of its kind in Europe. If we look at the design of casemates, we can see two different and opposite types in the Minčeta tower. In addition, there is the problem of the eastern corner of the aforementioned tower at the junction with the curtain wall. The radial design of the casemates around the corridor did not allow a firing trajectory along the curtain wall to cover the northern side of the city walls. One might speculate that this is why it was necessary to modify the second casemate, with its laterally curved space and diagonal opening, to allow a firing trajectory along the curtain wall. Could such changes be examples of the trial-and-error method of Michelozzi's practice? Furthermore, the design of the Minčeta tower followed the practices of the time, as later prescribed by Francesco di Giorgio

Martini. Michelozzi adapted to the fortification site he found in order to protect it from various weapons. He did not, however, follow the instructions of the time and later, which constantly warned of the dangers of the hills surrounding the cities and their fortifications. Although his main concern was to modernise the city walls, there is no record of him discussing the fortification of the hills around and above the city. One might wonder if this was because of the possibility of enemy occupation and direct attack on the city.

On the other hand, Michele Sanmicheli's experiments in Zadar in the 1530s were a response to the previous project, which had not been realised. It was not a question of creating a standardised model, but of adapting to the disadvantages of the site. Initially praised, it soon revealed its drawbacks, which are recorded in various writings. The project of Michele Sanmicheli and his family workshop could be seen as an example of trial and error. However, since Sforza Pallavicino completed the project at the end of the 1560s and the beginning of the 1570s, we can witness the standardisation of knowledge about fortifications. The initial mistakes were soon understood and corrected, as was the case with the detailed instructions given by Giulio Savorgnano, who left dozens of pages on the necessary improvements to be made in the design, construction, equipment, and management of fortifications. The accumulation of knowledge over the years allowed the completion of the walls and their improvement at the end of the 16th century, coinciding with the specialisation of military knowledge. Of particular importance for the history of Zadar's fortifications is the fact that Bonaiuto Lorini, who worked on Zadar's fortifications in the 1580s, included Zadar and its fortifications in his treatise *Delle fortificationi di Buonaiuto Lorini libri cinque*, published in 1596. He also discussed the use of materials for construction. This inclusion of a specific fortification in the treatise of one of the most important authorities on fortification at the end of the sixteenth century shows the urge to harmonise what was experimental in fortification knowledge and what could be identified as science. This is also the first topic of interest at the beginning of the dialogue between the Count and the author. The direct inclusion of the fortifications of Zadar as a comparable model in specialist literature, such as the treatises, indicates their importance in the author's work and the real change of perspective that fortification architecture represents and how it can be shaped, adapted, and developed. Finally, it allows us to follow the gradual change of the actors involved in the fortification process and how they saw themselves as the originators of certain models, from the Sanmicheli family to Sforza Pallavicino and Bonaiuto Lorini. Bonaiuto Lorini made it possible for a wider audience than the Venetian government bodies to discuss and take an interest in the fortifications. Lorini staged the discussion about Zadar's fortifications by including a fictional discussion about Zadar

in the dialogues of his treatise. In this way, a technical discussion between those involved in Venetian fortifications took on a wider dimension. The spread of printed books made it possible for people outside this narrow circle (in the Republic of Venice or even abroad) to read and possibly discuss the fortifications of Zadar. Lorini transformed the Zadar fortification from a real work into a literary case on the level of other important fortifications. Apart from the unpublished manuscript by the Ragusan Michielle Hraniaz from 1617, Zadar is the only fortress on the Eastern Adriatic to be discussed in a treatise on military architecture, at least as far as we know today.

In the case of the fortress of St. Nicholas in Šibenik, built in the 1540s, what was once considered innovative and exceptional in just thirty years soon became inadequate and outdated. In addition, this fortress is specific because of its surroundings and layout - it is a triangular island fortress. The most critical document dates back to September 1540, the report of Giangirolamo Sanmicheli, who designed the fortress. The location on the island was always a problem. The fortress was far from the city and difficult to reach. The island is situated at the end of the canal, where it opens into the sea, and is therefore very dependent on weather conditions. Nevertheless, its proximity to the mainland made it easier to be within range of the cannons. The shape of the island also determined the triangular shape of the fort, which made it even more difficult to defend as there were only three points of defence. The function of the fortress was to defend the passage to the Channel, so it was a maritime fortress, which also determined the shape and position of the defensive points. There was also a sacred building on the terrace and, if we are to believe the fortress graphic, it may have had a tower. However, the presence of the bell tower, which appears in several depictions of the fortress, can be problematic, as it poses a fundamental strategic problem in the event of an attack. This makes their reliability questionable. It is a fact that sacred buildings had bell towers to call the faithful to worship and to warn of danger. The authors of the treatises had different opinions on the vulnerability of triangular and island fortresses, mainly because the triangular form is the weakest and narrowest of all the fortifications. However, the island can have its advantages and disadvantages. The quality of the fortress of St. Nicholas is the size of the island of Ljuljevac, or the natural rock, which is not of great dimensions, and the fortress completely occupies its surface. Such a position does not allow the enemy army to encircle it. In the case of the island fortress of Šibenik, the only questionable position is the part of the mainland overlooked by the *tenaglia* of the fortress and the location of St. Andrew, dominated by the *torrione* of the fortress. Although the actual function of the fortress was never tested and remains questionable, it is certain that Giangirolamo had to adapt to the site and experimentally perfect the questionable

design and its execution. Other external factors, such as the remoteness of the area and the ever-present humidity, have also contributed to the poor state and use of the fort over the years.

Looking at the fortress above the hill in Pula from the 1630s and its designer Antoine de Ville's views on various fortification sites before designing a fortress in his treatise of 1629, the military engineer marked their advantages and disadvantages, concluding that the most prominent sites are located near the sea and have a harbour on a coast. This corresponds to Pula, although De Ville made a project for both the island in front of the harbour and the hill above the harbour. In his treatise, he did not speak well of the location of the fortress on the hill, arguing that there was little soil and too many mixed stones, which were not suitable for working. Anyone wishing to fortify these places would have to bear the cost of transporting earth from nearby places. As for the enemy, his inconvenience might be that if he wanted to approach, he would not have the means to run. In Pula, he approached both fortresses, on the island and on the hill, in a comparable way, making two floors of close dimensions and leaving the base quite the same. In this way, he overlooked the disadvantages of the terrain he was writing about and concentrated on a well-proportioned design to suit his regular fortifications. In his treatise, he divided fortifications into regular and irregular forms. The regular ones have equal sides and angles, with corresponding equal bastions at the angles. Irregular ones do not have the aforementioned equality, sides, or bastions. As he wrote in his description of the monuments of Pula in 1633, the shape of the fortress was "ordinary". However, two facts must be considered. First, the fortress was never finished. Second, the reports of 22 October 1701 indicate many disadvantages in the design. The fort was too small to be effective. The parapet could not be thick enough to be strong enough to defend the soldiers. There would not be enough space to place and move the artillery on the bastions. In addition, the ground plan of the fortress had to be the same, which was the main characteristic of De Ville's regular fortifications. In De Ville's own words from his treatise, an artist sees the conveniences or inconveniences in his design and considers the defects that arise, solving them until he has reduced them to perfection. In practice, the fortress was not built according to the design, not because of its imperfections, but because the geometrical principles were followed, and the importance of the fortification site was reduced.

The War of Candia (1645-1669) determined the future of the Eastern Adriatic territories. The final case study of interest is two Eastern Adriatic fortresses of the mid-seventeenth century as individual fortifications that responded to the challenges of siege and attack and tested their function. The first is the fortress of St. John in Šibenik during the decisive siege of 1647 and the less dangerous attack of 1646; the second is the fortress of Gripe in Split during the multiple

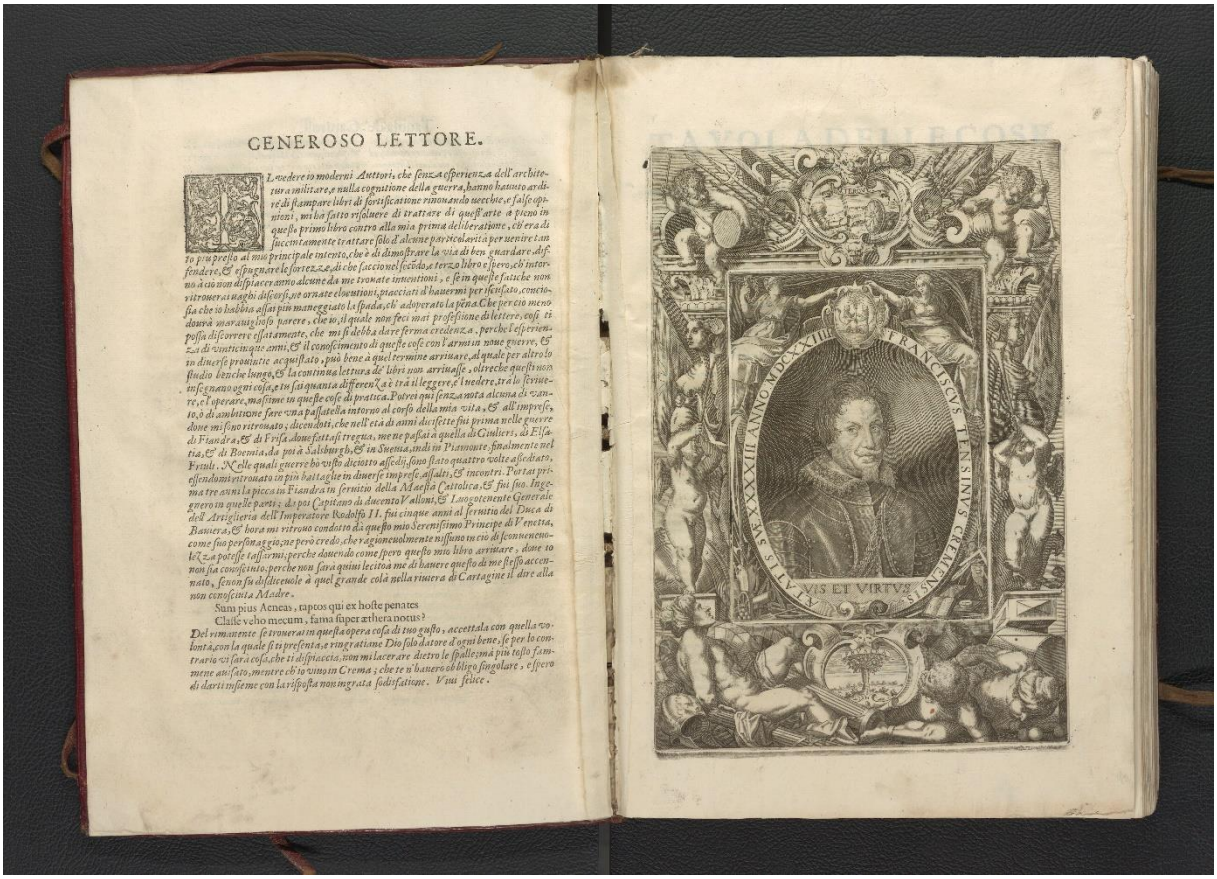
attacks on the city in 1657. The construction of these fortresses was forced by the tenacity of the inhabitants of Šibenik and Split. Both fortresses were designed as the outer defence of the most vulnerable zone of their city, the hill overlooking the cities and the surrounding area. Unlike the Gripe fortress, the St. John fortress was not conquered, but only its outermost part, the *tenaglia*. Both fortresses were designed to have the thinnest walls towards the city, in order to make them easier to liberate in the event of capture, which was the case in Split. In Šibenik, the external fortifications were crucial points that allowed the siege to last longer in order to wait for the army in the harbour (also in the case of the siege of Gripe), as can be seen from the instructions in De Ville's treatise. In addition, several hints from the authors of the treatises regarding the design and construction were presented. The analysis of the treatises showed that the siege tactics and the concentration on the outer fortification, as in the case of the siege of Šibenik, was the most acceptable way to survive a siege. The design of the elongated *tenaglia*, the new *tenaglia-hornwork* and the concentration on the battery determined the siege. Relying on the theoretical solutions, but adapting them to the challenging fortification, thanks to the good understanding of fortification knowledge and siege tactics of the then military experts in Šibenik, enabled the aforementioned prolongation of the siege and the arrival of the army, thus forcing the enemy to retreat.

The theory and practice of fortification architecture depended on visual sources and technical terms because of their extensive repetition in diverse sources studied, such as treatises, reports, and simple designs. Images of fortifications and technical terms are two constants that are repeated and diffused from treatises to military instructions, from detailed fortification prints to simplified geographical maps, and from legends to tables of contents and indexes. Images as visual source material differ in functionality and typology, for example from diagrams to pictorial scenes, the latter even representing cities and reconstructions of battles. Croatian military terms in the Eastern Adriatic show the appearance of multiple terms for the same architectural element or building type, which makes their study and use less clear. They were strongly influenced by other languages previously used in the area. Historically, there was a problem of direct contact between participants on the building sites, between superiors and subordinates. Thus, it has been hypothesised that the establishment and codification of fortification terms in Croatian was based on the standardisation of predominantly Italian fortification terminology, whose circulation in the area was caused by the spread of theoretical and practical concepts.

The terminological research shows that the authors of the treatise, who were military engineers, introduced a new terminology for fortification architecture, which became widespread in the

Eastern Adriatic. The presence of numerous engineers and military personnel on the eastern Adriatic coast probably influenced this. In order to understand the process of Croatisation of terms, further research is needed, especially on the lexicography and literature of the nineteenth century. The overall focus of the Croatian Terminology Survey is to update the corpus of terms. The inclusion of fifty-two new Italian and seventy-five new French terms will help to achieve this goal. The research facilitated the isolation of the French corpus of fortification architecture terms, enabling their analysis in dictionaries and other literature in order to study their influence on Croatian terms. In particular, the French administration in present-day Croatia had a significant impact at the beginning of the nineteenth century. This corpus will support future archival, lexicographic, and literary research. The corpus clearly shows that the Italian language had a considerable influence on French, with synonyms appearing in both languages. For the research of historical Croatian fortification terms, four types of sources are crucial: pre-standardised dictionaries (including multilingual and Croatian ones), Croatian literature (which is an underestimated but lively source, especially on war topics and enlightenment texts), scientific literature (excluding Croatian, but available in several languages), and a re-evaluation of archival documentation to uncover potential Croatian traces. These methods are also of international importance and can be used in any terminological study of fortification architecture. In addition, scholars may find it relevant to study the spread of a particular language at the official level of the state, while still producing the majority of literature in the unofficial language of the masses, as was the case in the Eastern Adriatic. The formation of corresponding terms in Croatian was most likely directly influenced by scientific literature and other traceable sources, such as reports and inscriptions of fortification designs written in the aforementioned languages.

6 FIGURES



GENEROSO LETTORE.

Io vedere io moderni Autori, che senza esperienza dell'architettura militare, e nulla cognitione della guerra, hanno hauuto ardire di stampare libri di fortificatione rinouando quelli vecchi, e false opinioni, mi ha fatto risoluere di trattare di quest'arte a pieno in questo primo libro contro alla mia prima deliberatione, ch'era di succintamente trattare solo d'alcune particolarità per uenire tanto più presto al mio principale intento, che è di dimostrare la via di ben guardare, difendere, & espugnare le fortezze, di che facciono il secondo, e terzo libro; però, ch'intorno à ciò non dispiacerà anco alcune da me trouate inuentioni, e ben che le fatiche non ritrouerai ne gli discorsi, ne ornate elocutioni, piacciati di hauermi per iscusato, conciosia che io habbia assai più maneggiato la spada, ch'adoperata la penna. Che per ciò meno douerà marauiglioso parere, che io, il quale non feci mai professione di lettere, così ti possa discorrere essattamente, che mi fi debba dare ferma credenza, perche l'esperienza di vinticinque anni, & il conoscimento di queste cose con l'armi in mano guerre, & in diuerse prouincie acquistato, può bene à quel termine arriuare, al quale per altro lo studio lunghe lunge, & la continua lettura de' libri non arriuasse, oltreche questi non insegnano ogni cosa, e tu sai quanta differenza è tra il leggere, & l'vedere, tra lo seruire, & l'operare, massime in queste cose di pratica. Potrei qui senza nota alcuna di vanto, ò di ambitione fare vna passatella intorno al corso della mia vita, & all'imprese, dove mi sono ritrouato; dicendoti, che nell'età di anni diciotto fui prima nelle guerre di Fiandra, & di Frisa, doue fattasi tregua, me ne passai a quella di Giuliers, di Elsatia, & di Boemia, da poi a Salsburgh, & in Suetia, indi in Piamonte, finalmente nel Friuli. Nelle quali guerre ho visto diecisette assedi, sono stato quattro volte assediato, essendomi ritrouato in più battaglie in diuerse imprese assalto, & incontri. Portai prima tre anni la picca in Fiandra in seruitio della Maestà Cattolica, & fui suo Ingegnero in quelle parti; da poi Capitano di cento Valloni, & Luogotenente Generale dell'Artiglieria dell'Imperatore Rodolfo II. fui cinque anni al seruitio del Duca di Baniera, & hora mi ritrouo condotto da questo mio Serenissimo Principe di Venetia, come suo professo ingegnere; ne però credo, che ragioneuolmente nissuno vi cio di sconuenenolezza potesse tassarmi, perche douendo come spero questo mio libro arriuare, done io non sia conosciuto, perche non sarà quiui lecito me di hauere questo di me stesso accennato, senon fu disdicevole à quel grande colà nella riuiera di Cartagine il dire alla non conosciuta Madre.

Sum pius Aeneas, raptos qui ex hoste penates
Classe veho mecum, fama super æthera notus?

Del rimanente se troverai in questa opera cosa di tuo gusto, accettala con quella volontà, con la quale ti si presenta, e ringratiane Dio solo datore d'ogni bene, se per lo contrario vi sarà cosa, che ti dispiaccia, non mi lacerare dietro le spalle, ma più tosto famme auisato, mentre ch'io vmo in Crema; che te n'hauero obligo singolare, e spero di darti insieme con la risposta non ingrata sodisfattione. Viui felice.

FRANCISCVS TENSINVS CREMENSIS ANNO M.DC.XXIII AETATIS SVÆ XXXIII

VIS ET VIRTVS

Figure 1. Francesco Tensini, *La fortificatione guardia difesa et espugnatione delle fortezze esperimentata in diverse guerre*, 1630. National and University Library in Zagreb. Signature: Zbirka rijetkosti | BZ 117.

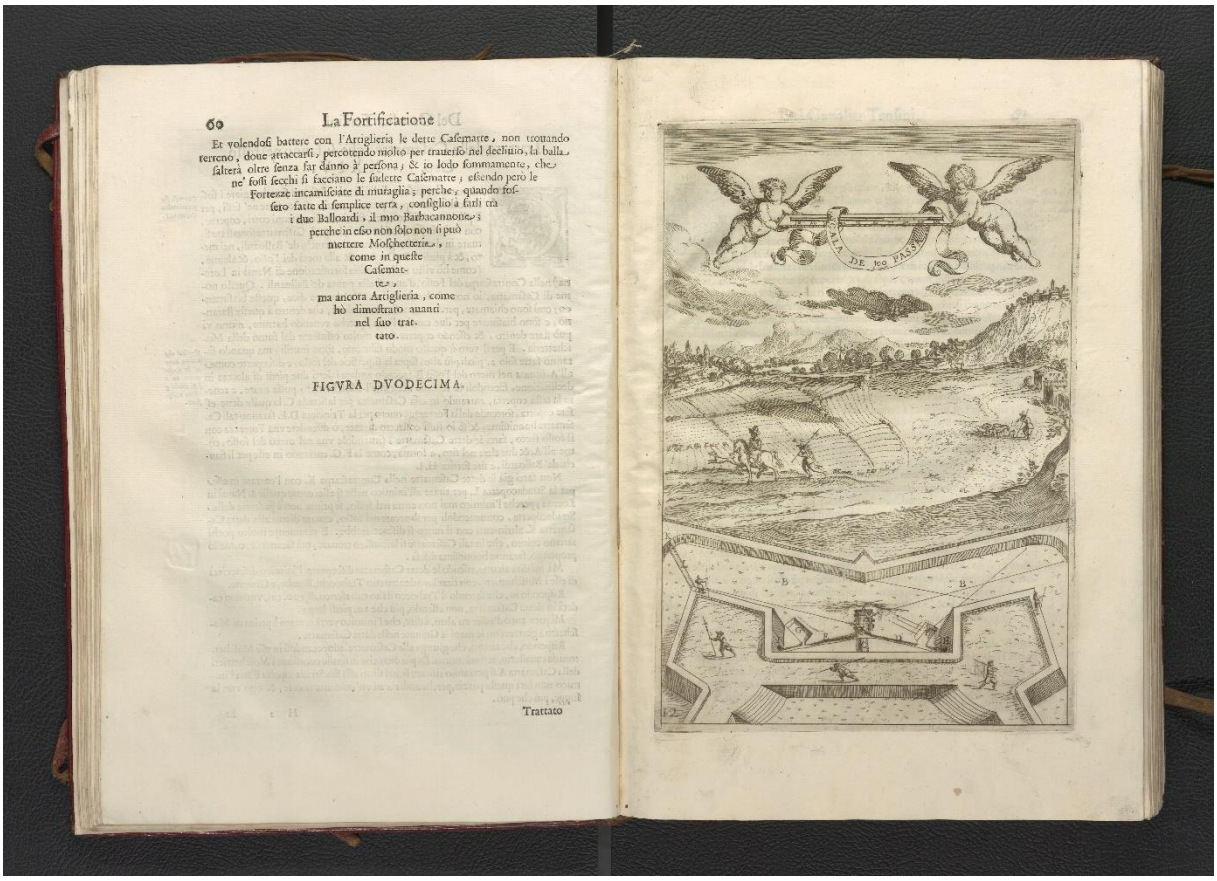
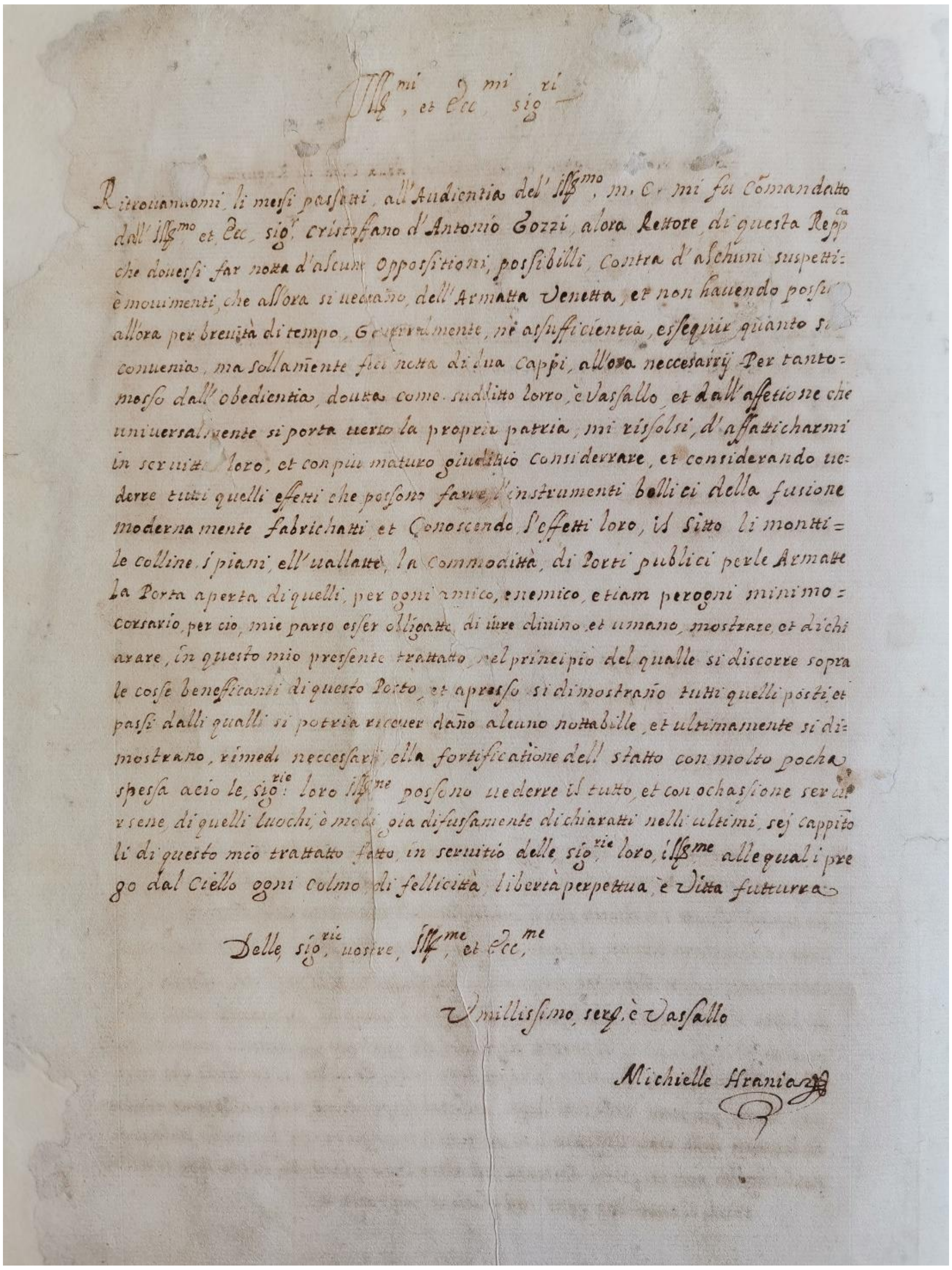


Figure 2. Francesco Tensini, *La fortificatione guardia difesa et espugnatione delle fortezze esperimentata in diverse guerre*, 1630, pp. 69. National and University Library in Zagreb. Signature: Zbirka rijetkosti | BZ 117.


Ill.mi et Ecc.mi sig.ri

Ritrouandomi li mesi passati, all'Audientia del' ill.mo m. C. mi fu Comandatto dall' ill.mo et Ecc. sig.r Cristoffano d'Antonio Gozzi, alora Rettore di questa Rep.ca che douessi far notta d'alcune Oppositioni possibilli, Contra d'alchuni suspetti: è mouimenti, che allora si ueciauano dell'Armatta Venetta, et non hauendo possu[to] allora per breuità di tempo, [illegible], nè asufficientia, esseguir quanto si conueniua, ma sollamente fici notta di dua cappi, allora necesarij. Per tanto: mosso dall'obedientia, doutta come suddito lorro, è Vassallo et dall'affetione che uniuersalmente si porta uerso la propria patria, mi risolsi, d'affatichamni in seruitio loro, et con piu maturo giuditio considerare, et considerando ue: derre tutti quelli effetti che possono farre, l'instrumenti bellici della fusione modernamente fabrichatti et Conoscendo l'effetti loro, il Sitto li montti= le colline, i piani, ell'uallatte, la commodittà, di Porti publici perle Armatte la Porta aperta di quelli, per ogni amico, e nemico, etiam perogni minimo= corsario, per cio, mie parso esser obligatto, di iure diuino et umano, mostrare et dichi arare, in questo mio presente trattatto, nel principio del qualle si discorre sopra le cosse beneficanti di questo Porto, et apresso si dimostrano tutti quelli posti et passi dalli qualli si potria riceuer dano alcuno nottabille, et ultimamente si di: mostrano, rimedi necessarij alla fortificatione dell stato con molto pocha spesa acio le sig.rie loro ill.me possono uederre il tutto, et con ochasione seruir sene, di quelli luochi, ò modi gia difusamente dichiaratti nelli ultimi, sej cappitoli di questo mio trattatto fatto in seruitio delle sig.rie loro, ill.me alle quali pre go dal Ciello ogni colmo di fellicità, libertà perpetua è Vitta futturra.

Delle sig.rie uostre, ill.me et Ecc.me

Umillissimo serv. è Vassallo

Michielle Hranicz

Figure 3. Michielle Hranciz. *Fortificatione della Città di Ragusa*, 1v. Archives of the Croatian Academy of Sciences and Arts. Arhiv HAZU I. d-130.

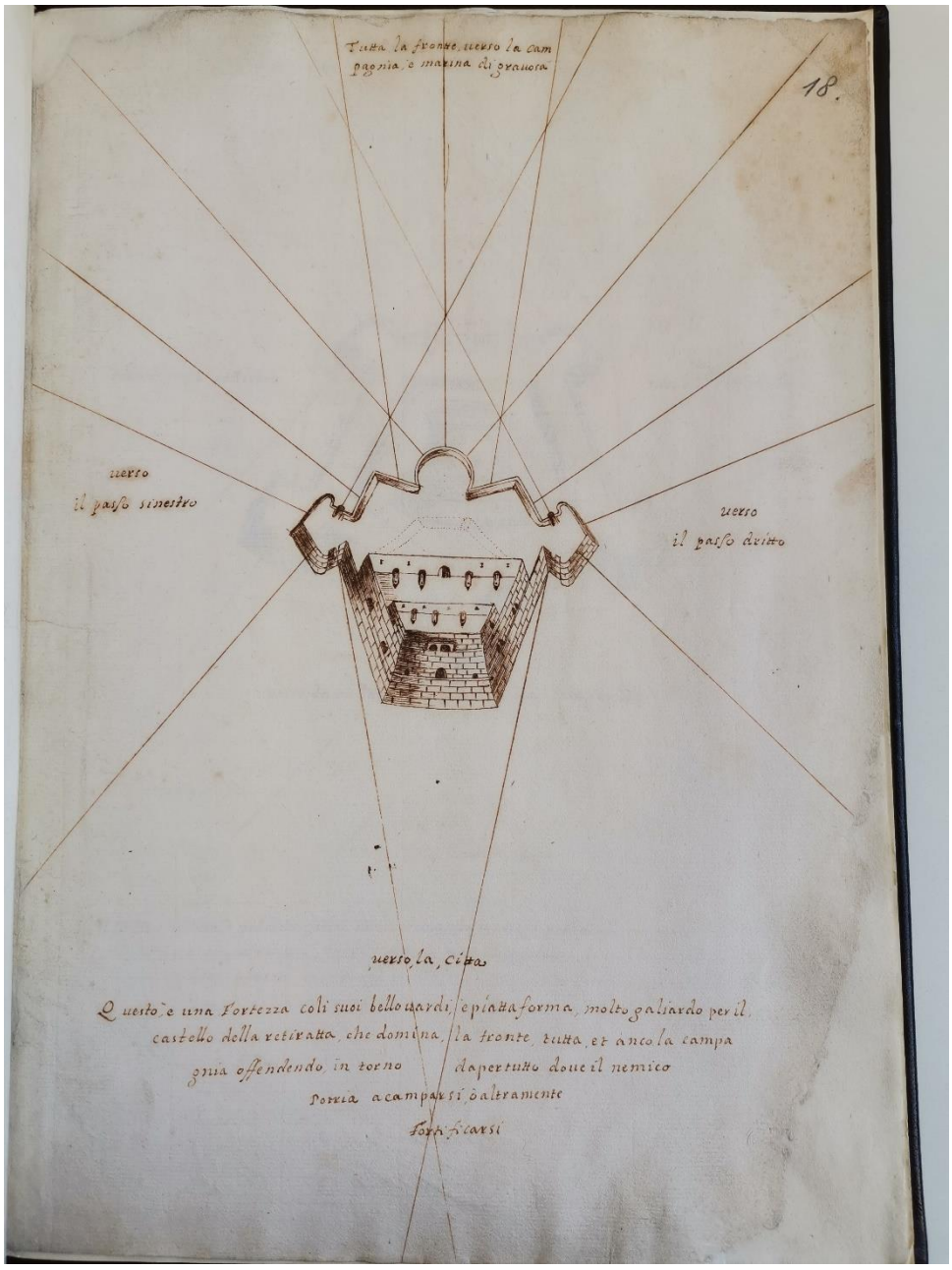


Figure 4. Michielle Hranciz, *Fortificatione della Città di Ragusa*, 18. Archives of the Croatian Academy of Sciences and Arts. Arhiv HAZU I. d-130.

