THE JUNIPER COAST:

A SURVEY OF THE MEDIEVAL SHIPWRECKS OF NOVY SVET, UKRAINE

A Thesis

by

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ABSTRACT

This thesis provides an accurate, comprehensive physical context for the extent underwater archaeological excavations in the Bay of Novy Svet, located on the southeast coast of the Crimean Peninsula. In addition, it presents vital new historical context and explores new archaeological assemblages discovered while mapping the 100 x 250m^2 research site. These include minimal hull remains, concretions, ceramics and an assemblage of anchors and ships equipment dating from antiquity to the modern day. Certain of these may indicate an 11th century wreck site, while others provide probable evidence for seafaring on the bay as early as the foundation of Sudak in 212 A.D. or before. These findings reinforce the work they are built on, and provide improved digital tools for future research. Results are assessed alongside historic and archaeological documentation of medieval and modern activity in the region, including invasive and destructive actions around the Bay of Novy Svet. In addition, the historical record has suggested that a 13th century wreck in the bay may be a Pisan ship burned there by the Genoese after a battle in 1277. While no proof of correlation has been found to date, extent datasets do not preclude the possibility, and support it to some extent. Therefore, this thesis also presents a framework for describing and discussing the 13th century Pisa Ship and its potential actions within historical and maritime landscape contexts. Current research and conservation efforts are presented, hopefully serving as a platform for increasing those efforts locally and internationally in the future.

For Clifford Arthur Albertson, Julie Anne Albertson and William George Albertson

of course it was a perfect day for it

and

For Dr. Sergey Zelenko, Ms. Yana Morozova, Mr. Nikita Zelenko

and all the members of the Novy Svet teams over the years

Ἀρχόμενος σέο, Φοῖβε, παλαιγενέων κλέα φωτῶν μνήσομαι[1]

[1] Rieu 1959, 35, 109.

ACKNOWLEDGEMENTS

Above all and including all, I would like to thank the global community of friends and families that I have had the honor and pleasure to share my life with over the years. Learning about our common anthropological past is by nature a multinational, multicultural endeavor – one that should bring us together as a global community and help us remember and celebrate our shared heritage. To these individuals, but above all others to my family, Dr. Vaclav Paris and Captain Craig Clark, USAF, I would like to re-express the dedication of an intrepid adventurer who penned my exact sentiments 133 years ago, and thank them who variously, in their own profound, sublime geniuses, have

"inspired in me that love of natural history
and true sport
which enabled me to pass so many hours
of thorough enjoyment
in wild countries far from home."[2]

℘ Captain H.C. St. John, R.N., Ret.

More specifically, I would like to thank my committee chair, Dr. C. Wayne Smith, and my committee members Dr. Filipe Castro and Dr. Dan Schwartz for their guidance, support and advice during the course of this research.

[2] St. John 1880, iii.

I would also like to thank the Centre for Underwater Archaeology (CUA) at the Taras Shevchenko National University of Kiev (TSNUK) and the Institute of Nautical Archaeology (INA) for their initial and continued support of my research; the faith and help of their personnel were indispensable to the success of this project. In particular I would like to acknowledge Dr. Sergey Zelenko, Yana Morozova, Nikita Zelenko and Officer Slava of CUA, and Dr. George Bass, Dr. Deborah Carlson and Tamara Hebert of INA.

The friends, companions and mentors to whom I owe so many great adventures, moments and lessons are too many to name in full, and you know who you are in any case. But in particular, though in no particular order, I would like to thank Dr. Jessi Halligan for absolutely everything, Dr. Donny Hamilton, Dr. Pulak and Dr. Castro for their inspiration, Chad Gulseth, Rodrigo Torres, Nick and Sarah Budsberg, Justin Parkoff, Jim Jobling, Dr. Helen DeWolf, John Hamilton, Bill Charlton, Sheila Mathews, Josh Keene, Marion Coe, Dave Hoffman, David Brankovits, Dr. Tom Iliffe, Brett Gonzalez, Tamara Thomsen, Tuba Ekmekçi, Bilge and all staff at the BRC, Chris Cartellone, Ralf Singh-Bischofberger, Laura White, Chris Dostal, Lilia Campana, Dr. Dan Davis, Dr. Michael R. Waters, Morgan Smith, Neil Puckett and Sunshine Thomas, Ed Green, Dr. Kris Trego, Deniz Güney Akkor, Andrey Kulagin, Eugene Archangelski, Sergey Spluhin, Yuri Ivanov, Sergey Ivanov, Alexandra Bashenkova, Katerina Valenterova, Peter Fix, Amy Borgens, Max Pschorr and Rugger.

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NOMENCLATURE

TAMU	Texas A&M University
INA	The Institute of Nautical Archaeology
CUA	The Centre for Underwater Archaeology
TSNUK	Taras Shevchenko National University of Kiev
Nm	Nautical Mile: 1,852 m, 6, 076.11 ft.
Kt	Knot: One nautical mile per hour. (1.852 kmh, 1.151 mph)
[ ]	Indicate additions by the author

TABLE OF CONTENTS

LIST OF FIGURES

Page

LIST OF TABLES

Page

CHAPTER I

INTRODUCTION

The sea is beautiful in the eyes of God, especially, because it surrounds the islands of which it is at one and the same time the adornment and protection; because it brings together the most far-removed lands and gives to sailors unhindered intercourse: through them it furnishes to us the history of what was previously unknown…[3]

℘ *St. Basil of Caesarea*

The Bay of Novy Svet, located on the southeast coast of the Crimean peninsula, Ukraine, has proven to be a site of exceptional archaeological value. Since Dr. Sergei Zelenko, of the Centre for Underwater Archaeology (hereafter CUA) at the Taras Shevchenko National University of Kiev began research there in 1997, the submerged cargos of two to three medieval ships have been discovered. Dating to the 10th - 11th and 13th centuries respectively, these vessels comprise a unique opportunity to study medieval maritime trade on the Crimean peninsula and in the Black Sea. A significant amount of work has been conducted at the site, focusing on aspects of the assemblages and their historical context, yet the comprehensive context of the site as a whole has not been established. While preliminary maps exist, no accurately mapped dataset has been assembled that places all elements under study at Novy Svet in geo-spatial and

[3] Giet 1950, IV.7 274-5. Rare among the early Church Fathers, Basil (329-379), insisted that only in community could humans make progress together against and in spite of our weaknesses. Solitude, he declared, was difficult and dangerous.

geomorphometric relation. This thesis provides that vital physical context, ensconced within the historical and historiographical contexts of the Juniper Coast.

St. Basil, writing in the 4th century[4], was a Christian theologian far ahead of his time. He insisted that the work of a community was desirable over individual enterprise, both on the spiritual battlefield and in the lives of laymen on the war-torn fields of the world. The following work is a true narrative of high adventure and cross-cultural enterprise. Above all, however, it is a story of community and community interaction. It was the sea that brought the Novy Svet teams together, and the efforts presented here, detailing the work of the author conducted alongside and with the assistance of numerous mentors, maritime scholars, students and volunteers, have indeed illuminated another small portion of history. My first sight of the Juniper Coast was as a terrestrial and maritime field school participant in the summer of 2005. I had just finished semester terms at John Cabot University and the Intercollegiate Center for Classical Studies (ICCS) in Rome. During my time there, my experiences on the Italian peninsula made me fall in love with archaeology. As a diver, I was drawn to the numerous exhibits of underwater finds, and when I began browsing the AIA's catalogue of field schools on offer, underwater training was at the top of my list. By far the most exciting option was a six week school, offered by CUA and the Taras Shevchenko National University of Kiev (hereafter TSNUK), on the

[4] All dates are C.E. unless otherwise specified.

Crimean peninsula. To my young imagination, it was a wild coast on the far side of the world. Those six weeks, under the tutelage of CUA founder and director Dr. Sergey Zelenko and Ms. Yana Morozova, changed my life. Three were spent excavating a medieval church on the premises of the Sudak fortress, and three at the Novy Svet staging base, where I donned ancient Soviet era tanks to make my first dives on the medieval shipwreck sites lying along the bay seafloor. I will never forget that first impression: arriving in Simferopol on a bright morning after an overnight journey from Kiev by train, driving through the verdant farmland of the interior, through the lush valleys of the trans-mountain corridor to see the sun-soaked vista of the Sudak littoral. I saw immense, sheer cliffs, vineyard covered mountainsides and a narrow winding road leading from the proud Genoese fortress to the glittering bay of Novy Svet (Fig. 1.1).

Having kept in touch with my friends at CUA, I returned to Novy Svet for the 2007 field season, and served as their liaison and representative at the 12th annual ISBSA conference in Istanbul in 2009. Inspired by what we were discovering, I decided to commit to the effort, and entered the graduate program in Nautical Archaeology at Texas A&M in 2010. During the summers of 2011 (June 15th to August 25th) and 2012 (June 17th to August 20th) I conducted supplementary surveys and exploratory excavations, in tandem with, and under the auspices of, CUA's ongoing research program on the Crimean peninsula. These efforts were made possible in large part by the financial, material and logistical support of CUA and TSNUK, and of the Institute of Nautical Archaeology

(hereafter INA), with which CUA has a long and fruitful history of partnership and collaboration. The following work presents and discusses the results of those efforts, embedded within a pertinent historical and historiographical context of both the local littoral and the relative international addenda, compiled over the past two years.

Fig. 1.1. Aerial photo of the Bay of Novy Svet. Photo by S. Zelenko.

Richard Steffy's seminal definition of ship reconstruction emphasized that the entire wreck site should be analyzed as accurately and extensively as possible, not just the physical remains of the hull itself.[5] Reconstructing a ship need not and should not be limited to the reconstruction of its lines and rigging – while these are primary elements, true reconstruction involves resurrecting the vessel within the context of its contemporary maritime cultural landscape. Landscape, which continuously stores and conveys culture, exists "at the intersection of culture and space, space which only becomes a place, and therefore anthropologically significant, with the addition of human activity."[6] All pertinent aspects within this place have to be taken into consideration; maritime history and ethnography must be "integrated with the physical residue of past maritime systems, including shipwrecks, ports, harbors, roadways, rail lines, modified rivers, villages, cottages, fortifications, shipyards, lighthouses and regulations."[7] The skin of the landscape has often been lost, but the bones remain, the "artifacts, sites, features, and material culture that serve as touchstones of the past. They form the physical foundation of what can be told. These reconstructions probably cannot create a "real world" map that an ancient, contemporary person would recognize. They, like all research questions, are defined by and reconstructed

[5] Steffy 1994; Green 2004, 4.
[6] Ford 2011, 1-2.
[7] Ford 2011, 5.

from a particular viewpoint and with a limited dataset. "The story and the landscape are nearly always larger than the artifact[s]."[8]

The following work is built on the previous efforts of CUA and its affiliate organizations, including the Institute of Nautical Archaeology and Texas A&M University, that have revealed three assemblages on the bottom of the Bay of Novy Svet, dating to the 10th, 11th and 13th century, respectively, and equated with shipwrecks. Current theory poses the possible correlation of the 13th century assemblage with a brief contemporary source documenting the wreck of a Pisan galley in its precise vicinity in 1277. The core platform of the work consists of a presentation and analysis of several important new archaeological discoveries made during my 2011 and 2012 field seasons. This core assemblage is elucidated and expanded upon by placing it within geospatial, historical and historiographical context. Geospatial relationships to the published artifact assemblages and seafloor are presented through highly accurate physical and bathymetric maps. Historic and historiographical relationships are presented through clear, chronological histories of both the Novy Svet/Sudak littoral, and of Pisa as a maritime entity from its foundation through the dawn of the Renaissance. Further research has identified the documented wreck as a special type of fighting merchantman best termed a "merchant adventurer," and offers an

[8] Ford 2011, 6.

in-depth summary of what such a vessel's condition and complement would have been like at the close of the Middle Ages.

Chapter II begins with the history of Novy Svet and Sudak, as their activities are vital to understanding what has been and what will continue to be found on the seafloor. This is followed by an assessment of what effect that recent history has had on the archaeological context of the bay floor. This can be summarized as enhanced disarticulation: the weathering and artifact dispersion already brought about by the natural elements has been heavily increased by the deposition of modern detritus, heavy mechanical fishing and significant looting and tourist damage. Discussion of conservation ethics, considerations and the serious danger the Novy Svet site is in follows; the excavations here are unquestionably in need of rescue archaeology. These contemporary and historic contexts are brought together in geospatial context with the presentation of a highly accurate map of the 290 x 100 m research site under consideration in this thesis. The site map is complemented by a bathymetric map of the same size, with 10 m resolution for general areas and 2 m resolution for areas of high interest. The chapter includes an in-depth discussion of the methodology employed in mapping the seafloor and bathymetry of the bay. It concludes with a discussion of the importance of the impacts of archaeological materials from the last few centuries, the spatial relations of those artifacts within the site parameters, and the implications for future conservation and research that they make necessary.

Chapter III presents and discusses the results of the 2011 and 2012 excavation seasons in terms of the predefined ceramic assemblage areas, while better defining those assemblages and the new-found spatial implications of the new finds within those areas. It highlights how newly discovered anchor assemblages suggest new temporal and social relationships on the bay, offering compelling arguments that Novy Svet was in fact an active harborage from the foundation of Sudak or before and pushing back previous estimates of bay usage by several centuries. Data concerning a new stone weight anchor assemblage is also presented. This anchor assemblage may, along with a newly discovered Y anchor, be a potential indicator of the hitherto unknown 11th century wreck site. A large ship's floor timber, discovered at the end of the 2012 season, is also presented. Its presence corroborates the theory that significant hull features may indeed remain in the geophysical context of the Novy Svet seafloor, and proves that some, at least, do. The presence and importance of concretions as hull identification elements is discussed. The potential for the significant hull fastener assemblage, though somewhat disarticulated, to provide significant locational data when plotted in density patterns is highlighted. The chapter closes with a focus on the real possibility of narrowing down the precise location of the bay's shipwrecks in the near future, and calls for water dredging to be implemented as standard excavation methodology as soon as possible.

One of the most important and best studied archaeological assemblages at Novy Svet is that of the 13th century wreck, most notably its beautiful and rare (for a maritime cargo) assemblage of glazed ware. Dr. Zelenko has presented a theory that this ship is in fact a Pisan galley mentioned in a contemporary Genoese chronicle. While Pisa was a high profile actor in the maritime history of the Mediterranean and Black Seas up until the Renaissance, it is often overshadowed by the activities of Genoa and Venice. To this effect, Chapter IV presents a maritime history of Pisa from its foundation through the Renaissance, highlighting appropriate social, political and military aspects. Chapter V acknowledges the fact that while the current discussion has been limited to the fact that the material dates to the latter 13th century, and some basic correlations exist between text and wreck location, the fact that both vessels existed is quite clear.

Equally clear is the fact that Pisan vessels were regularly involved in trade in the Black Sea region throughout the 13th century. Careful study of Pisan maritime history and the *Annales Aevi Suevici* reveal that the vessel in the text was of a special, though common, archetype, a fighting, free-willed merchant galley best classed as a merchant adventurer. To that effect, the chapter entails a detailed study of what a merchant adventurer sailing from Constantinople to Sudak in the late 13th century would have been like. Chapter VI summarizes the conclusions presented in previous chapters. Based on the new data presented in this thesis, it offers fresh insights regarding where excavation and historical

research should be focused in the future, and how that work might best be carried out (Fig. 1.2).

Fig. 1.2. The author after a dive over the medieval shipwrecks at Novy Svet. Photo by S. Spluhin.

CHAPTER II

THE JUNIPER COAST: MAPPING THE HISTORY AND THE HAVEN OF NOVY SVET

> *"Simply looking at the Mediterranean cannot of course explain everything about a complicated past created by human agents, with varying doses of calculation, caprice and misadventure. But this is a sea that patiently recreates for us scenes from the past, breathing new life into them, locating them under a sky and in a landscape that we can see with our own eyes, a landscape and sky like those of long ago. A moment's concentration or daydreaming, and that past comes back to life."*[9]
>
> ℘ *Fernand Braudel*

This chapter presents the pertinent histories of Novy Svet and Sudak, followed by an assessment of what effect that history, especially the relatively major development of the hinterland over the last century, has had on the archaeological context of the bay floor. This can be summarized as enhanced disarticulation: the weathering and artifact dispersion already brought about by the natural elements has been heavily increased by the deposition of modern detritus, heavy mechanical fishing and significant looting and tourist damage. This introduces a discussion of conservation ethics, considerations and the serious danger the Novy Svet site is in follows; the excavations here are unquestionably in need of rescue archaeology. These contemporary and historic contexts are brought together geospatially

[9] Braudel 2001, 3.

with the presentation of a highly accurate map of the 240 x 100 m research site under consideration in this thesis. This map was by divers using real tapes and triangulation to record features in relation to our datums and datum-locked base point.[10] The site map is complemented by a bathymetric map of the same size, with 10 m resolution for general areas and 2 m resolution for areas of high interest. The chapter includes an in-depth discussion of the methodology employed in mapping the seafloor and bathymetry of the bay. It concludes with a discussion of the importance of the impacts of archaeological materials from the last few centuries, the spatial relations of those artifacts within the site parameters, and the implications for future conservation and research that they make necessary.

[10] Datum-locked base points are locations fixed in relation to a datum, like a relay. These were necessary due to the size of the site and the inability to efficiently measure each point from the datums themselves.

Novy Svet in Perspective: A Bay Called Paradise

The lush valley that embraces the bay, beach, village and sloping hinterland is a micro climate, whose early history is a lacuna (Fig. 2.1). Piquant, ambrosial scents of juniper and mountain flowers fill the air, accented by the fresh sea breeze.[11]

Fig. 2.1. Novy Svet.

[11] Seifriz 1931, 363. Here *juniperus excels*, which is the only tree which forms pure stands along the southern shore of the Crimea, joins *juniperus foetidissimus*. Novy Svet hosts one of the small woods of a pure juniperus growth that still remains from the extensive forest that once covered the littoral. The juniper grows on poor rocky soil to the almost complete exclusion of other coastal trees such as the oaks.

The more recent cultivation of vineyards has only increased its verdure, and the quite recent addition of apiaries lends a pleasant buzz and sweetness to the secluded hillsides. The practical presence of a clear, fresh stream running down from the mountains on the stark coastline, and the lush vegetation that flourishes between the peaks on its account probably inspired the appellation Paradise.

The recorded story of Novy Svet is a relatively new one, beginning with the cultivation of its hinterland for the wine industry in 1879.[12] For the most part, it shares the story of the nearby fortress city of Sudak. Located on an ideally defensible outcrop, now known as Mt. Fortechna, Sudak was founded in 212 A.D. as a fortified seaport (Fig. 2.2).[13] Present day Sudak still functions in the latter capacity, but the region now hosts a conglomerate of settlements consisting of the city of Sudak, 2 smaller towns (one of which is Novy Svet) and 13 villages with a permanent population of about 32,000 people.[14] In written sources, the town of Sudak is mentioned under various names. In Greek it was called Σουγδαία (Sugdea, Sygdeya); in Western European sources, Soldaia or Soldalia; in Persian, Arabian, and Turkish source the city is referred to as Sugdak or Soltak; in Old-

[12] Vrazhnova and Ivan, 2009. Author's introductory note.
[13] Strizhynskaya 2009, 94-95. The only written evidence for this comes from a collection of late 13th and early 14th century hagiographic texts, recorded in a shortened format and called synaxarions; Vrazhnova and Ivan. 2009. 1. Nevertheless, the city officially celebrated its 1800th anniversary in 2012.
[14] The city of Sudak itself has a permanent population of about 15,500. The region is world famous for its viticulture and as a tourist destination.

Russian, Сурóжк (Surozh).[15] The current name, Sudak, is rooted in the eastern linguistic tradition, and essentially means "water from the mountains."[16] At its inception, it seems to have been a Greek outpost that was operational for something more than a century. Sudak began to flourish again in the 7th century, on the ruins of the fortress, and another community grew up around the local harbor at the western base of the fortress mount, known as *Limena Cale* (Fig. 2.3).

Well located and with this impressive harbor, Sudak began to populate its hinterland quickly. Roaming nomadic tribes, covering the entire peninsula at this time, began to intermarry and acculturate, keeping the Greek language and Orthodox faith. The city began to grow in wealth and both military and religious power, becoming an ecclesiastical center under the guidance of Sudak's St. Stephen, bishop of the city during the Byzantine iconoclastic period in the early 8th century, and one most Crimea's most controversial and influential hagiographic figures. Records of the saints life depict Sudak at this time as a blossoming, rich, well-fortified place with a numerous and multi-ethnic population.

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[15] Zelenko 2009, 235; Odoric, 1939. 215. His text, concerning this journey circumnavigating the Black Sea territories between 1318 and 1321, mentions that he passes through a city called Soldaia, just southwest of the southwest terminus of the Caspian Sea in Iran, where the Persian emperor was wont to spend his summers; Vechers′kyĭ and Tarasov 2005, 193. The eastern form comes from the Old-Iranian word "sugda," which is translated as pure or holy in both the eastern tongues and in Greek.

[16] Vrazhnova and Ivan, 2009. 8.

Fig. 2.2. The Sudak Fortress rising atop Mt. Fortechna. The modern harbor at the base of the western slope occupies the location of ancient *Limena Cale.*

Fig. 2.3. View from the western walls of the Sudak Fortress, looking out over ancient *Limena Cale*, now covered with modern harbor structures, towards the bay of Novy Svet.

The complex cultural structure throughout these centuries, included Christians, Muslims, Jews, possibly Zoroastrians, nomadic raiders, traders, townspeople, and all of the variations within these broad categories. In the middle of the 9th century, immigrating Turks and Iranians increased the population, changing from a nomadic to a sedentary life,

and the territory of Sudak expanded. New fortress walls were built around the harbor and the hill to the north of Mt. Fortechna (Fig. 2.4).[17]

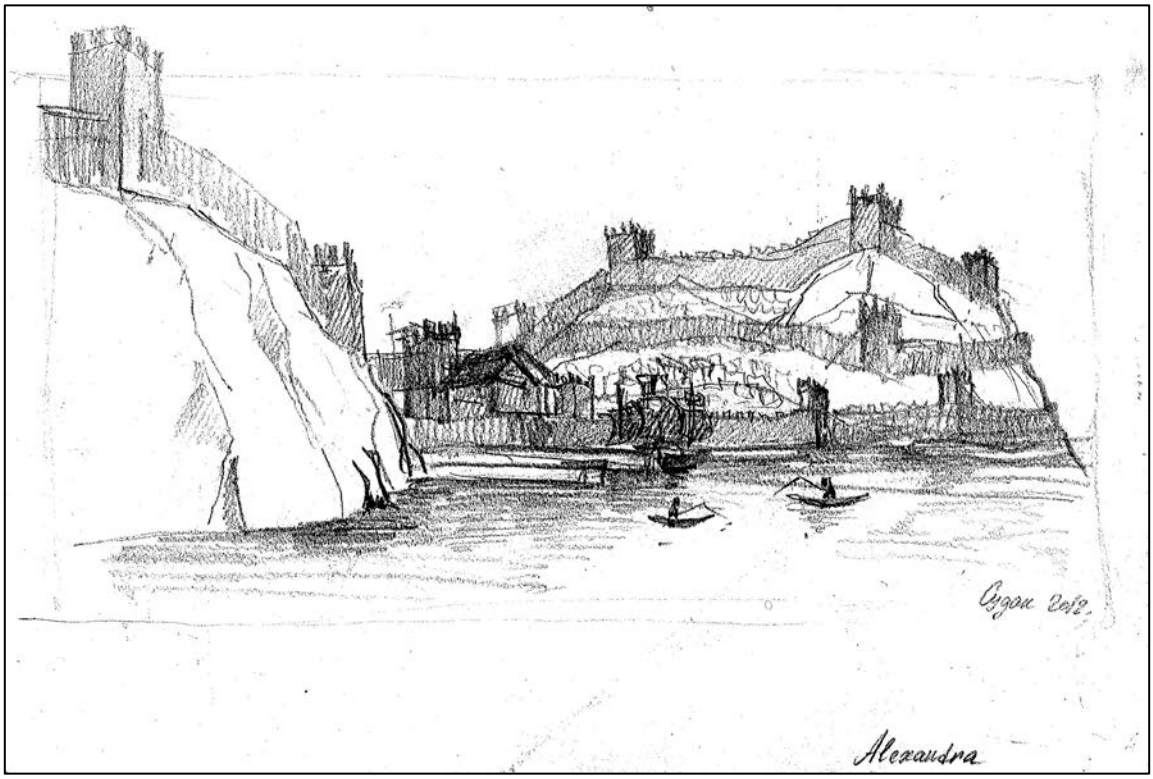

Fig. 2.4. Reconstruction of the fortified 13th century harbor of *Limena Cale*, below the walls of the Sudak Fortress. Drawing by A. Bashenkova.

[17] Vechers′kyĭ and Tarasov 2005, 205-6.

Byzantium played a significant role in the city's culture and control from the sixth century, trading off governorship of the city and port with other powers. In the early tenth century, however, the Byzantines regained control of Sudak along with most of the Crimean peninsula, and held it exclusively until 1204. They improved fortifications that were built to guard against raids from nomadic tribes from the north, and territories were unified to streamline defense; Sudak and Kherson, for example, were brought under unified jurisdiction in 1059.[18] These tribes, most notably the Polovtsians, proved to be excellent trading partners, and indeed were depended upon for that trade, but were nevertheless a threat and were regularly paid off with tribute. From this time to the mid-12th century, trade began to move from the western part of the Black Sea towards the Sea of Azov, from the valley of Dnipro to the valleys of the Volga and the Don, making Sudak the most important trading city on the northern seaboard.[19] The foundation and rising power of the kingdom of Trebizond in the 13th century, arising with other Greek, Slavic and Latin states on the ruins of Byzantium, capitalized on the vast wealth of the Silk Road trade so recently shifted from the shores of the Levant.

This contributed significantly to the new trade conditions of the region, and led to Sudak becoming the largest transit and trading center between Byzantium, the Seljuk

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[18] Vechers′kyĭ and Tarasov 2005, 204-8.
[19] Vechers′kyĭ and Tarasov 2005, 209.

sultanate and southern Rus.[20] Indeed, the 10th to the 13th centuries are the period of the highest development of the settlement, and its richness and role in international trade could no longer escape the attention of its powerful military neighbors.[21] Between 1220 and 1222, during the reign of Sultan 'Ala' al-Din Kayqubad at the apogee of the Seljuk Sultanate of Rum, Sudak was conquered and occupied by Seljuk troops, apparently as reparation for the abuses suffered by Muslim merchants at the hands of their western counterparts.[22] No other incentive than mercantilism, however, is required, as the economic interests of taking the city are clear: lucrative trade with the king of the Rus, and competitive economic advantages with the trading partners of Trebizond and Cherson. Perhaps most importantly of all, the city could serve as a source of slaves, that most important commodity for the armies of all pre-modern Muslim states.

Such a Crimean possession as Sudak would allow the Seljuks direct access to supplies of slaves from the peninsula and the southern Russian steppe. This access would remove the need for intermediaries, and the tremendous expense they required. The victorious commander Husam al-Din introduced shari-ah law and Islam to the city, built

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[20] Strizhynskaya 2009, 94-101; Vechers′kyĭ and Tarasov 2005, 210.
[21] Vechers′kyĭ and Tarasov 2005, 209.
[22] Peacock 2006, 134-40. According to the best existing source for these activities, the later Saljuk court historian Ibn-i Bibi, the campaign began on account of Muslim merchants complaining of abuse at the hands of Franks, including the people of Sudak. It seems that the cause may have been interpreted later to fit the "ideal leader" profile, but that Sudak was taken is clear, as is their addition of a mosque to the structures found at the Sudak Fortress. Later addendums state that the Muslim troops were Crusaders in their own right, described as "religious warriors and Arab holy fighters."

and staffed a mosque, and left a garrison in the town. While this was merely conventional Seljuq policy at the time, and it alone does not imply the forced conversion of the populace, the choice of many to flee to Muslim territories rather than nearby Christian kingdoms or the hinterlands argues that they either were indeed compelled to convert, or that a Muslim population already called Sudak home before 1222. [23] At this time the Seljuks were rising to power, which would reach its height in the middle of the century. The Sultan ruled from the fortified province of Synopolis (based around modern Sinop), erecting a great port there in the early 13th century.[24] Mongolian soldiers threatened the city further in 1226 and 1239. These scenarios introduce a view of the fast-paced, edgy nature of the region in the first half of the 13th century.

Activity came to a head, as recorded by a contemporary chronicler, in 1240: "In [1240], a detestable nation of Satan, to wit the countless army of the Tartars, broke loose from its mountain environed home, and piercing the [Caucasus Mountains], poured forth like devils from Tartarus, so that they are rightly called Tartari or Tartarians. Swarming like locusts over the face of the earth, they have brought terrible devastation to the eastern parts [of Europe], laying it waste with fire and carnage."[25] Little was done by the Papacy or the princes of Europe despite the slaughter, until Innocent IV in 1243, after whose example

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[23] Peacock 2006, 140-2.
[24] Daggülü 2009, 17; Rubruck 1937, 54.
[25] Parisinensis 1877, 76.

many followed suit.[26] Not all relationships were troubled; many emissaries of princes and Popes were able to make their way along the harsh hinterlands of the Black Sea to conduct foreign policy with the Mongol Khans. For instance, Friar John of Pian de Carpini traveled at the behest of the Holy See along the northern marches of the Euxine. Leaving Cologne in 1245, he returned to Lyons in 1247 having delivered the communication of the Pope.