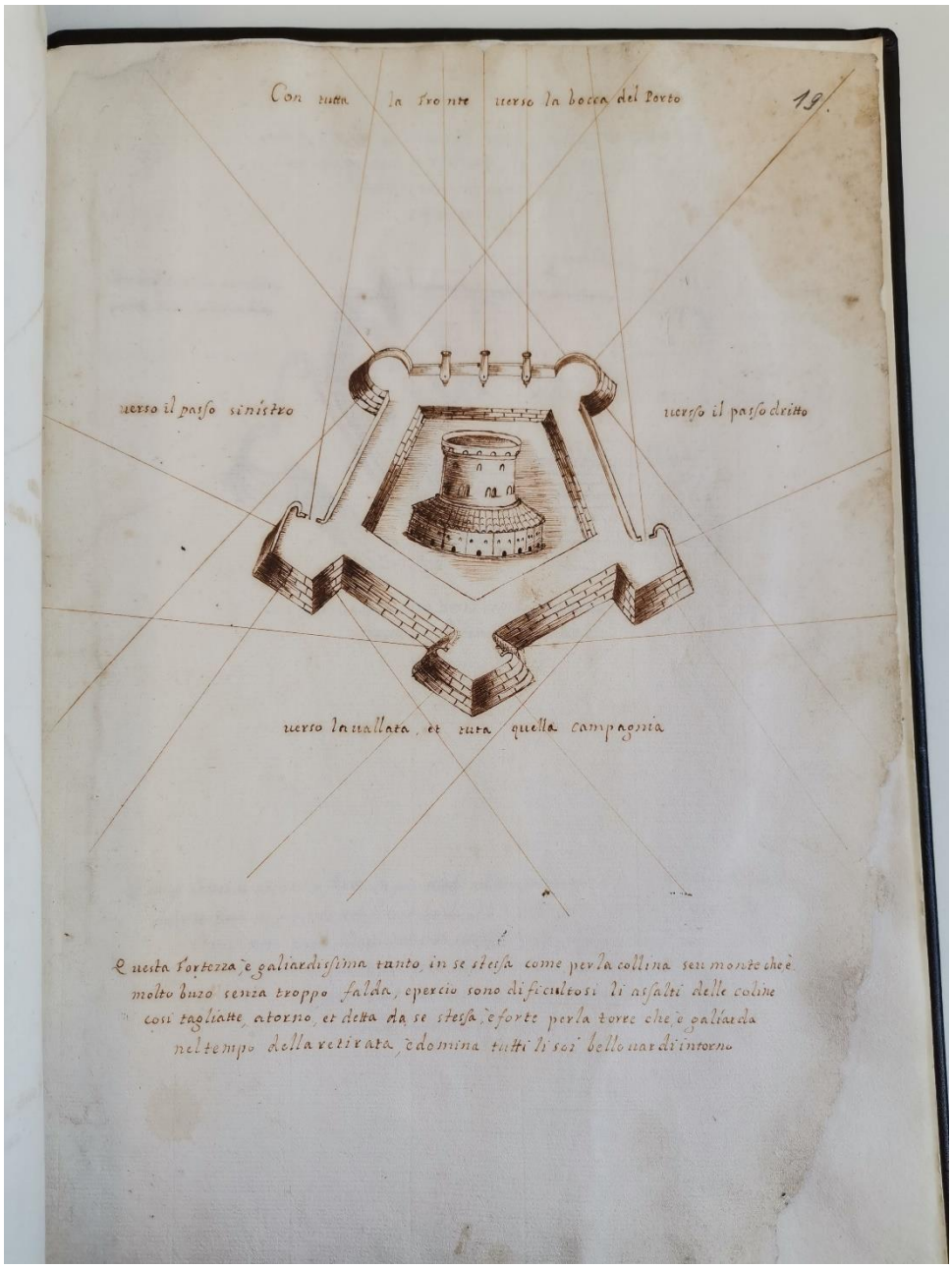


Figure 5. Michielle Hranciz, *Fortificatione della Città di Ragusa*, 19. Archives of the Croatian Academy of Sciences and Arts. Arhiv HAZU I. d-130.

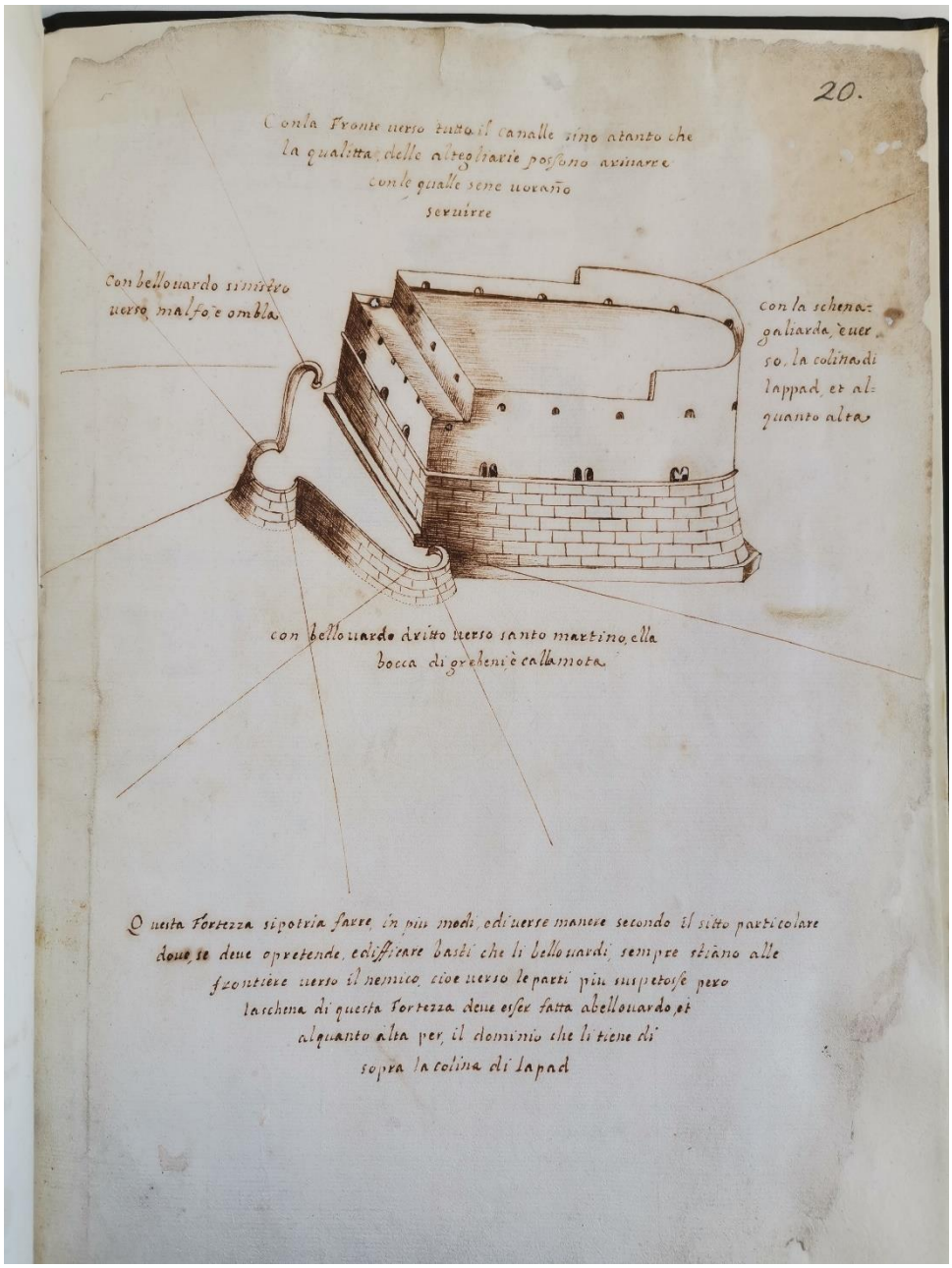


Figure 6. Michielle Hranciz, *Fortificatione della Città di Ragusa*, 20. Archives of the Croatian Academy of Sciences and Arts. Arhiv HAZU I. d-130.

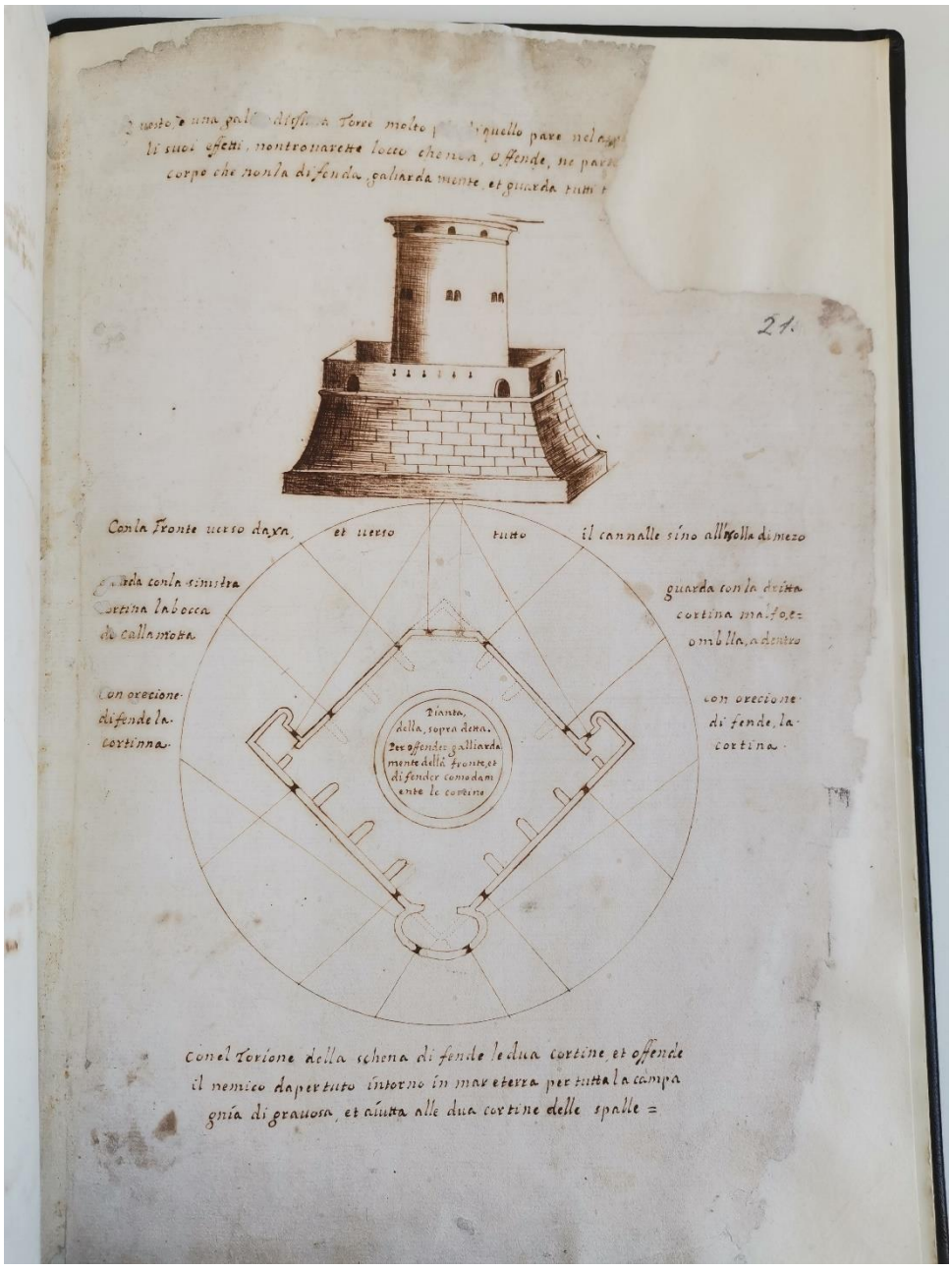


Figure 7. Michielle Hranciz, *Fortificatione della Città di Ragusa*, 21. Archives of the Croatian Academy of Sciences and Arts. Arhiv HAZU I. d-130.

Figure 8. Tavola n(u)ova di Schiavonia by Girolami Rusceli, 1561. Šibenik State Archives. Signature HR-DAŠI-192-1.1.

Figure 9. Dubrovnik, city plan. From: Deanović, Ana, “Prilog Michelozza Michelozzija” , pp. 54.

Figure 10. The Tower of Minčeta in Dubrovnik. Photographed by Karla Papeš.

Figure 11. The Tower of Minčeta from the northern side of the city walls of Dubrovnik. Photographed by Karla Papeš.

Figure 12. Dubrovnik, the northern city walls. Photographed by Karla Papeš.

Figure 13. Dubrovnik, the western side of the city walls. Photographed by Karla Papeš.

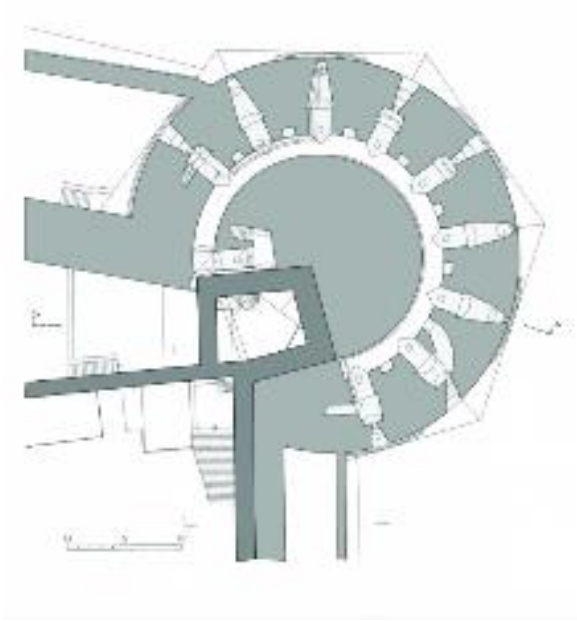


Figure 14. The Tower of Minčeta in Dubrovnik. Ground plan of the second floor. From Deanović, Ana and Ivo Tenšek. “Predziđe dubrovačke Minčete”, pp. 307.

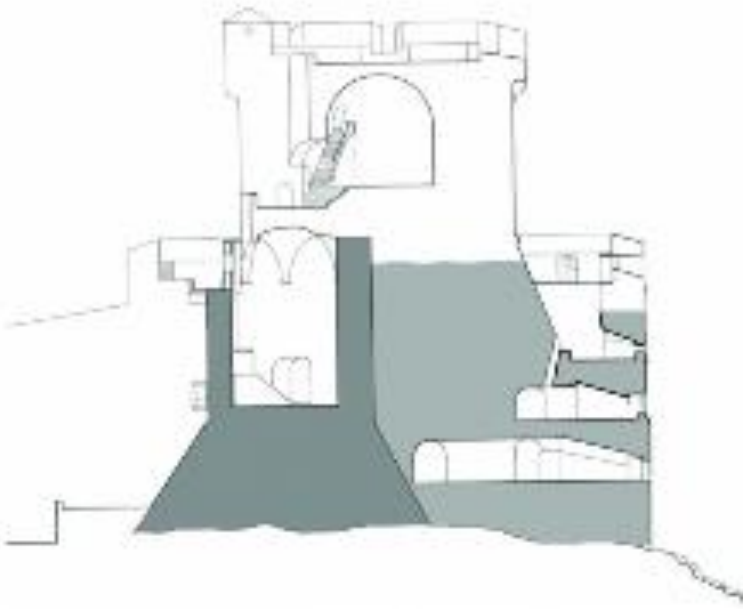


Figure 15. The Tower of Minčeta in Dubrovnik. Cross section. From Deanović, Ana and Ivo Tenšek. “Predziđe dubrovačke Minčete”, pp. 309.

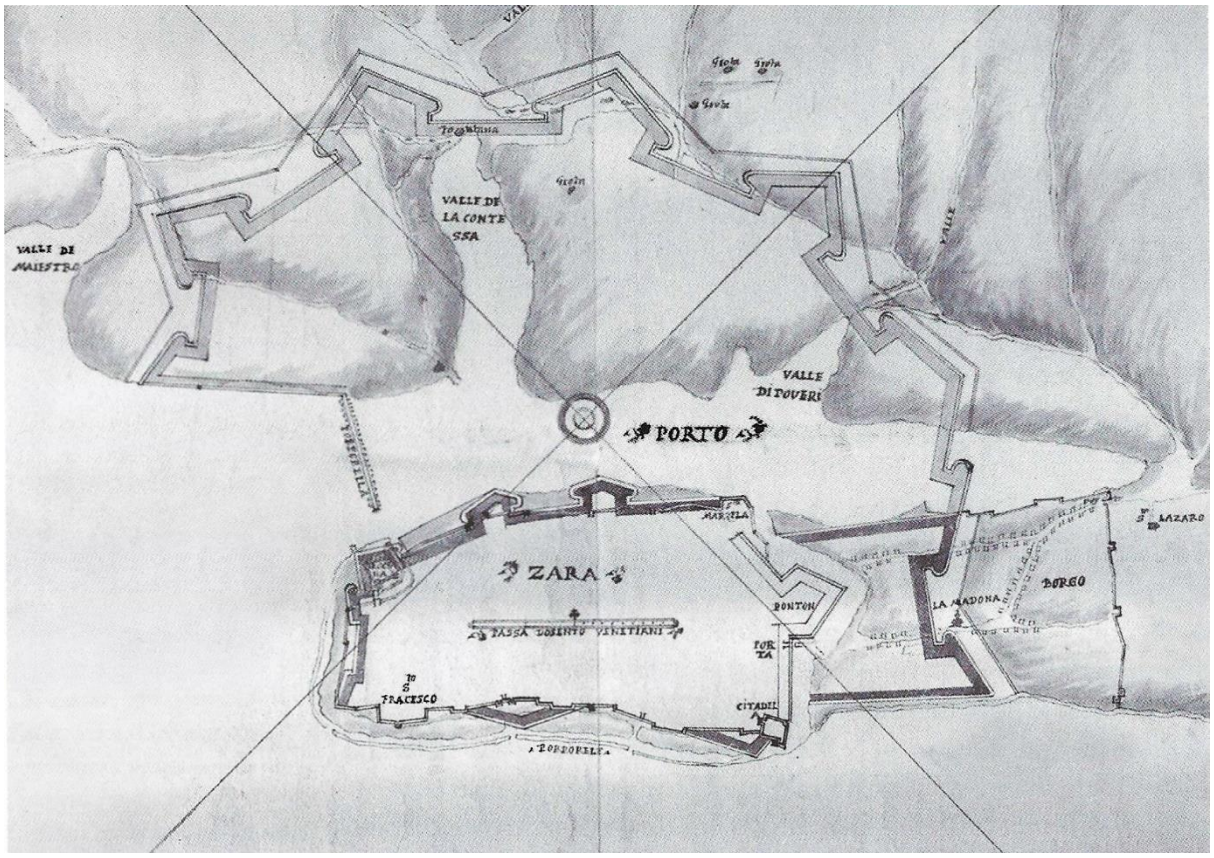


Figure 16. Plan of Zadar. Project of unrealized fortifications. Around 1567. Biblioteca del Museo Correr, Venice. Signature Ms. PDc 848 n. 24. From Žmegač, *Bastioni jadranske Hrvatske*, pp. 60.

Figure 17. Plan of Zadar. Around 1568. Austrian State Archives, Vienna, K VII I 174. From Žmegač, *Bastioni jadranske Hrvatske*, pp. 33.

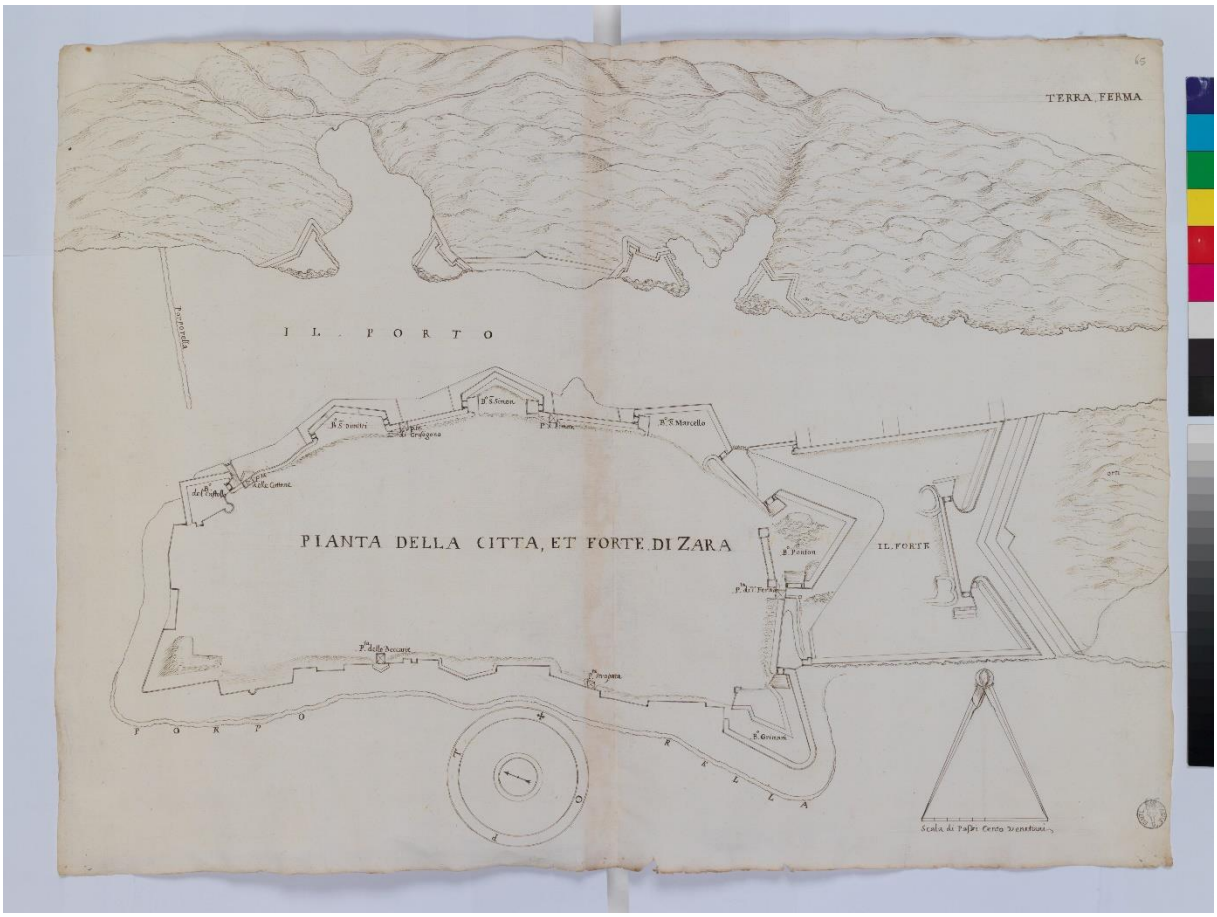


Figure 18. Plan of Zadar. Original title Pianta della città, et forte di Zara, ca. 1625. Municipal Library of Treviso, signature BCTv, ms. 1019, cc. 64-65: tav. 31.

Figure 19. Zadar, view of the elongated Bastion Ponton and the corner of Porta Terraferma. Photographed by Karla Papeš.

Figure 20. Zadar, view of Porta Terraferma from the Bastion Ponton. Photographed by Karla Papeš.

Figure 21. Zadar, Porta Terraferma, detail. Photographed by Karla Papeš.

Figure 22. Drawing of Porta Terraferma by Michele Sanmicheli. Galleria degli Uffizi, 1759A.

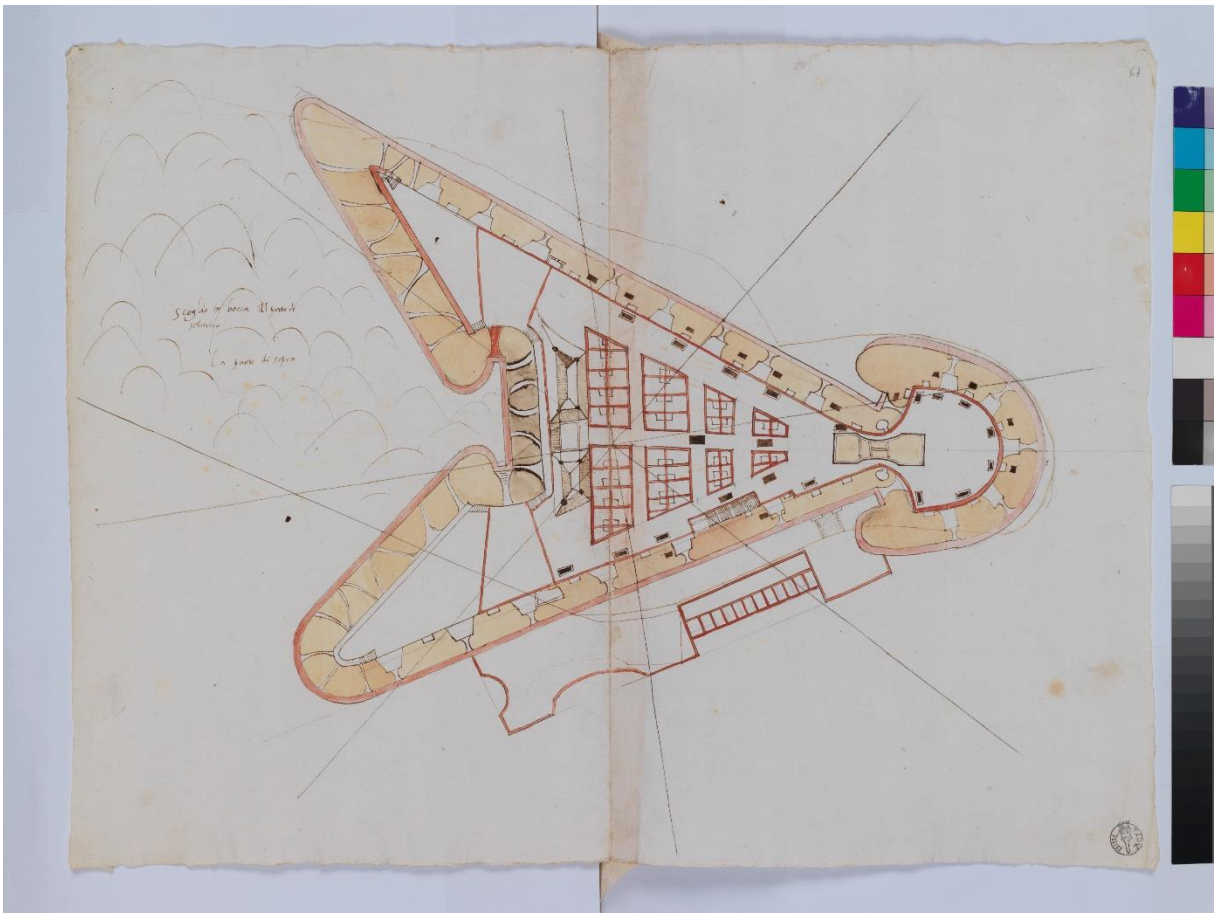


Figure 23. Fortress of St. Nicholas, Šibenik, upper level. Municipal Library of Treviso, signature BCTv, ms. 1019, cc. 66-67: tav. 32.

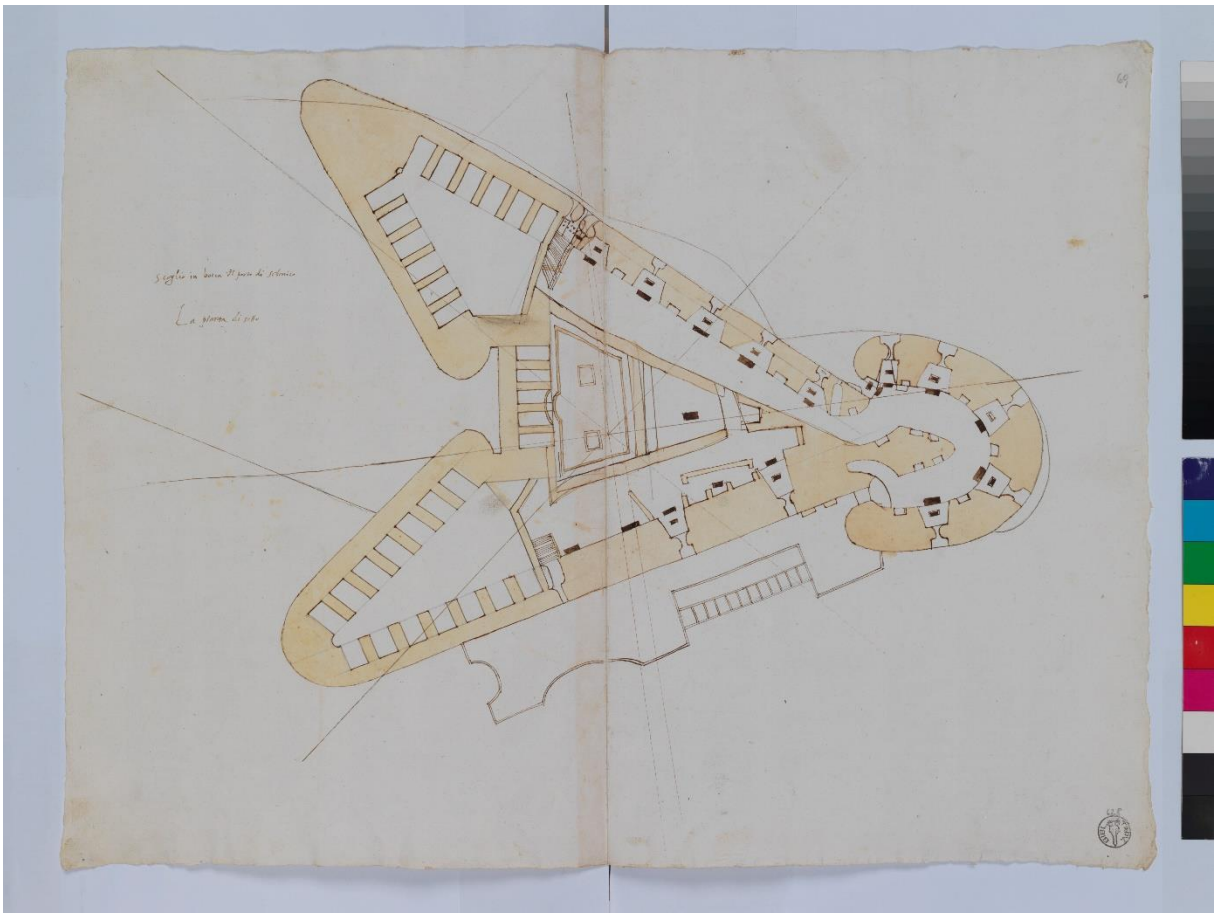


Figure 24. Fortress of St. Nicholas, Šibenik, lower level. Municipal Library of Treviso, signature BCTv, ms. 1019, cc. 68-69: tav. 33.