The midpoint of the 13th century offers a rare glimpse of the city, a still-life caught out of the whirlwind of unrecorded time. By 1249, Sudak was under the complete political control of the Mongol Empire (although the municipal administrative system of the Byzantine Empire was preserved for a long time afterwards), and the *Sugdeia Synaxary* records that on April 27th a census was conducted.[27] The space within the fortress walls was by this time considerable, totaling over 20 hectares (50 acres, 0.2 km^2); including both the fortress city and its suburbs. Built on sprawling terraces down the slopes of Mt. Fortechna to the harbor and over a kilometer out into the surrounding valleys, the population recorded was over 5,000 people. The buildings were of one, two and sometimes three stories, with the base structures built of stone and successive stories of brick or wood. Religious structures abounded, including several churches and numerous chapels, as well as at least

[26] Komroff 1937, XV.
[27] Vechers′kyĭ and Tarasov 2005, 211-12; Nystazopoulou 1965. The best analysis of the *Sugdeia Synaxary* to date is found in the dissertation of Maria Nystazopoulou. The author is currently undertaking a translation of her work, as none currently exists.

one mosque, and such municipal structures as public cisterns.[28] Beginning in the second half of the 13th century, the market of the Black Sea coast began to be actively courted by the merchants of Western Europe, mainly from the north Italian cities of Venice and Genoa. They were attracted by favorable trade conditions with the countries of the far East and middle Asia, established there after the formation of the great Mongolian empire. Upon paying a three percent duty, the merchants obtained on behalf of the Mongolian khan the right to cross the continent from the Black Sea to the Yellow Sea, guaranteed risk free from Mongol molestation. This, primarily, is the reason that the fighting for possession of northern Black Sea ports was so reckless, fierce and widespread.[29]

It was from the city of this description that the astute Friar William of Rubruck, less than a decade after Pian de Carpini, travelled to the court of Kuyuk Khan at the behest of the same Pope, between 1253 and 1255. He was a man of practical science as well as faith, and kept meticulous notes of his journey and his companions.[30] He began his outward journey at Constantinople, sailing from there on the 7th of May and arriving at the great port city of Sudak on the 21st, three years after Nicolo and Maffio Polo, and reported much

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[28] Vechers′kyĭ and Tarasov 2005, 220-3. Water management was of especial import to the fortress city, as the nearest freshwater supply was almost three km outside the gates.
[29]Pian de Carpini 1939, 33.
[30] Rubruck 1937, 59. A sufficient example of the man's dedication to accuracy is shown in his approach to problems. Being denied access to the great carts of the Mongol baggage train, he, desirous of describing them, measured their wheel ruts and impressions to learn what he could.

about the city and its people.[31] The Crimean peninsula was at this time called *Gasaria* by the Latins and *Cassaria* by the local Greek inhabitants, both rooted in the oft-used Latin appellation *Caesarea*.[32] *Cassaria*, as a peninsula, is encompassed by the sea on three sides, and each coast had a key city: on the west, Kersona, on the south, Soldaia, and on the east, Matrica upon the mouth of the river Tanais [Don].[33]

These were certainly not the only cities in the region; indeed, he reports that there were no less than 40 castles between Cherson and Soldaia, and as many dialects.[34] All countries around the Black Sea, including Trebizond and Synopolis, paid tribute to the Tarters. At Sudak "all the Turkish merchants who traffic in the north countries, in their journey outward, arrive, and also they who return homeward from Russia, and the northern regions, and wish to pass into Turkey. The merchants carry ermines and grey furs, with other rich and costly skins. Others carry clothes made of cotton, and silk, and various kinds of spices."[35] In discussing the travels of Christian merchants and messengers going to consult with Tartar leaders, he lists the Soldaians in company with Wallachians, Bulgarians,

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[31] Murray 1845, 48, 75; Rubruck 1937, 59. The fact that the journey took 15 days implies that he did not sail directly to the Crimean Peninsula, and the fact that he passed Kerson [Chersoneses] first implies that he rather sailed up the Bulgarian coast and cut across to the Gasaria [Crimea].
[32] It is the equivalent of the generic and incredibly common "Kingston" or "Kingsport" in English.
[33] Rubruck seems to imply that at this time the seas facing each of Crimeas three coasts were named after the principal city of that coast, that is the Sea of Cherson to the west, the Soldaian Sea to the south, and to the east, the Maricandis Sea of Matrica, which is perhaps the Sea of Azov. The straits of Azov were considered to be the terminal mouth of the river.
[34] Rubruck 1937, 54-6.
[35] Rubruck 1937, 54.

the Kirghiz and the Alans.[36] His commentary is similar to observations made by Marco Polo twenty years later, although Polo made his way to the east by a more southern route, embarking on the long trek overland from Acre; his eastern odyssey is one of the longest, lasting from 1271 to 1294.[37]

Once leaving the seaport of Sudak, these travelers had several choices of transportation for the long overland journey to the east, including [apparently] open ox carts and pack and travel horses. Those with the most experience in the matter, the Rus traders from the north, favored a type of covered cart.[38] By 1270, these Rus had negotiated free passage and guaranteed protection for merchants, and while the 1261 treaty of Nymphaeus gave Genoa virtual commercial hegemony east of the Bosphorus, it was Mongolian authority that allowed its business presence in the Crimea[39] Friar William did not return to Europe via the Black Sea, but took the long road south along the Caucuses, travelling far overland and eventually taking ship for the West from the Levant. The summary of the nuncio ends strangely, darkly foreshadowing what Christopher Columbus was to write of the Arawak population of Hispaniola a quarter of a millennia later -

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[36] Rubruck 1939, 55-6. These other four groups are nationalities, not cities - which may imply, along with the fact that the governors of Soldaiya went themselves to Sartech to give tribute to the Mongols, that Sudak had the status of a city state. Since William did not travel through the lands of the Wallachians (Modern Romania) or the Bulgarians, and since he most certainly met other people, namely from Constantinople, Acre and Genoa, at least, it is clear that he was not simply listing the people he met and must have had some other criteria.

[37] Murray 1845, 89-94.

[38] Rubruck 1937, 206

[39] Cosimo 2005, 392-3.

emphasizing that much of the land he had travelled through "would be easy enough to conquer by a motivated army."[40]

Around the year 1260, the Genoese established a large trading emporium at Caffa (modern Feodosia), located 50 km to the east from Sudak. They had gained great concessions and ease of access to the Black Sea, on account of their support at the struggle of the Nicene Emperor Michael Palaeologus against the Crusaders for the restoration of the Byzantine Empire. The ease with which the rival city-states of Venice and Pisa were able to trade here was similarly disrupted, and merchants were forced to trade along more remote, inconvenient and dangerous routes.[41] A decade later, the Venetians boldly strengthened their position in Sudak and gained a measure of authority, although formally the city remained under the rule of the Khan. Infighting and intercultural conflict grew, however, and in the first half of the 14th century, the governors of the Golden Horde expelled many local inhabitants of the city, apparently dissidents, and demolished much of the extant

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[40] Rubruck 1937, 206-7; He passed through Armenia to the border of modern Syria, then headed west into the heartland of Turkey. He traveled, intentionally, through Caesarea in Cappadocia (modern Kayseri) and visited there, it seems, the Church of the St. Basil of Caesarea. From thence he travelled to Iconium (modern Konya). From the port of Anax he sailed to Nicosia in Cypress, and then to Antioch and Tripoli. It is possible that he sailed to the West from Acre, although his point of departure is not precisely known. 209; He emphasizes that "it is not necessary to risk the dangers of the sea, nor to be at the mercy of the seamen; the money necessary to arm a fleet would suffice for the expenses of the voyage by land." He further states that if the very peasants of Christendom were willing to travel and eat as the kings of the Tartars did, they would become the masters of the world. Dunn and Kelly 1989. 55.

[41] Zelenko 2011, 54.

fortification; this brought the city to a state of decline. It was under such conditions that the Genoese, capitalizing on a split among local emirs, conquered Sudak on July 19, 1365.[42]

The establishment of a Mongolian empire in the Eurasian steppes had fundamentally changed the geopolitical situation in the basin of the Black Sea. The words on the seal of the Khan, placed upon the letter that Friar William was charged to bring back to the Pope, suffice to describe the new order of the world: "*In the power of the eternal heaven, the order of the oceanic khan of the people of the great Mongols. The conquered people must respect it, and fear them.*" Oceanic is the key word; it implies the coast to coast control of the khans in a way that is more final and terrifying for its simplicity. From where we cannot ride to where we cannot ride, it asserts, we control. For almost one hundred years, until the second half of the 14th century, the existence of the transcontinental *Pax Mongolica* had created "extraordinarily favorable conditions for safe trade exchange between Western Europe and Mediterranean countries and countries of the Eastern Europe and Far East."[43]

From 1365 to 1475, the Genoese controlled the city exclusively, and it is during this time that the most impressive fortifications were constructed. While there is archaeological evidence for the towers of the city being reinforced in the early 13th century, and additional efforts came at the transition to the 14th, it is the massive fortification ensemble of the

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[42] Vechers′kyĭ and Tarasov 2005, 213. Unlike the Transcaucasian Czardoms, Sudak could not oppose the Mongolians, possessing insufficient economic and military potential. For all its usefulness, it remained a mere fortified settlement torn off from the principal Greek territories.
[43] Vechers′kyĭ and Tarasov 2005, 211-12.

second half of the 14th to the 15th century that remains today.[44] Soldaya finally fell in 1475 to the Ottomans, and was henceforth called Sudak. The population had decreased dramatically by the 16th century, numbering roughly 1500 persons, or 30% of its 13th century population. While predominantly Greek, it still had Armenian and Muslim elements, as well as a very small Jewish population and a token garrison of 11 Ottoman troops. By the second half of the 17th century, no people lived within the fortress itself, home only to a garrison of some 50 Ottoman troops, and by the time of the Russian occupation in 1771 it was undefended; the city was taken without a fight. A Russian garrison remained until 1816. The demographics had shifted, and only a few Christians remained in the predominantly Muslim population.[45] The current fortifications date to the Genoese period, and are made of dense local sandstone.

The Bay and hinterland of Novy Svet show up only vaguely against this impressive historical backdrop until its purchase by the Prince Lev Sergeyevich Golitsyn in the early 19th century, featuring mentions in a few 14th and 15th century documents as a village called Paradise.[46] With the advent Golitysn, the Juniper and grass covered coastline was terraformed to support the viticultural dreams of its new owner. Such activities included redirecting the course of the local streams with buried ceramic pipes, creating the "Golitsyn

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[44] Vechers′kyĭ and Tarasov 2005, 200. In 1969 massive reconstruction efforts were undertaken, and today the Genoese fortress is practically reconstructed in full.
[45] Vechers′kyĭ and Tarasov 2005. 220-223.
[46] Vrazhnova and Ivan 2009, 11.

trail" which includes landscape modifications such as sturdy stone bridges and the modification of rocky slopes with hewn stairs and blasted passages, building cellars and storage facilities in existing caverns, and hollowing out more tunnels, over some 3km of them, for wine storage and processing. These activities have left indelible marks on the landscape and people. During the Soviet period, other modifications were made, including the construction of a lighthouse on the lower slopes of Mt. Sokol. Even as late as 1950, however, there was hardly any construction on the Novy Svet littoral, such that the stark landscape looks utterly foreign to the bustling resort town of today. For comparison, contrast Fig. 2.5 with the 19th century photographs of the same littoral presented by Vrazhnozva.[47]

The beautiful littoral of Novy Svet, that is, the Juniper Coast, is a pertinent example of how the blossoming science of maritime archaeology is in no way limited to research, excavation and publication, but includes the management of the sites as well, sites which are priceless elements of public cultural heritage.[48] While Sudak changed quickly, during its nearly two millennia of existence, frequently swapping political and military masters and growing from obscurity to, during the Middle Ages, one of the most important trading ports in the northern Black Sea, the bay of Novy Svet has remained remarkably unchanged.

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[47] Vrazhnova and Ivan 2009, 127 – 137.
[48] Green 2004, 3.

Archaeology Beneath the Bay

Braudel's great exhortation for us to 'see the sea' certainly extends to the Black Sea, as the great historian knew full well and wrote that the Mediterranean has never been confined inside its own history. Rather, it rapidly outstripped its own borders, not deigning to stop "at the point where the last olive tree has been left behind."[49] I fully share Braudel's belief; since I first set foot in the Mediterranean world, I have walked in joyful awe amongst the living memories of the people and places that have so captivated my imagination. Indeed, it is this very sentiment that inspired the present work.

It is exactly this devoted reflection that is required to transform the gently rollicking seaside resort of Novy Svet today into a canvas on which the glory of antiquity can be re-painted, if the mind's brush be given adequate pigment. To see the great galleys and vessels of our ancestors riding on the gentle swells of a summer evening, or the frantic finality of the crew of a doomed ship, casting anchor after anchor into the boiling sea to deter the inevitability of the looming rocks ahead…The next step that must be taken in reconstructing the pageant of Novy Svet's past is visually assessing the whole of the stage, including that hidden by the illusion of water. What then lies beneath that swift-changing surface, beneath the clouded mirror of the sea?

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[49] Braudel 2001, 15.

Fig. 2.5. The Bay of Novy Svet. Photo by A. Bashenkova.

A History of Excavation

The first archaeologically minded inspection of the waters in the Bay of Sudak occurred in 1957-58, conducted by the Ancient and Medieval Department of the USSR Institute of Archaeology.[50] In 1960, Professor HP Blavatsky of Moscow University conducted additional surveys in the area, recovering pottery and worked stone fragments.[51] Further expeditions were conducted between 1983-6, and, in the early 1990's, additional work was undertaken by the Ukrainian Academy of Sciences.[52] Dr. Sergei Zelenko of the Centre for Underwater Archaeology at the Taras Shevchenko National University of Kiev began to survey the area in 1997, and has been actively excavating there since 2000. The preliminary surveys conducted in 1997 and 1998 covered a 50-100 m wide strip along a large section of the south east Crimean coast from the Gulf of Yalta to Cape Meganom, including the entire Bay of Sudak. Two distinct areas of dense ceramic remains were identified in the Bay of Novy svet, one on the southern coast close to the shore and a second more towards the center of the bay. These assemblages immediately showed not only amphorae, but pithoi, course or table ware and glazed ware as well.[53] In 2002, CUA held the first of its yearly, ongoing excavation seasons off the coast of Novy Svet.[54]

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[50] Zelenko 2008, 19.
[51] Zelenko 2008, 40.
[52] Zelenko 2008, 43.
[53] Zelenko 2008, 127, 156-7; Zelenko 2001, 83.
[54] Zelenko and Morozova 2010, 81; Morozova 2009, 4-5; Zelenko 2008, 127-9, 156.

Since then, three distinct artifact assemblages have been identified at the site, dating to the 10th, 11th and 13th centuries respectively (Fig. 2.6). Current theory to date associates each of these assemblages with a shipwreck. Of these, the 13th century wreck has drawn the most attention and seems to be providing the most leads. Outstanding among its attributes is a collection, thought to be a possible secondary cargo, of beautiful glazed ware. Scholars are avidly studying this assemblage as this is only the third excavated shipwreck with a cargo of Byzantine glazed ware ever found in the Mediterranean or Black Seas.[55] A portion of this collection comprises a style unique to this wreck and the Crimean peninsula, and has been named Novy Svet ware as the wreck comprises the largest collection found. Excellent discussions of this and the other ceramic and artifact assemblages have been published.[56]

[55] Collins 2012, 2. The other two cargoes were found in Greek waters, on the Kastellorizo shipwreck and the Pelagonnesos-Aloenessos shipwreck respectively.
[56] Zelenko 2008, 126-52; Zelenko 2009; Zelenko and Morozova 2010; Morozova 2009; Morozova and Zelenko 2012; Collins 2012; Morozova and Albertson 2012.