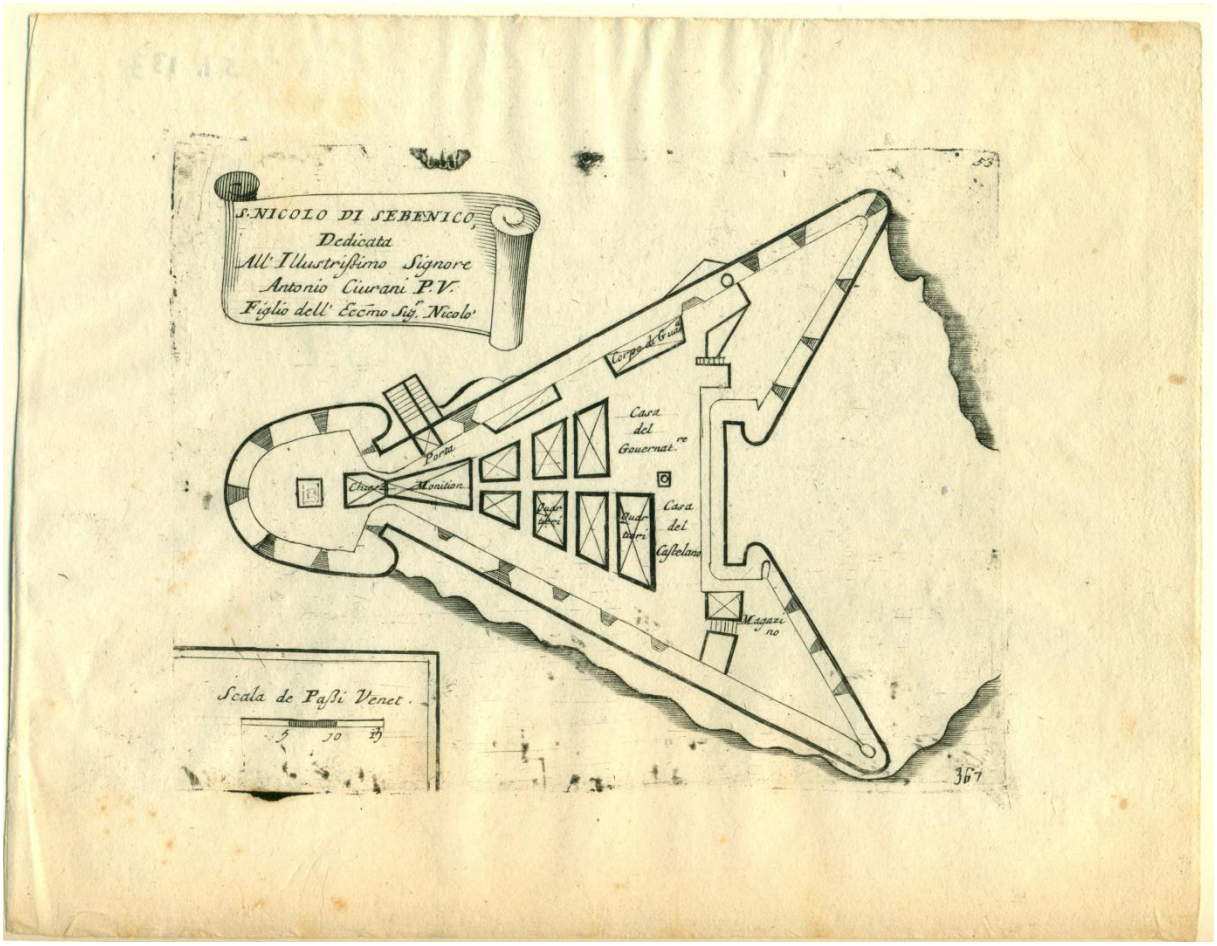


Figure 25. Floor plan of the Fortress of St. Nicholas in Šibenik. Vincenzo Maria Coronelli, 1688. Šibenik State Archives. HR-DAŠI-244 Grafička zbirka, Grafika tvrđave Sv. Nikole.

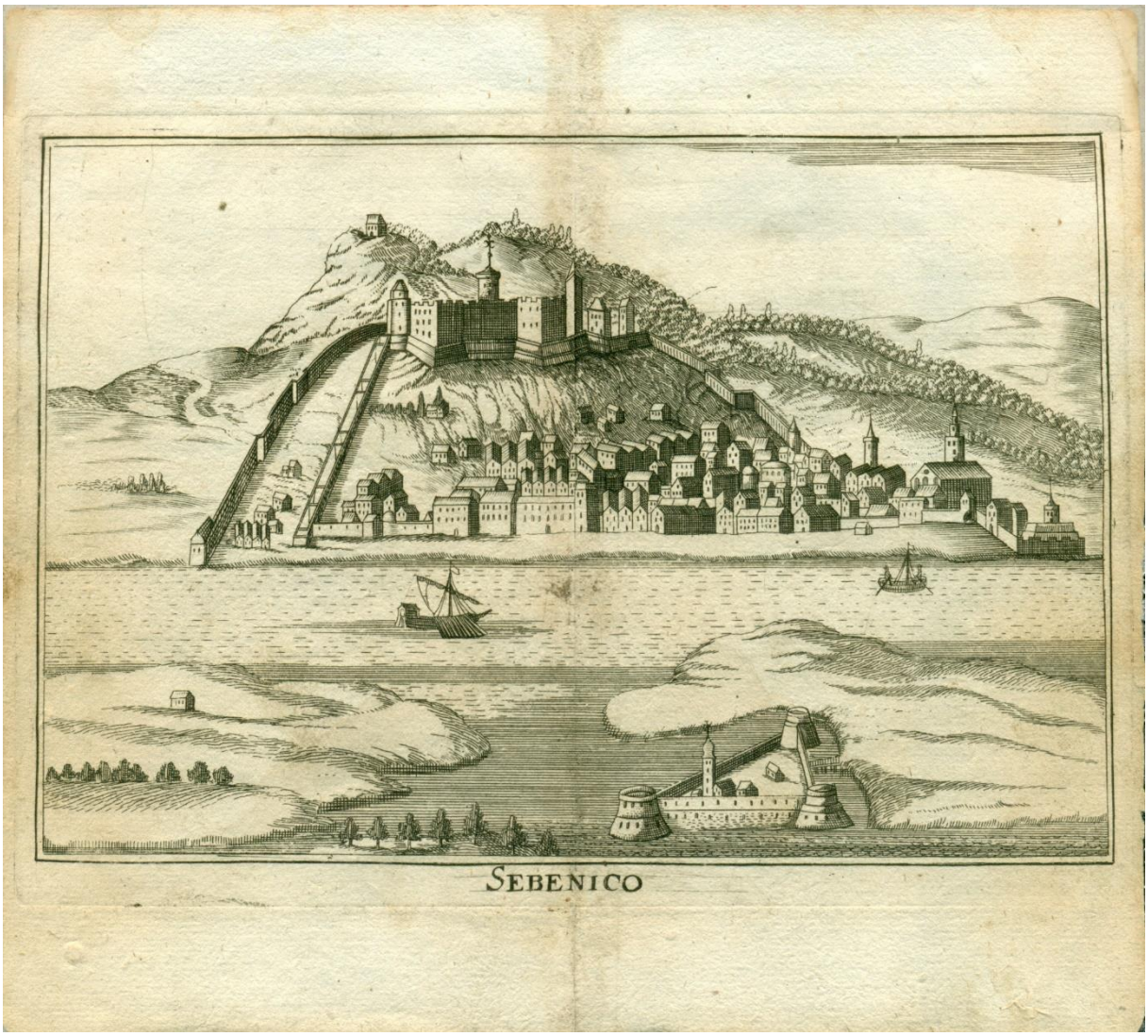


Figure 26. View of Šibenik. Šibenik State Archives. HR-DAŠI-244 Grafička zbirka, Sebenico.

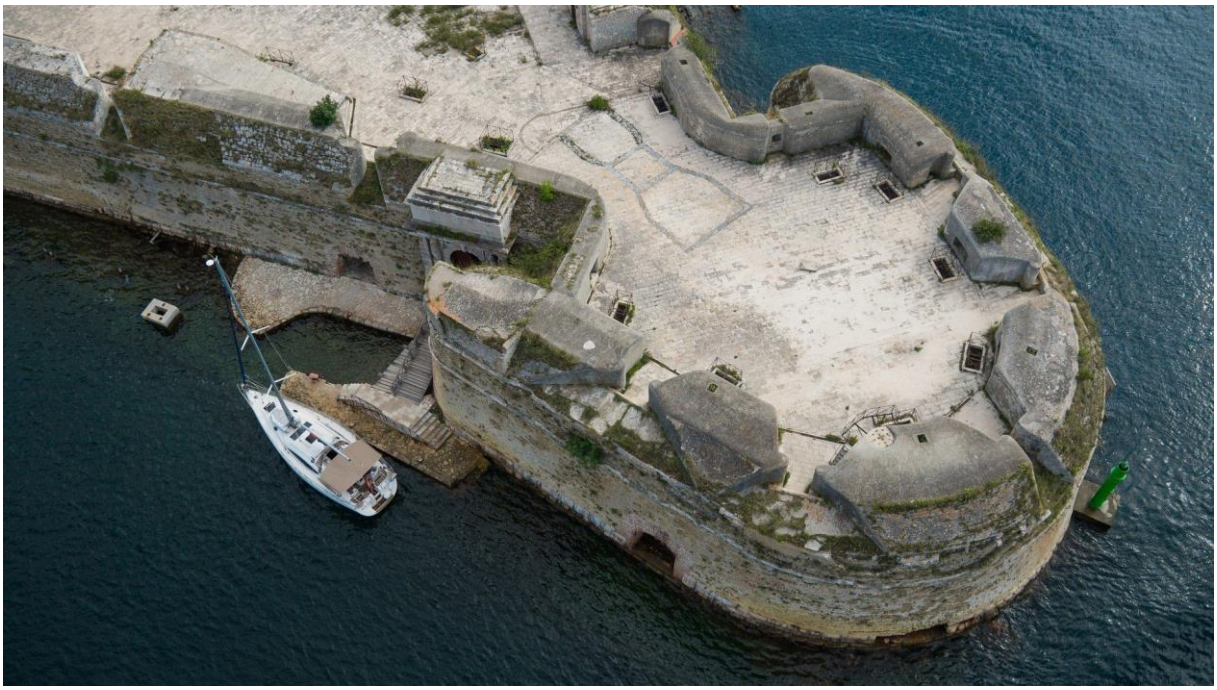


Figure 27. Indicated position of the sacral building in the Fortress of St. Nicholas in Šibenik (Source: Šibenik Tourist Board).

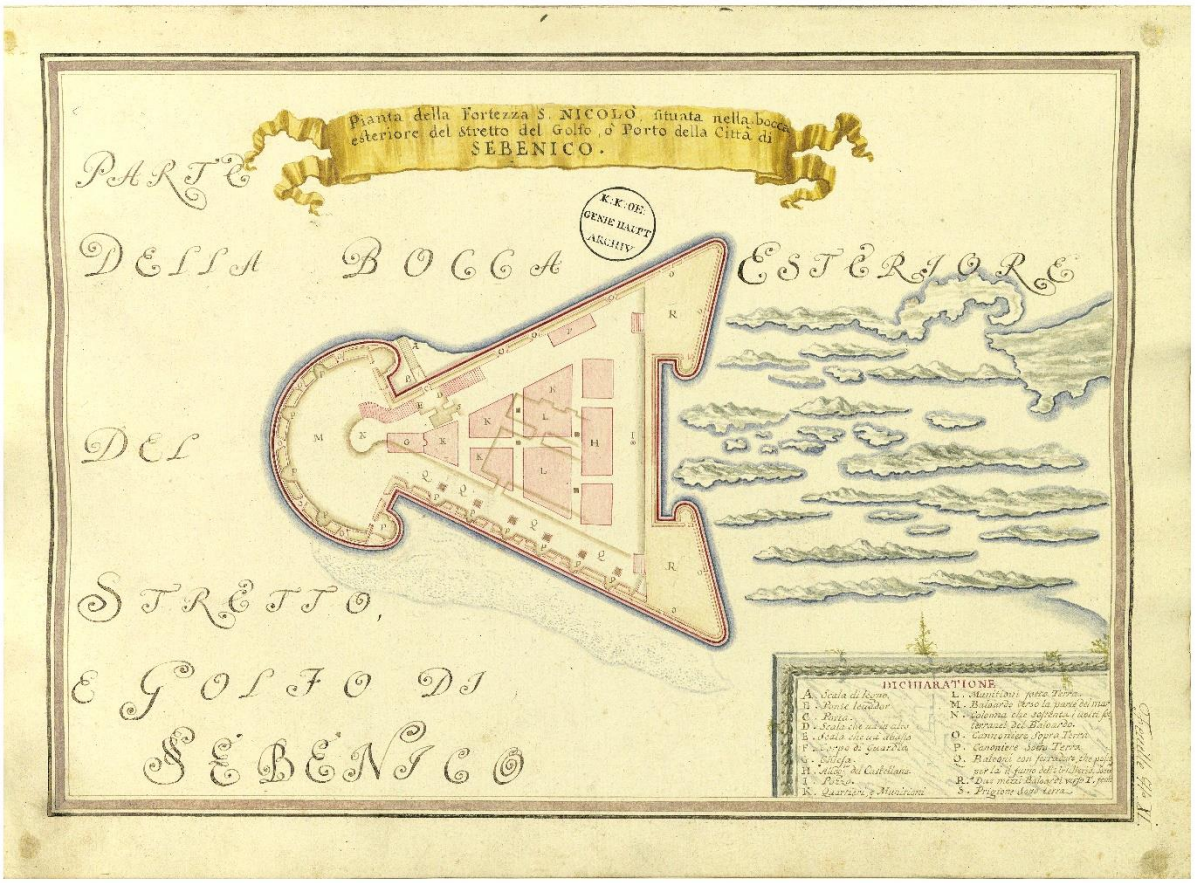


Figure 28. Floor plan of the Fortress of St. Nicholas from 1708 by Giuseppe Juster. Austrian State Archives, Vienna, GIa480d fol.24r, Nr. XI.

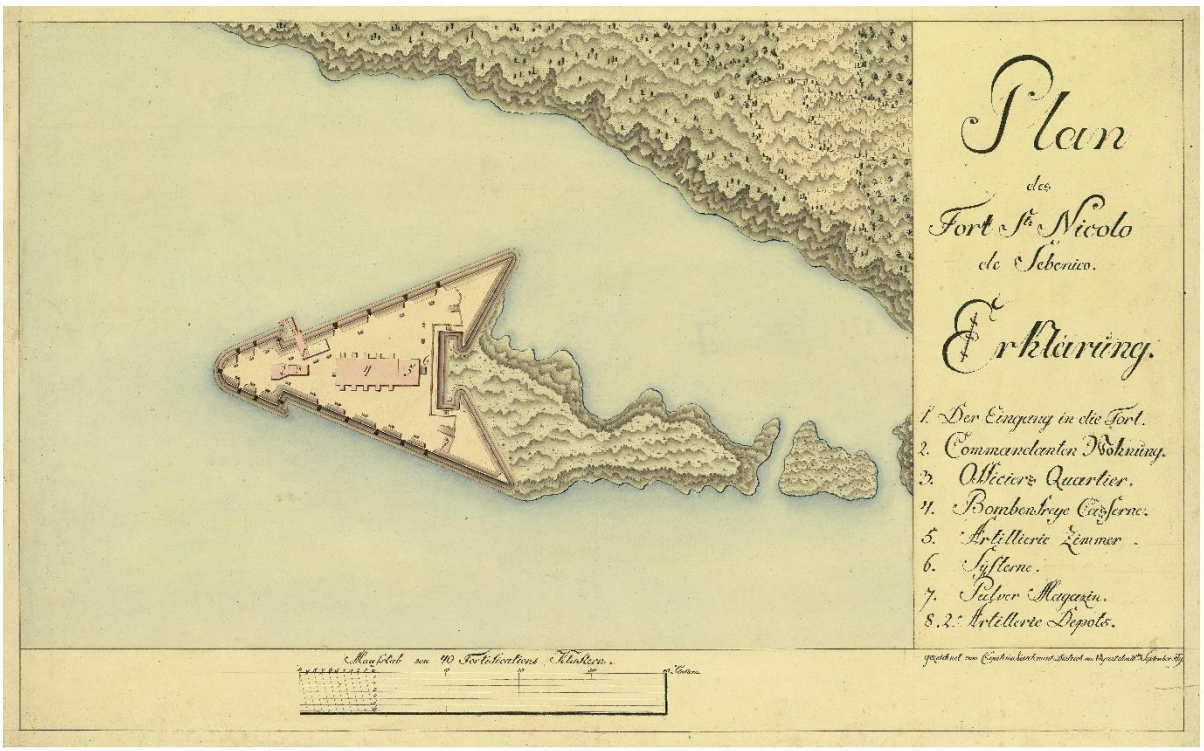


Figure 29. Fortress of St. Nicholas from the first half of the nineteenth century. Austrian State Archives, Vienna, GPA Inland C III a) Nr. 21.

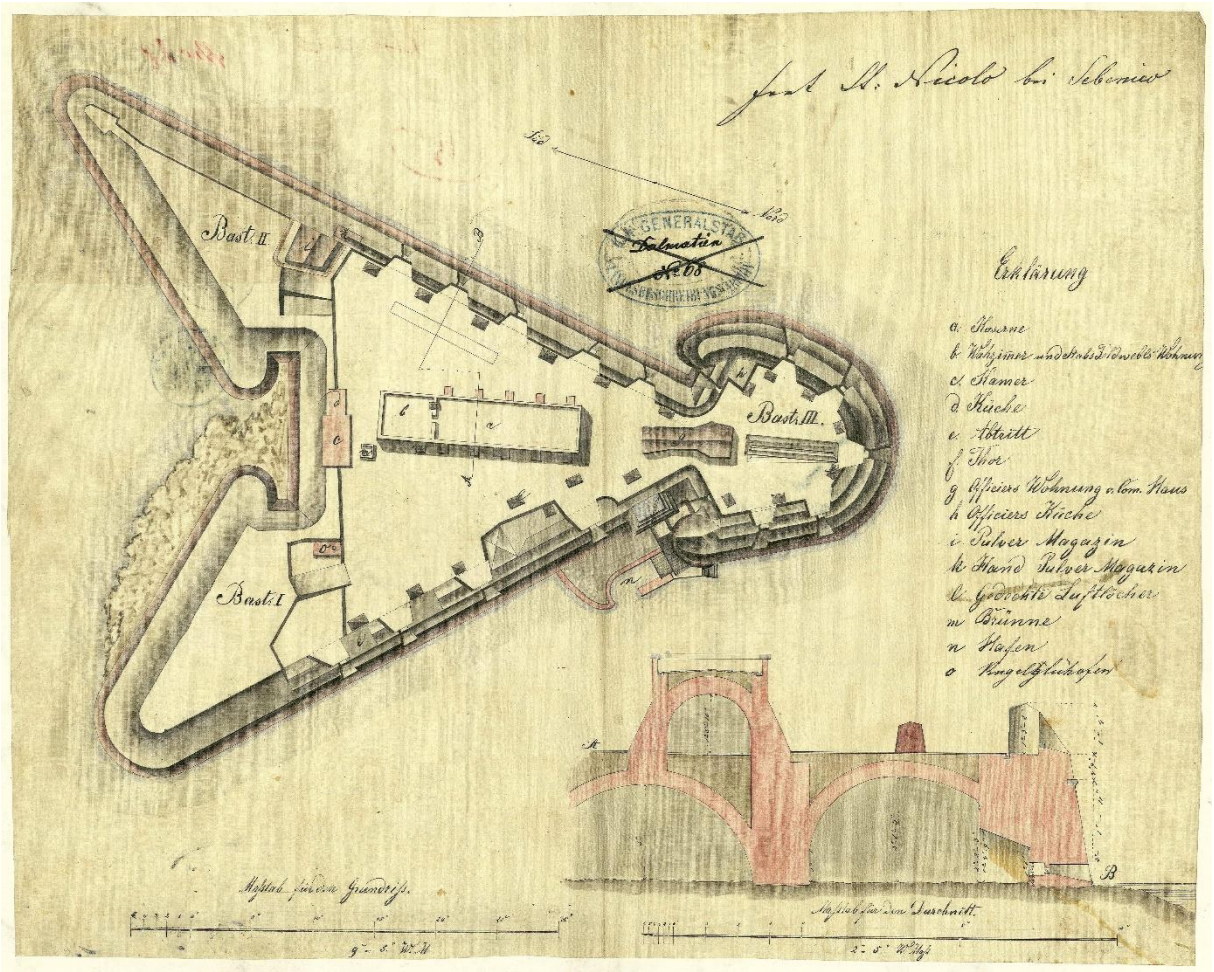


Figure 30. Floor plan of the Fortress of St. Nicholas from the first half of the nineteenth century. Austrian State Archives, Vienna, GPA Inland C III a) Nr. 11.

Figure 31. Fortress of St. Nicholas, Šibenik, main entrance. Photographed by Karla Papeš.

Figure 32. Map representing the Port of Pula. Around 1619. Municipal library in Treviso. BCTv, ms. 1019, cc. 58-59: tav. 28.

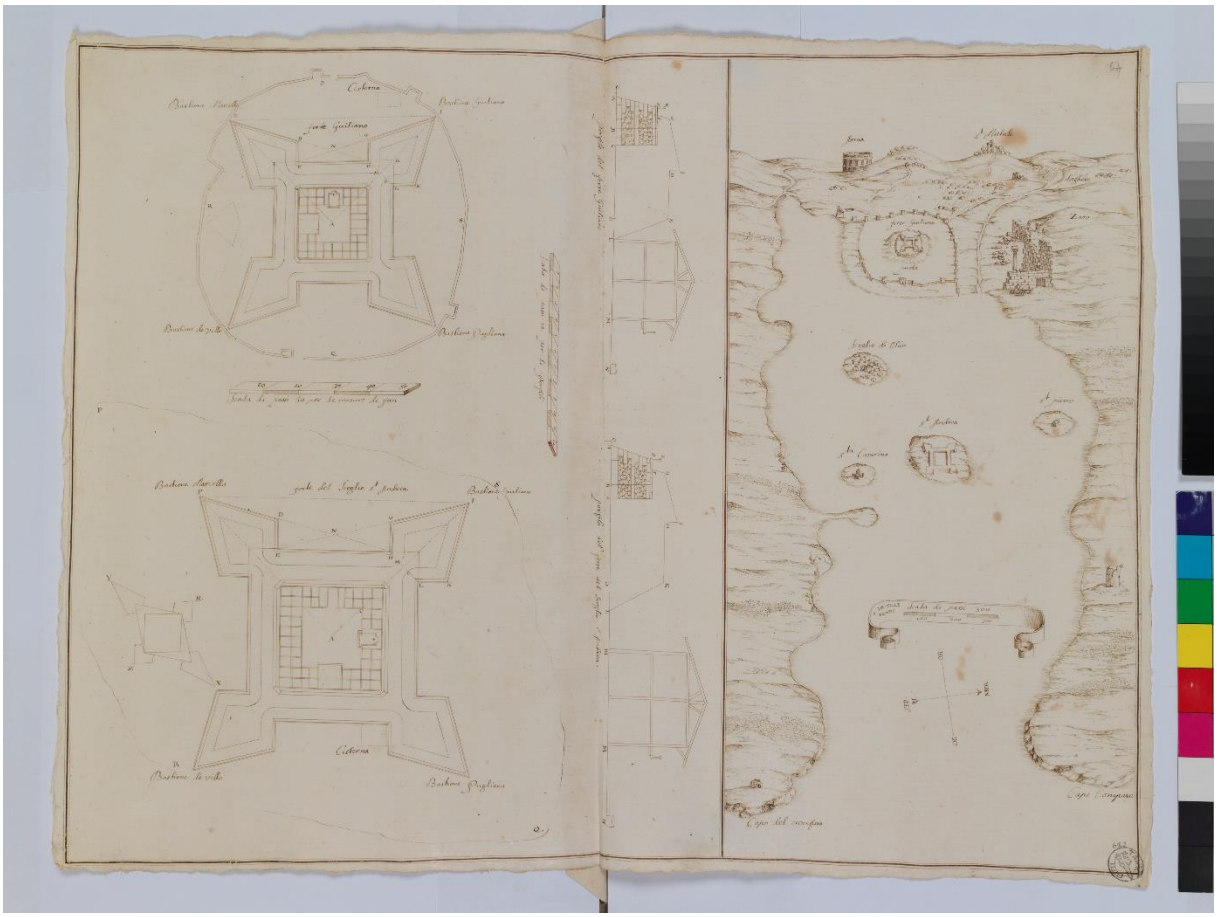


Figure 33. On the left: floor plans and cross sections of two fortresses. On the right: map of Pula. By Antoine de Ville. Municipal library in Treviso. BCTv, ms. 1019, cc. 56-57: tav. 27.

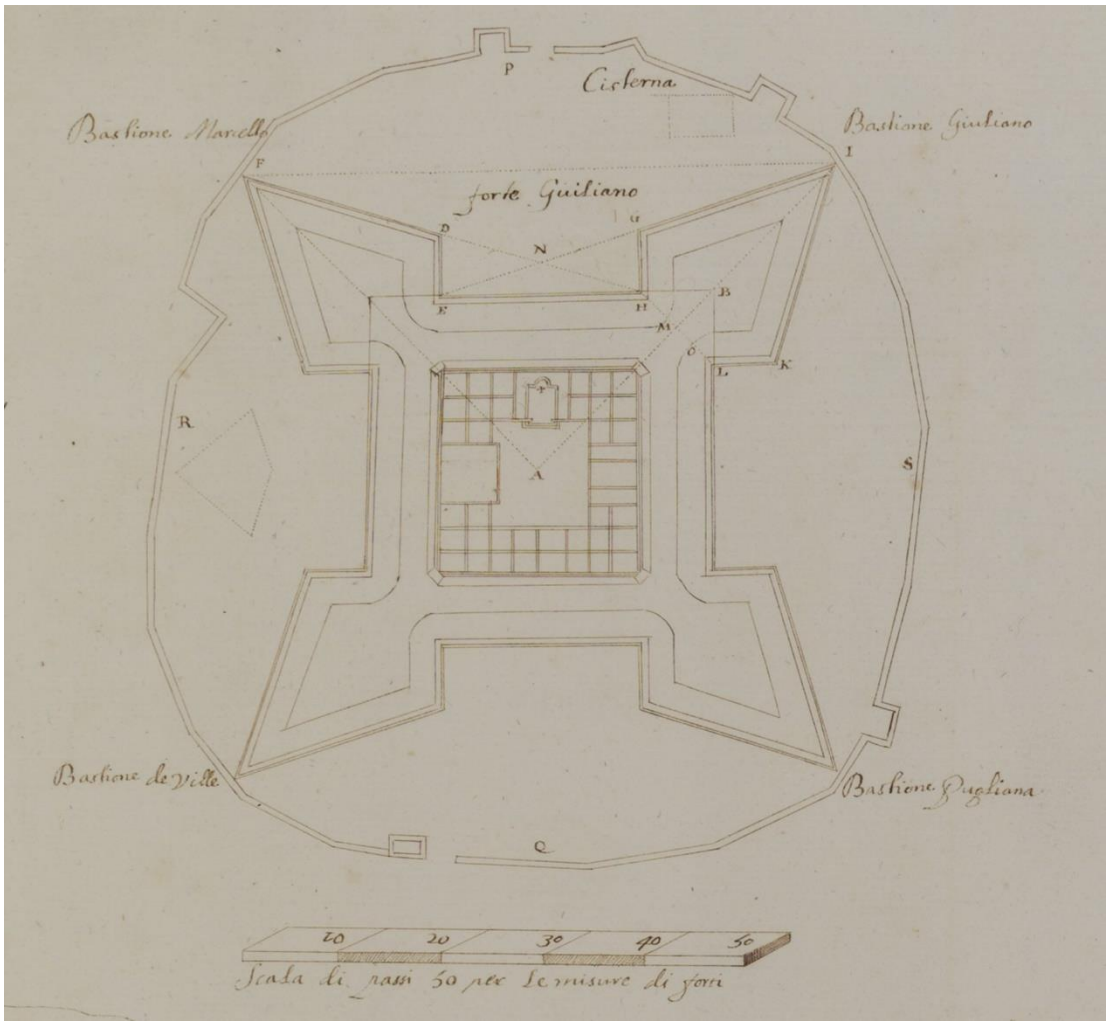


Figure 34. Floor plan of the Fortress in Pula, detail. By Antoine de Ville. Municipal library in Treviso. BCTv, ms. 1019, cc. 56-57: tav. 27.