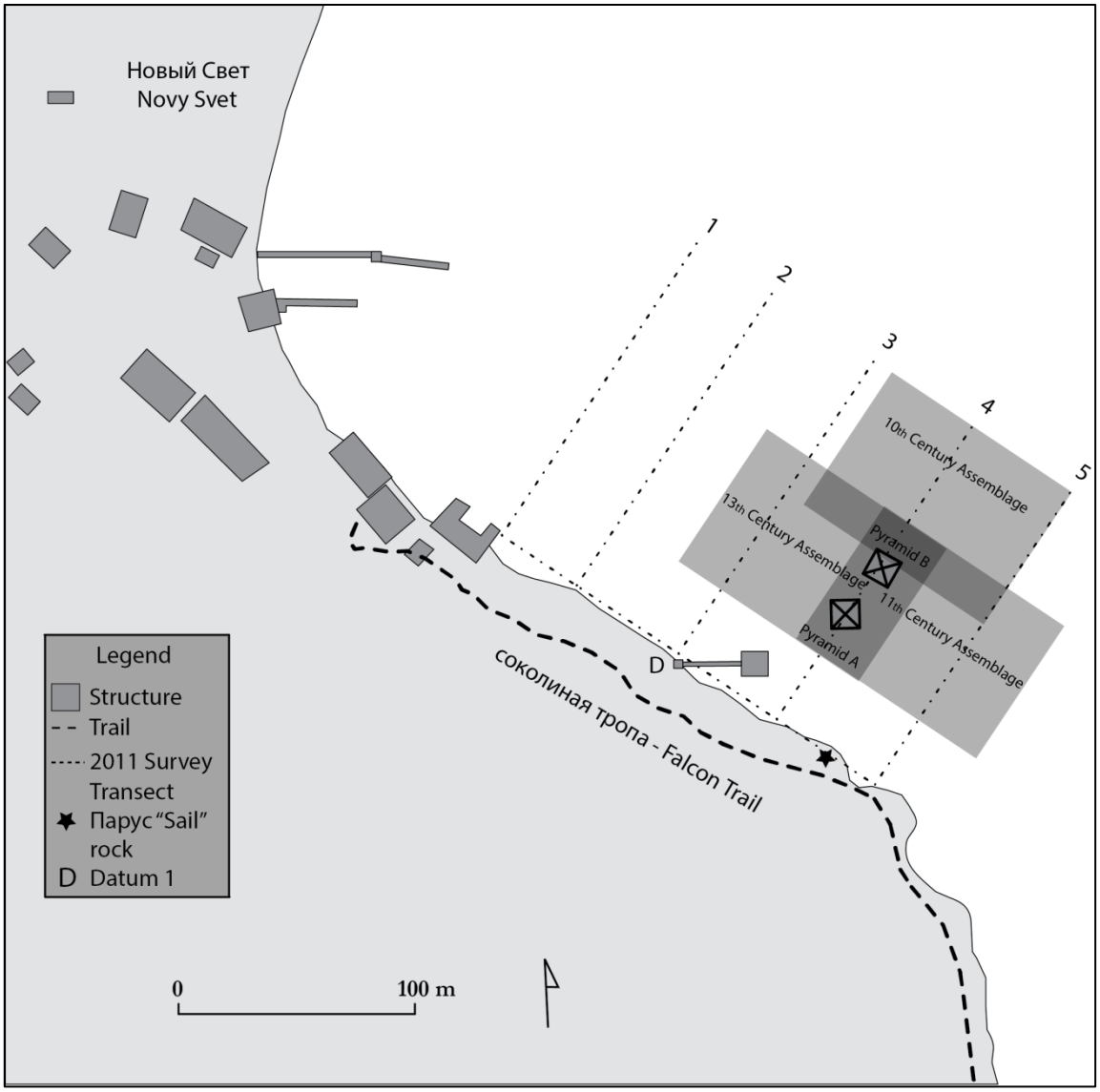

Fig. 2.6. General outlines of the three artifact assemblage zones and the initial mapping transects.

Modern Considerations

One of the greatest challenges to underwater work in the bay is the vast size of these artifact spreads. Added to this is the fact that the three assemblages introduced above, while occupying identifiable density prominence zones, are highly intermixed. Light material from the top layers of sediment is highly disarticulated and strewn about, reshuffling to some degree each season on account of submerged geomorphometric activity. Archaeological consideration should in no way be limited to the Middle Ages and antiquity, however. Many more recent phenomena, as outlined above, have left their mark on the bay floor. These more modern artifacts have disturbed the medieval assemblages on the seafloor, and the extent of their impact must be recorded and analyzed. These later artifact groups are archaeologically significant in their own right. They are remnants of the history of the social growth of the Novy Svet littoral, a story not well known, and one that deserves full consideration. This history includes the terraforming and wine-producing activities of Prince Lev Golitsyn's estate in the late 19th century, 20th century fishing activities and modern material left by tourists and by tragedies. [57]

Significant fishing activity has been present in the bay during most of the 20th century.[58] Remnants of this activity were visible at the surface until 2009, in the form of a large, haphazard structure made of thick wooden posts strung with nets near the shoreward

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[57] Vrazhnova and Ivan 2009, 12-25.
[58] Zelenko 1999-2013. Pers. Comm. Captain Ivan.

edge of the research site (Fig 2.7). Elements of this apparatus still exist beneath the waves. Two steel pyramids, designated pyramid A and pyramid B, have settled into the sediment near the center of the research zone, in the overlap between the 13th and 11th century assemblages. They appear to be constructed of ¼" heavy-duty angle iron. They lie some 20-25m seaward of the observation platform and 40 – 50 m out into the bay from it, respectfully. Pyramid A is oriented directly north-south, while pyramid B has a more northeast-southwest orientation. Each pyramid is roughly 3 m on a side, and 3 m tall, supported by a reinforcing crosshatch of beams at the midsection and internally, and terminating in an elevated oval structure (Figs. 2.8, 2.9).[59] The common theory concerning these structures is that they were part of the fishing infrastructure, but their exact function is not clear. Sonar imaging has, at least, allowed their contextual relation to the excavation units to be more clearly shown (Fig. 2.10).[60]

[59] Pyramid B does not have an equilateral base.
[60] Zelenko 1999-2013.

Fig. 2.7. The wooden fishing structure over the site in 2005. The exceptionally clear water shows the vegetation line (kale) that extends throughout the site along the shore.

Fig. 2.8. The author at Pyramid A. Photo by S. Zelenko.

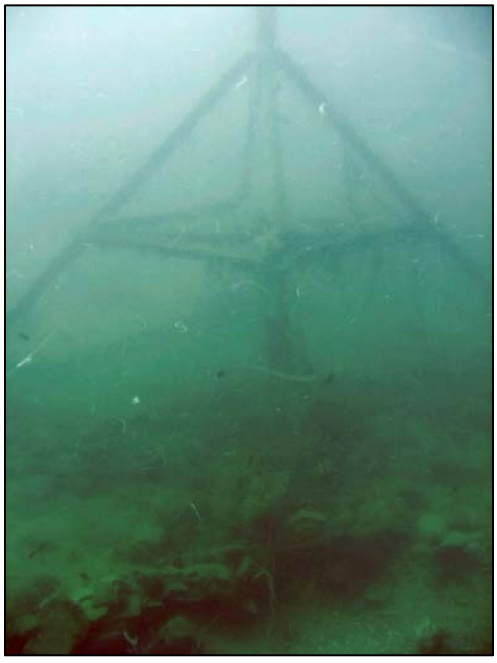

Fig. 2.9. Pyramid A.

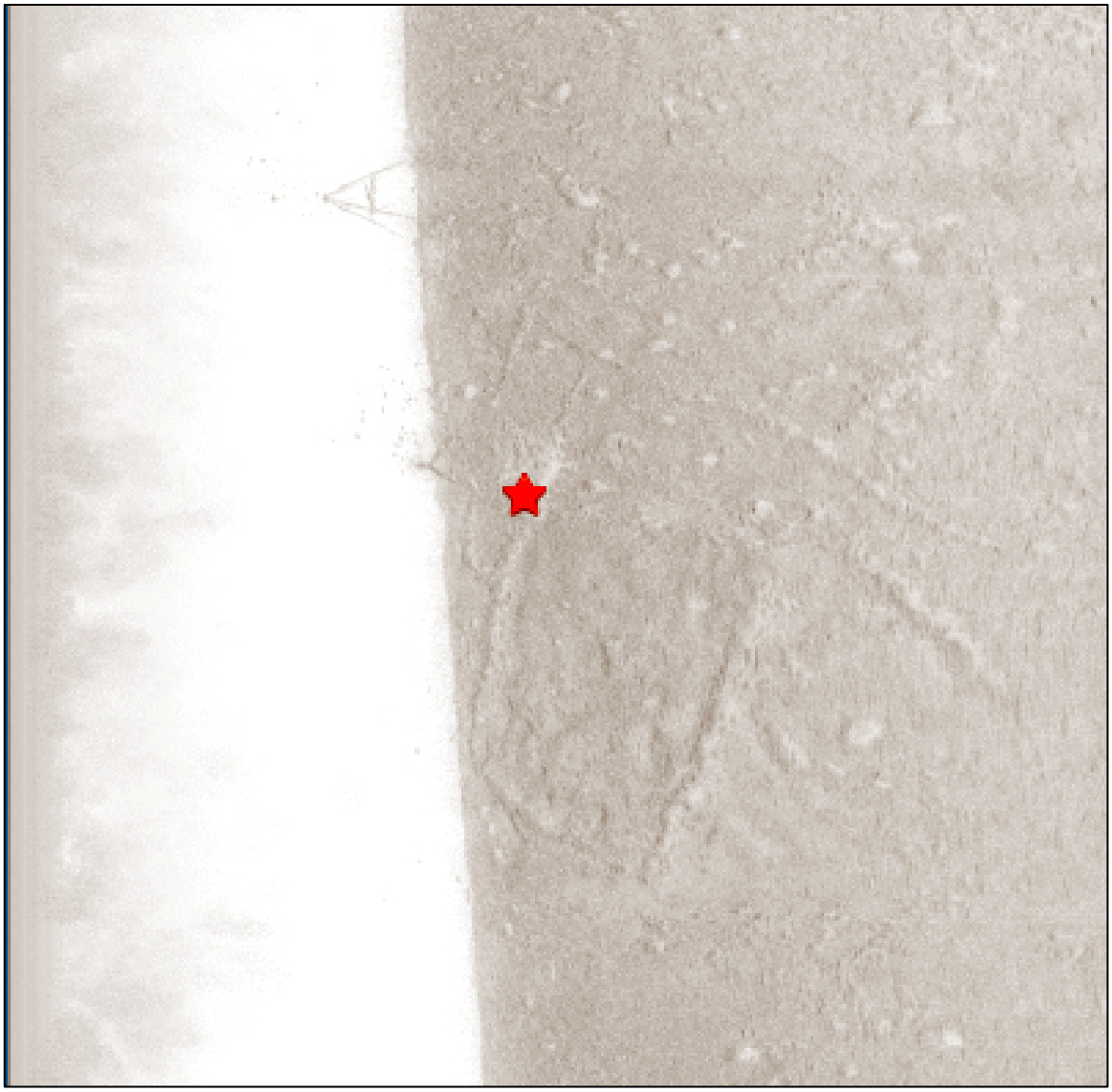

Fig. 2.10. Sidescan sonar image of the Novy Svet site. The red star indicates the main 2012 excavation quadrant. The triangular structures in the water column are pyramids A and B. The lines on the seafloor are created by low walls of stones and broken sherds, shown in Fig. 2.8 above. Image courtesy of S. Zelenko, V. Lebedinski and the author.

In 2012, surveys uncovered a strange device that team members speculated may have been part of that same infrastructure. It consisted of a circular metal object with a groove in the middle, like a pulley, with metal cable wrapped around it within the groove. A handle was affixed on the surface-facing side that seemed capable of putting tension on the cable. The device was oriented such that one cable ran due north and the other due west, the same orientation as Pyramid A, and most likely intentionally oriented that way. If the two are related, this device may have formed the eastern corner of a large grid. If the pyramid comprised the center of one side, the grid would have been roughly 70 m on a side, encompassing an area of roughly 5,000 m^2. Numerous pieces of 1/8" – 1/16" iron rod covered in old, cracked rubber, which are strewn liberally over the research site, may possibly be associated with this system as well.

Modern activities have left their mark, both physical and emotional, on this beautiful and deadly bay. Large numbers of 19^{th} and 20^{th} century anchors have been discovered and still remain on the seafloor, in conjunction with countless concretions of unknown origin and context, numerous broken pieces of metal and concrete, modern worked stone, and large specialty items like a 1.5m long cylindrical metal object that looks remarkably like a large drill bit. The personal effects of enthusiastic tourists, such as sunglasses, hats and watches can be found on the seafloor. Intermixed with these symbols of vacationing families, however, are broken shards of white, ceramic crosses. These beautifully inscribed fragments are markers thrown into the sea in memory of loved ones

who have died there, victims of the terrible storms that wrack the Juniper Coast. While it is true that most of these storms occur in winter months, there are many outliers. Storms can assault the coast during the summer as well, and many occur in June and July. These can produce waves over 3 meters high, and produce conditions, including undertows, that are deadly to swimmers modern and ancient alike. Winds from April to October typically blow from the east, pushing waves directly against the rocky southern coast. In winter especially, but indeed whenever storms rage, the area is dangerous for sea travel.[61]

The Shield of Poseidon: The Seas as Protectors of Our Multicultural Heritage

Archaeology is commonly defined as the study of material objects in context, which can be acquired via the archaeological and the historical records, and most effectively when they complement each other[62]. This context can come in three different forms: exact, approximate and general. Exact context would be finding an accessory to the vessel or a portion of the vessel itself attached to an inarguably locatable zone, such as the tiller, rudder, ram etc. Approximate context would be being able to put something at the bow or the stern. General context is simply being able to say that a certain item was probably

[61] Zelenko 2008, 127-8; Zelenko 2009, 82; Pers. com. Sergey Zelenko and Dan Davis; Albertson 2012a; Albertson 2012b; Vraznova 2009, 132. Fig. 1.
[62] Schiffer, 1987.

associated in some way with the shipwreck. This is the category into which most of the Novy Svet data obtained to date fall, on account of both natural and unnatural disturbance.

Natural disturbance comprises the actions of the physical elements and marine flora and fauna. These include weathering, chemical degradation, sediment and artifact transport on account of currents and wave action in shallow water, and bioturbation and digestion. Unnatural disturbances are those caused directly or indirectly by human activity.[63] This ranges from active looting by scuba and skin divers, to the effects of underwater construction, intentional or unintentional deposition of waste materials, trawling and other fishing practices. Need or pleasure, greed and laziness each play a part in these actions, but they are bound together by a common trope; for most human beings, what cannot be seen is no longer of consequence. Thus it is that the illusory surfaces of the rivers, lakes, seas and oceans of the world provide an instant venue for disposing of that which is no longer desired, a bad habit prevalent throughout history.