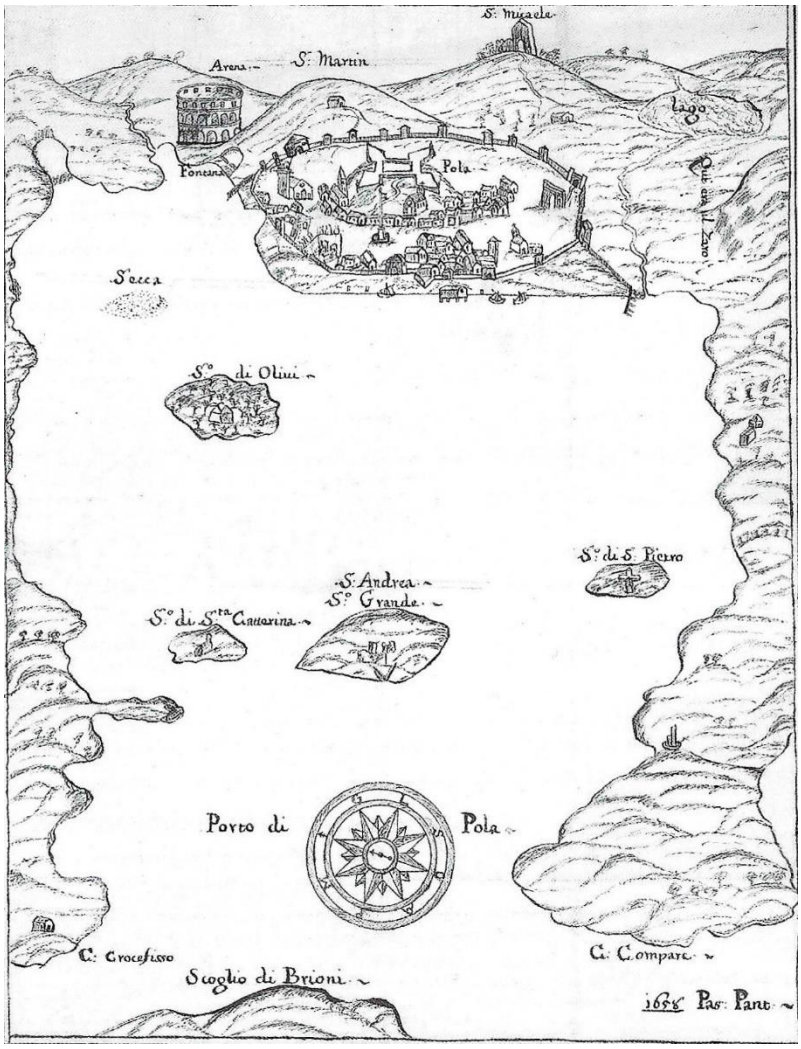


Figure 35. View of Pula. By Pasqualin Panteleo, 1658. Venetian State Archives, Provveditori sopraintendenti alla camera dei confine, b. 338, dis. 14. Žmegač, *Bastioni jadranske Hrvatske*, pp. 73.

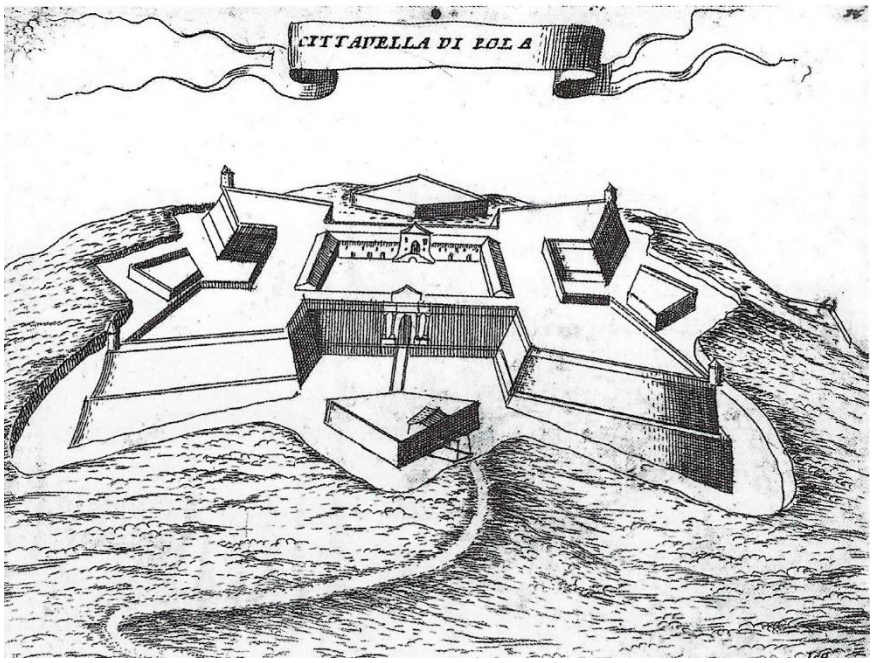


Figure 36. Fortress in Pula. By Vincenzo Maria Coronelli, 1688. Žmegač, *Bastioni jadranske Hrvatske*, pp. 74.

Figure 37. View of the southern side of the Fortress in Pula. Photographed by Karla Papeš.

Figure 38. View of the southern entrance of the Fortress in Pula. Photographed by Karla Papeš.

Figure 39. General map of the St. Anthony's Channel and the port of Šibenik. Around 1647. Municipal Library of Treviso, signature BCTv, ms. 1155, tav. 12.

Figure 40. View of Šibenik and its surroundings. Šibenik State Archives, HR-DAŠI-244 Grafička zbirka, Situs particularis.

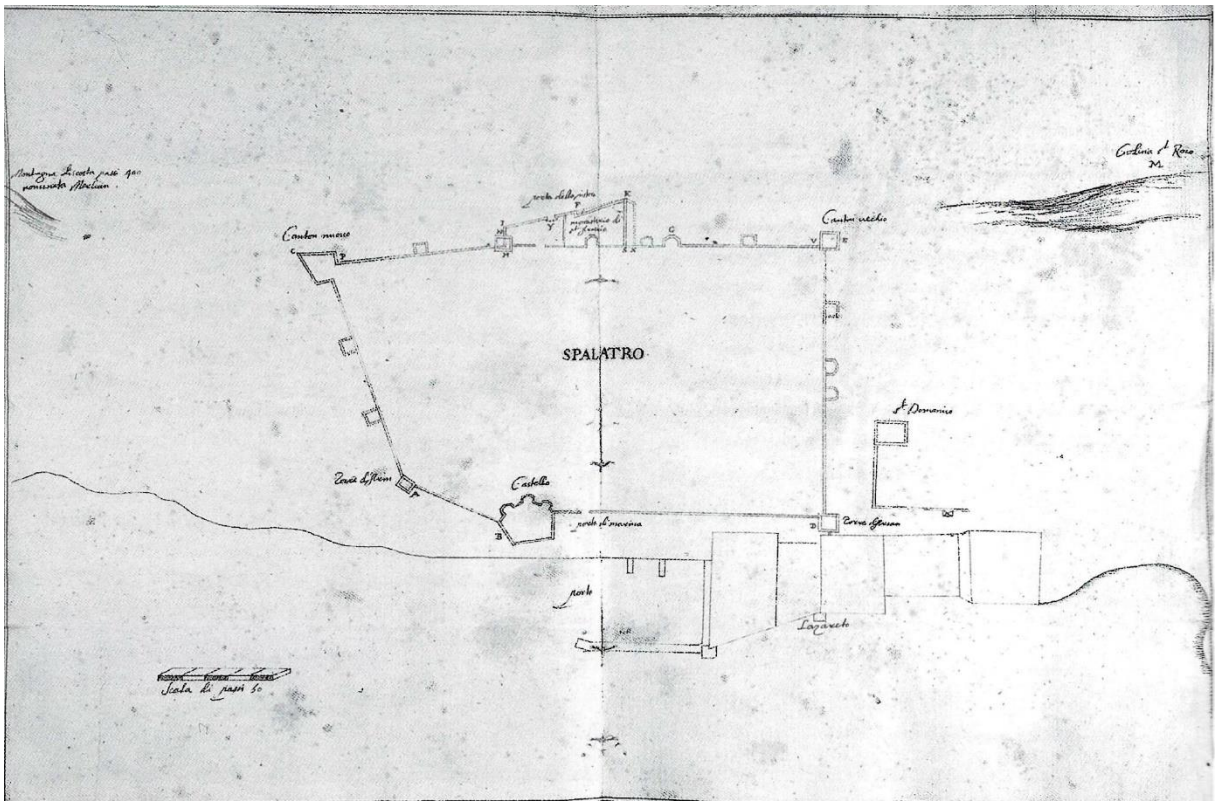


Figure 41. Project of fortifications in Split. By Antoine de Ville, 1630. Venetian State Archives, Senato, Dispacci, Provveditori da Terra e da Mar, fz. 1152, dis. 1. Žmegač, *Bastioni jadranske Hrvatske*, pp. 80.

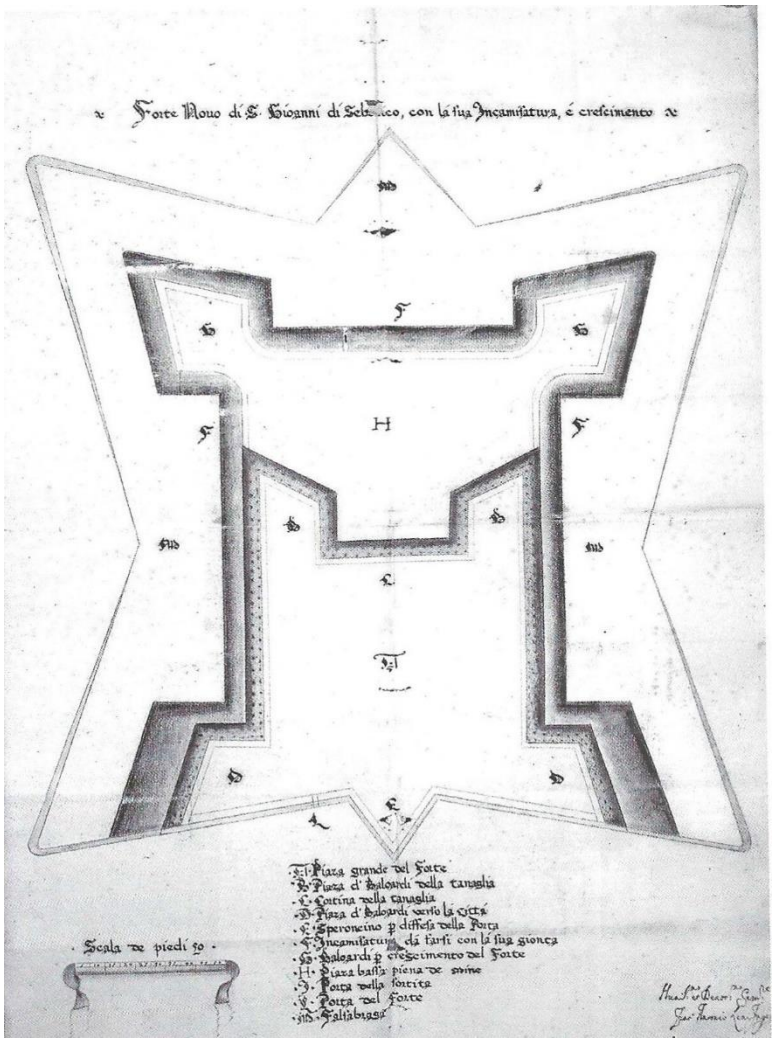


Figure 42. Project for the Fortress of St. John. By Antonio Leni, 1646. Venetian State Archives, Senato, Dispacci, Rettori Dalmazia, fz. 51, dis. 1. Žmegač, *Bastioni jadranske Hrvatske*, pp. 97.

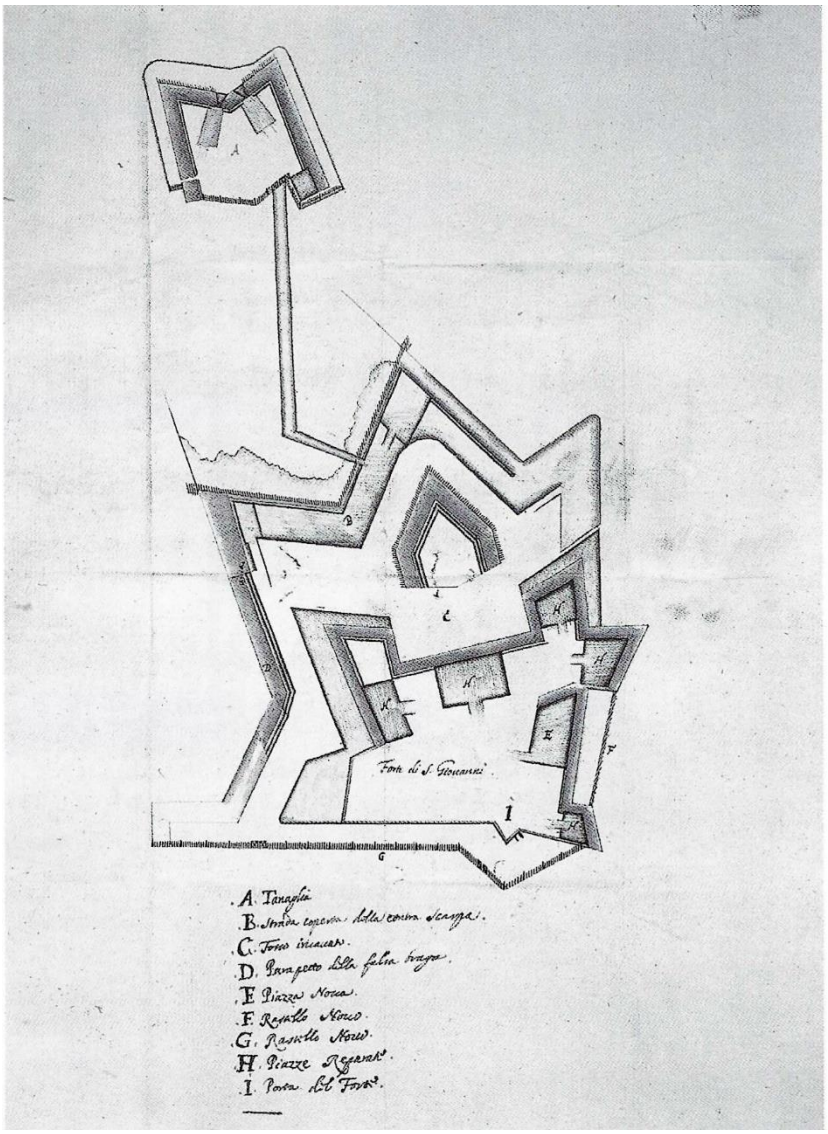


Figure 43. Fortress of St. John around 1648. Venetian State Archives, Senato, Dispacci, Rettori Dalmazia, fz. 53, dis. 2. Žmegač, *Bastioni jadranske Hrvatske*, pp. 98.

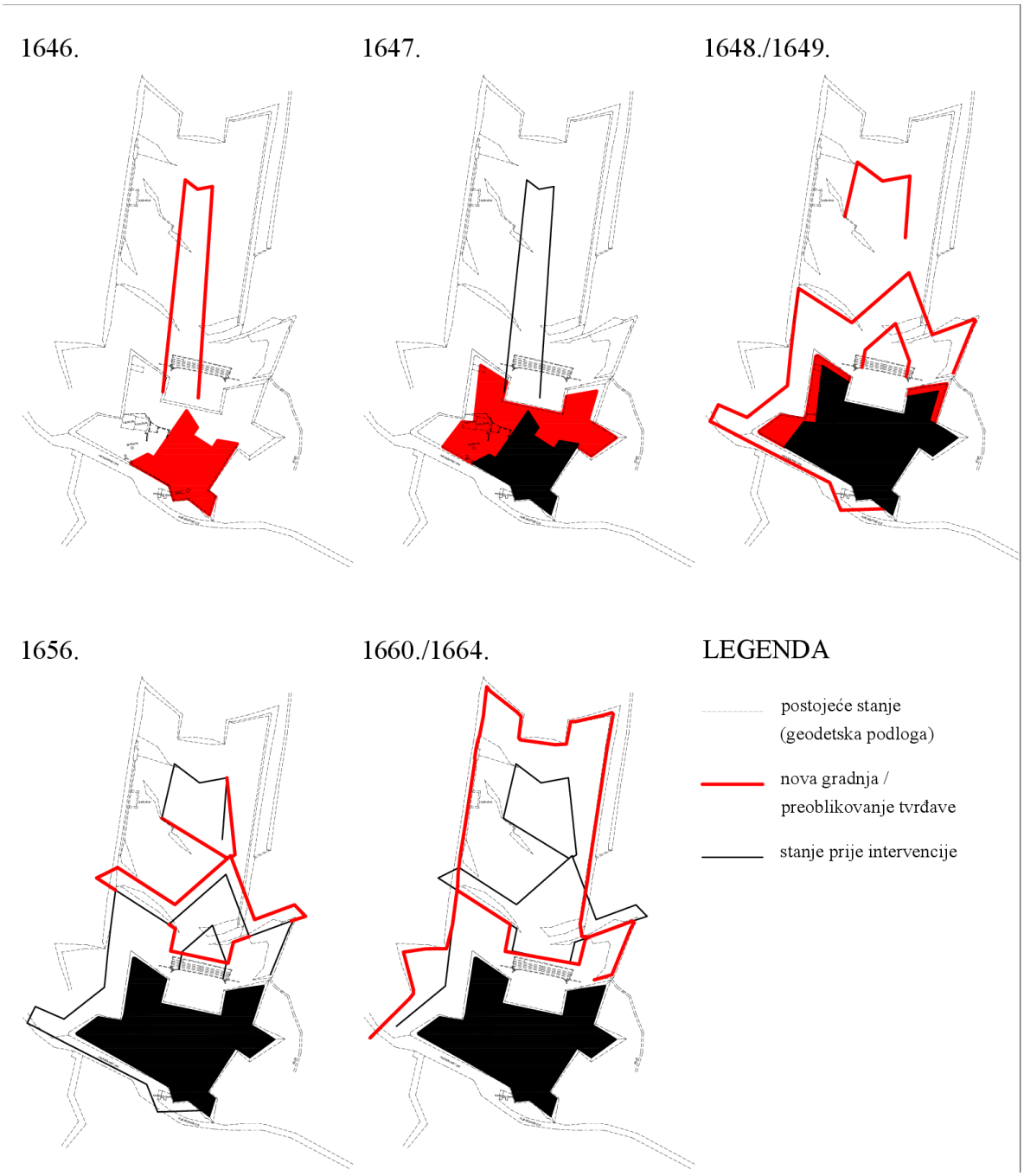


Figure 44. Scheme of development of the Fortress of St. John in Šibenik, made on a geodetic base map, based on historical, archaeological, and spatial analysis. Drawing by I. Petković Pavić and J. Pavić. From: Glavaš and Pavić, "Tvrđava Sv Ivana u Šibeniku", pp. 101.

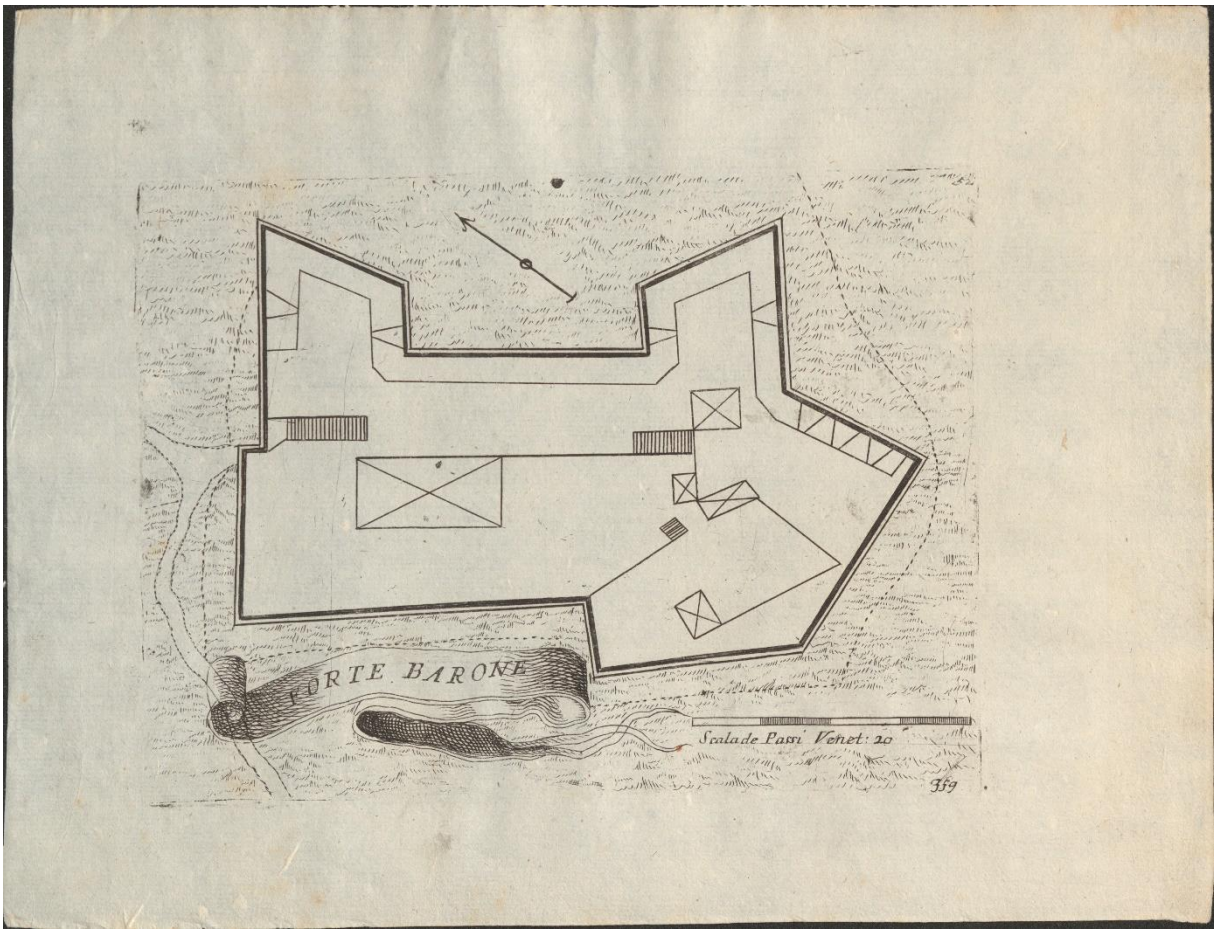


Figure 45. Fortress Barone. Šibenik State Archives, HR-DAŠI-244 Grafička zbirka, Forte Barone.

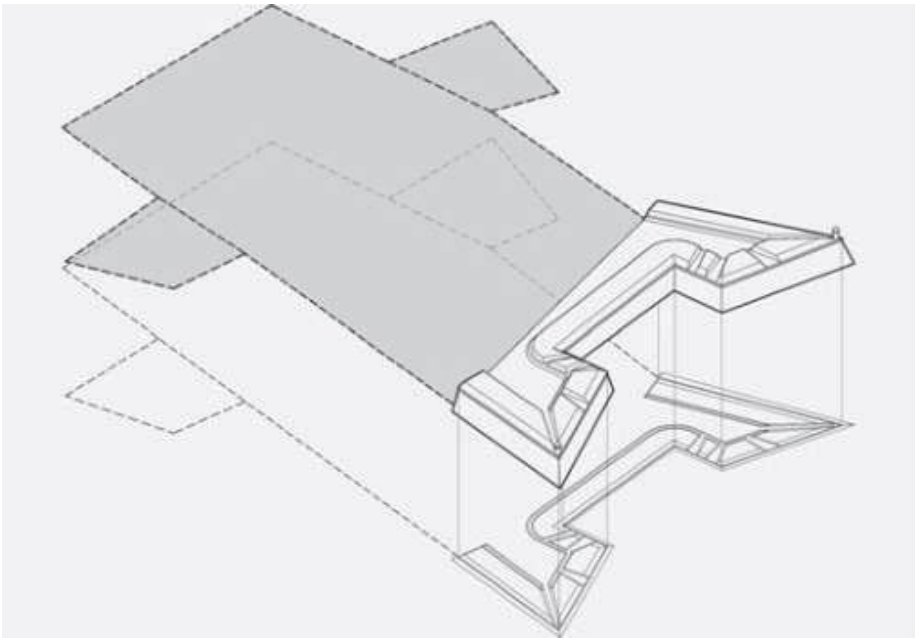


Figure 46. The Fortress Gripe. First construction stage, from 1647 to 1651, featuring a plan and a perspective view. Perojević, “Tvrđava Gripe”, pp. 10.

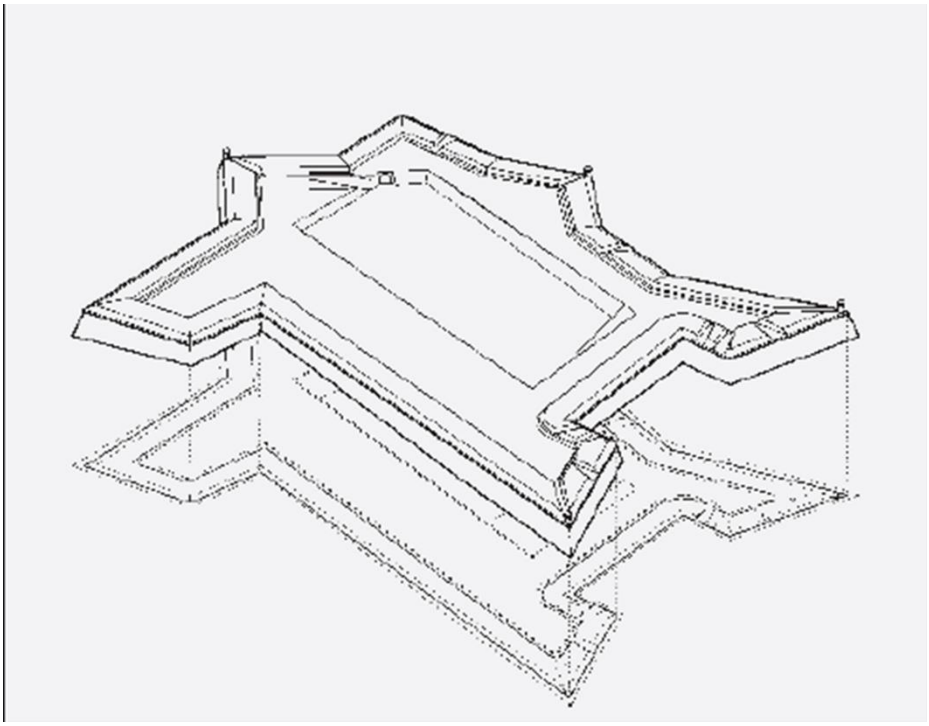


Figure 47. The Fortress Gripe. Second construction stage, from 1656 to 1657, featuring a plan and a perspective view. Perojević, “Tvrđava Gripe”, pp. 10.

Figure 48. Plans of Šibenik and its fortresses. Šibenik State Archives, signature HR-DAŠI-244 Grafička zbirka, Port de Sebenico a' Amsterdam, Chez Pierre Mortier Avec Privilege.

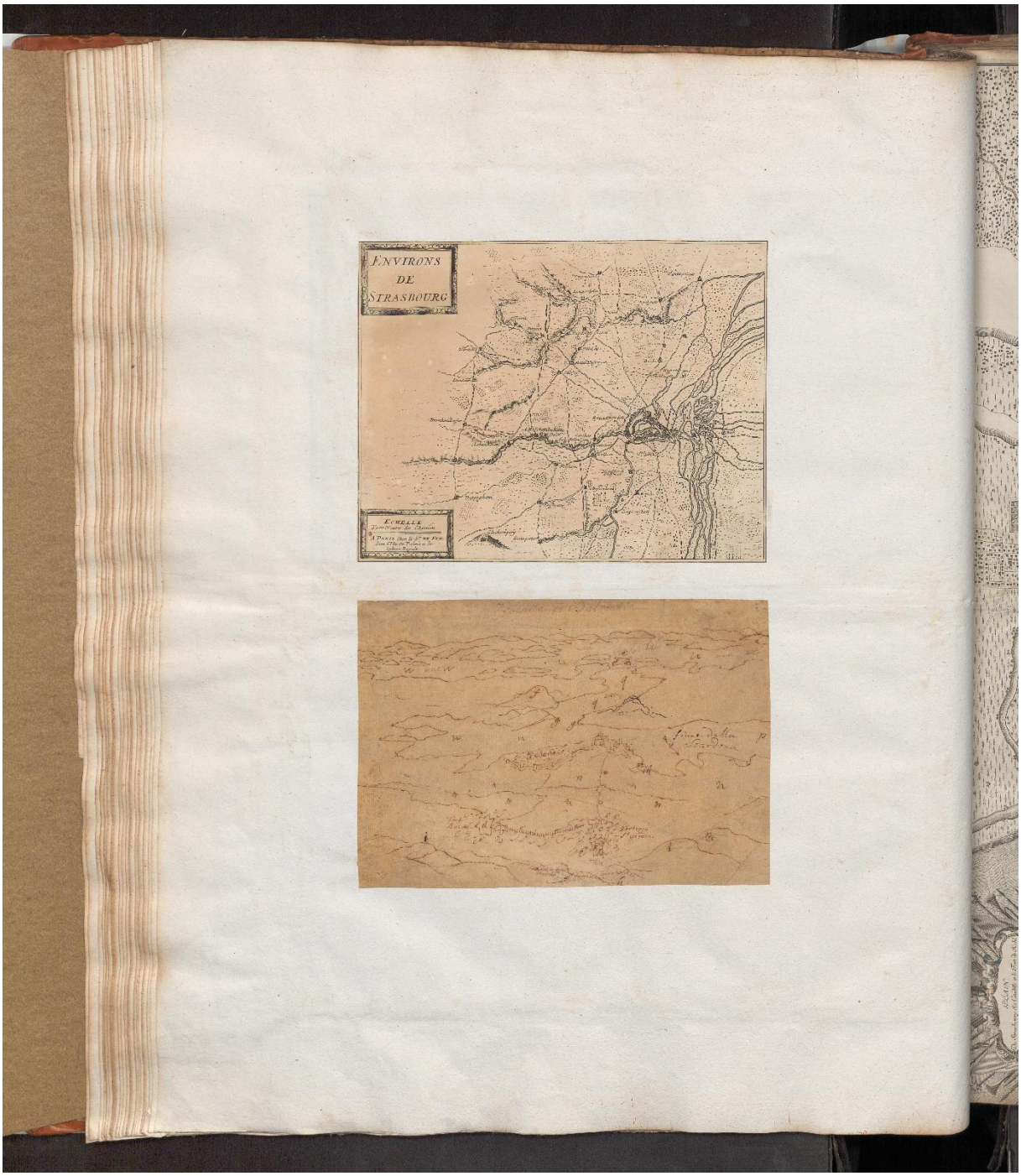


Figure 49. View of Šibenik. Württembergischen Landesbibliothek. I-23-00351. Nic.S.55, 19v.