The infrastructure and balance of a wreck site is incredibly delicate, not only in physical terms, but terms of chemistry as well. Often forgotten on account of imperceptibility is that all objects are constantly immersed in a complex chemical environment. The effect that this has upon an individual object depends on the nature of the solution it is in, and the proximity and composition of other objects surrounding it.

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[63] Schiffer 1987. This is approximately equal to Schiffer's discussions of c-transforms and n-transforms.

The clearest example is of metals in water, particularly if it is saline. Salt water makes an electrolytic environment facilitating their decay and effect on surrounding artifacts. It is best to visualize the phenomenon as "bubbles" of effect surrounding each individual object, overlapping where chemical influence is present. These zones of influence change as they move in relation to each other or the chemistry of the sea changes. Often, when wrecks are somewhat preserved, it is due in part to a chemical equilibrium that has been reached amongst its parts. If that should change, however, if the pieces should in any way be moved by even the slightest of human or natural force, it can instigate a swift decline.

Throughout the long millennia of human seafaring, one element has remained constant in the preservation of submerged cultural heritage: the very seas, oceans and other waters of the world themselves. This is on account of three main factors. Firstly, that the locations of wrecks lost at sea were often unknown, and secondly the fact that even if locations were known, local conditions such as bathymetric depth, stratigraphic depth, current and visibility could often, though not necessarily, prevent the recovery a portion of the vessel's cargo, let alone the vessel itself. Thirdly, benign and even beneficial (anoxic and undisturbed, for example) environments exist in many submerged locations around the world, preserving material, especially organic elements, for lengths of time often unheard of in terrestrial environments.

Even if a stricken vessel arrives at the seafloor somewhat intact, storms and adverse effects of the sea (in particular, geomorphological effects in shallow coastal zones like Novy

Svet), chemical and biological degradation and, in more modern times, human effects such as trawling are fully capable of disarticulating and destroying shipwreck remains, sometimes fully. Until the modern age of underwater exploration, and, more importantly, the age of personal underwater breathing equipment ushered in by the enthusiastic inventiveness of Jacques Cousteau and Emile Gagnan in the early 1940's, humans could not work beneath the waves over long periods of time and in relative comfort. That world was limited to very select and rare groups of people.[64]

Up until less than a century ago, the oceans and waters of the world proved relatively effective protectors of at least some material from the millennia of humanity's countless seafaring exploits and disasters. It is appropriate to label this late phenomena as Poseidon's shield for two reasons. First, on account of the fact that the narrative under discussion in this work revolves around Sudak and its hinterland, which were first colonized by Greek seafarers in the second century A.D. The image of the great Olympian, standing guard over the silent wooden tombs strewn across the sea bed is quite fitting: he leans on his trident, staring with hard eyes at the ruin he has wrought, cold currents curling in his beard. Secondly, I summon this image because after a moment's reflection on the proud, terrifying avatar of the maritime aspect of nature, the visage begins to dwindle. It diminishes, fading back into the constraint of the lines of red and black slip vases unmatched in workmanship,

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[64] Green 2004, 4-7. Such groups included the Roman diver's guild of the Urinatori, the Turkish and Greek sponge diving communities, and pearl divers of Japan, amongst others.

back into the lines of poetry of undying beauty. We see the god as he is today, not a terror-bringer to be feared and sacrificed to, but a fascinating myth immortalized in chipped ceramic and tattered text. We see this, and realization strikes us as poignantly as a ships' bell in the silence of a fair April morning: Poseidon's shield has failed, for it has been surpassed by a force against which it can no longer defend: ourselves.

In all archaeological endeavors time is precious, but a number of dynamics contribute to the fact that, at Novy Svet, it is an exceptionally precious commodity. For instance, wave activity in the bay is such that it is neither possible to keep a manned station over the site at night, nor a prepared boat in dock that is ready to go. Combined with the significant distance of our camps from the launch site, simply getting our catamaran and Zodiac pressurized, loaded and dive teams across the 0.5 km of bay to the dive site takes several hours (Fig. 2.11). The infrequent availability of reliable tank fills, the difficulty of switching dive teams and the capricious nature of the weather exacerbate these parameters, and the great successes that CUA and its affiliates have had here over the years are powerful testaments to their tenacity and dedication. The driving question then, in terms of economics as well as scientific endeavor, is not whether to continue excavating, but where?

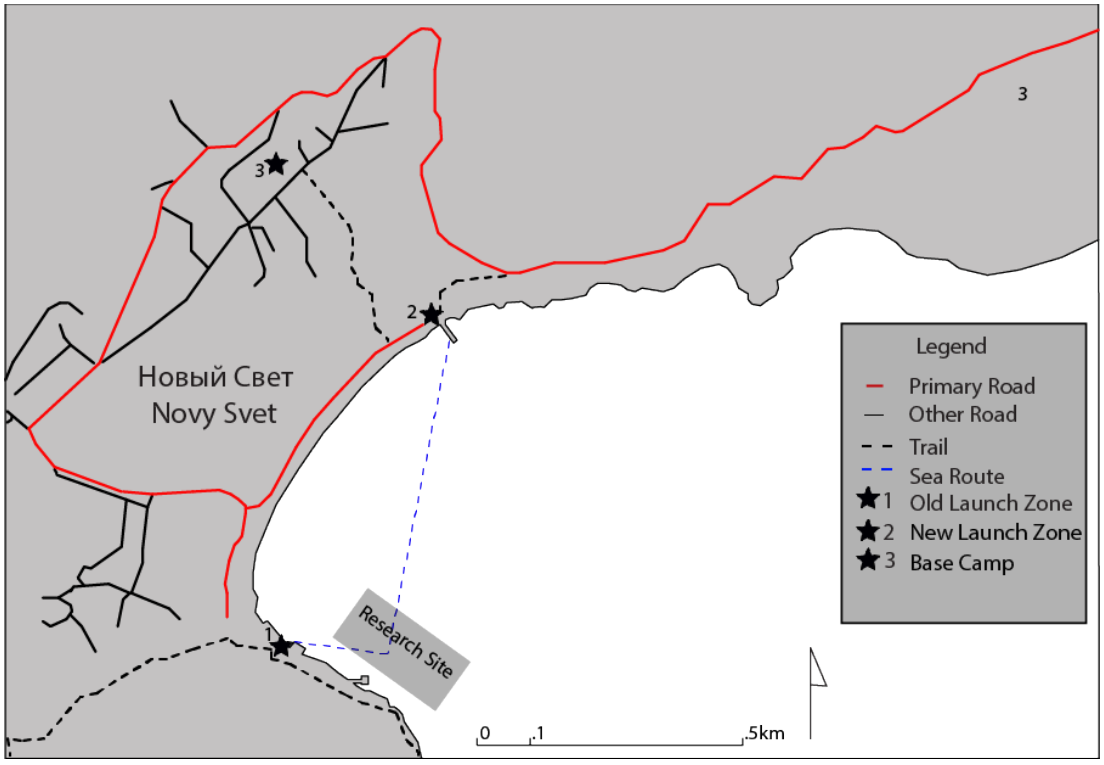

Fig. 2.11. Research site access routes.

Charting the Unknown: Mapping the Novy Svet Research Site

Excavating nearly anywhere within the mapped area of the site presented in this research would undoubtedly result in the recovery of disarticulated artifacts, but greater archaeological potential remains. Most prominently in terms of the possibility of features such as articulated hull remains and cargo or ballast assemblages. The preeminent method for determining the presence of high probability excavation zones is surveying and mapping the site in as great detail as possible.[65] To this effect, I organized portions of the 2011 and 2012 field seasons to gather the best visual, spatial and bathymetric data possible, and processed it in 2013 incorporating the best previous sitemaps and miscellaneous data available. The result is the Novy Svet Sitemap and the Novy Svet Bathymetric map (Figs. 2.12, 2.13 and 2.14). Taken together, they offer a new and necessary insight into every aspect of the excavation.

[65] Green 2004, 7.

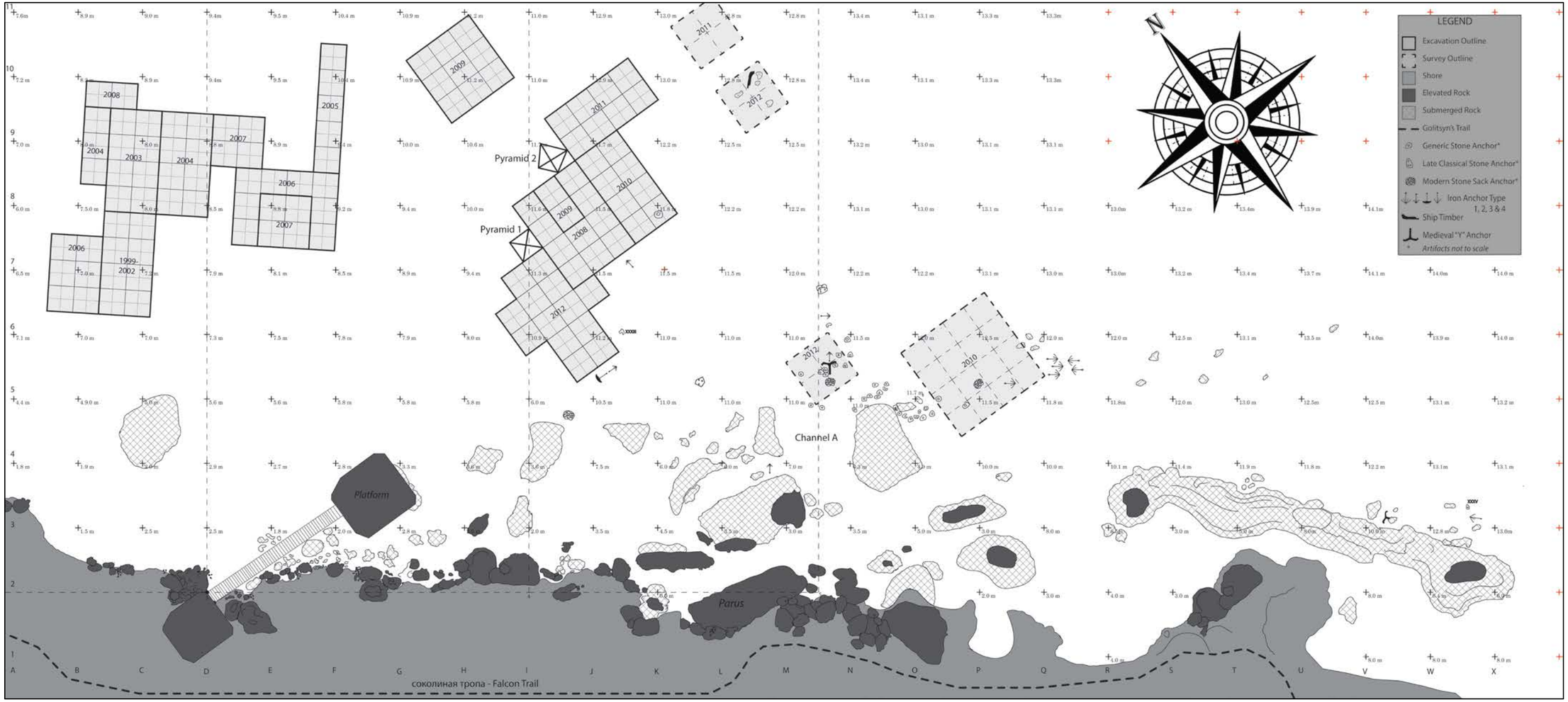

Fig. 2.12. Site map of the Novy Svet research zone.

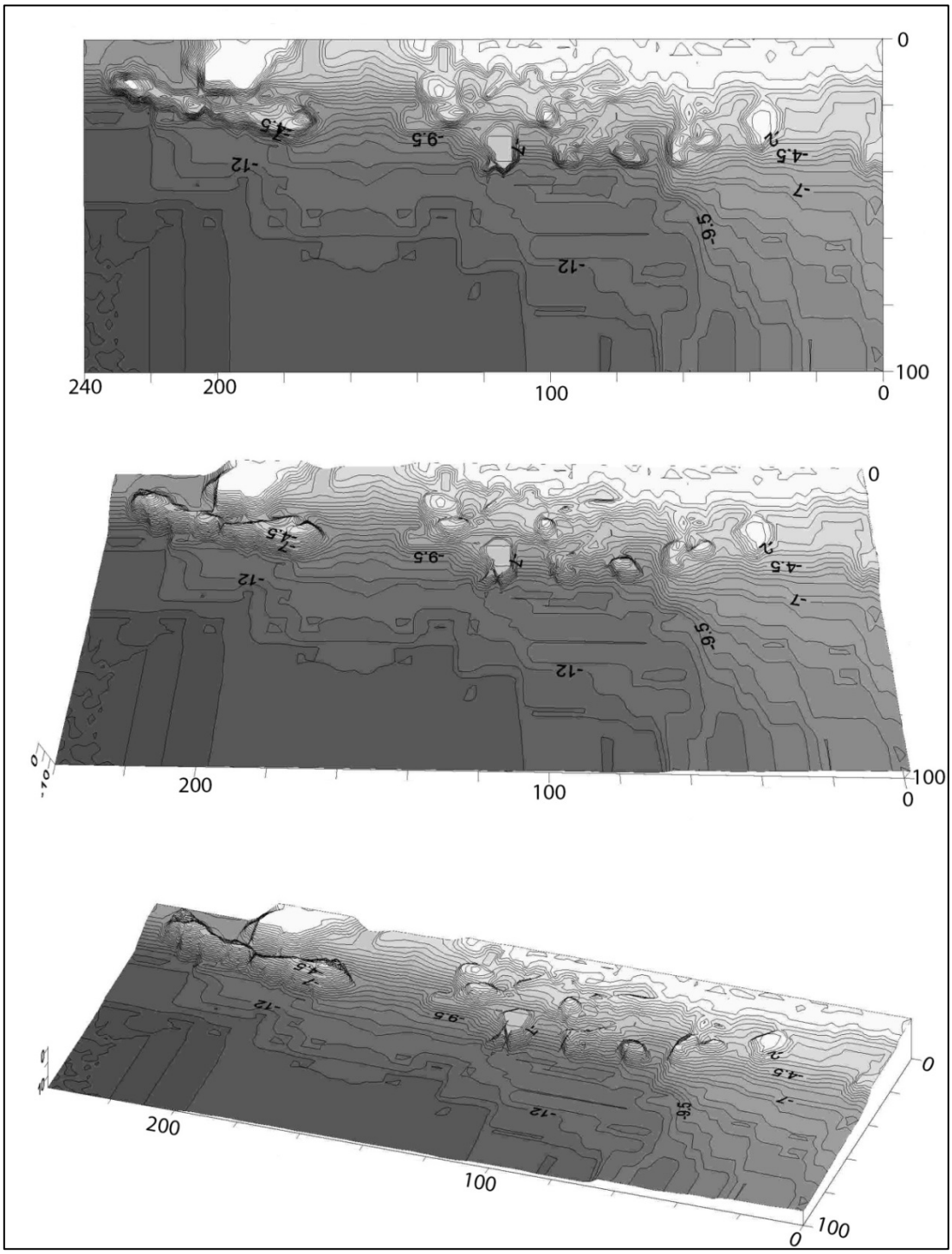

Fig. 2.13. Three bathymetric views of the Novy Svet research site and submerged littoral.

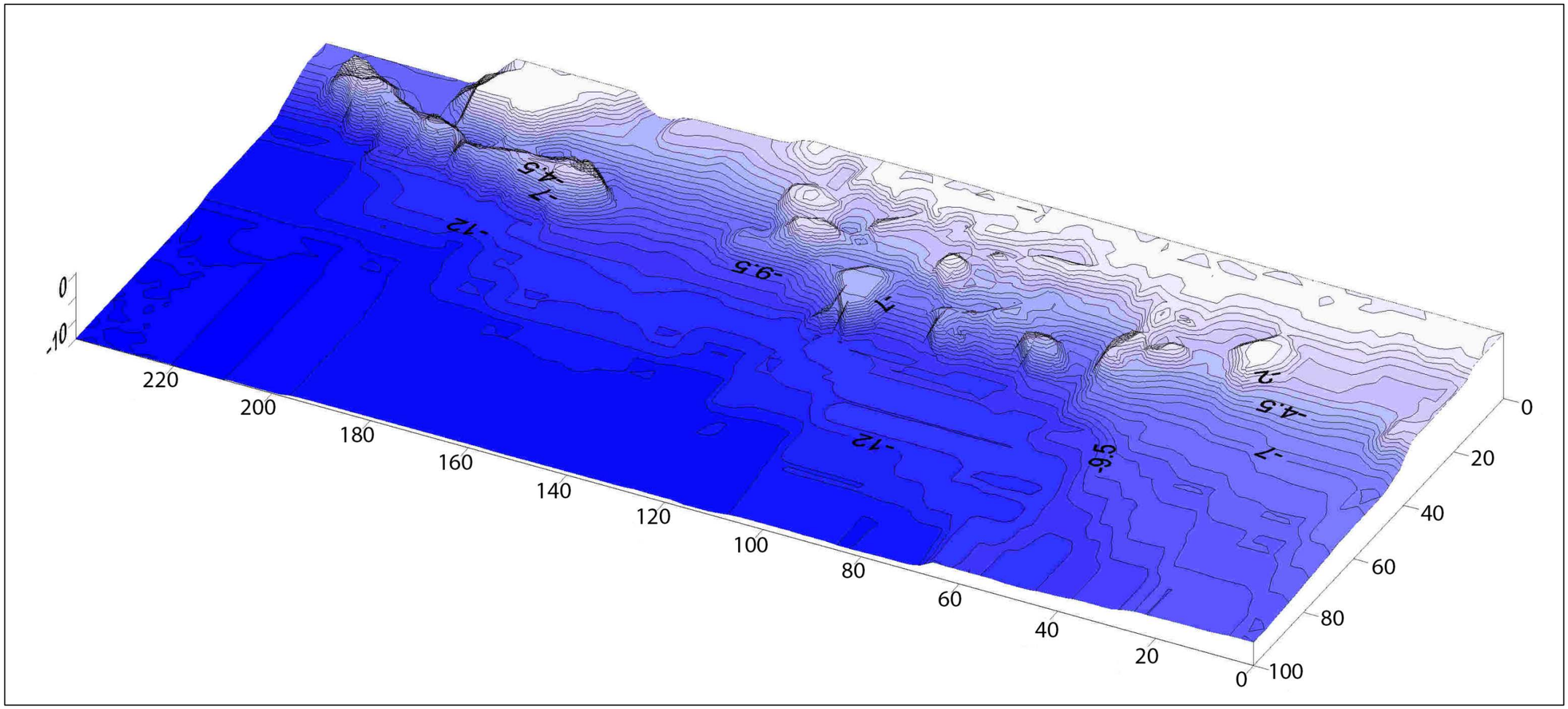

Fig. 2.14. Large bathymetric view of the Novy Svet research site and submerged littoral.

The seminal aspect of accurate mapmaking is the determination and use of a fixed point, or points of reference. This is referred to as a "datum" in English and "репер" [rayper] in Russian.[66] The most accessible permanent aspect of the modern Novy Svet coastline, as mentioned above, is the observation platform just off the southwest shore. This platform is accessed by a 20 m plank and cable bridge connecting it to the coastal "соколиная тропа," or Falcon Trail, that runs around the side of Mt. Koba-Kaya (Коба-Кая) and leads off to the other bays (blue bay - Голубая бухта, and dark blue bay – Синяя бухта), honey farms and hiking trails (Fig. 2.15).[67] As a permanent installation, it was an ideal choice for a datum. The exact reference point is the northern pylon that supports the bridge on its mainland terminus (Fig. 2.12: D,2).[68] This is the point from which Dr. Zelenko measured all previous terrestrial and surface maps, and it the point from which we georeferenced Pyramid A, which serves as the primary underwater datum for the Novy Svet site. The pylon and Pyramid A have been used as the base datums for all of the following work.[69]

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[66] This term literally translates as "bench mark."
[67] The Falcon Trail has other names (that is one popularly used on Google Earth) more local people talk of it as part of Golitsyn's Way.
[68] This will hereafter be referred to as datum 1.
[69] Zelenko 1999-2013.

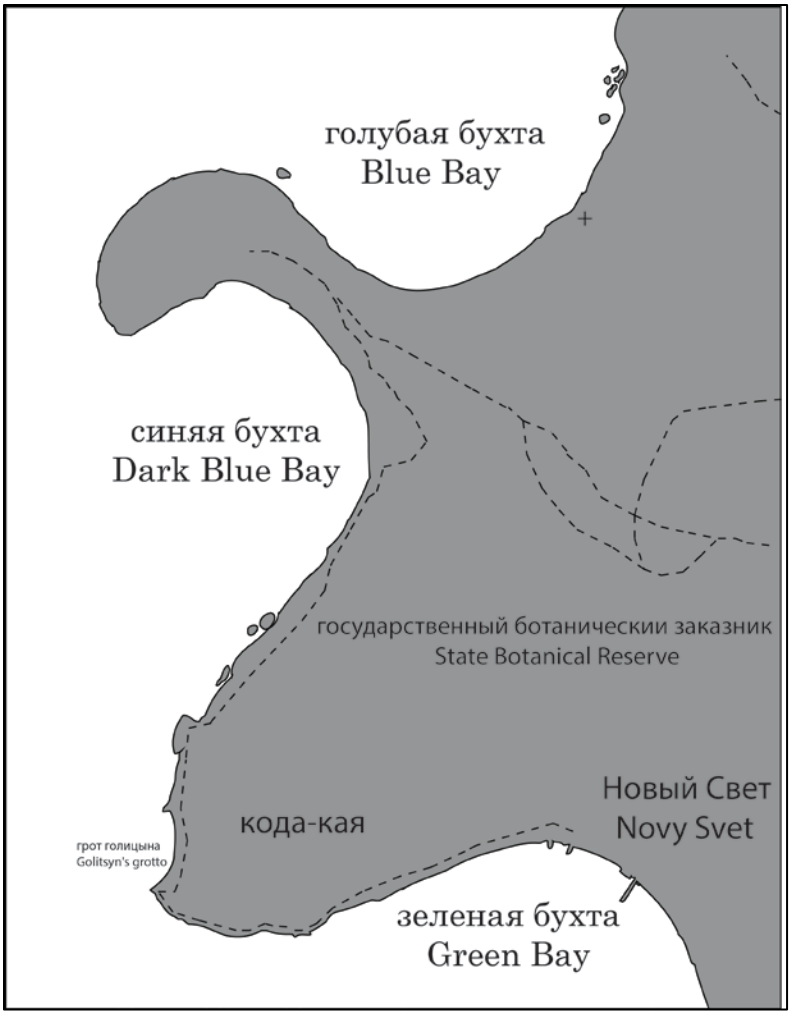

Fig. 2.15. The bays south west of Novy Svet.

Table 2.1: Yearly totals of area surveyed and excavated at Novy Svet.

Year	Phase 1 Survey[70] (m^2)	Phase 2 Survey (m^2)	Excavation (m^2)
1999 – 2002	15,000 m^2[71]	--	128
2003	--	--	128
2004	--	--	176
2005	--	--	80
2006	--	--	224
2007	--	--	128
2008	256	--	192
2009	128	--	176
2010	384	--	128
2011	3,000	256	128
2012	11,100	128	208
Total	**29,356 m^2**	**384 m^2**	**1,696 m^2**

The present effort compiles the best available records from the first excavation season in 2000 until the most recent in 2012 (Table 2.1). It was drawn during the 2011 and 2012 field seasons, and fully prepared over 2013. The preliminary efforts of the 2011 field season comprised a basic seafloor survey conducted alongside the primary excavation. The goal was to obtain maximum coverage and bathymetry data of the pertinent length of the southwest coastline of the Bay, stretching about 200 m along a bearing of 300°, and 150 m into the bay, following the research zone outlined in Dr. Zelenko's initial survey of the

[70] Phase 1 Survey is purely visual. It comprises teams of scuba divers conducting precise, methodical search patterns over the seafloor and combining reported results into a survey plan. Phase 2 Survey is penetrative, and is reserved for target areas of high Phase 1 interest for potential future excavation. Sample material is recorded and collected for analysis.

[71] Zelenko 1999-2013. This is a best estimate. Exact survey parameters are unavailable.

site conducted in 1999.[72] Team members hand-crafted a 150 m reel, affixing a reflective marker every ten meters. A surface team used the reel to demarcate a target length of 100 m NE and SW of datum 1, marking nodes at 50 m intervals. The northeastern most node is a small concrete pier from which much of the initial years' diving was staged, close to the Novy Svet beach and easily accessed from a drivable road. This section is ten meters short of 50 on this account. The mid-point is datum 1, and the final node is a sea-mantled rock just seaward of the Parus outcrop. This node represents the last reachable, accurately measureable point on the target line for quite some distance, and is 45 meters from point 4. The final length of the initial survey line measured 185 m (Fig. 2.6).

At each of these five locations, numbered 1 thru 5 in series going out to sea, that is, east to west, the surface team paid out the reel to a pair of scuba divers who swam the line out on a north north-east heading roughly perpendicular to the coast line.[73] The divers took photographs and depth measurements every ten meters, recording features along each transect.[74] This provided general seafloor analysis, topographic and feature data and generated a rough bathymetric map of the excavation site. It further revealed that artifact assemblages had greater contiguous length than previously thought, both southwards

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[72] Zelenko 2008, 145.

[73] Line 0 runs ~31.5°, 1 ~32.5°, 2 ~33.5°, 3 ~34.5° and 4 ~35.5°.

[74] All depth measurements recorded in this work were taken with a Nitek Trio dive computer, on metric settings. The measurements are accurate to within ten centimeters.

towards the nearest shore, and in a northeasterly direction, leading out into the bay.[75] Transect 4 lies directly over the pyramids, a fortuitous happenstance in terms of reference, and transect 5 runs down a sloping channel in the submerged rock line. At the bottom of this channel was discovered an interesting grouping of artifacts – including millstones, stone and iron anchors, which will be discussed in detail later in the next chapter.

During the 2012 field season, mapping was undertaken in earnest. Rosters were made for two dive teams for each day of good weather. The first, under the direction of Dr. Zelenko, continued to excavate the main site on hookah. The second, under direction of the author, mapped the site and surveyed targets on SCUBA. The mapping team assisted the main crew when tanks were unavailable and for secondary dives. They also undertook light secondary excavations at two zones of high interest, one surrounding a large medieval Y anchors and another around a scarfed, teredo-damaged floor timber, discussed in detail below. These excavations were carried out using the same standard methodology employed at Novy Svet. An 8 x 8m zone was laid out in each instance, divided into 2 x 2m excavation quadrants oriented north-south. Excavation was undertaken by hand-fanning, which is the most commonly employed technique, and reverse Scooter dispersion, which is faster but less precise and highly silting. Depth did not exceed 40 cm due to time constraints and the preliminary nature of the excavation.

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[75] Zelenko and Albertson 2005-13.

Over the course of the 6-week 2012 season, both a scaled site map and a correlating bathymetric map were compiled. Care was taken to demarcate only the most appropriate portion of the seafloor; for the final product, a significant shoreward portion of the 2011 dataset was disregarded, while significantly more was recorded going out to sea, on account of significant finds in that direction. The final site map measures 240 x 100 meters, and provides visual data for the entire research area to date, from just shoreward of the initial excavation quadrants to just seaward of the furthest artifact discovered, a small early medieval Y anchor near the end of an underwater ridge following the curve of Mt. Koba-Kaya (Fig. 2.12).[76] The site map is divided into 10 m^2 quadrants, and divided again to show square meter demarcation[77]. The horizontal axis is demarcated by Roman letters, a total of 23 quadrants rendering 24 notations: A to X. The vertical axis is demarcated by Arabic numerals, 10 quadrants rendering 11 notations: 1 to 11.[78] Of the 24,000 m^2 depicted within that grid, approximately 12%, or 2,880 m^2 are taken up by dry land or submerged elements that are unsuitable for excavation. A further approximate 20%, or 4,800 m^2 has only been very lightly surveyed and is represented to give context to the primary areas. These areas have been delineated by red crosses at the 10 meter marks, and do not have accurate bathymetric data. They are primarily in the north-east corner and

[76] The map encompasses 23,000 m^2, 2.3% of one square kilometer.
[77] The margin of error should be considered at +- 2 meters, although often it is more accurate than that.
[78] Using this notation, the location of the Platform would be H, 3; the target quadrant occupies the space to the upper right of the coordinate. Further accuracy can be obtained by placing a period after either portion of the coordinate, followed by the numerals 1 to 10. For example, datum 1 is at Fig. 2.12: D,2.

along the western edge of the map, and should be discounted when considering the viable research area shown on the map, amounting to 16,320 m^2, or 68% of the mapped area.

Artifact Assemblage Zones

Early surveys identified distinct 10th and 13th century artifact spreads, followed later by an 11th century assemblage. The 11th and 13th century zones lie next to each other, parallel to and roughly close to the shore, north-west and south-east of Datum 1 respectively. The 10th century assemblage, to the north east of Datum 1, lies further out into the bay. These strata overlap each other over a significant portion of the shoreward area. Storm and wave action have dispersed elements of each assemblage throughout the others, but there are much higher percentages of period material in each of the zones. The majority of the diagnostic material used to define these zones is ceramic. The 13th century zone, however, has additional high-density assemblages of ballast stones, many appearing heat-cracked, and iron fasteners which are discussed in more depth below. The current zone outlines delineate the areas period artifact density and of their effective interactive influence within the dynamic site environment (Fig 2.6).