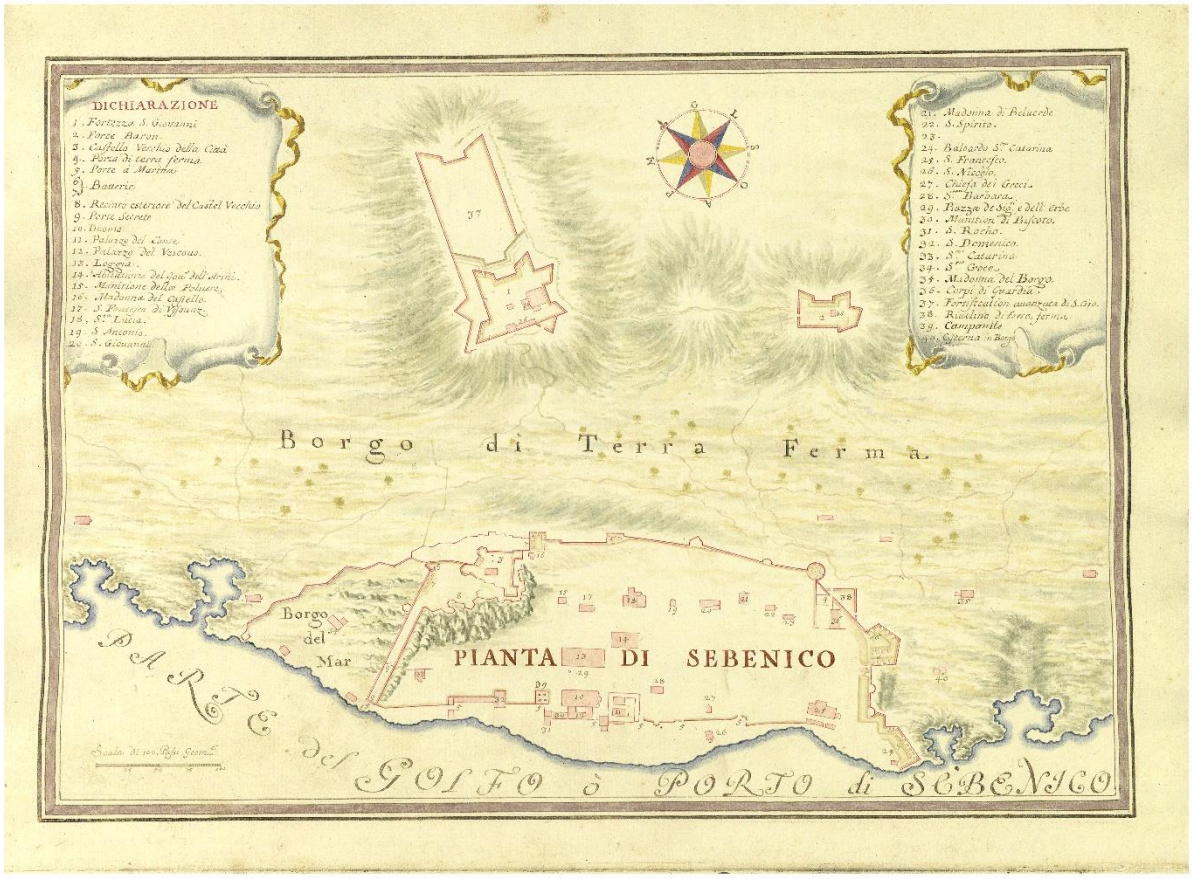


Figure 50. Plan of Šibenik. Austrian State Archives, signature GIa480d fol.23v, Nr. XI Pianta di Sebenico.

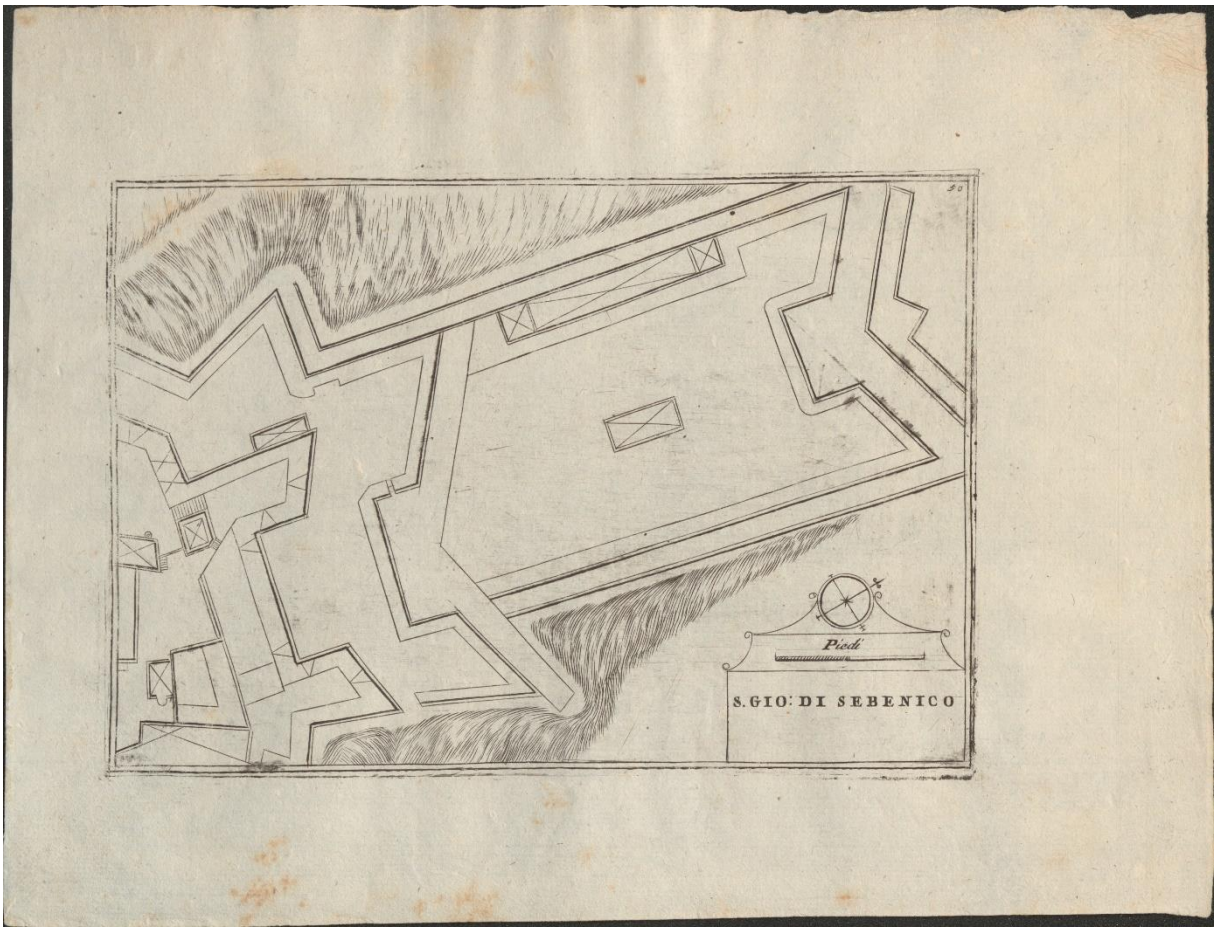


Figure 51. Fortress of St. John in Šibenik. Šibenik State Archives, signature HR-DAŠI-244 Grafička zbirka, S. Gio di Sebenico.

Figure 52. Floor plan and view of Šibenik. By N. F. Eraut, 1682. Biblioteca Nazionale Marciana, Venice, signature Ms. It. Cl. IV 28 (5093), c. 4r. Žmegač, *Bastioni jadranske Hrvatske*, pp. 94.

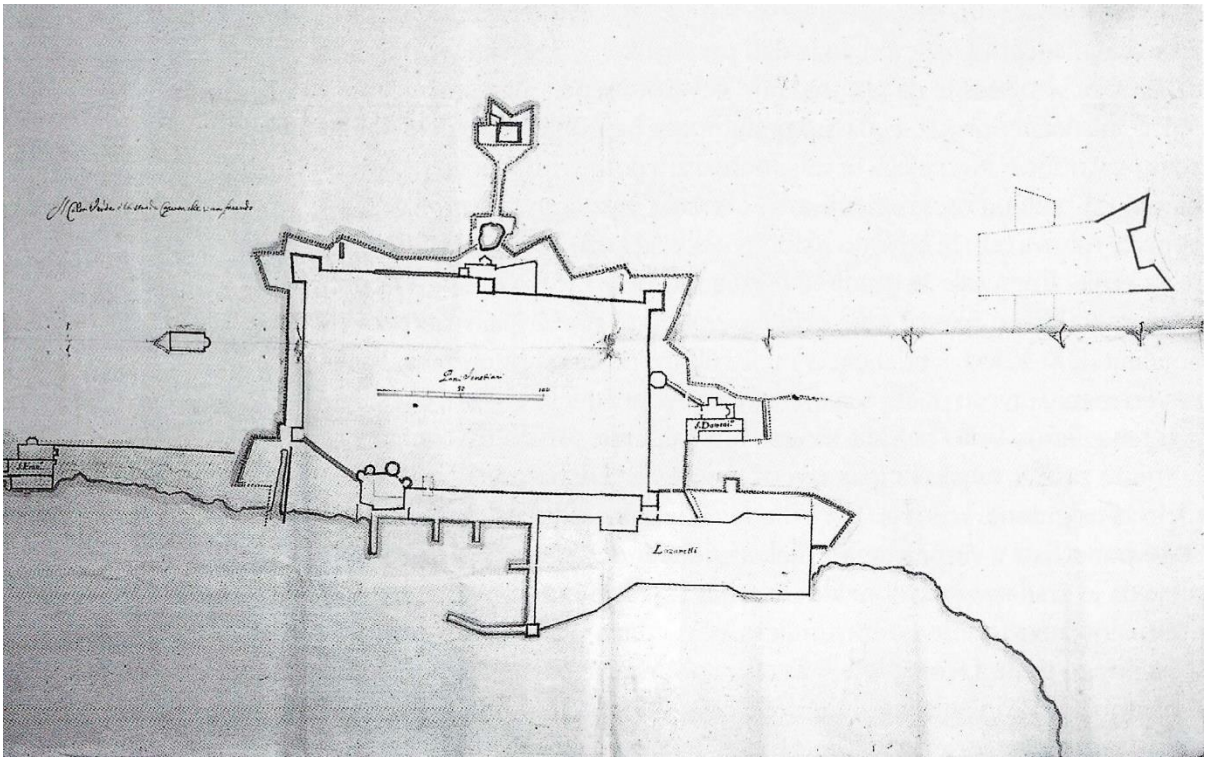


Figure 53. Project of fortifications in Split. By Alessandro Magli, 1648. Venetian State Archives, Senato, Dispacci, Rettori Dalmazia, fz. 53, dis. 1. Žmegač, *Bastioni jadranske Hrvatske*, pp. 82.

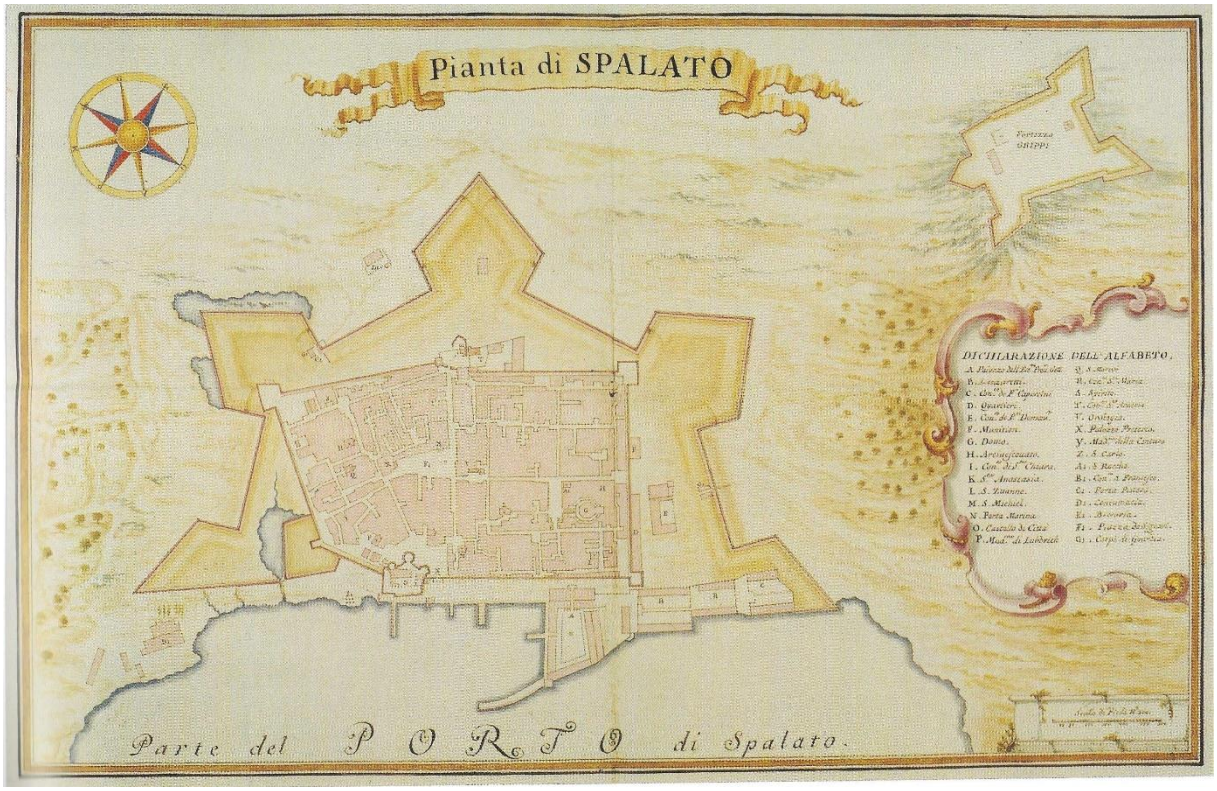


Figure 54. Plan of Split. Biblioteca del Museo Correr, Venice, signature Cl. XLIVb n. 0789. Molteni and Moretti. *Fortezze veneziane nel Levante*, 23.

7 APPENDICES

1) Michielle Hraniaz, *Fortificatione della Città di Ragusa*, 1v[598]

Illustrissimi, et eccellentissimi signori
Ritrovandomi li messi passati all'Audientia dell'Illustrissimo M. C. mi fu comandatto dall'Illustrissimo et eccellentissimo signor Cristoffano d'Antonio Gozzi, alora Rettore di questa Reppublica che dovessi far notta d'alcune oppositioni possibili contra d'alchuni suspetti e movimenti, che allora si vechano dell'Armatta Venetta, et non havendo possu? Allora per brevità di tempo, Generralmente, ni assufficientia esequir quanto si convenia, ma sollamente fier notta di dua cappi, all'ora neccesarrii per tantomosso dall'obedientia, dovtta come sudditto lorro e vassallo, et dall'affetione che universalmente si porta verso la propria partia, mi rossolsi d'affatticharmi in sarvitto loro, et con piu maturo giuditio considerrare, et considerando vederre tutti quelli effetti che possono farne, l'instrumenti bellici della fusione moderna mente fabrichatti et conoscendo l'effetti loro, in sitto li montti = le colline, i piani, ell'vallante, la commoditta di Porti publici per le Armatte. La Porta aperta di quelli, per ogni amico, enemico, etiam per ogni minimocorsario, per cio mi e parso esser obbligatti di iure divino et umano, mostrare et dichiarare, in questo mio presente trattatto, nel principio del qualle si discorre sopra le cosse benefficanti di questo Porto, et apresso si dimostrano tutti quelli posti et passi dalli qualli si potria ricever dano alcuno nottabille, et ultimamente si dimostrano, rimedi neccessari ella fortiicatione dell statto con molto poscha spessa acio le signorie loro illustrissime possono vederre il tutto, eti con ochassione servirsene di quelli luochi, e modi gia difussamente dichiaratti nell ultimi sei cappitoli di questo mio trattatto fatto in servitio delle signorie loro illustrissime alle quali prego dal ciello ogni colmo di fellicitta, liberta perpattua, e vitta futtura.
Delle signorie nostre illustrissime et eccellentissime
Umillissimo serv. e vassallo
Michielle Hraniaz

[598] Arhiv HAZU I. d-130

2) Report by Girolamo Cicogna, 1538[599]

Relatio viri nobilis ser Hieronimi Ciconia reversi comitis Jadre. Presentata in collegio die 17 novembris 1538.

Et primo dicho, che attrovandossi le cosse de la fabrica in termene, che non accade altro darli, ma solum exequir, quanto esta parte principiato e parte dessegnato, et che specialmente sii imposto tal carrico ad uno deli ministri, che sono lì per nome di essa prelibata vostra serenità, et per opinion mia reportandomi nondimeno sempre al sapientissimo parere di quella, tal carico comune estaria bene ali magnifici capitanei, che de tempo in tempo si troverano, sì per non esser molto occupati in altri negotii, come per esser stato sempre il cargo di essi magnifici capitanei, et che algun altro non si debbi impazar iîn dette fabriche.

Item perchè il ponton a iuditio mio è fra quelle tute forteze la più importante per li termini, nelli quali quella cita si trova de presenti, non mi par di dover tacer ciò, che cerca quello né stato, remettendomi nondimeno et aderendomi sempre al sapientissimo parer et deliberation di essa prelibata vostra serenità. Dico adonca, che summamente è bisogno, che non solum il non si poni dilation alguna, come ale volte si fa, in seguir il principiato muro, che mete in forteza ditto pontone, ma cum ogni studio et diligentia et cum ogni bono forzo el si expedisca et fornisca. Dela qual opera diversi et molto boni effeti ne devegnirano, ma principalmente dui, che non mi par de tacerli. L'uno il conservar del ditto pontone, el qual cerza essi fortissimi muri, nullo modo a iuditio mio si conserverà, per esser de tera cum la coperta de lotthe, et però debile et sugeto a molti pericoli, et maxime che de tempo in tempo per pioze et altri disconzi il ruini, come già ha dimostrato, et ala zornata, quod absit, continuerà. Per l'altro ne sortirà, che in essa opera si ponerano ogni sorte di pietre, che stano sparse et in monti ali locii suoi per il borgo. Per la qual cosa tenterasi etiam questa ombra over più presto periculo in caso de assedio che… in suoi repari o altri soi bisogni, che seria l'impir delli fossì, et altre operatione simile pezior et più damnose, che idio nol permetti...

[599] Ljubić, *Commissiones II*, 146.

3) Report by Alessandro Contarini, 1540[600]

Relatio viri nobilis ser Alexandri Contareno procuratoris, reversi provisoris classis. Presentata die 8 ianuarii 1540.

"La fortification di Zara è benissimo riddutta, et la fabrica del ponton pocca cosa la ridduria a perfettion; et veramente per quella pocca prattica, che ho, et per le ragion aldite da diversi periti si faria gagliardissima. Però exhortaria vostre signorie, che volessero far seguitar il dissegno et con prestezza, riportandomi però al giuditio del signor Valerio et meser Zuanhierolimo inzegnero, et parendo haver etiam il parer del strenuo meser Agustin Cluson non saria salvo a utile et beneficio suo.

[600] Ljubić, *Commissiones II*, 155.

4) Report by Marc' Antonio Mula, early 1540s[601]

Relazione di Zara di Marc' Antonio da Mula

Ne qui è da parlare della spesa, poichè la intentione de chi fortifica non die essere la principale nel considerare la spesa, ma nel fare la città forte; ne vi andrà tanta spesa, che non sia facile a vostra serenità farla, poichè vedemo, ch'ella ha fortificate tante città nella terra ferma de importantia, che non sono da compararsi alla città di Zara; ma della fortificatione, e di qual modo sia il megliore, non è da dire al presente, ma qualunque volta vostra serenità si degnerà udirmi, dirò ad altro tempo l'opinion mia. Per hora dirò questo solo, ch'io laudo ogni sorte di fortificatione, purchè la si faccia, e niuna cosa può essere peggiore, che il non far niente, e lasciarla così aperta, perchè non semo sicuri della diuturnità della pace né della fede de confederati. E quello, che molto mi spiace, è, che vostra serenità habbi dimostrato nella guerra passata di farne tanta stima, e che quella città sia stata vista e considerata da 5 o 6 milia soldati pugliesi et altri non sudditi di vostra serenità, et poi al presente la si lasci così a descretione d'altri, e si perda un buon tempo quieto da fortificarla, perochè a tempi de bisogui urgenti i denari si gettano via, e l'opera non è mai ben fatta, et il tardare è causa dell'atterrar del porto, il quale del 35, ch'io fui sindico, misurai, e mo con Zuan Jeronimo inzegnier fedele, diligentissimo et industriosissimo di vostra serenità l'ho scandagiato, et l'ho trovato monito da 7 anni in quà in tal luogho quattro piedi, in tal cìnque, più che non era, perchè i baloardi, che erano sul porto principiati, cominciano a ruinare nel porto, et ogni dì faranno peggio chi non l'aiuta, il che facilmente si potria fare.[602]

[601] Ljubić, *Commissiones II*, 170.

[602] Ljubić, *Commissiones II*, 171.

5) Report by Giulio Savorgnano, 10th January 1547[603]

Sopra Zara

1547, alli 10 Genaro

Alli Sig.ri delle Fortezze, il Sig.or Marchio Michel et Sig.or Alvvise Gritti.

Ecc.mi Sig.ri miei obser?mi secondo la commisione datame, che io Giulio Savorgnano dovesse in questa mia andata à Zara dar un' occhiata alla fabrica, et Fortification di quella Città, qual cosa ho fatta, et particolarmente ho detto, quanto mi parrebbe si havesse à fare, laqual mia opinione, oltre che io l'ho detta à Zara, lo dico anco alle Sig.r Vre, et quelle sapientissime facciano poi, quanto li pare.

Ho havuto tre considerationi, la prima che sarebbe ben fatto di fare alcuni muretti à quelli Belloardi, et Repari di Terra, che furono fatti al tempo della guerra passata, dalli quali le lotte sono cascate, et distaccate dall'altra terra, et ogni giorno li detti Bastioni vano rovinando, et cascano in mare di modo che si vien haver 2 danni, l'uno che la terra si vien ad aprire, et venendo um bisogno presto si conveniva conciarli di terra un'altra volta, l'altro danno è che si perde quella terra, che uà in mare, che è un grandissimo danno, come sanno v. Sig.e che erano al tempo della guerra Turchescha passata, l'uno proveditor generale, et l'altro Cap.o di Zara con quanta faticha, con quanta Spesa, et affanno ne conveniva far ponti longhissimi à traverso il Portò, et andar cercando la Terra fra quelli Sassi et portarla su la vita de gli huomini per far li sopradetti Bastioni. Pero con ogni 10 ducati che si spende adesso in questi muretti pustizzi, nelli quali non si perdera altro, che un poco di maiestranza, et calzina, si venira à conservar cento con dieci, oltra al mantenir la cosa in esser come è al presente, et questi lochi sono al cavallier di Santa Marcella al mezo Belloardo della Cittadella, et à S.to Nicolo, et in qualche loco verso il porto.

La Seconda cosa è, che a tempo sopradetto della guerra, eto dopoi si ha sempre atteso à fabricar alle parti piu debole, di modo che al Castel vecchio, cioe alla bocca del porto mi pare che quella parte al presente sia restata tale, che l'ha bisogno di aiuto, perché quando venisse occasione à una armata Turchescha di venir in colfo, o, per nostro conto, o per altri, o, per altra cosa simile, et ritrovandose in quelli Mari vicini à Zara, et vedendosi una occasion tale anchora che fusseno come Amici non bisogna haver le Terre nostre fatte a tal modo, che le siano in discretion sua. Pero dico che dal Bastion di San Dimitrio in fina per tutto 'l Castello, sarebbe facil cosa à metter in terra 10, o, 15 cannoni et farli una brava Batteria, stando di là del Porto, che non è largo, piu

[603] ASVE, Misc. materie miste notabili 11, Giulio Savorgnano MDLXXVI., 3r–4v.

di 100 ò, 120 passa, et quella muraglia non e Bastionata di Terra, et manco gl'è terra li appo di Bastionarla, et dipoi fatta questa Batteria, qual veniria pianissima, et che niuno che fosse dentro la potrebbe difendere, sarebbe facil cosa in quel ponto per dar l'assalto, caricar le Gallee di fanteria, et che quelle venissero dentro del Porto, et dar delli Speroni in terra, et metter 2, o, 3 mille fanti dentro di questa Batteria alla qual cosa non li vedo altro rimedio di potersi assicurar in 8 giorni, che haver preparata una bona monition di terra adesso, et non aspettar in quelle presse, che non si puol haver homini, et si ha da lavorar in cento lochi, et questa monition di terra la voria poner di fora via del Castello in la facciata, che guarda verso ponente, et quando venisse poi un bisogno, havendo dei gabbioni, et altre cose, che in quelle presse s'adoprano, et la terra li parrechiata, senza haver ad andar lotano à cercharla, et portarla, et metterla in opa, si potria accomodar talmente quel sito, che si li metterebbe assai Cannoni, quali farebbono un effetto mirabile, et sicuro, per la cortezza del Tiro à quelle Galee, che volessino venir dentro della bocca del Porto à discaricar quella fanteria che ho detto di sopra alla Batteria fatta stando in terra de là del Porto. Si che con l'esser questa terra solamente lì in deposito, si venne à far tal effetto, che gl'inimici non potrano intrare, et la Batteria fatta da terra veniria esser fuori di proposito, et con questa sicurtà della bocca del Porto, veremo à Sicurare il Bastion di Santo Dimitrio, quel della Beccaria fino à Santa Marcella, che è un terzo del circuito di Zara, et al ponente non si puol metter pur un cannon di Batter la detta Bocca del Porto, et pero come cosa di grandissima importanza la dico, sì per conto di reppezamento, et provisió presta, come per conto della fabrica perpetua, che ha da restare. Questo ha d'andare in utilitade dell'una, et l'altra. Bisognarebbe poi in caso di necessità abbassare quelle Cime di quelle torre vecchie del Castello, acio che con le cannonate li nemici non facessino cascare adosso le ruine à quelli, che havessino, a, adoprar l'Artiglieri in questo loco, che ho detto di sopra.

La terza cosa, che ho considerata, è che hormaj il Belloardo detto il Pontone, e fabricato di muro tanto alto, che per adesso mi parrerebbe piu util cosa di finirlo in quella parte, per la quale, e, stato fatto principalmente: l'intentione di chi l'ha fatto, e, stata acioche stando in esso Belloardo quatro, o, 6 pezzi d'artiglieria per banda fiancheza quella fazzata verso la terra ferma, qual cosa adesso non si potrebbe far con tanti à pena con dui per Banda, et malamente prima non sono fatte le cannoniere alle piazze de basso ne parapetto, ò, merloni de missura sorte; ne'manco e fatto quella muraglia, sopra la quale si ha da fare le cannonere, che vano piu altre, et la causa che non sono fatte, si è questa, che tal muraglia conviene esser fundata nella fossa vecchia, che rimasta vacua fra il Pontone, et la Città, qual cosa sara di grandissima spesa à farla, et è cosa necessarijssima, et utile anzi è impossibile, a far senza. Ma doppo fatta, et andando in loco profondissimo per trovar il buon fondamento non sara cosa apparente, ne iustosa. Per tutte

queste raggioni fin qui si ha atteso ad altro. Et se queste muraglie che io dico sarano fatte, qual sono quelle che circondano le Piazze da basso, et sostengono il terren delle Piazze da alto, si potra servirsene di 3 cannonere ad alto, et 2 à basso per ogni banda, che adesso àpena si potrebbe servrsi d'una à basso, et malamente d'una ad altro perche li pezzi che si havessino à tirare alle cannoniere, che sono vicine alla cortina nel ricular li pezzi cascarebberno in la fossa vecchia, qual è in questo loco altissima, et larga; terreno non se li ha gettato per non haver-fatica di farlo cavar via nel voler fondar queste muraglie, ch'io dico; Pero bisogna venir al fine, et farla, et non lascar à questo modo il Belloardo imperfetto, che non possa far tutti li suoi effetti; et pezo, e, che per questo rispetto non si empi quella parte di fossa, che è fra luj, et la terra, per la qual si ha da condurre le artiglierie al Belloardo, per la quale bisogna mandar li 400 ò 500 fanti alla uolta in battaglia à difender detto Belloardo, et che una parte possa, in una volta andare nel Belloardo, et l'altra ritornare, à questo modo, che è al ponente, la golla del detto Balloardo, ch'è importantissima, non è sì che tutto il Belloardo vien à rimanere in utile. Bisogna adonque per poter impir questi siti di terra fondar quelle muraglie, che vano fatte fra questi terrapieni, che si potrà poi far le cannonere, li merloni, le piazza e bastanza delle riculate, et la golla sara libera di poter andar, et ritornar di detto Belloardo, ma chi uora attender solamente à crescer con le muraglie alli fronti del Belloardo, lassara una fortezza di fora via in apparentia solamente, ma non in effetto, venendo il bisogno.

Il Governator di quella terra, Il Colonello Toso Furlano à quelli rappezzamenti, et ancò alla Seconda consideratione supplira benissimo, per esser soldato Vecchio, et pratico come si sa, et che con li effetti ha fatto assai, et è per fare, et perché luj non si ha da muttar così in pressa de là, et con lui ho visto il tutto, et raggionato Quanto à questa ultima cosa delle cannoniere del Pontone, et altre cose, che ho detto. Il detto Cap.o Toso non si vol impacciare solo à ordinarle, et fa bene; perché è cosa da Prudente a far simil cose con il consiglio di qualchun altro, et po' per satisfatione del ditto Governatore mi pare che à questa fabrica che ho detta si convenira esser la presentia d'uno delli suoi ingegneri, et se io fusse de li faria il medesimo, come come fa il detto Governatore, perché non è il dovere, che uno solo sopra di se, si toglia tanto peso, Non dico per conto della fabrica del Sollecitare, ne mancho per dire il suo parrere, ma participar con sì Ingegnieri et del honor, et della vergogna. Questo, è, quanto mi ha parso di dire à V. S.^{e} et quello ho visto in un giorno solamente, che son stato in Zara, et à V. S.^{e} C. di continuo mi racomando.

Di Zara alli 10 di Genaro 1547.

Di V. S. Clar.^{me} Servitor

Giulio Savorgnano.

6) Report by Piero Pisani, late 1540s[604]

Relatio viri nobilis Petri Pisani reversi capitanei Jadre

(…)

La città dalla parte da terra è ridotta in assai bona difesa, ma da la parte da mar si può dir aperta con sette porte marze, et da quella parte salvo nel castello non se gli fa guardia, ne etiam sul ponton, che tanto importa, et dalla cittadella fino al castello non si tiene se non una guardia, et è un gran pezzo di cortina, che sono passa 614, cosa che molto pericolosa, massime che da quella parte le muraglie sono tanto basse, che con dificilità si potria andar dentro. Et oltra che sono basse, gli sono attaccate alcune case di conza pelle, talchè un'homo, che alzasse l'altro, potria entrar commodamente nella città per esser massime quella parte, come è ditto, senza guardia, benchè le sentinelle non restano di andar a torno la notte, ma alla muraglia non si può andar per esser horti et casette contigue a quella, et stà malissimo.