The Bathymetric Map

The bathymetric map has the same dimensions as the sitemap, and is made up of 7,536 distinct data points (Fig 2.14). 93% of the site plan is displayed at a resolution of two meters, while the remaining 7%, covering a section of the most complex coastal features that surround the densest anchor assemblage discussed below, are displayed at a one meter resolution. The latter zone correlates to the 40 m x 40 m area designated L,4 – L,7: P,4 – P,7 (Figs. 2.12, 3.14). The dataset, compiled within the bathymetric rendering program Surfer™, is written such that the entire dataset is expandable to one meter resolution should it be required at a future date. Furthermore, adjacent sections of the seafloor can be seamlessly joined to it when further bathymetric data is gathered. The areas of less accurate bathymetric survey mentioned above have been compensated for by kriging algorithms, an acceptable method given the even decline of the seafloor.[79] Since the map is equal in size to the feature sitemap described above, it allows the visualization of the underwater landscape and the correlations between topography and artifact dispersion. This also forms the basis

[79] As defined by ESRI's GIS Dictionary, kriging is "an interpolation technique in which the surrounding measured values are weighted to derive a predicted value for an unmeasured location. Weights are based on the distance between the measured points, the prediction locations, and the overall spatial arrangement among the measured points. Kriging is unique among the interpolation methods in that it provides an easy method for characterizing the variance, or the precision, of predictions. Kriging is based on regionalized variable theory, which assumes that the spatial variation in the data being modeled is homogeneous across the surface. That is, the same pattern of variation can be observed at all locations on the surface."

of an initial GIS, and will be further enhanced by the addition of hydrologic and geomorphometric data.

Several important features of the Novy Svet site become apparent in this visualization. First is the common, gradual progression of depth from the beach to the mouth of the bay, leveling off at a flat, sandy plain at 13-14m. Most of the material surveyed and excavated to date lies shoreward of the 12m contour line, between 10-12m of depth. In this zone, comprising the mid-shore section of the bathymetric map, the submerged littoral is shown to be comprised of a series of gently sloping troughs or channels, ranging in width from 10 to almost 50 m. The 11th and 13th century assemblages lie in close proximity to the 10 m channels. Interestingly, a large concentration of material, including anchors from all representative age groups, is located almost directly in front of one of these channels, labeled Channel A on the sitemap, which in turn lies directly below the eastern edge of the most striking feature of the south coast: the large, triangular rock known locally as the "парус" or lateen sail (Fig. 2.16).

Fig. 2.16. The Parus rock, shoreward of Channel A and the weight anchor assemblage.

Conclusions

When the prolific debris of modernity has been accounted for, including intrusive material ranging from construction detritus to structures like the controversial fishing apparatus, three clear zones of influence appear on the seafloor at Novy Svet, corresponding to the material assemblages from the 10th, 11th and 13th century shipwrecks respectively. These assemblages are comprised predominantly of ceramic artifacts. Now that the site has been mapped to a high level of accuracy, it should provide the baseline for future recording, either adding to its size or detail. The geospatial and historic relationships that it shows allow a new level of analysis of the site and site dynamics. Venturing into the shadowy depths of Novy Svet's submerged maritime cultural landscape reveals two remarkable facts. Firstly, the apparent lack of ancient local cultural remains is grossly inaccurate. Not only do the shipwrecks discovered to date firmly indicate medieval maritime activity in the bay, but the modern cultural footprint is shown to be much messier than the relatively clean visage the classy resort town presents. On land, all that remains of Golitsyn's facilities are quite tidy, the crumbling remains of Imperial Russian and Soviet mansions molder discreetly, and any vestiges of World War II are not visible to passers-by.

The seafloor, on the other hand, is literally littered with the detritus of the past two centuries. And it is not just garbage; material ranges from cut stone blocks strewn liberally about, to complex fishing apparatus and heavy machinery, metal sheeting and other

building materials. Items such as signs, and modifications like cairns made with archaeological material, have been left and created by members of the sport diving community. Elements from each category can be found both on the seafloor, and submerged to a current maximum depth of 15 cm, indicating the volatile nature of the upper strata. There is no doubt that this most important element of Novy Svet's maritime cultural landscape is under duress and in need of help. The broken aegis of the obsolete god is clearly exposed: it is up to us and us alone to protect our submerged cultural heritage now.

CHAPTER III

A PALIMPSEST OF SAND: NEW ARCHAEOLOGICAL EVIDENCE FROM TWO MILLENIA OF SEAFARING IN THE BAY OF NOVY SVET

"The known is finite, the unknown infinite; intellectually we stand on an islet in the midst of an illimitable ocean of inexplicability. Our business in every generation is to reclaim a little more land, to add something to the extent and solidity of our possessions."[80]

℘ *Thomas Henry Huxley*

This chapter presents and discusses the results of the 2011 and 2012 excavation seasons in terms of the predefined ceramic assemblage areas, while better defining those assemblages and the new-found spatial implications of the new finds within those areas (Fig. 3.1). It highlights how newly discovered anchor assemblages suggest intriguing temporal and social relationships on the bay, offering compelling arguments that Novy Svet was in fact an active harborage from the foundation of Sudak or before and pushing back previous estimates of bay usage by several centuries. Data concerning a new stone weight anchor assemblage is also presented. This anchor assemblage may, along with a newly discovered Y anchor, be a potential indicator of the hitherto unknown 11th century wreck site. A large ship's floor timber, discovered at the end of the 2012 season, is also presented. Its presence

[80] Huxley 1887, 204.

corroborates the theory that significant hull features may indeed remain in the geophysical context of the Novy Svet seafloor, and proves that some, at least, do. The presence and importance of concretions as hull identification elements is discussed. The potential for the significant hull fastener assemblage, though somewhat disarticulated, to provide significant locational data when plotted in density patterns is highlighted. The chapter closes with a focus on the real possibility of narrowing down the precise location of the bay's shipwrecks in the near future, and calls for water dredging to be implemented as standard excavation methodology as soon as possible.

Fig. 3.1. A new survey site chosen for excavation at Novy Svet.

Anchors in Time: The Anchor and Brail Ring Assemblages

While the primary focus of research presented in this work is the site in the bay of Novy Svet, consideration of the entire bay of Sudak is required to understand key aspects of the material spread, including the anchor assemblage. The bay of Sudak stretches from Cape Meganom in the southeast to just past Novy Svet in the northwest, and is interconnected with regards to the mooring of ships. While the Genoese fortress lies in roughly the center of the Bay, the two terminal ends serve as tandem safe harborages, depending on the weather, with the bay of Novy Svet shielding ships from S, SE, E, NE, N, NW, and Meganom from W, SW and NW. Should the ships at anchor not move when the wind changes, the haven turns to an unescapable trap, channeling the brutal 2-3 m swells capable of smashing the vessels against the rocky coasts. This exact phenomenon remains true today, with small boat captains ferrying their vessels back and forth depending on the weather.[81]

The surveyed portion of the Bay of Novy Svet holds a tremendous number of stone and iron anchors, as well as an assemblage of lead brail rings, spanning at least 1500 years of activity, and potentially well over two millennia. These include modern stone and iron anchors, medieval iron anchors, late Classical stone and iron anchors and a large assemblage

[81] Pers. comm. Captain Ivan of the *Favourite*.

of light stone weight anchors common throughout antiquity. Their precise locations are recorded on the site map (Fig. 2.12). In addition to this, a collection of lead brail rings discovered at the site indicate that vessels were plying the waters of Novy Svet well before late antiquity, although more than that cannot as yet be determined.

The modern stone and iron anchors abound, and are of cheap, efficacious construction. Sixteen are present within the bounds of the site map. The stone anchors, of which there are 3, consist of several hundred pounds of loose rock bound together inside a woven mesh of thick rope, brought together at the apex with an iron ring. Three are recorded in the site zone, lying laterally, in line along the seafloor, equidistant from the shore. No lines or buoys are currently attached to them, but they seem useful only as mooring anchors for small vessels, and appear to simply be out of use and abandoned. The modern iron anchors are more complex; some are made of hastily welded rebar, and others of less apparent construction.

Modern Anchors

There are four main types of modern iron anchors present on the site, which I have termed Novy Svet Types 1 thru 4. Type 1, of which there are 5 examples, consists of a sturdy 2-2.5 cm thick iron rebar shank between 1.4 to 1.8 m in length (Fig. 3.2). The stock end of the shank terminates in a sturdy ring. The crown of the shank is blunt and unmodified. 30 – 40 cm above the crown, 4 arms of rebar, equal in diameter to the shank, are welded to it in equilateral positions. These make a slow curve, coming around not quite 180 degrees, and terminate in triangular flukes. The maximum curvature of the arms brings them flush with the crown. Type 2, of which there are 6 examples, consists of a 1.4 to 1.8 m long rebar shank (Fig. 3.3). The stock end of the shank terminates in a sturdy ring, and the crown is blunt and unmodified. Four rebar arms are welded to the shank about 20 cm above the crown. Roughly 5 cm above the crown they extend outwards about 50 cm, curving slightly up and terminating in triangular flukes. A single, unequal length of rebar is welded between each arm and the shank.

Type 3 is harder to classify. It only appears in a singular instance. It has an iron, cylindrical shaft about 1.5 m long, terminating at the stock end in a ring. The crown is obscured, absorbed in an odd-looking, blunted half-moon shape that serves as the arms of the anchor. It appears to be made all of one piece, and is about 15 cm in height and 80 – 95 cm in length. Type 4 also only appears in a singular instance (Fig. 3.4). Its details are harder to discern and describe because the anchor is more corroded than any example from

Type 1, Type 2 or Type 3. It has a cylindrical iron shank about 1.5 m long, terminating on the stock end in a lump of growth that may conceal a ring. The crown is likewise obscured by growth. Three equilateral metal arms extend about 40 cm from about the crown in sharp upward curves, terminating in triangular flukes measuring roughly 10 cm in length and 5 cm in width.

Fig. 3.2. Type 1 modern anchor.

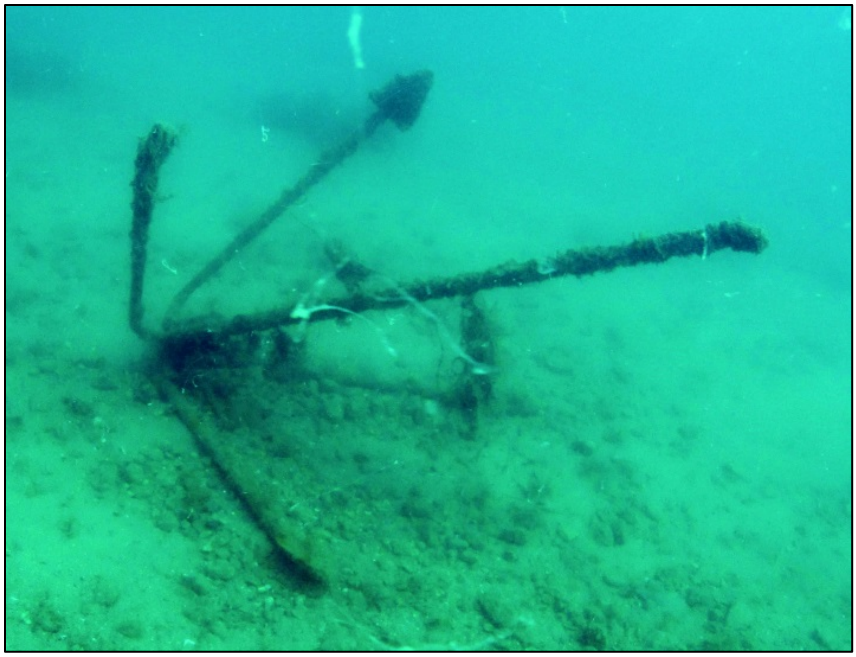

Fig. 3.3. Type 2 modern anchor.

Fig. 3.4. Type 4 modern anchor.

Fig. 3.5. The *Favourite*, vessel of Captain Ivan, is an icon of the modern bay of Novy Svet.

Medieval and Late Classical Anchors

For the medieval and late Classical iron anchors, the categorical system devised by Gerard Kapitän has been used for comparative analysis.[82] Throughout antiquity and the Middle Ages, it was the custom for ships to carry many smaller anchors rather than a few large ones. This fact seems to be correlated with needing a lot of them, as they were neither terribly heavy nor effective at this time, and their frequent loss on account of having to cut free in the face of bad weather or surprise military action.[83] Anchors are also changing during this century, as there is more iron. While anchors are get progressively larger and better on account of the greater availability of iron, in the middle of the 13th century carrying a larger number of smaller anchors was still general practice. Anchor weights would have ranged from 166.6 kgs on a small oared vessel to 476 kgs on a huge round-hulled sailing ship. For a full sized *galea*, it would have been in between.[84]

The latest of these at Novy Svet are two type E "Y" anchors, according to Kapitan's typology, found in 2012. They date to the 9th-11th centuries. They are spaced about 70 m apart and likely unrelated. The first Y anchor is large, and lies amidst the main assemblage of stone anchors at the bottom of the first sloping coastal trough, Channel A, 8 meters further out into the bay (Fig. 3.5). It is heavily concreted, including numerous ceramic inclusions (Fig. 3.6). The concreted shaft measures 130 cm in length and 12-17 cm in

[82] Kapitän 1984, 42-43.
[83] Pryor 1984a, 370.
[84] Pryor 1984a, 369.

width, reaching its maximum width 20 cm below the apex of the shaft, and narrowing as it reaches both the apex and the crown. The crown itself is not visible, overgrown with concretion from itself and the arms, which are offset negative 15° from the shaft. Thus it has the same general outline, but is much thicker in all its dimensions, than the type E anchor from Chersonesos recorded by Dr. Zelenko.[85] The fluke on the western projecting arm is broken off and has not been located; the broken edge is equally concreted with the rest of the anchor. The eastern fluke was obscured by sand when our excavation illustrator sketched the anchor, and has been reconstructed from the author's preliminary sketches. It measures 15 cm in height and 4-7 cm in width, and is quite robust. The extant arms measure 125 cm in total, and 13-17 in width. The total width would have likely been around 140 cm.

The second Y anchor is smaller, less heavily (though still significantly) concreted, and lies wedged under a series of medium sized rocks at the base of the narrow undersea ridge at the southeastern extent of the site map (Fig. 3.7). The shaft measures 85 cm in height and 10-12 cm in width. Its apex is most obscured as it lies under a rock, but its probable reconstruction is outlined in the sketch below (Fig. 3.8). The arms, also offset negative 15° from the stock, measure 115 cm in total length and between 9-15 cm in width, the widest section being that connecting to the shaft and the narrowest at the connection to

[85] Zelenko 2008, 71.

the fluke. The flukes measure 12-15 cm in height and 5-6 cm wide. The shaft is broken 30-35 cm from the crown, in a jagged triangular pattern. The eastern arm, whose outer quarter and fluke lie amidst rubble, is also cleanly broken across near its midpoint. Both of these breaks appear to bear somewhat less concretion than the rest of the anchor. They were almost certainly caused by modern divers trying to remove the anchor, as the breaking points are best explained by vertical force being applied to the unrestrained, western arm. It is extremely unlikely that the fracture could be from the tension caused by the anchor's owners hauling on its rope after it had become wedged, as the entire anchor remains. Such a scenario would require the breaking of the anchor and the anchor rope at the exact same moment. Strangely, this anchor appears to have an element of its stock remaining, partially caught beneath the same rock as the apex of the shaft. It is stubby, measuring an estimated 40 cm in length and 15-18 cm in width. It is oriented in the same plane as the arms, and appears to be pierced by 4 holes. The author has found no analogues for the design to date.