(…)

Cerca le fabriche nel tempo, che son stato in quella città de mesi vinti, non ho mancato di sollicitudine, sforzandomi sopra il tutto di spender il dinaro suo col maggior avantaggio, che mi sia stà possibile, attendendo all' utile et beneficio suo, sì come son tenuto senza sparagno di fatica, tal che ho fatto lavorar la cortina verso la cittadella et finita fin dove la deve andar, et non li manca altro salvo che li parapetti. La ditta cortina fatta in mio tempo è di longhezza passa numero 40, d'altezza piè 35, di grossezza piè 25 da basso et in cima piè 19, oltra che ho fatto lavorar dentro in molti lochi, che bisognava. Ma sappia vostra serenità, che se gli fosser stato modo di metter maggior forza di maistranze, le qual no bo potuto metter per non ne esser, haverei fatto molto maggior lavoro, et per intelligentia di vostra serenità, ho speso nella detta fabrica dal principio del mio regimento fin al mio partir ducati 2300., come appar in quella camera, per esser passato il tutto per quella, oltra tante robe mandate per la serenità vostra de lì; niente di menno si può dir, non esser sta fatto una minima parte; però sarà ben fatto, che non si manchi di continuar la fortificatione di quella tanto importante città, anzi che s'usi in ciò ogni accurata diligentia et poter, perciochè li vorrà a ridurla nella perfetion sua et tempo et spesa grandissima. Si consideri etiam, di quanto maggior avantaggio sarà in continuar al presente rispetto alla quiete, che sì ha, che iddio ne conservi, che in tardar et diferir in altro tempo. Ho fatto doi mercati de calcine per le ditte fabriche, le qual in essecution della parte sopra ciò presa ho comprate sopra l'incanto, et dove sì solevano pagar per il passato lire 5. soldi 18. il mozo

[604] Ljubić, *Commissiones II*, 183–185.

per il manco, quelle ho havute per lire 5 il mozo, roba bonissima, tal che sì ha avanzato assai per haverle havute al ditto pretio de lire 5. Etiam saria buono continuar a condur al presente delle calcine pagate, che è buona summa, acciò che li patroni di quelle per povertà loro non le vendessero, perchè poi vostra serenità ne partiria grandemente; saria etiamdio buona cosa, che s'accordassero per mandar iu ditta città sei over otto spezzamonti da Bressa, over da quelli de Curzola, li quali fariano frutto grandissimo, che seria in cavar la fossa del ponton et accommodarsi delle piere a quella fabrica, la qual ne haverà bisogno nell' avenire.

7) Description by Giovanni Battista Giustinian, 1553[605]

Principio della descrizione di Dalmazia ed Albania.

ZARA.

(…)

"… è diffesa dal novo baluardo detto Ponto, ben fabricato, ne però del tutto fornito, il qual è gagliardissimo e sta cavagliero fra levante e ostro, ma vi manca quasi un quarto a fornirlo. Non è ancora posto in tutta fortezza, e sin ora vi è stato speso ducati 80,000; al qual mancano le canoniere, ch'è l'anima di sifatte machine, che quando sì fabricava, s'hanno scordato di farli, ed il parapetto; nelle quali due opere andariano più di 15000 ducati di spesa, oltre che anderà di male un mar di muraglia per farli. V'è l'altro baluardo chiamato cittadella , non fabbricato ancora, ma è empiuto di terra in modo, che stà cavagliezzo alla marina in ponente ed alla terraferma in ostro, il quale và anch'egli portato fuori in mare circa passa 30 e più. N'è medesimamente l'altro baluardo, che sì dimanda santa Marcilla verso levante, il quale sì fabbrica tuttavia, ha nondimeno tanta eminenza di terra, ch'è cavagliezzo; e batteria benissimo da quella parte il nemico, che si volesse accampar sotto per offender la città. Sono ancora altri bastioncelli di terra posticci, sopra li quali bisognando sì può mettere a segno l'artillaria sin a tanto, che si fornisca di fortificarli secondo il disegno, perchè sono cavaglieri al nemico, che volesse offender la fortezza da quella parte. Le munizioni veramente, che sì tengono in quella fortezza, sono mal all'ordine…"

(…)

"Si spende una infinita quantità di danari nella fortificazione d'affitti di case per allogiamento de' soldati; e chi mandasse dei legnami, con poca spesa s° accomodariano tante stanzie, che sariano bastanti a tutti i soldati sì da piè come da cavallo, e si liberaria la camera da questa gravezza, che perciò fà una spesa eccessiva.

(…)

SIBENICO.

(…)

Questa città è situata sopra un scoglio, nella suprema eminenza del quale è fabricato il castello sopradetto, il quale giace tra levante et tramontana; et se il monte ivi vicino verso levante, sopra il qual è fabbricata la chiesa di s. Zuanne. non gli stesse cavagliezo, saria inespugnabile; per la qual cagione sì comprende chiaramente, che volendosi far forte questa città, bisogneria tirar

[605] Ljubić, *Commissiones II*, 195–197.

dentro il detto monte di s. Zuanne, o farvi sopra una fortezza, le quali due cose non sì potriano fare salvo che con grandissima spesa. In questo castello vi stà un castellano nobile veneziano, il quale ha libertà di uscirvi il giorno, et venir giù nella città: et appoi è custodito da un contestabile, ch'è Gabriel da Crema, et da soldati del guazzo venticinque computando il bombardiere; nella spesa delle quali spende l'illustrissima signoria d'ordinario ogni anno ducati cinquecento trentadue, li quali paga la comunità.[606]

(…)

Da questa ponta del turione fino al pie del castello detto di sopra, ch' è la parte verso ponente, la città non è circondata di mura, perchè la marina gli batte sotto, che circonda tutta questa parte, la qual è sìcurissìma, perchè sulla bocca[607] del porto lungi dalla città due miglia è il castello s. Nicolò fabricato novamente da questa republica, il qual è fortissìmo et innespugnabile. È fondato questo castello sopra un scoglio tagliato a punta di scarpello, et è tutto in isola salvo che dalla parte di siroco, dov'è un poco spazio di pietra viva, che và in terra ferma, la qual secondo il disegno và levata et scarpellata in modo di fossa. La forma di questo castello è triangolare, et ha tre corpi di guardia; il primo è tra ponente et tramontana apunto su la boca del porto. Questo è un bastione bellissimo in forma rotonda et gagliardissimo a combatter i nemici, et a guardar tutta la bocca del porto; da questo baluardo alla ponta, ch'è in ostro, sono passa cento, la qual è in forma aguzza, et da questa all'altra ponta, che è in levante medesimamente aguzza, sono altri passa cento, et da questa al bastion sopra nominato sono altri cento passa, di modo che tutto il circuito è di passa trecento; a rimpetto del qual bastione è un poco di piazzuola et una chiesetta, et all'altra parte verso levante et ostro una cisterna d'aqua perfettissima, la quale non vien mai meno, et lozetta ch'è il corpo della guardia. Nel restante sono gli alloggiamenti del magnifico castellano misser Benetto Belegno e dei soldati, et questa è tutta la parte di sopra. Sotto li volti poi sono le case matte benissimo intese, et tanta capacità di lungo vacuo è di sotto quanto di sopra, et tante artiglierie, et assai più grosse sono quelle di sotto, le quale battono il porto. Si teniria un'infinità d'ogni sorte di munizioni. La porta del castello è dabasso, et guarda verso Sebenico, cioè verso levante, ma per ora sì tien serrata, et si servono d'una porta postizza in sirroco, cioè in quella parte, ch'è congiunta con la terra ferma, fino che si compino le fabbriche d'esso castello, nel quale, com'è detto stà un castellano nobile veneziano con pena della testa di non uscirvi mai; alla cui custodia è il capitanio Pompeo di Pompei veronese con una compagnia di fanti venticinque, li quali costano ogni anno d'ordinario

[606] Ljubić, *Commissiones II*, 200.

[607] Ljubić, *Commissiones II*, 200.

alla signoria ducati settecento quaranta quattro, il qual numero non è bastevole a guardar detto castello, perchè non mettendo in numero il caporal, due ragazzi, il tamburino ed il capellano restano di venticinque, venti solamente. Et questi sì dividono alla alla fazioni in due squadre, cioè dieci per squadra, li quali dieci sì sudividono in due corpi di guardia, cioè cinque per uno, a tale che uno dei tre corpi resta senza essere guardato. Laonde necessaria cosa è crescer questo numero di fanti, acciochè il castello di tanta importanza sia ben custodito. Questo capitanio Pompeo usa ogni diligeuza nella custodia della fortezza et nel governo de' suoi soldati, li quali sono di buonissima forza et ben ad ordine. Oltra d'essì sono cinque bombardieri al governo dell'artiglierie, che sono belle e ben tenute, nelle quali spende la signoria all'anno ducati ducento otto. Le provisioni, che sì doveriano fare in questo castello, sono: cavar la fossa, dov'è la terra ferma in sirocco, nel qual cavamento andarà spesa grandissima, perchè bisognerà farlo a ponta di scarpelli, essendo tutto scoglio et sasso durissimo et appresso far li corridori in castello per potervi andar attorno et diffenderlo quando occorresse, et dabasso verso levante et ostro far le canoniere, che mancano, et munirlo de tutte le cose necessarie, che da artellarie in poi non v'è altro.[608]

[608] Ljubić, *Commissiones II*, 201.

8) Summary by Giovanni Battista Giustinian, 1553[609]

Relatione del sindicato della provincia di Dalmatia et Albania havuta nell'eccellentissimo collegio per il magnifico Giovanni Battista Giustiniano, 1553

"Sommario di tutte le provisioni, che sì doveriano fare nella provintia di Dalmatia.

Zara

Riconciar le purpurelle della città di Zara, che sono tre, dalle quali dipende dalla parte di mare la fortezza et sicurtà di Zara.

Serrar il portello del castello di Zara, et aprir la porta del detto castello, ch' è dentro della città, che già sì soleva usar in luogo del detto portello per maggior sicurtà.

Ridur la castellania del castello di Zara, la qual è comessa a due castellani nobili, in un sol, assegnandoli il salario d'ambi due, per i dissordini et risse, che nascono ordinariamente fra loro, che percio il detto castello stà in pericolo.

Cassar i soldati di paga da guazzo, ovvero, non sustituir nell' avvenire alcun' altro in luogo di coloro, che mancano, ma che da se si vadino consumando.

Deputar dieci fanti alle guardie della piazza, et levar via quei soldati da guazzo, che sono al presente, per ogni futuro accidente come altre fiate.

Crescer vinti fanti alli ottanta, che sono ordinarij, alla custodia della città sotto un governator et un' altro capo; ovvero senza altro accrescimento di fanti et di spesa far, che i ottanta si dividano in due parti, et stiino in guardia otto giorni per uno come in tutte l' altre città.

Fornir il balluardo detto ponton, al quale mancano le canoniere et il parapetto; finir il balluardo detto cittadella empiuto di terra, et parimente quello santa Marcella et altri bastioncelli a quella parte, che sono le guardie et difesa della parte verso terra.

Ridur il castello detto in bastione, empiendolo di terra, che sì faria un gagliardo cavagliezzo, che guarderia la bocca del porto et la fronte di terra ferma, et a questo modo sì sparagnariano ducati mille di spesa, che vanno a guardarlo.

Metter un spadaro in castello, che tirasse una paga come gli altri senza obligatione di far alcuna fattione, ma con carico speciale d' affinar la polvere, ch' è in barilli marzi, et di rivederla spesso, et di tener tutte le munitioni in ordine.

Far governar con maggior diligentia le saline delle isole di Zara di ragion di diverse chiese.

[609] Ljubić, *Commissiones III*, 37.

9) Report by Antonio Diedo, 1553[610]

Relatione del sindicato di Dalmatia e& Albania nell' eccellentissimo senato per il magnifico meser Antonio Diedo

SIBENICO

(…)

Il canal, che fà quel di Sibenico, entra fra certi scogli, sopra le porte dei quali stanno due torrette, che guardano quella bocca, ora superflue, essendo stato edificato il castello s. Nicolò sopra la bocca del porto, fortezza bellissima, le quali sì doveriano spianare, et tanto più, perchè seuza alcun beneficio publico, forse ad istanza di qualche privato. Fanno spesa alla serenità vostra di ducati quattrocento settanta tre l' anno, che vanno a pagar due castellani, due bombardieri, due caporali et dieci soldati di paga da guazzo dissegnati a quella custodia, nelle guali-non solamente ne stanno il giorno ma anco la notte, come sono tenuti massimamente i castellani, che tengono contra la mente della sublimità vostra a mal esempio casa nella città, poco curandosì di custodir quei luoghi loro comessi; il che non è da supportar nè a questi nè ad altri, che hanno simili cariche in quella provincia, anzi in tempo di suspetto di guerra non potriano essere se non di disturbo et di danno a Sibenico, perchè essendo imunite, ruinate et mal guardate, potriano facilmente essere prese dai sudditi Tarcheschi come per l' addietro, che metteria a pericolo la città di Sibenico et la fortezza di s. Nicolò; e il che fù benissimo avvertito dal signor Camillo Orsino, che prudentemente diede principio a far le minare.

(…)

Alla bocca del porto lontano da Sibenico due miglia è il castello S. Nicolò fundato sopra un scoglio, che d'ogni intorno beve nel mare eccetto che dalla parte del sirocco, dove è un poco spatio di vivo sasso, et secondo il **disegno** va scarpellando in modo di fossa; il qual cavamento si doveria principiare senza tardar più per far quella fortezza più sicura et inespugnabile, benchè in ciò v'andazeno molti migliara di ducati, chè in questo termine è pericoloso. Nel qual è ancora necessario far i corridori, per poter caminar attorno et deffenderlo, quando occorresse, abondantemente munirlo di tutte le cose necessarie, come ricerca una fortezza di tanta importanza et di tanta spesa, perche dentro non vi sono né poche né molte munitioni. È vero, che vi sono molte belle artillarie, il che de esser benissimo avertito dalla serenità vostra, che a della quale stanno vinticinque fanti computando capellano, tamburino et due ragazzi, che vengono alle fattioni a restar sol ventiuno, che si dividono in due squadre a dieci per squadra,

[610] Ljubić, *Commissiones III*, 15–18.

che custodiscono due corpi di guardia a cinque per corpo; et uno di tre corpi, perchè il castello è in triangolo, resta senza sentinella et incustodito la notte con pericolo. Ha tre bastioni, uno dall'altro cento passa, onde vien a circondar tutto passa trecento, nel che saria opportuna provisione crescere quella compagnia almeno a trenta cinque fanti, acciocchè una simil fortezza si potesse chiamar ben custodita, perchè non solo è stata fabricata per sicurezza di quella città, e perciò si die conservar, ma è da far ogni opera, acciocchè dai nemici non fusse rubata, che potria occorrere stando in si fatti mali termini.

(…)

ZARA

"È situata in pianura, circondata dal mare da tre parti, da levante, ponente, tramontana. Il circuito suo è di poco più d' un miglio. Le mura, che la serrano, sono antique, tuttavia dalla parte di mare assai forte per le due purpurelle, larghe passa sei l'una, che vanno attorno la città dalla bocca del porto, ch' è in tramontana, sino al bastione detto cittadella, ch' è in ostro. U''altra simil purpurella è alla bocca del porto, che lascia tanto spatio aperto, che può ricever dentro i vasselli, che vogliono pigliar porto; la qual parte è serrata da una cattena, di maniera che nissun legno può entrar o uscire, se dai guardiani a tal effetto deputati non gli è aperto. Quelle purpurelle sono in più luoghi ruinate per le pietre, che vengono levate dalle galie et altri navilii per cavar i datoli marini; perciò, staria bene riconciarli.

(…)

La parte veramente di terra ferma, ch' era debolissima, ora saria alquanto fortificata dal bastion del ponton gagliardissimo ma non del tutto fornito, perchè gli mancano le bombardiere alle case matte, che sono l'anima di quelle si fatte machine, perchè così non sì ponno adoperar, et nel farle, come è forza, sì ruinerà un'estremità di muraglia, che dimostra, che chi l'ha ordinato, poco s'intendè del mestier di fortificare. È da farci ancora il parapetto, che v' ha sopra il cordone, la qual opera importerà in tutto a ridurla a perfetione intorno venticinque mille ducati, nel qual fin ora sono stati spesi ottanta mille ducati. La fabrica dell'altro baluardo di santa Marcella verso levante non è sollecitata con opinione di vederne di breve il fine per mancamento di danari; ne anco è fornita la cortina, ch'è fra quello e l'ponton; il terzo balluardo ancora detto cittadella in ostro non è fabbricato ma sol empiuto di terra; onde ogni volta, che quei baluardi dalla parte di terra ferma saranno condutti al fine et tirrati secondo il modello, quella città saria inespugnabile. L'altellaria era mal governata et confusamente tenuta, la quale habbiamo con poca spesa fatta separatamente collocare in buon luogo.

10) Report by Nicolò Marcello, 1585[611]

RELATIONE DEL NOBEL HOMO SIGNOR NICOLÒ MARCELLO, RITORNATO DI CAPITANZATO DE ZARA PRESENTATA A DI 4 DECEMBRE 1585

Primo: Quella fortificatione ritrovai al principio del mio Reggimento in malissimo termine, et particolarmente quella del Forte, non si ritrovando alcuna piazza, ò diffesa, dove se potesse tener non solo l'artegliaria, ma neanco li soldati alla sua diffesa, se non assai più scoperti, et esposti alle offese, che non sarebbe stato lo nemico, et conoscendo, che per tal sua imperfettione poco giovaaa alla Serenità Vostra haver con così notabile spesa fabricata quella fortezza, non potendo essequire il suo fine, ch'è in diffendersi con pochi deffenzori da numero pur assai maggiore, et che ancora Zara è sola tra tutte le altre Fortezze ad esser esposta all'improvisi assalti dal suo nimico, essendo così vicino, et potente, come in ultimo dirò, mi mossi prontamente à procurar l'essecultione di tal opera, per ovviare alli graai disordini, che potevano succedere, e tanto più quanto, che sapevo esser tale la volontà della Serenità Vostra, havendoci di già mandato per lo istesso effetto il Signor Bonauito Lorini Ingegnier, con l'ordine di quello, che s'haveva à fare, si che non si hà mancato di essequir con ogni sorte de diligenza, et sollecitudine, conforme però à quella poca provisione de danaro che à lei è parso mandarmi, come ancora in visitarlo spesso con lettere et disegni, mostrandole il bisogno manifesto, et il servitio che se faceva, nondimeno non sono mandati più che ducati 3 milla con li quali si hà ridotto à buon termine le diffese del forte, come opera più necessaria, sicome per il presente modello nel color gialo si uede, che ci son fatti tre fianchi con le sue canoniere, et diffese doppie, et coperte, et similmente d'ogr'intorno alla sua fronte l'alciato delle sue piazze. non solo per commodità, et segurtà dell'arteglieria, ma delli deffensori ancora, S'è rifatta la galerola, ch'era cascata con assai danno del Porto, la qual è stata assicurata d'ogn'intorno con la sua camiscia di muraglia, et il simile s'hà incamisciata parte dell'alciato del terrapieno della Cortina sopra il Porto, et la terra, con la quale s'hà fatto l'alciato delle dette piazze, et diffese, è stata cavata la maggior parte del fosso, et portata dentro, facendo con una sola spesa il servitio duplicato, cioè s'è allargato il detto fosso dalla parte verso il Porto, un terzo più, che non era, et con facilità fatte le dette piazze, s'hà ancora incamiscialo la mità del Baloardo de Santa Marcella che pur il suo terrapieno cascava nel Porto.

[611] Novak, *Commissiones IV*, 364–365.

11) Report by Vicenzo Moresini, 1589[612]

RELATIONE DEL NOBIL HOMO SIGNOR VICENZO MORESINI RITORNATO DI CAPITANIO DI ZARA 1589.

Restaurata adonque la presenta muraglia del Borgo si ha atteso alla perfettion della Fortezza, iusta l'aricordo del Lorini Ingegniero, et così fin hora è rifatto un pezzo del muro, che è tra le doi porte fuori del barbacano, longo passa sei, et alto altretanti con la sua scarpa secondo il dissegno, et medesimamente rifatto un''altro pezzo di Muro fuori della porta, et un altro ancora dalla parte del Revellino è stato alzato, et terrapienati quasi fin al piano delle piazze di sopra, et fattovi anco la guardiola delle sentinelle de Muraglia di pietre tutte, et rassettati tutti, i, tetti delli allogiamenti de soldati, li quali sono al presente alla custodia di essa Quaranta fanti.

[612] Novak, *Commissiones IV*, 446.

12) Report by Marco Loredano, 1589[613]

RELATIONE DEL NOB. HOMO SER MARCO LOREDANO RITORNATO DI CAPITANIO DI ZARA PRESENTATA NELL'ECMO COLLEGIO ADÌ 3 FEBRARO 1589.
In prima et sopra ogn'altra cosa rendo infinite gratie alla Serenità V. del buon concetto, nel quale appresso di lei conosco esser' stato tenuto, perchiochè se ben non le ho in niun tempo d'esso mio carico dimandata summa alcuna de danari per continuar la fortificatione del Forte, et l'escavatione della fossa di quello, tuitavia ha voluto pur Lei mandarmi quattro mille ducati li quali fino alli 28. Marzo prossimo passato, che arrivò a Zara il Cl.^{mo} S.^{r} Federigo Nani, mandato dalla Serenità V. in quela sua Provincia per Prov.^{or} G^{nale}, ho secondo il disegno, et ordini da lei havuti, consumati in quelle occasioni, et bisogni, che La intendarà, con l'absenza sempre del Signor Bonauito Lorino Inzegnier.

[613] Novak, *Commissiones IV*, 450.

13) Report by Giangirolamo Sanmicheli, 1540[614]

Del castello di san Nicolò di Sebenico 1540.
Essendo richiesto dalla vostra magnificentia, che li dia in scritto l'ordine tenuto nella fortezza della bocca del porto di Sibenico, volentieri l'obedisco.
Prima la groscezza della muraglia nel fondamento suo è di piedi 10, la larghezza delli suoi speroni è di piedi 19, la sua groscezza è cinque, la loro distanza da l'uno all'altro è di piedi X incirca, la loro altezza dall'acqua in su piedi 16, et lì alla loro altezza và voltato sopra il tereno da speron a speron, et voltato che sarà, restera la groscezza della muraglia piedi 24, et di detta groscezza si farà il parapetto di piedi 18, et la sua banca di piedi 6. Il restante, che manca alla misura sopradita, si perde per il ritirar della Scarpa della muraglia.
La scarpa de detta è d'ogni 4 piedi et meza di altezza uno di scarpa.
L'altezza di detta fortezza sarà piedi 26 dall'acqua sino all'altezza della imposta, che sarà il merlone del parapetto.
L'altezza del cordone dell'acqua in su piedi 20; la groscezza di detto cordone piedi uno, dal cordone… sino alla imposta del parapetto piedi 5.
Le cannoniere, che vanno al pelo dell'acqua, la sua altezza è piedi uno et mezo, la sua larghezza di bocca piedi 7, in nel più stretto di dentro piedi 2.
Le piazze si farà per tutte le canoniere basse, saranno voltate in forma di case matte; la sua larghezza sarà piedi 30, la sua lunghezza sarà tanta, quanta vorremo, perchè habbiamo il luogo da poterli accomodar.
In la cortina de detta fortezza dalla parte verso Slarin lì sarà 4 cannoniere tagliate nel sasso vivo alla bassezza se come ho detto di sopra, quali tiriranno tutte alla bocca del porto, cioè all'entrata sua, che è tra li scogleti et santo Andrea; la distanza, che sarà tra una cannoniera et l'altra, piedi 32.
In el torrion tondo, che è all'entrata della detta bocca, si come si puol vedere sul disegno, lì facciamo 7 cannoniere, delle quali 4 ne vien nell'altezza del sasso vivo, et le altre nella groscezza della muraglia; una difenderà per fianco dritto alla cortina dalla parte di mar, et due delle dette tirerà alla bocca del porto tra gli scoglietti et santo Andrea, et un'altra tirerà alla valle detta Sicinica, et l'altre due tireranno a lungo il canal di Sebenico, et l'altra difenderà la cortina dentro del porto; et in detta cortina ne facciamo altre due, si come vostra signoria ha visto, le quali tireranno a lungo al canale alla volta di Sibenico, et non potranno esser inboccate da terra

[614] Ljubić, *Commissiones II*, 150–152; Žmegač, *Bastioni jadranske Hrvatske*, 185.

ferma; la distanza, che è fra l'una, et l'altra di quelle, che vien in el terreno tondo, cioè di quelle, che si fà nella muraglia, piedi 45; et quelle, che vien nel sasso piedi 25; et le doi, che è nella cortina di dentro verso il porto, fra l'una et l'altra piedi 55.

La fronte de terra ferma ha due fianchi, si come è nel disegno, che si difendono molto bene l'uno con l'altro.

L'altezza della piazza di detta fortezza è piedi due sopra il cordone, nella qual se li potrà accomodare meglio di 20 cannoni, di maniera, che detta fortezza sarà tutta cavallerezza molto ben difesa et fiancheggiata, et è superiore a ogni cosa, si come la signoria vostra ha molto ben visto su l'opera.

Il circuito di tutta detta fortezza intorno intorno è de passi alla mesura Venetiana numero 280.

Non altro bacio le mani a vostra signoria, et humilmente me li raccomando.

Data a san Nicolò alli 3 settembre 1540.

Di vostra signoria serenissima

Gian Geronimo di san Michiel.

14) Report by Jacomo Boldù, 1542[615]

Relatio viri nobilis ser Jacobi Boldù reversi comitis et capitanei Sibinici. Presentata die 7 maii 1542.

Memoria delle cose bisognano per Sibenico fatta allo excellentissimo collegio per mi Jacomo Boldù fo conte et capitanio in tutte le cose più esential. Et primo:

Quanto alla fortezza de s. Nicolò, atender de expedir cum diligentia il perito ser Zuanhierolimo da s. Michiel inzegner, qual ha havuto precipuo cargo di designar et dar regola a tutte canoniere de essa fortezza cum le sue reculate. Et essendo za più mesi in questa cità, saria hormai tempo, che fussi expedito, et alla sua expeditione è neccessario, che de presenti per il manco se li dagi ducati 3000, perchè n'andarà da ducati 1500 in circa a far calcina, solamente che hora è il tempo, e non ritardar più, come per calculo fato cum il diligente ser Jacomo Venier, che ha havuto tal carico, è sta novamente concluso hora bisognar, quanto che avanti se tagliano le piere vive grande, che domandano sopli da meter in le calcare con le preparatione de frasche e legnami, et che se brusino, chel sì possi adoperar la calcina, sé convignerà scorer molti giorni, che se potria haver bisogno, e sì retardaria l'opera, oltra che le se farano con manco spesa assai per li zorni longi et più ati al lavoriero. Et damo se hora non sì atende a questo, le maistranze potriano star indarno, per consumarsi al presente gran quantità de calcina per le piere cotte giunseno giorni 15 avanti il partir mio da Sibinico, che ogni giorno sì mettovano in opera da 7 in 8 migliara cum gran quantità de tuffi per ridur il turion del porto et le cortine da banda da mar ala egualità de piè 20 de alteza fino al cordon, come se attrovano li mezi baloardi con la cortina da parte da terra, et sin hora tien ditto turion, et cortine siano ridutte atorno atorno a quella alteza de pie 20, benchè manca il revoltar di sopra de alcune bombardiere, sonno stà fate in pello de aqua sul saxo vivo di pie 15, cavate con bona parte delle sue reculate, ecceto do, che sonno da parte da mar, chel se aspeta il preditto ser Zuanhierolimo inzegnier, convenendosì butar zoso la chiesia antiqua de s. Nicolò, et chel dagi la forma a ditte bombardiere; et sarà conveniente ancor refabricar ditta chiesia in forma di capella, per esser quella il membro principal della abbacia de meser pre Zorzi abbate.

Li altri duc. 1500 per non perder tempo è neccessario che ancor sì mandino cum prestezza per il pagamento sì convien far ogni zorno ale opere, che atendeno alle maistranze, et pagar esse maistranze che sono da 80 et più che lavorano, licet per avanti ne fusseno assai più. Oltra che si convien mandar da 15 maistri tagliapiera dalli brioni, che tegno toccano a loro, per esser li

[615] Ljubić, *Commissiones II*, 155–159.

ultimi stati da Rovigno, et se li ha mandar uno groppeto a Puola per il pagamento loro de doi mesì, altramente non si potrano levar, et che mandino persone sufficiente atte a far lugnere et non di scarpello et si convien mandar da 20 maistri alli molini a tagliar tuffi, che hormai le se ale fine della munition fu fatta, tagliandoli nel sasso pella montagna, che cum difficultà poi se conducono al aqua, et meterli in le burchiele et de burchiele in navilii grossi, per non ritrovarsi più tuffi despicati, come erano per avanti; et questi serano assai migliori delli primi, ma sì farano e condurano cum assai mazor spesa. Ge intrano poi noli de diversi navilii, che conducono ditti tuffi a s. Nicolò, sabioni sì grossi quanto sutili, calcine et creda in gran quantità, che tanto, quanto sì erse la fabrica, tanto sì alza con ditti creda e tuffi atorno atorno. Et si convien alzar dal cordon fino al parapeto. Etiam è ancor neccessario, ch'el si mandi el restante delle piere cotte fino alla summa de 500 migliara, et li 25 migliara de coppi et legnami za ballotadi sotto il magnifico meser Piero Loredan cassier, da 300 lire de azal fino per la feramenta azalada adoperano gli tagliapiera da 3 in 4 migliara di ferro, chiodi de uno pe e mezo pe, chiodi picoli e de sexena per far li allozameti per il castellano et soldati hanno ormai a star a quella custodia, che non sii robata. Et laudo summamente, che fate cum prestezza le stantie per la dessignation hara a far ditto ser Zuan Hieronimo inzegnier, che al tutto facci per vostra sublimità, chel magnifico meser Luca Zorzi proveditor se ne vadi a stantiar a s. Nicolò, qual è certo diligentissimo, et ha non meno a core essa fabrica che se la fusse de sua propria specialità, et la fortezza sì lavorerà con più celerità et segurtà, licet ogni zorno lavorente, et se ne vadi su l'opera, et stagi fino a sera, che merita grande comendatione, et perlaudo cum sua magnificentia de resto per zelo dela patria non me ha ricusato tal cargo. Ma volendo hora se faccino tal stanze come neccessarie, bisognarà mandar mazor quantità de legnami, ferramenta et coppi sì per questa opera quanto per adatar li allozamenti delli castelli di Vellin da Slina et Varpoglie, acciò li cavalli stagino lì per segurtà deli lavorenti ala campagna, come avanti la guerra solevano star, et etiam per adatar li allozamenti delle do torrette.

(…)

Et ne è sta referto, che li soy vayvode hano havuto a dir, che sforzati tandem andorano ala expugnation di Segna et di Fiume, dove hora stantiano diti Uscochi, che idio non vogli per sua infinita bontà, et li togli lo intelletto a far questo, come del 1539 tolte lo intelletto a Barbarossa di non venir de longo a Sybenico, della importantia molto ben nota a vostra celsitudine, che perso Sibenico con il porto, sì puol reputar esser persa tutta la navigatione, et il tutto star in manifesto pericolo per la grande habilità, che hanno Turchi, de tutte cose necessarie alla fabrication de ogni grossissima armada, et quella construer, havendo maxime la propinquità della Puglia, della Marca et de tutta l'Istria et ancor di Venetia; ch'el luni santo, partito io da

Sibenico cum sirochi piaccevoli senza tocar cità ne porto alchuno, slontanandomi in mar cum una barca de stara 600 per schivar Uschochi, in 25 horo arivai il zorno seguente a Cità Nuova, et scorsi il pericolo per la bontà del nostro signore iddio, perchè mi expettavano cum barche sie da numero 60 tra san Piero in Nieme et altri porti de la dal Quarner per asaltarmi, volendo al tuto vendicarsi dela morte havea fatto dar a nuove degli suoi parenti da Segna per depredar non solum Turchi ma ancor nostri.

Compita la fortezza de san Nicolò, laudo anchora, chel si faci un turion over maschio solamente sopra il monte, che è propinquo alla torre granda, et non della grandezza voleva il capetanio Melon, et chel sì faci gagliardo da parte de terra, perchè da le tre altre bande el sito da si è fortissimo, et levando le piere per via de scarpello et lugnere, quelle mettendo in opera, vien a far il sito inaccessibile, che la natura da si l'ha fatto, qual cole predomina tutte do le torre et tutte le vallade da l'una et l'altra banda del canal, ch'el nemico non sì puol accampar alle rive a devedar qualunque nostro navilio, che bisognasse andar suso a difensar la cità de Sibenico; et mantenuto ditto maschio, le do terre se poleno defender, et devedar etiam qualunque navilio, che se per caso pasasse la forteza de s. Nicolò, che reputo con dificultà potrano passar, non possi vegnir insuso, altramente ditte torre stanno in manifesto pericolo, non preoccupando ditto monte che la fortezza de s. Nicolò non puol defenderle et preservar le rive soprascritte, chel inimico non vengi cum qualche pezo de artellaria a devedar il soccorso della cità; et seben se rovinassero ditte torre loro, le potriano refabricar.

Cità de Sibenico.

Della cità de Sybenico per non metter hora tanto a campo, chel fastidisca respeto ala spesa, dico che ancor di quella sì debbi haver gran consideratione di fortificarla da poi sarà finita **b** fortezza de s. Nicolò et il ditto maschio del monte soprascritto, perchè sì puol molto ben fortificar da parte da terra, afferando il monte de s. Zuane, che predomina tuta la cità et castello, tolendo do altre coline più basse, per le qual l'inimigo puol gagliardamente bater la terra, che la fortezza si fosse a s. Zuane sola, non potria devedar l'acamparsi, ma afferando ditto monte et coline contigue, lo inimico da ogni banda vien ad esser discoperto. Et poi stante le fortezze de il porto cum la fortezza da parte de terra sì potria reputar quel loco de'Sibenico recetaculo de tuta la Dalmatia, che potriano venire ad habitar lì una grandissima quantità di gente fra la ditta cità, et monte cum le preditte coline, facendo tutto un corpo della cità, come occulata fide bisognando si monstrarà a vostra sublimità il dissegno fabricato per il ditto ser Zanhierolimo inzegnier cum il consulto del illustrissìmo signor Valerio Orsino et mio, approbato etiam per il capitaneo Melone.

Custodia.

Bisogna ancor far pensiero di mandar una custodia ordinaria cum uno capo fidelle oltra il prefato magnifico proveditor, che stagino fermi in la fortezza de s. Nicolò cum qualche pezzo de artellaria et munitione, solicitando se facino presto le stanza loro, et far che habbino li suoi pagamenti ordinarii ali suoi tempi, et non come è sta fatto za uno anno in circa, che non sono sta mandati li pagamenti ordinarii sì della cavallaria extraordinaria quanto della fantaria, che se ha convenuto de setimana in setimana darli soventione, et si crede sparagnar et perdesi grossamente, per non si poter far le mostre ordinarie, non havendo il danaro prompto, oltra le grande mormorationi siegueno, che pareno non esser pagati; et meglio è tenirne pochi et ben contenti, cha continuar questa mala stampa.

Cavo-Cesta.

A Cavo-Cesta, villa grossissima sotto il territorio de Sibenico, qual solea dar bon numero de gallioti in gallia, et il quinto de tutte intrade speta a quella camera, è neccessario li abasso verso la porta et ponte levador, che li sii fatta dentro una seraglia di muro non troppo grosso in forma de ponton cum uno poco di fianco, che lì dentro possino securar le persone loro et animali, che non siino depredati, et far uno turionzello piccolo, qual responda ad un altro za fatto, che defensa la muraglia da fuora, ma che fato il calculo cum ser Zuanhierolimo inzegnier, ne potrà andar pocho più de ducati 300, per haver le piere li apresso, et cum poca spesa sì farà lì una calcara per calzina, che za fu fata sotto il magnifico messer Andrea Gritti mio precessor per far la fortezza più insuso sopra la colina, che ne andava gran spesa, et bisognava meterli guarda, che per la ruina deli molini, che si conveneno refabricar, non fu fato altro; et questo, che hora sì doveriano far, saria uno riduto sicuro da corarie, che induria le persone, qual parte sono andate in Puglia et parte disperse in altri loci, che ritorneriano ad habitar, per non tegnirsi sicuri per esser lontani dalla cità miglia 15 et più, et se multiplicherà la intrada per conto della camera, qual intrada se soleva affitar avanti la guerra ducati 300 al anno.

15) Report by Zuanne di Garzoni, 1557[616]

Relatio viri nobilis domini Joannis de Quarzonibus olim comitis et capitanei Sibinici 1557 die primo julii.

(…)

Hora descenderò alle cose pertinenti alla fortezza del castel s. Nicolò, che è in bocca di quel porto, per esser di grandissima importantia. Veramente, principe serenissimo, che questa è una bella et inespugnabile fortezza; non le manca altro, che esser munita d'ogni sorte di munitione, non essendo al presente troppo ben all'ordine; gli sono solamente sei canoni da 50, sei da 20, doi colobrine da 40, sei cani da 12 et sei falconi da sei, tre periere et tre moschetti da zuogo. È ancora di grandissima importantia far empir di terreno gli doi pontoni, che sono dalla parte di terra ferma, perchè sel occorresse il bisogno, non potriano li soldati ascender le muraglie né meno condur la artegliaria per difender quella parte. Fo commesso per vostra serenità al clarissimo capitanio in colpho, che mandasse una galea con la ciurma, dalla quale si facesse questa opera; il qual mandò il magnifico messer Marin Pisani sopracomito, che non potè lavorar se non X giorni, perchè venne il suo disarmare; dopo venne il magnifico messer Zuan Battista Contarini, che fece lavorar altri quattro giorni, et poi lì convenne venir in Istria a levar l'illustrissimo signor Don Ferrante Gonzaga per commission di vostra serenità, ne più vi è venuto alcuno, di maniera che l'opera appena è principiata; per il che lo raccordo riverentemente a vostra serenità, che veglia commetter, che li detti pontoni siano empiuti con ogni celerità possibile, per assicurar quella parte, la qual sta in qualche pericolo; et oltra di questo la può commetter ancora, che siano finite alcune case, che mancano per habitation de quei soldati per poter serar una apertura, che fu fatta nella muraglia per commodità della fabrica, et aprir la porta maistra, perchè in vero a star a questo modo si scorre grandissimo pericolo. Io le haverei fatte finir in tempo mio, s'io havessi havuta commodità de danari, ma non l'ho havuta mai, se ben da me non ha mancato di richiederla di tempo in tempo alli clarissimi proveditori sopra le fortezze, li quali sono restati forse, perchè hanno havuto da proveder, dove il bisognoera, maggiore. Però se così parerà a vostra serenità, la potrà mandar il modo al magnifico mio successor, acciò sì possa far finir così buona opera, essendo quella fortezza di quella importantia ben nota a vostra serenità.

Fù in tempo mio castellan di quella il magnifico m. Zuan Surian, il qual in vero è sta molto solicito et diligente in tutte quelle cose, che sono sfate di beneficio di vostra serenità. Ha

[616] Ljubić, *Commissiones III*, 94–96.

accarezzato sempre quei soldati, et sovenutili nelli suoi bisogni, di modo che merita grandissima laude. È venuto in suo luogo il magnifico messer Thoma Donado, il quale per quel poco di tempo, ch'io l ho praticato, parmi dell'istesso buon animo, che era il suo magnifico precessor. Sono stati doi capitani in tempo mio con 40 fanti per uno; il primo fu il capitan Pompeo di Pompei, che non è stato longamente sotto il regimento mio, ma per quel poco, ch'io lo esperimentai, lo trovai sempre fidele a vostra serenità et amorevole verso li soldati. Il capitan Julio de Naldo, che s'attrova al presente, è persona di valor, magnifico et molto liberal; ha tenuto sempre una bella et honorata compagnia, ne mai ha mancato delle debite fationi; et ha intertenuti quasi tutti gli soldati, che menò seco, che è gran miracolo, perciò che essendo le soe paghe alquanto longhete, et non potendo haver soventione da quelli della città, per esser persone povere, convengono quasi tutte di necessità partirsi, poichè hanno servito le soventioni, che hanno hauto de qui. Sono adunque stati intertenuti quasi tutti da questo suo capitanio, parte con haverli accomodati del suo, et parte con la buona compagnia, che gli ha fatto, di modo che si vede in lui grandissima bontà et gran destrezza; per il che vostra serenità può molto promettersi di lui, et esser certe d'haver sempre a riceverne buon servitio, per che invero non degenera dalli suoi antecessori, et perciò è degno della bona gratia di vostra serenità…

16) Report by Michiel Bon and Gasparo Erizzo, 1559[617]

Relatione de noi Michiel Bon et Gasparo Erizzo già sindici in Dalmazia. MDLIX.

(…)

perchè due miglia lontano è il castello di s. Nicolò, che puol devedar l'intrada ad ogni legno armato; onde saria di beneficio publico levar la spesa de ducati 500, all'anno, che si fa in duoi castellani, XII paghe da guazzo et duoi bombardieri deputadi alla custodia di quelle.

(…)

Doi miglia lontano da Sebenico, come habbiamo preditto, è la fortezza novamente fabricata sopra il scoglio di s. Nicolò; quella è veramente bellissìma. Et hora, che li pontoni sono tutti empiti de terreno, sì può dire, che sia perfetta se però s'attenderà a far levar via parte di quel sasso, che li è vicino dalla banda di terra ferma. Il qual, per quel, che vedessimo nel disegno, die esser scarpellato. Una delle maggior necessità di quella importantissima fortezza è che in essa non s'attrova alcuna sorte di vittuarie, a tal che in qualche accidente potrà restar in grandissimo pericolo; perchè se ben'ha la città vicina, però spesse fiate aviene, che non se li può dar soccorso delle cose del viver, ritrovandose alle volte non n'havere per se medesima. Onde raccordemo reverentemente alla serenità vostra, che dopoi che con tanta spesa ha fabricato così bello et forte castello, vogli almeno tenerli una monitione de megli o de biscotti, et non lasciar, che nell'avvenire resti nelli termini, che l'habbiamo veduto, essendo massime li tempi pieni di sospetto, come alla serenità vostra prudentissima è chiaramente noto. Et perchè mancano alcuni pezzi d'artellaria per fornir la difesa, sarà ottima provisione mandarli più presto, che sia possibile, et tanto più voluntieri, quanto che quelli, che se ritrovano, sono benissimo governati. In quello non è alcuno magazeno; però è necessario al tutto farne far uno. Et il luogo di tavole, dove al presente habita il capitanio, sarà molto a proposito, dovendosi dar principio a fabricar una stantia per lui in un'altra parte del castello. A la custodia del quale è il capitanio Tullio Naldo, buon servitore della serenità vostra, con fanti 40 ordinarii et 20 mandati ultimamente, tutti ben' all'ordine; però li raccomandamo alla sublimità vostra in far, che habbino le sue paghe alli tempi debiti. Secondo il debito nostro fu fatta l'inquisitione sopra li portamenti delli rettori et altri rapresentanti publici et tutti ad una voce laudano fra gl'altri il magnifico m. Filippo Bragadin come gentilhuomo, pieno di bontà, di valor et di giustitia. Ritrovassemo, che li camerlinghi attendono a far mercantia. Il che è di pericolo, manegiando il danaro publico; ma perchè in fatto questa corruttella è introdotta in molti luoghi di levante

[617] Ljubić, *Commissiones III*, 126–127.

habbiamo considerato, che non era cargo delle nostre spalle provedere a cosa di tanta importantia, et messa in tal consuetudine; giudicamo bene esser nostro debito raccordarlo alla serenità vostra senza rispetto alcuno, acciochè lei con l'infinita sua prudentia faccia quella provisione, che si conviene alla sua grande autorità.

17) Report by Giulio Savorgnano, 20th July 1566[618]

(…) Di Sibenico per esser quella Fortezza di San Nicolo tanto piccola, che tutta starebbe in un mediocre Belloardo alla qual fortezza ancora che sia piccola li mancano alcune miserie alli parapetti di terra, con ogni debita riverentia mi par che sia peccato di mancar per cosi poca cosa di finirla come ha d'andare, per non dar causa alli capitanij, che vi fussero dentro di dire, io l'ho persa, perché non haveva terreno, et mi mancava la tal cosa, quando le iscuse non sono vere per coprirsi, li Soldati ne fanno nascer di quelle, che siano del veri simile, ma quando ne hanno di legitime facilmente fanno portar la pena a V. Ser.tà per saria ben fatto à farli portar quel poco terreno, che li manca.

In Venetia alli 20 luglio 1566

Di V. S. Ill.me

Suo Servitor

Giulio Savorgnano

[618] ASVE, Misc. materie miste notabili 11, Giulio Savorgnano MDLXXVI., 50v, 51r.

18) Report by Giulio Savorgnano, 25th June 1570[619]

(…) Mi resta à dirli, che hò convisione di smantellar quelli dui Castelli Vechhij di Sibenicco, tra la Fortezza di San Nicolo, et la Città, et imediate che io habbia 2 mille Fanti à Sibenico, di prender la Cima de un monte, et Fortificarlo di terra, vicino alla Città; Questo ordine ho havuto dall'Eccmo Generale da Mare, et dal Sig.r Sforza;

Di buttar à terra li do Castelli sopranominati, sue Eccties l'hanno comandato a me nel pizzolo della sua galera capit.a, alla prudentia del Cl.mo Conte di Sibenicco, et del Governator Camillo Stella; anzi io imediate dissi, che si debba cominciar in quel istesso giorno con la prudentia de Suo Ecc.tio et cosi fa rissolto di dover fare; fu differita l'essecutione per il giorno seguente, che fu alli 15 dicendosi che li zapponi non erano inmanicati, il Cl.mo Conte tornò da Sua Ecc.tia del Generale, et fosse un mandato in Scrittura per sua chiarezza; Io non mancai al mio partire di ricordarlo, si al Cl.mo come al Stella, che dovessero da mattina dar principio, tornato che io son da Spalato, hò trovato, che se Stella havra cominciato a gettar giu, et à obedire, ma il Cl.mo ha sospeso tal fattura, facendosi tornare à murar de pietre secche, quel poco, che havra disfatto; Il Stella ha fatto bene à obedire il suo Rettore; Sebenzani sono interessati perché godeno certi Capitaneati; et utilità sta do questi Castelletti in piedi; Io hò detto à quell Cl.mo Conte, qual è un da ben Gentilhomo à mio giudicio, che io sarò sforzato di scriuer tutto questo fatto, per mio discarico à V. Ser.ta ma che voglio dar tempo à Sua Sig.ria Cl.ma che con sue sre si possi difender appresso lei, perciò hò tardato fino à questo giorno, che è alli 24 per dar tempo à Sua Sig.a di scriver prima V. Ser.ta come de obedir a tal mandato; Heri che fu alli 23 per alarmi che sono venuti da Sibenico domandati da me hanno referto non esser stato fatto altro; Il ponto è questo, che se nemici anderanno à torno detti lochi, con quelli pezzotti da 12, o 16, che habbiano li prenderanno, et se ne starano dentro, et farano impedimento, che non si potrà andar con Barche, né con galee à soccorrer Sibenicco, né à portarli Vittoarie; et se questo è cosa, che importi, lo lascio considerar à V. Ser.tà et sua Sig.a Cl.ma dice che quelli di Sibenico hanno mandato dal Generale da Mare per far revocar quel mandato, si come questo fosse una lite civil ordinaria; et che il Padre di V. Ser.tà Ser.mo Principe, essendo Generale da Mare sospese tal gettar giù di detti Castelli; il che non può esser, perché in tempo di sua Sig.a Cl.ma io era qui in Dalmatia, et fù rissolto da sua Ecc.a di far quel Castello di San Nicolo; con la prudentina del Ill. S.r Valerio Orsino; il qual Castello fu fatto dapoi; et non accadeva di parlar di spianar questi vecchi castelli, fino che non fusse in qualche buon esser il novo; Molti armi passarono avanti, che l nuovo fosse

[619] ASVE, Misc. materie miste notabili 11, Giulio Savorgnano MDLXXVI., 122r–124r.

in esser; Non può per questo stare, che essendo sua Ecc.[a] Generale habbia sospeso il gettar giù di quelli all'hora; Tonto io sò della cosa vecchia, et della prudente hò voluto nominarsi la verità.
(…)
Di Zara alli 25 zugno 1570
Di V. Ecc.[ta] buon Servitor
Giulio Savorgnano“

19) Report by Jacopo Foscarini, 1572[620]

RELATIONE DI ME GIACOMO FOSCARINI NELL' ECC^{MO} SENATO DELLE COSE DA ME OPERATE ET OSSERUATE NEL GOUERNO DI PROUEDITORE GENERAL IN DALMATIA

…la Città è posta à dirimpetto del detto canale che dominando il colfo et esso canale fà vista bellissima è situata in costiera di monte arido, alla sommità del quale vi è un castello uccchio et poco forte, come di manco fortezza è la città tutta essendovi all'incontro del monte di San Gioanni che in poca destantia può batter il Castello e la citta la quale è circondata da debolissìme muraglie, è slato fatto un poco di fortificatione alla porta di terra ferma verso levante con un bastione, et con terra pieno della muraglia, et alcuni torrioni più per la stantia de quei cittadini, che per gran giovamento se gli facesse perchè possendo esser batutta la città da molte parti sarrebbe bisogno di altre fortificationi che hanno cercato et cercano quelli d'introdurre et molte volte hanno sopra ciò molestata la Serenità Vostra tanto perchè pensino sì possi far in quella città alcuna fortezza, quanto perchè fabricandosi sperarrebono cavar, et per loro, et per il popolo qualche beneficio. Circuisse la città mille passì, all'incontro di essa verso mezo giorno su la bocca del canal stretto che entra nel colfo vi erano due torrete fatie anticamente per guardia di esso, qual trovai destrutte all'andar mio destrutle però dalla parte del mare perchè verso terra li sono restate le muraglie nel modo erano con fine che se i Turchi volessero impadronirsene potessero dalla parte di mare facilmente esser cacciati. Hanno suplicato Sebenzani ultimamente che esse torrete fossero rifatte dicendo che assicuravano quel canale, che quando da nemici fosse molestato, vennirebbe esser impedita la entrata, et uscita da Sibinico. Vostra Serenità mi commesse che facesse quello pensassi esser qui a proposito et io giudicai che se le torrete fussero state in piedi com'erano già, non sarebbe forse stato bene haverle distrutte ma non mi parve tempo poichè era seguita la rovina di reedificarle, tanto più che il canal viene in qualche parte assicurato dalla fortezza de San Nicolò posta poco lontano dalla bocca di esso, ne la ragione vole che i nemici pensino a fortificarsi tanto vicino possendo in molti modi esser offesì, patisce la città d'acqua come ordinariamente fanno tutte quelle di Dalmatia.

(…)

… canale, et alla bocca di esso è la fortezza de San Nicolò posta sopra una picciol linguetta in mare loco picciolo, circuisse circa 200 passa con doi mezi beluardi verso la terra ferma che per il disegno dovendo esser scarpelato per esser posta in Isola. Dalla fronte che è verso ponente,

[620] Novak, *Commissiones IV*, 20–22.

scopre l'entrata di scoglio, è tutto l'canal de fuori, vi è un pontone che fà beluardo, tenendo questo loco, ò fortezza. è posta tutta, sopra volti intorno ecceto che dalla parte di terra ferma sotto li quali volti ui è bellissima artelleria di bronza al numero de pezzi 32, et frà essì periere da 150, et canoni da 50, li tiri delli quali in loco serrati, oltre che impedirrebbono dal fumo il potervi stare senza dubio dal strepito. et tuono sarebbe risentire, et rovinar li volti sopra quali è posta la fortezza, più che se da nemici di fuori fosse battuta, se ben sì crede altrimenti per l'esperientia sì dice essersi fatta, oltre che di sopra non è in alcuna parte terrapienata, ne vi è altro parapetto se non di muro che a batteria sarrebbe rovina a chi la diffendesse. Concludo che sii in apparentia più che in effetto fortezza, oltre il volto vi è in mezo una gran cisterna per conservatione dell'acqua la qual non basta anco l'estate al presidio ordinario de suldati settanta che in questa guerra se li è tenuto, di modo che viene a esser una machina di pietra tutta voda di dentro, Se gli tien della vittvaria continuamente per ogni bisogno potesse havere. È di grandissima importantia per giudicio mio, il sito de Sibinico et oportarrebbe assai che fosse più forte la città di quello è overo fosse in termine di potersi fortificare, perchè è porto capacissimo ad ogni grandissima armala, (…) per questo come ho detto desiderarci che fosse la città più forte, che in due modi è sia considerato potersi fare. l'uno facendo un forte sopra il monte a San Gioanni, loco che di sopra ho detto esser cavalliero alla città da onde è dominala et battuta, l'altro è fortificar il loco delle Maddalene questa è una lingua posta nel colfo o nel porto che spinge verso ponente circa passa quatrocento di terra, in larghezza di passa ducento et tal Peninsula lontana dall'una e l'altra parte di terra tanto che non potrebbe esser battuta, farrebbe fronte verso levante che basterrebbe solamente fortificare, et sarrebbe loco sicurissimo quando come tutto il resto anco esso non patisse di acque…

20) Report by Andrea Giustinian, 1576[621]

RELATIONE DI DALMATIA, E LEUANTE FATTA DEL CLARISSIMO SIGNOR ANDREA GIUSTINIANO L'ANNO 1576

"Sebenico pure Città in Terraferma, è situata in costiera d'un monte molto alto, nella sommità del quale è un Castello, che è picciolo, con muraglie debole; et hà un monte di San Giovanni: il quale batte il Castello, et il roinarebbe affatto; ma il monte è molto aspro à salire; et credo io, che con difficoltà se gli condurrebbono Cannoni; però chi volesse assicurar quella Città da Terra, ogni picciol forte, che sc facesse lì sopra gli sarrebbe di notabil beneficio. Da mare sì può dir forte, mentre sta in piede la fortezza di San Nicolò, che è due miglia lontana, dalla Città. (…)

La fortezza di San Nicolò è cosa più arteficiosa, et più vaga da vedere, che utile per la Serenità Vostra, et è stata fatta, a giuditio mio, con molta spesa. Questa è fatta sopra un scoglio alla bocca del Canale, che va à Sebenico; et è luogo molto picciolo; et ristretto, et da terra puo esser battuta, se ben difficilmente potrebbe essere assalita: ma quel, ch' è di male, è che la fortezza di San Nicolò e simile a quella di San Nicolò del Lido qui da Venetia; et dubitano questi pratichi, et con raggione che con sparar molti pezzi; li muri, et li volti non si aprissero; et si ruinasse tutta la fortezza da se ad'un tratto, di modo, che quello, che è bello da vedere, sarrebbe dannosissimo per la Serenità Vostra.…"

[621] Novak, *Commissiones IV*, 173–175.

21) Report by Agostino Moro, 1575[622]

RELATION DEL NOBIL HOMO SIGNOR AGOSTINO MORO RITORNATO DAL REZIMENTO DE SIBENICO PRESENTATA NELL'ECCELLENTISSIMO COLLEGIO A 4 LUGIO 1575.

"la maggior parte di essa muraglia è cativa, puo benissìmo esser haiuta dal monte de San Giovani…

(…)

Della Fortezza di San Nicolò non gli dirò cosa alcuna sapendo lei benissimo la sua imperfettione, gli raccordarò solamente con quella debita riverenza, che debbo che vogli dar ordene che sia munita di biscotto, oglio, aceto, polvere et altre cose necessarie a una fortezza. Altrimente essendo priva di monitione come si trova di presente potria occorregli qualche cosa, che torneria poi di molto maleficio alle cose sue, alla custodia della quale conoscendo il valor, et la sufficientia del strenuo Capitanio Francesco Farfarello…"

[622] Novak, *Commissiones IV*, 139, 144–145.

22) Report by Vicenzo da Canal, 1577[623]

RELATIONE DEL NOBEL HUOMO S. VICENZO DA CANAL, RITORNATO DALLA CITTÀ DI SEBENICO CONTE, ET CAPITANIO

Quanto alla fortezza di S. Nicolò, li dico, che è ben noto alla Serenità Vostra quanto sia a proposito per siccurtà di quella città, essendo in luoco, dove può impedire l'entrata del nemico. Ma perchè à giuditio mio potria occorere che venendo bisogno di esser frequente a tirar l'artigliaria, massime li pezzi grossi in quel luoco posto sopra volti, la detta fortezza potria correr pericolo di cascare; parendo anco oppositione di esser batuta da tre parti da terra. Però direi, che saria buono di terrapienar la detta fortezza, et far di sopra le canoniere, et li luoghi, che bisogneriano per conservar l'artigliaria. Sì levarebbe anco l'occasione al nemico di potersi far patron di essa così facilmente, atrovandosi anco puoco discosto dal luoco materia atta per poterla empire.

[623] Novak, *Commissiones IV*, 218.

23) Report by Luca Falier, 1587[624]

… ma la fortezza et sicurtà sua principale è la fortezza di S. Nicolò, fabricata alla ponta del canale, per il quale dalla banda di mare, dove corre il suo pericolo, s'entra alla detta Città, come dissi di sopra, fortezza veramente molto stimata et forte, et di sicurtà grande, nella quale oltra l'altra monition necessaria, come il bisogno suo richiede ha la Serenità Vostra li sottoscritti trentadoi pezzi d'artellaria fornita di tutte le loro circonstantie, si che per hora non occorre intorno ad essi renovar cosa alcuna, come mi ha affermato il Capo de Bombardieri di detta fortezza.

Canoni da cinquanta pezzi – numero 6
Canoncini da vinti – numero 6
Sacri da dodese – numero 6
Falconetti da sie – numero 6
Periera da cento cinquanta – numero 2
Periere da quaranta – numero l
Colombrine da quaranta – numero 2
Moschetti da uno – numero 3, numero 32

Alla custodia della qual fortezza manda la Serenità Vostra di doi in doi anni per Castellano un Nobele, elletto dal maggior Consiglio, che non se ne parte mai, et un Capitano con quaranta soldati Italiani et otto Bombardieri.

Al mio tempo sono stati Castellani prima il Magnifico Signor Zacharia Soranzo del Clarissimo Signor Marco, et hora è il Magnifico Signor Simon Capello, gentilhuomini tutti doi, che hanno governato con molta prudentia, et destrezza, et che hanno havuto bonissima intelligenza con li suoi Capitani, et hanno dato satisfattion grande alli soldati, che così come meritano d'esser commendati, così non ho voluto mancar di farne relatione alla Serenità Vostra. Capitani li strenui Mutio Singlitico, et Pompilio Massimi da S. Lupidio...

[624] Novak, *Commissiones IV*, 400–401.

24) Report by Ferigo Nani, 1591[625]

RELATIONE DEL DILETTISSIMO NOB. HOMO FERIGO NANI RITORNATO DI PROUEDITOR GENERALE IN DALMATIA. – LETTA NELL ECC^{MO} SENATO A X. DECEMBRE 1591.

„Dentro essa Città vi è il Castel vecchio, fortezza antica. assai forte per battaglia da mano: Et alla Bocca del Porto quello di San Nicolò; la quale per la piccolezza sua, et per esser tutta uncua non è riputata da intelligenti di quella fortezza, che da altri viene stimata. Tiene la Sublimità Vostra in quella Città, et nei sudetti due Castelli per ordinario suo presidio un Governatore, tre Capitani, 125, soldati italiani; 25, de quali sono stati da me aggionti di ordine suo per maggior sicurezza di essa Città, come per suplire alla custodia del Castello di Verpoglie; vi sono anco 59, Cavalli, un Governatore, et sette Capitani; otto Bombardieri, et due Capi: la spesa di dette militie à piedi, et à Cavallo, et Bombardieri importa all'anno 8999, ducati."

[625] Novak, *Commissiones V*, 30.

25) Report by Antonio da Cha da Pesaro, 1593[626]

"La sudetta fortezza di San Nicolò il quale è, che essendo tutta voltata, e tenendosi à pello d'acqua, molti delli più belli, et maggior pezzi continuamente su le ruode, si marciscono così fattamente esse ruode, e letti, che la Serenità Vostra hà una spesa troppo grande, oltreche venendo il bisogno d'adoperarle, non se ne potria promettier alcun securo servitio, procedendo questo dall' humidità, che grandemente risente sotto li volti così per rispetto del mare, che gli batte d'ogni intorno, come per non havere al disopra tanti spiracoli, overo aperti, che bastino à rissolvere la detta humidità, di maniera che se dalla Serenità Vostra non gli sarà proveduto, uenirà ad hauere una perpetua spesa, et in bisogno di doversi valere di quelle artellarie non potrà; mà la provisione per opinione mia, è tanto facile, quanto è necessario che sia fatta, et sì potrà in questo modo; che ella dia ordine, che quelle artellarie, che sono sotto li detti volti siano scavalcate dalli letti, et poste sopra li suoi cavaletti, che se gli faranno per questo rispetto di legname di rovere, è d'altro legno durabile, tenedoli però sempre alli suoi luoghi dissegnati, perche in un punto si possino reponere sopra li medesimi letti con quei inzegni, che sanno adoperare quei Bombardieri; Et per conservare le ruode, et letti, che se gli levoranno di sotto. è necessario trovar luogo coperto, et asciuto, et però vi è la casa del capitanio di essa fortezza, la quale non solamente è alta et capace per questo effetto, mà commoda, et idonea, però se gli potranno poner, et resservar dentro, et dare al detto capitanio due di quelle altre casette de soldati, che ne ne sono de buone, et assai recipienti, perche certamente se piacerà alla Sublimità Vostra di fare quanto io gli hò predetto, sparegnerà non pure la molta, et quasi continua spesa, che hà nel rinouare li detti letti, et ruode, che da un anno in poi, che stanno al basso, si fanno inutili, mà li conseruerà, che in ogni euento gli hauerà in pronto buoni da potersene ualere, nel resto poi da me operato à sicurtà della detta fortezza mi reporto à quanto le scrissi à 25 d'Agosto ultimamente passato."

[626] Novak, Grga. *Commissiones et relationes Venetae V (1591–160*0). Zagreb: Sumptibus Academiae scientiarum et atrium Slavorum meridionalium, 1966, 81–92.

26) Report by Piero Morosini, 1620[627]

RELATIONE DI PIERO MOROSINI RITORNATO DI CONTE ET CAPITANO DI SEBENICO 31. LUGLIO 1620.

In fortezza di San Nicolò vi hò fatti alcuni accomodamenti necessarij per ordine datomi da Vostra Serenità et ella per i miei riverenti raccordi l'ha munita di aprestamenti et munitioni per l'artellaria e perchè come lo hò più uolte rapresentato hò veduto che li aprestamenti di rispetto, quali stano sotto li voltoni oltrechè in quella bassezza sentono l'humidità, come piove trapassando li detti voltoni, restano bagnati, se da Vostra Serenità non sarà dato ordine per la costrutione del magazeno, seguirà di questi quello, ch'è sucesso di altri che se bene erano descritti novi in inventario non più adoperati in tempo che passò l'armata spagnola per quelle acque, sendoli state sparate contra doi colobrine andarono in terra per trovarsi imarciti et infraciditi i letti et navi sotto detti voltoni cadendo la palla poco discosto dalla fortezza il che fù osservato con grande amiratione dal general di quel'armata per quanto hò inteso, et havend'iò voluto far prova delle medesime colobrine, doppo riposte sopra letti mandati ultimamente dalla casa dell'arsenale, fecero benissima passata e come poi volsi esperimentare doi canoni nel recinto da basso in pello (sìc! pela) d'acqua ambidoi andarono in terra per essere cavalcati sopra letti che già qualche anno stano sotto essi voltoni; Vedi Vostra Serenità s'è necessario il magazeno per conservatione di tal sorte di legname, com'è anco neccessario di provedere quanto prima all'incamisatura di tutta essa fortezza, che uà ogni giorno rovinando, altrimente in poco spacio di tempo quelle mura restarano nuda con quel patimento, che può essere compreso dalla sua singolar sapienza e volendosi all'hora poi restaurare non ui sarà di gran longa proportione da quella alla spesa d'adesso, oltre la diminutione della reputatione di quella piazza, appresso che raccordo riverentemente alla Serenità Vostra, che sarebbe bene fare un salizo di pietra sopra li voltoni in pendenza, acciò l'acqua piozana scoresse nelli condotti, altrimenti detti voltoni fabricati con tanta spesa imarzirano et un giorno per il strepito dell'artellaria da basso faranno rovina che vi entrarà poi spesa incredibile à restaurarli et in tanto nella piazza restarà senza commodità di difesa, così di sopra come da basso; Aggiongendole di più che li 40 fanti, che Vostra Serenità vi tiene per ordinario, nel qual numero vi è compreso il castelan, tamburo e ragazzo, et un bombardiero orbo, non bastano ad armar la muraglia, non che a rendere quella fortezza ben guardata come porta la necessità de tempi presenti; Onde

[627] Novak, Grga. *Commissiones et relationes Venetae VI (1588–1620)*. Zagreb: Sumptibus Academiae scientiarum et atrium Slavorum meridionalium, 1970, 304–305.

sarebbe bene che Vosira Serenità vi aggiunggesse altri 30 à 40 soldati, et mutasse li sette bombardieri che si trovano là dentro da 25 anni in qua contra le sue leggi, sendo la maggior parte inutili, che in tutti non possono muovere un pezzo da luoco à luoco, senz'altro aiuto, e stante che non si trova munita di vettovaglia di rispetto da fare 18 miara di biscotto che vi feci introdurre l'Eccellentissimo signor Giustinian Antonio Belegno, già proveditor general in quella provintia, havendo quel signor vigilantissimo nei publici interessi conosciuto il bisogno se bene anco questo per non essere rinovato andarà a male, conosco mio debito di raccordarle essere neccessarissìma qualche provisione di grano, accetto, oglio, et legname, non dovendosì affatto fidare sopra il soccorso della città, perchè gli può essere facilmente levato dal nemico con un sborco di moschettaria, che fosse fatta passare dalla parte di terra ferma alle rive del canale in luoco coperto dall'offesa della medesima fortezza, e dela città, oltrechè questa provisione l'hò conosciuta neccessaria anco per rispetto de cattivi tempi, che impedirono alle volte per tre, e quattro giorni à quelli soldati di poter venir alla città a provedersi che la fanno male, com' è più volte occorso in mio tempo, che come sarà poi stato provisto a quanto di supra, mediante la vigilanza de Illustrissimi proveditori, che Vostra Serenità nè mottivi passati, in segno della stima che tiene di quella piazza, vi hà introdotti appresso l'ordinario Clementissimo castellano, il primo de quali fù l'Illustrissimo signor Benetto Soranzo, e doppò lui l'Illustrissimo signor Vettor Moresini, et adesso l'Illustrissimo Signor Paulo Emilio da Canal tutti soggetti di quel valore et honorate qualità che sono benissimo note alla Serenità Vostra in alcun tempo non haverà da dubitare di essa fortezza nella quale però per quello ho potuto comprendere stimo che sarà di maggior suo servitio il tenervi un capo solo, cioè il proveditore col salario che hà de ducati 60 al mese, et avanciar li cinquanta che da al castelano, potendo un solo suplir d'avantaggio al comando e buona custodia di quel luoco. Non dovendo tacerle per fine de bisogni d'essa fortezza che la dentro non vi stancia alcun religioso, mà solo ne uà uno la domenica à dir messe per la recognitione che hà di una paga, et occorre ben spesso, che per contrarij tempi non vi può andare neanco quel giorno. Onde restano quelli capi con li altri tutti senza messa, et il Santissimo Sacramento che sì tiene in quella chiesa, resta tanti giorni senza custodia et administratore oltrechè in tempo mio vi sono morti la dentro alcuni senza il ultimi sacramenti, per mancamento di religioso, et però raccordo riverentemente alla pia mente di Vostra Serenità zelantissima del culto divino per beneficio di quelle anime, che sarebbe bene che vi stassi per ordinario un sacerdote che seguirà sempre che gli sia da lei accresciuto presso la paga altri doi ducati di provisione al mese da esseri dati da quella camera.

27) Sebenico assediato l'anno 1647[628]

LE CONQVISTE DEL PROYVVEDITORE GENERALE LEONARDO FOSCOLO IN DALMAZIA NEL 1647 E 1648.

(...)

Spedito Thechieli bassà dalla Porta in Bossina con ordini rissoluti di estirpar li Morlachi loro ribelli e risarcir con qualche impresa le perdite passate, pervene il medesimo in quel paese. Allestitò poi da lui il canone unite le proviggioni maggiori e militie con quasi 40 milla huomini, sì acostò il mese di agosto à Sebenico. Questa piazza è posta sopra una colina lungi un ampio seno derivato dal fiume Cerca, che forma capace porto per qual si sia armata, qual poscia per un lungo canale sboca raso alla fortezza di San Nicolò nell'ampio mare. Tiene la città un vecchio castello, sopra una colina disposto, e per coprir la medesima vi furono alzati due forti, uno nominato San Giovanni e l'altro Barone quali con una linea sì comunicavano uno con l'altro. Vi erano per comandanti nella piazza due dell'istesso nome e cognome Tomaso Contarini nominati sopraproveditori, l'uno estraordinario e proveditor l'altro ordinario. Altri comandanti vi si introdussero in quella piazza et il pressidio al numero di 3500 fanti è 60 cavalli assendeva alla voce precorsa ni acorse altre galere, benchè armate, e militie da ogni parte chiamate e dal general Foscolo che al' l'hora indisposto a Zara giaceva, inviate. Doppo molte fationi seguite sortite et praticate, assalti sostenuti convenero l'inimici con infinito loro danno levarsi, mentre alla comparsa del provueditor general Foscolo sudetto che con quantità di legni se ne veniva al socorso, non hebbero cuore d'attenderlo e maggiormente cimentarsi.

[628] Novak, *Commissiones VII*, 70.

28) Report by Luca da Chà de Mezzo, 1561[629]

"El suo castello della città di Pola… è posto in cima il monte che è nel mezzo di essa città, et circonda la cima dil monte in giro tondo di circuito di passa dusento e nonantaquatro la muraglia che si trova di dentro del barbacane: Ben è vero che la muraglia che circonda detta rocha o castello, anchor che di dentro sia tutta piena di terreno a livello delle mura, in gran parte, in diversi luoci essa muraglia e rovinata; intorno alla qual muraglia circonda d'ogni parte un barbacane pieno de terreno di largezza di passa octo; Nel centro della muraglia delle passa 294 del sopradetto castello, anchor che sia pieno di terreno, come è detto di sopra non vi sono habitationi di sorte alcuna, ne vestigio alcuno ci appare di habitatione, ma il tutto è spaciosa pradaria: Nel mezzo della qual appareno alcune vestigia d'un grandissimo tempio senza coperto alcuno ma solum la muraglia, la qual è machina grande; Discosta a questa farsi passa vinti alla facia di levante Vi è un edificio di muro fatto a foggia di un turione, il qual per informatione che ho havuto da questi del luoco già tempo soleva esser uno molino da vento. Si vegono nel circuito di questo castello esser state quatro porte, alla facia delli quatro venti maestri, una delle qual che è alla facia di ponente e talmente distrutta che poche vestigia se ne vede; l'altra alla facia di tramontana in grandissima parte ruinata. La porta alla facia di levante è del tutto integra et sana con un Turione quadrato sopra essa porta fatto da rustichi di piera viva di altezza di passa sette in octo. A canto alla qual porta, pur di dentro dal centro dil castello, vi è una piccola porta, per la qual si discende per diece gradi sotto terra dove si entra in una belissima cisterna di longezza de piedi 42 et larga piedi 31 fatta in volto, sopra octo volti edificata, di altezza de piedi tredece in quatordice; Ben è vero che al presente pocha acqua si vi attrova per non esser curata. La porta di verso mezzo giorno è malissima in essere et quasi che atterata del tutto; pur apresso a quella nel la muraglia del medessimo castello, di dentro dil giro dil barbacane vi si trova in esser un cavaliero fatto di piere vive quadratte quadro per ogni canto tutto pieno di terreno non rovinato in niuna parte per ogni faza passa quattro e mezzo di largezza che sarebbe il circondar suo passa disdotto, et di altezza passa tre e mezzo pocho più. Questo castello domina e signoreggia la città tutta d'ogni canto, il porto tutto che è così grande, et spacioso domina anche la campagna tutta per ogni canto, ne cosa alcuna si trova qui vicina che eguale o superior li sia…

Consiglio dei X. Lettere del Conte di Pola B. 268. Archivio di Stato in Venezia.

[629] Caprin, Giuseppe. *L'Istria nobilissima*. Vol. I. Trieste: Libreria F. H. Schimpff, Editrice, 1905, 152, note 1.

29) Report by Pietro Matteacci, 1625[630]

Esso porto è capace d'ogni grossa armata, et potrebbe ricever tutte l'armate delli potentati dell'universo, sicuri da tutti li venti, con ottimo sorgitore molto profondo nell'ingresso, nel senno, et alle ripe favorito da un'aqua di fontana indeficiente, che depone nel mare, et da altre aque. Non le mancano legne da fuoco, nè monitioni di grano, di vino, di carni, de pesci, d'oglio, et d'ogni altro alimento, alla vita humana necessario.

Hà nel suo interno la Città, che è posta al sito, mà giacente, cadaverosa, un horrendo spettacolo, non essendo in essa più di quaranta habbitanti, d'ambi li sessi, mal complessionati; et vilissimi, de quali non è alcuno che abbia prole, nè che averne possa mancandole del tutto la propagatione, si che in breve hore potra vedersene in totali esterminij, et quando quelle genti infelicissime escono alla campagna, il che sempre fano, la Città rimane totalmente vota, che non si forma in essa numero, dove io mi sono diverse fiate trovato, a mal partito solo privo d'ogni altra compagnia, che di quella del suo horrore, et mestitia.

Adonque essendo cio vero, non è forse ben fondata la machinatione d'ogni animo avverso di potersi impadronire di quella Città, et che più importa del porto senza contrasto, et di poter in breve hore fabricare un forte sopra lo scoglio di Santo Marco, (Andrea) per tener occupato l'ingresso del porto, e tenendolo di poter impedire la navigatione per Venetia con molta facilità. Il che far potrebbe con maggior progresso il Re Catolico, che non fecero Pisani, et Genovesi, poichè questo Re congionto con la casa d'Austria potrebbe havere dalla parte da terra successi subiti, et insuperabili, della quale alcun altra nè pari, nè maggior impresa farsi potrebbe à danno del Golfo della Provincia, et della medesima città Dominante.

Qui non posso far di meno di non dire che si hà da haver (se mi è lecito à dirlo) obbligo à Sua Maestà che habbia di verse fiate annonciato, senza haver effettuato questo pensiero, poiche rendendo aveduta la publica prudenza la eccita di prevenire con la provigione ogni grave caso, che mai succeder possa per una facile provigione, della quale io entro ai termini della mia fede, et devotione sono per addure, oltre altri recordi da me à Sua Serenità dati, il modo della habbitatione, molto opportuna, et di darle forma di governo cotanto necessario; et prima che à cio m'accinga convegno rissolver due concetti volgari, li quali pare che intorbidino la deliberatione, di questa grandissima, et importantissima materia, la maggiore che offerire si possa alla protettione, et alla vigilanza publica.

[630] Ivetic, "La classe dirigente", 308–309, 312.

L' uno è che essendo altri porti in Istria dell'ocupatione di quello di Pola solo non si possa dubitare. L' altro è che sempre chi haverà in mare maggiori forze prevalere potrà nel predominio; onde Pola non deve esser posta in tanta consideratione, che haversene debba gielosia maggiore, che delle altre città, terre, et porti dell'Istria.

Quanto al primo parlando distintamente della natura, et della forma de porti dell'Istria, io non nego, che non cene siano diversi; Quelli di Bado, di Medolin sono nel quarner aperti, et esposti a venti firanei, scarsi d'aque dolci, ò privi di esse per alimentare un'armata, et percio buoni da porteggiare, ma non suficienti per annidarsi col verno d'ogni grand'armata, come è questo solo di Pola atto per stabilire una ferma ressidenza di essa, per nodrirla, et per poter fare un arsenale, col favore delli boschi vicini, essendo, che in Pola Romani fecero le loro armate, con molta facilità, il che meno riuscire potrebbe, nel porto delli Brioni per essere aperto fra il contenuto della terra,…

(…)

Et quando appresso sua Serenità si disponesse di fare un forte **sopra lo scoglio di Sant'Andrea**, dove stare potessero cento soldati, almeno con un Castellano, et un Capitanio di Militia, et si fabricasse per l'habitatione d'un Illustrissimo Senatore un recinto al Castello della Città, che rileva dal suo interno un colle, dove fabbricare si potrebbe un Palazzo, con li alloggiamenti di cento altri soldati, anco questi formando fuochi, et portando delle loro paghe denaro nella città, sarebbero utilissimi all'habitatione, oltre che, et lo scoglio, et il Castello sarebbero stanze saluberrime in ogni stagione dell'anno, anzi la Città tutta potrebbe habitarsi quando fusse da genti riempita, et di fuochi purificata, per il che male non sarebbe di far entro quattro forni da biscotti per l'armata con avantaggio della metà del prezzo de formenti , et di legne da fuoco, di quello che costa à Venetia; oltre che potendo caricare le galere di biscotti à Pola, non haverebbero ocasione di venirsene à Venetia per levarli, con molta perdita di tempo, deviandosi dal pubblico servitio, meno si farebbe alcuna spesa in noli per condurre all'armata detti biscotti, con rischio del mare, et altri notabili danni. Dovendo bastare che in Pola si facessero li biscotti, necessari per l'armata, mentre che si torna con le militie in Golfo da Corfù in quà per lasciare alli forni di Venetia la facitura de biscotti del Levante. Questa opera che cederebbe à sommo publico servitio per lo risparmio, et per altri utilissimi avantaggi sarebbe saluberrima per li fuochi alla purificatione dell'aria, et introdurebbe per l'habitatione della Città molti operarij. Altresì potrebbero, et dovrebbero nella città esser fatte calcare per calcine, fornaci per pietre cotte, et per coppi; potrebonsi fabricare anco molti carboni, onde con impiego utile al publico, et al privato interesse, facendosi cumulo de operarij, et purificata l'aria, per li fuochi, aggiontavi l'essentione facilmente s'havrebbero utili, et felici indrezzi per l'habitatione di quella Città,

nella quale versando il popolo in giubilo, et in allegrezza havesse provigioni de viveri, le quali hora sovente le mancano…

30) Report by Giovanni Battista Polcenigo, 1701[631]

In Pola sopra una Collina dove era un antico Castello di pianta elittica giace situato il forte che si vede di presente in forma quadrilatera con 4 bastioni piccioli sistema e struttura del k.r Antonio de Villa che serviva questo Sereniss.o Pubblico l'anno 1634. Quest'opera è molto singolare così per l'architettura come per le pietre delle quali è formata, che sono tutte massicie et lavorate egualmente a mano, et potrebbe dirsi quando fosse più grande una fabbrica delle più cospicue di questo Stato. Ma perchè anco il tempo l'ha molto pregiudicata tiene presentemente bisogno di essere restaurata in molte parti e specialmente cominciando al di dentro né quartieri de' soldati mentre alcuni che erano fatti di legname restorono già tempo consumati da un incendio, et quelli che sono rimasti hanno bisogno di essere restaurati ne' coperti che in molte parti sono infraciditi et minacciano di cadere benchè per altro non le manchino nè coppi, nè travi, nè tavolati, ma il maggior bisogno et spesa sarà nel riparare la Casa principale destinata per il comandante il coperto della quale è caduto per la quarta parte, tuttavia la spesa non e molto considerabile perchè la fabbrica è picciola onde ho calcolato che tanto per questo come per li Quartieri non si spenderà più di ducati 200. Venendo poi a Bastioni ho trovato che l'opera non è ancora stata finita mancandovi così a questi come alle Cortine bona parte de terrapieni, onde considerata la minor spesa sarebbe mio riverente parere di finire li due terrapieni delle due Cortine che guardano fuori di Città et loro bastioni dalle parti solo che sono veduti dalla Campagna, et li parapetti per l'angustia de' medesimi Bastioni non si possono far più grossi di 10 et al più 12 piedi, perchè altrimenti non vi resterebbe piazza capace per postarvi l'Artigliaria. Il piano del detto Forte ha bisogno di essere eguagliato, et aperti nel medesimo li forri che portano l'acqua nella Cisterna situata nel mezzo della piazza nella quale vi è di presente anco dell'acqua, ma non quanto bisognerebbe per una occasione. La Porta grande è stata serrata con muraglie onde di presente serve per uscita et entrata un Portello posticcio aperto senza regola dopo la costrucione onde quando si volesse continuare a tener murata la Porta sarebbe meglio murare anco detto Portello et avalersi delle Porte di sortita fatte espressamente in quella et nelle altre Cortine. Il di fuori manca pure d' ogni opera solita farsi all'esteriore, mentre non vi è fosso, anzi la terra in molti luoghi all'intorno s'innalza sino ad un terzo della muraglia, ma di questa terra ci potremmo servire per far li terrapieni conchè resterà appianato l'esteriore, ma non so poi se profondandosì molto si potrà far anco il fosso all' intorno che sarebbe difficile quando s'incontrasse nel grebano comune a tutte queste Colline.

[631] Atti e memorie della Società istriana di archeologia e storia patria 8 (1892), 148–150.

Quando però fosse appianato potrebbe per adesso formarsì un Bonetto di semplice terra con sua fresa et pallizzata, mentre ad ogni cortina vi è spacio da poterlo fare, et è necessario per coprire tanto la Porta quanto le sortite che sono tutte in mezzo delle Cortine. Restando anche da considerarsi molto la strada vecchia che circonda il Castello da 3 parti, ed è così bassa che non potendo essere abastanza scoperta si dovrebbe assicurare con qualche ridotto che può farsi però con prestezza all'occasioni per le quali sarà anco necessario la spianata all'intorno. In tal modo accomodata questa fortezza haverà anco bisogno d'un servitio proporcionato d'Artigliaria mentre di presente non tiene che 24 cannoni da 20 et due sagri da 12 et questi tutti smontati che però se li dovriano aggiungere ancora 10 pezzi et molte Petriere specialmente per li Bonetti. Qui non ho ritrovato Polveri di sorta alcuna, et ne meno deposito per conservarle in fortezza come è di necessità; onde considerando quanto sia ristrettissima la Piazza per fabbricare un deposito andavo pensando che ritrovandosi in questa Città molte pille di Pietra o diremo Arche d'antichi sepolcri si potesse a valersi di queste ogn' una delle quali è capace di 3, 4 e anco 5 milliara di Polvere nelle quali potrebbe conservarsi molto asciutta et con occasione da farsi li nuovi terrapieni facendosi alcuni volti ne medesimi, si potriano metter dette arche sotto di quelli, et assicurata l'imboccatura con picciola muraglia resteriano da questa difese dagli accidenti del fuoco della piazza et con il volto e terrapieno dalle bombe dell'inimico, et questa sarà spesa quasi insensibile et senza paragone di maggior sicurrezza che non è quella che gli ordinarii depositi. La Collina sopra la quale è situata questa fortezza è tutta circondata nel basso dalla parte di terra dalla muraglia della Città et dalla parte del mare dalla Città stessa che si distende sino al Porto sopra il quale tiene 6 porte, et dalla parte di Terra 2 tutte senza ponti levatori, e con semplici portoni che però ogni sera vengono serrati da un apostato Portoniere. Le Mura sul Porto sono assai buone, ma quelle dalla parte di terra tengono bisogno di essere accomodate in molte parti.

Questa muraglia verso terra tiene 24 Torri tutte dissimili scoperte, et in nessuna positura di difesa, et per accomodarle crederei che la spesa fosse più considerabile dell'avvantaggio, mentre questa Città viene battuta da tutte le parti dalle Colline contigue.

Le dette mura hanno un secondo recinto al di fuori basso et terrapienato, ma tutto irregolare senza altra difesa, che quella di fronte. Il Porto di questa città è delli più considerabili dello Stato tanto per la sua grandezza quanto per la sicurezza delle navi che vengono ad ancorarvi; tiene nel mezzo cinque scogli tra quali uno chiamato lo scoglio grande eminente sopra tutti gli altri sul quale con prudentissìmo consiglio fece questo Serenissìmo Publico principiare una fortificatione per quanto vien detto circa l'anno 1630, la quale non fu proseguita a detto d'alcuni per dubbio che fosse battuta da certe Colline laterali che vanno a finir col loro piede in vicinanza

del Porto, che però sono stato a vederla et considerata la gran distanza di esse colline non posso darmi a credere che intendenti dell'arte ne habbino divertita la fabbrica, ma piuttosto qualche altro accidente, mentre la delineation della medesima si può concedere in modo ancora che restarà fuori d'ogni sospetto di qual si voglia battuta e avvantaggiosissimo per impedire ad ogni Armata navale di dar fondo nel Porto et stimarei ben fatto di proseguirne la fabbrica in quel tempo deliberata, et quando si volesse minorar la spesa tralasciar le pietre tagliate et fare una semplice muraglia ordinaria con suo terrapieno con angoli salienti e rientranti che possono farsi in forma regolare tenendosi coperti come si è detto, per la qual opera vi è tutto il bisogno delle pietre sul luogo, et la Terra che potesse mancare si può levar da vicini scogli, et le calcare si possono fare con l'abbondanza de legnami di questo paese con ordinarle alle dovitiose Ville soggette a questo Contado. Gli apprestamenti poi sono anco pronti nel magazzino della città cioè badili, vanghe e zapponi, onde l'opera riuscirebbe di poca spesa et assai capace d'un buon presidio et Artigliaria perchè gira circa 700 passi et di molto poca spesa, mentre già vi sono due pozzi o cisterne d'acqua bonissima et di più un antico sotterraneo di volti dove le militie potriano star sicure dalle bombe così che questa con ogni ragione quando fosse posta in tal difesa potrebbe chiamarsi una Fortezza inespugnabile molto proporzionata alle congiunture presenti come l'Eccell.mo Senato sa meglio di me considerare. Il che tutto mi è parso dover metter sotto li publici riflessì per non mancare al debito che mi corre per il riguardo delle flotte forestiere et accidenti che in avvenire possono succedere nel Regno di Napoli.

Resta in fine avvertita l'Eccellenza Vostra come per custodia della fortezza di Pola li Comuni delle diecisette ville soggette a questo contado non hanno altro aggravio che di mantenere 13 soldati alla continua guardia della Fortezza per li quali li viene dal Monitioniere d'ordine publico contribuito il biscotto giornalmente come all'altre militie dello Stato, et che essendomi io portato il primo giorno del mio arrivo subito sbarcato in Pola alla fortezza non vi ho ritrovato persona alcuna, et il giorno seguente che si sapeva la mia incumbenza ho ritrovati 7, o 8 soldati che hanno assistito sino alla sera, ma ritornato il giorno terzo et quarto non vi ho ritrovato pure nissuno; però ho stimato bene che l'Eccellenza Vostra ne resti avvisata per dar gli ordini proprii affinchè una fortezza munita d'Artigliaria non resti in avvenire così esposta, et sarebbe mio riverente parere che il Capo de Bombardieri fosse obbligato alla continua assistenza con stretto ordine di dover renderne conto. Et se se l'Eccellente Senato facesse caso di valersi delle Cernide del paese d'Istria per la difesa di questo et altri posti sarebbe di necessità dar la muta a Capitani et sergenti di queste Cernide venendomi asserto che tra tutti non ve ne sia uno solo che sappia maneggiar il moschetto. Questo è tutto ciò che ho potuto rilevare in questo mio viaggio d'Istria per riverente obbedienza de comandi dell'Eccell.mo Senato et dell'Eccellenza Vostra di cui sono

Umiliss.º Devotiss.º Servitore

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9 LIST OF FIGURES AND TABLES

Karla Papeš was born in Zagreb in 1995. In 2019, she graduated from the Faculty of Humanities and Social Sciences at the University of Zagreb with a double-major master's degree in art history and Croatian language and literature, defending her interdisciplinary thesis *Terminology of Croatian Fortification Architecture*.

In 2020, she enrolled in an international doctoral programme in art history at the Ca' Foscari University in Venice as a scholarship holder and member of the European Research Council project "Architectural Culture of the Early Modern Eastern Adriatic" (AdriArchCult ERC GA n. 865863). In her dissertation, *Military Architecture between Theory and Practice in the Early Modern Eastern Adriatic*, she investigates the relationship between military theory and architectural practice between the 1460s and 1660s in the Eastern Adriatic by comparing treatises, reports on the condition and construction of selected monuments and their formal characteristics. She conducts terminological research, assuming that language and visual material were the primary means of knowledge of military architecture.

She has participated in international and national conferences and workshops, such as "People of the Renaissance Adriatic" at the University of Bergen and "Palladio e Venezia: Politica e Architettura, 65° Corso sull'architettura palladiana" of the Palladio Museum in Vicenza. She is a member of the Croatian Society of Art Historians.

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Karla Papeš rođena je 1995. u Zagrebu. Godine 2019. završila je dvopredmetni diplomski studij povijesti umjetnosti i kroatistike na Filozofskome fakultetu Sveučilišta u Zagrebu obranivši interdisciplinarni rad *Terminologija hrvatske fortifikacijske arhitekture*.
Međunarodni doktorski studij povijesti umjetnosti upisala je 2020. godine na Sveučilištu Ca' Foscari u Veneciji, kao stipendistica i članica projekta Europskoga znanstvenog vijeća "Architectural Culture of the Early Modern Eastern Adriatic" (AdriArchCult ERC GA n. 865863). U svojemu doktorskome radu *Military Architecture between Theory and Practice in the Early Modern Eastern Adriatic* istražuje odnos vojne teorije i arhitektonske prakse između 1460-ih i 1660-ih na istočnome Jadranu usporedbom traktata, izvještaja o stanju i gradnji odabranih spomenika i njihovih formalnih obilježja. Pritom provodi i terminološka istraživanja, uz pretpostavku da su jezik i slikovni materijal bili glavna sredstva protoka i usvajanja znanja o vojnoj arhitekturi.
Izlagala je na nekoliko međunarodnih i domaćih skupova. Sudjelovala je na radionici "People of the Renaissance Adriatic" Sveučilišta u Bergenu i "Palladio e Venezia: Politica e Architettura, 65° Corso sull'architettura palladiana" Muzeja Palladio u Vicenzi. Članica je Društva povjesničara umjetnosti Hrvatske.

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Estratto per riassunto della tesi di dottorato

Studente:	Karla Papeš	**matricola:**	956572
Dottorato:	Storia delle arti	**Ciclo:**	36°

Titolo della tesi: Military Architecture between Theory and Practice in the Early Modern Eastern Adriatic

Abstract:

[it]

L'architettura militare creata sulla costa orientale dell'Adriatico come area di combattimento attiva tra il 1460 e il 1660 rappresentò una risposta rivitalizzata all'invenzione e all'uso delle armi da fuoco. Allo stesso tempo, l'Europa registra anche la crescente popolarità di testi teorici, istruzioni pratiche che manuali standardizzati sulla costruzione – trattati. Questa ricerca si concentra sulla circolazione, l'adattamento e l'uso delle conoscenze teoriche e pratiche sulle fortificazioni sulla costa orientale dell'Adriatico sotto le repubbliche di Venezia e Ragusa nel periodo citato. Si propone un confronto tra trattati, materiale d'archivio sulla costruzione e manutenzione delle fortificazioni prescelte e le loro caratteristiche formali. Inoltre, la ricerca comprenderà anche un'analisi terminologica, assumendo che il linguaggio e il materiale pittorico costituissero il principale mezzo di flusso e acquisizione delle conoscenze sull'architettura militare.

[en]

The military architecture developed in the Eastern Adriatic between 1460 and 1660 was a revitalised response to the invention and usage of firearms. At the same time, Europe witnessed the growing popularity of theoretical texts, practical instructions, and standardised construction manuals – fortification treatises. This research focuses on the circulation, adaptation, and use of theoretical and practical knowledge about fortifications on the eastern Adriatic coast under the Republics of Venice and Ragusa during the period under study. A comparative study was conducted, examining treatises, archival records related to the design and construction of specific fortifications, and their formal characteristics. The research will also include a terminological analysis, assuming that language was one of the main tools for the dissemination of knowledge about military architecture.

Firma dello studente