Fig. 3.6. The author sketching the large type E "Y" anchor at Novy Svet. A. Kulagin.

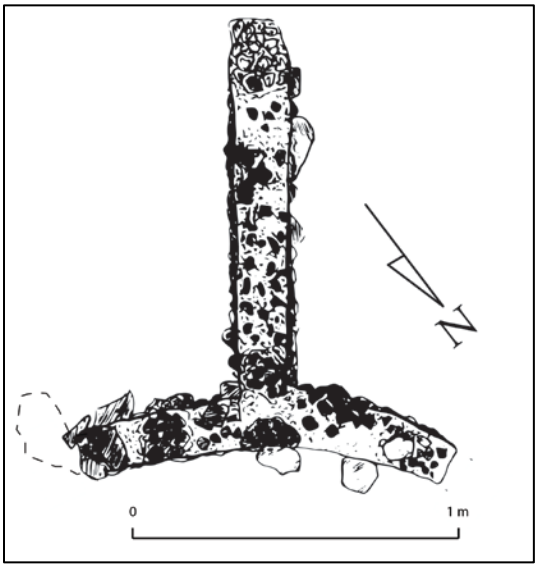

Fig. 3.7. Sketch of the large type E "Y" anchor at Novy Svet. Drawing by E. Archangelski and J Halligan, redrawn by author.

Fig. 3.8. Andre Kulagin with the small type E "Y" anchor at Novy Svet.

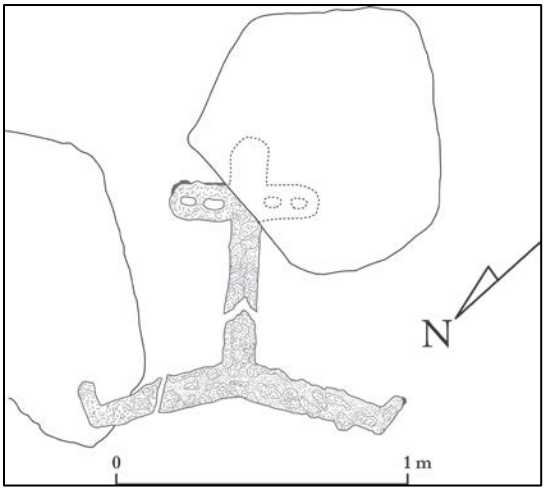

Fig. 3.9. Sketch of the small type E "Y" anchor at Novy Svet. Drawing by E. Archangelski and J. Halligan, redrawn by author.

Four other type E anchors have been discovered in the bay of Sudak, and a fifth has been reported by a third party but never visually confirmed by CUA team members. The first, lying 120 m off the coast of Cape Meganom at the eastern terminus of the bay, is missing its shank (Fig. 3.10).[86] Two others lie just off the tip of the cape. One of these is an almost exact analogue of the large Y anchor at Novy Svet.[87] The fourth, very similar to the small Y anchor at Novy Svet, was discovered by archaeological divers Sergey Spluhin and Yuri Ivanov in 2012, and lies in a small cove just east of the research site. The last anchor has been reported as looking similar to the small Y anchor at Novy Svet, lying amidst what sounds like a 10th century amphorae assemblage a little more than a kilometer west of the Novy Svet site. It also has never been visually confirmed by a trusted source. An anchor assemblage is known from around the Sudak fortress, but its current composition is unknown to the author at the time of publication. The approximate locations of all medieval Y anchors from the bay of Sudak mentioned above are shown below in Fig. 3.11.

[86] Zelenko 2008, 151.
[87] Zelenko 2008, 147.

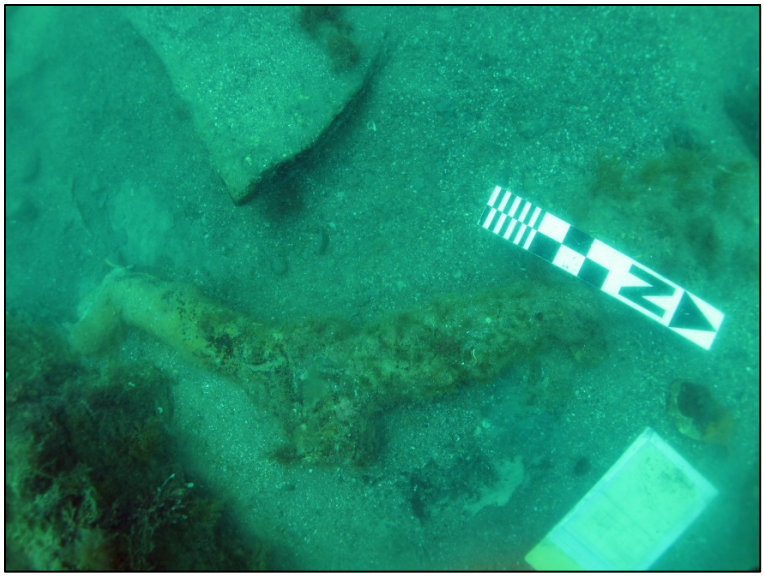

Fig. 3.10. Type E anchor to the west of cape Meganom.

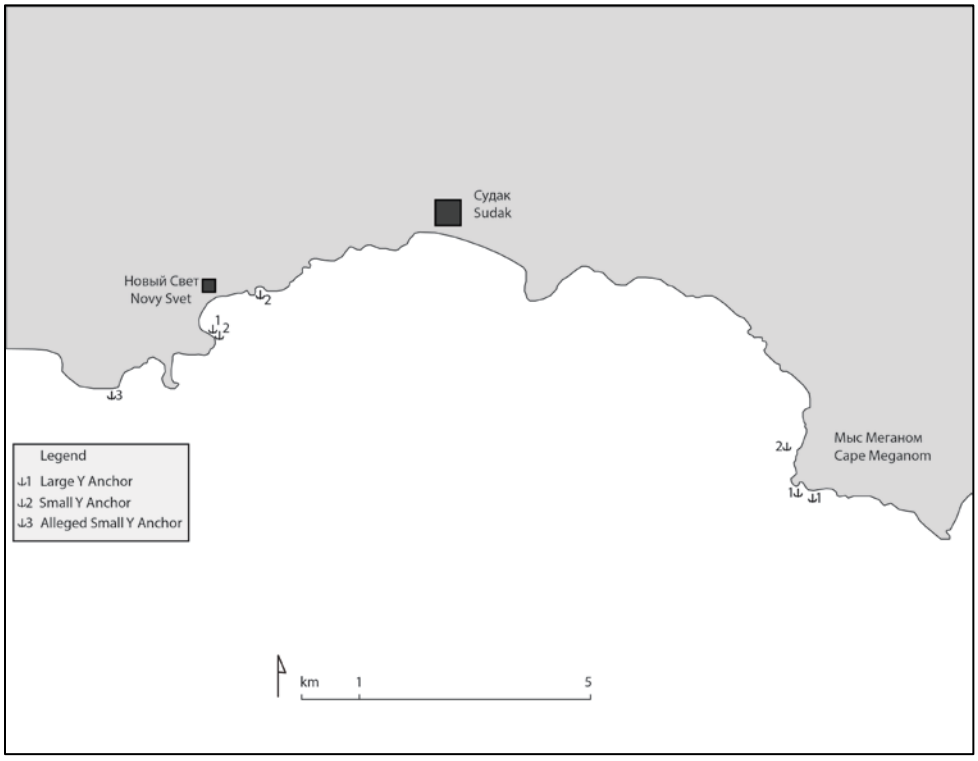

Fig. 3.11. Locations of type E "Y" anchors in the vicinity of the Bay of Sudak.

Two anchors from late antiquity, one iron and one stone, are also present, with a possible 2nd stone anchor in need of further analysis. The iron anchor is of type "D" according to Kapitan's typology, and dates from the 5th- 6th to the 8th centuries. A published record of it exists, but at the time of writing its exact location, dimensions and condition remain unknown to the author. [88] A medium sized, three-holed stone anchor is present as well that dates to about the 5th century (Fig. 3.12).[89] It measures 80 cm in length, 50 cm wide at the base and 35 cm wide at the top. The base is 15-18 cm thick, and the top 7-9 cm thick. The holes are relatively uniform, and 4-5 cm wide. The anchor is relatively free of marine growth, and lies in front of Channel A, about 20 m further out into the bay. It appears to have been manipulated to a slight degree by modern divers, but it is too big to have moved a significant distance. The other potential anchor has only been briefly documented. It appears to be much less symmetrical, and strangely smooth, yet its estimated dimensions are in line with anchors of this type (Fig. 3.13). Both are shown on the site map (Fig. 2.12).

[88] Zelenko 2009, 240.
[89] Pers. Comm. Dr. Cemal Pulak December 2012.

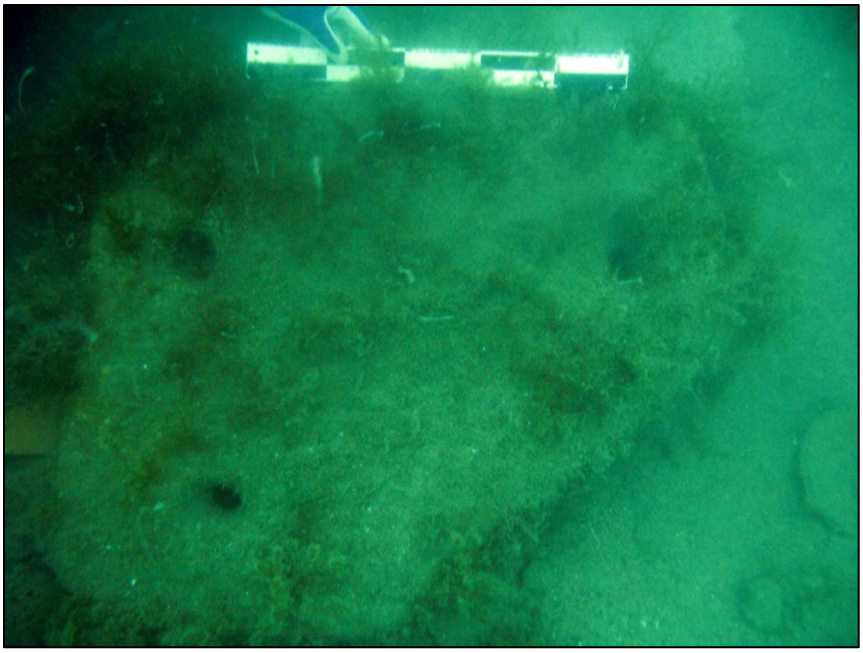

Fig. 3.12. A Late-Roman stone anchor.

Fig. 3.13. A possible Late-Roman stone anchor.

The Stone Weight Anchor Assemblage

One of the most impressive archaeological assemblages at Novy Svet is a collection of stone weight anchors, that is, anchors designed to hold a vessel fast by virtue of their mass alone. To date, the collection includes 36 examples. This type of anchor is one of the most common throughout the ancient world, and includes interesting analogues from the Bronze Age, well before Sudak was founded, and the Classical Mediterranean.[90] The concept and materials are so effective that they remained in constant use throughout antiquity and the Middle Ages, and examples remain in use up to the present day, albeit relegated to extremely rural outliers. The present anchors are of some of the simplest, possibly earliest designs: that is a simple stone with a hole, or the slightly later element of having the single hole close to a margin, like the apex of a rough triangle. This drove the style to become more elongated, prevailingly oval or trapezoidal.[91] All of these aspects are represented by various selections of the assemblage. Despite the variety in shape, the 32 anchors that we have spatial data for show remarkable basic dimensional similarity: their average maximum diameter is 48.05 and their average hole diameter is 15.3 – that is, 50 cm x 15 cm (Table 2.2).

[90] McCaslin 1980, 26-67; Frost 1973.
[91] Kapitän 1984, 33-5.

These anchors are concentrated just outward from the end of Channal A, lying at an almost exact north to south orientation, and extending seaward about 21m (Fig. 3.14). The assemblage ranges in width from 12 to 5 m. 34 of the pierced stones, the vast majority, lie within this zone. The assemblage was initially discovered by Sergey Spluhin in 2009, where the positions of 11 stone anchors were recorded.[92] In comparison, measurements of the enlarged assemblage in 2012, some minor discrepancies were discovered. These are best explained by minor storm movement or adjustment by curios sport divers. They do not appear to affect the general layout of the assemblage. The three outliers are in drastically different positions, lying singly at distances from 25 to 90 m away from the main assemblage. Anchor XXXIII lies to the north-east, XXXV far to the south-west, and due north of is the strangest outlier of all, "anchor" XXXVII. This pierced stone is three times larger than any other weight anchor on the site, with a proportionally larger hole, giving rise to doubts as to its function.[93] Dimensional data for the entire assemblage is presented in Table 2.2 below.

[92] Zelenko 2005-2013. The current map of the stone anchor assemblage was compiled with the help of Dr. Zelenko and Sergey Spluhin. Comparative data is taken from Zelenko's notes from the 2009 season.
[93] Anchor XXXVII was noticed only on the last diving day of the 2012 field season, and no photographs or specific measurements were taken. Estimates place its maximum diameter at 130 cm, and the width of its hole, aligned in the center, at 50 cm.

Table 2.2: Spatial and dimensional data for the stone weight anchor assemblage.

Stone Anchor #	Max Diameter ~ cm	Hole Diameter ~ cm	Type and Status
I - 1	52	15	Main Group
II - 2	54	12	Main Group
III - 3	35	13	Main Group
IV - 4	60	13	Main Group
V - 5	40	15	Main Group
VI - 6	60	13	Main Group
VII - 7	53	17	Main Group
VIII - 8	55	15	Main Group
IX - 9	50	16	Main Group
X - 10	55	15	Main Group
XI - 11	48	15	Main Group
XII - 12	50	15	Main Group
XIII - 13	43	16	Main Group
XIV - 14	50	16	Main Group
XV - 15	52.5	22.5	Main Group
XVI - 16	50	16.5	Main Group
XVII - 17	47	13	Main Group
XVIII - 18	40	13	Main Group
XIX - 19	40	19	Main Group
XX - 20	45	12	Main Group
XXI - 21	50	14	Main Group
XXII - 22	65	15	Main Group
XXIII - 23	30	15	Main Group
XXIV - 24	35	18	Main Group
XXV - 25	50	15	Main Group
XXVI - 26	Unk*[94]	Unk*	Main Group
XXVII - 27	50	13	Main Group
XXVIII - 28	Unk*	Unk*	Main Group
XXIX - 29	50	16	Main Group
XXX - 30	35	18	Main Group
XXXI - 31	40	13	Main Group
XXXII - 32	50	15	Main Group
XXXIII - 33	50	21	Outlier
XXXIV - 34	Unk*	Unk*	Main Group
XXXV - 35	53	15	Outlier
XXXVI - 36	Unk*	Unk*	Main Group
XXXVII - 37	130*	50*	Outlier

[94] Fields marked with an asterisk have missing dimensional data, visual data or both.

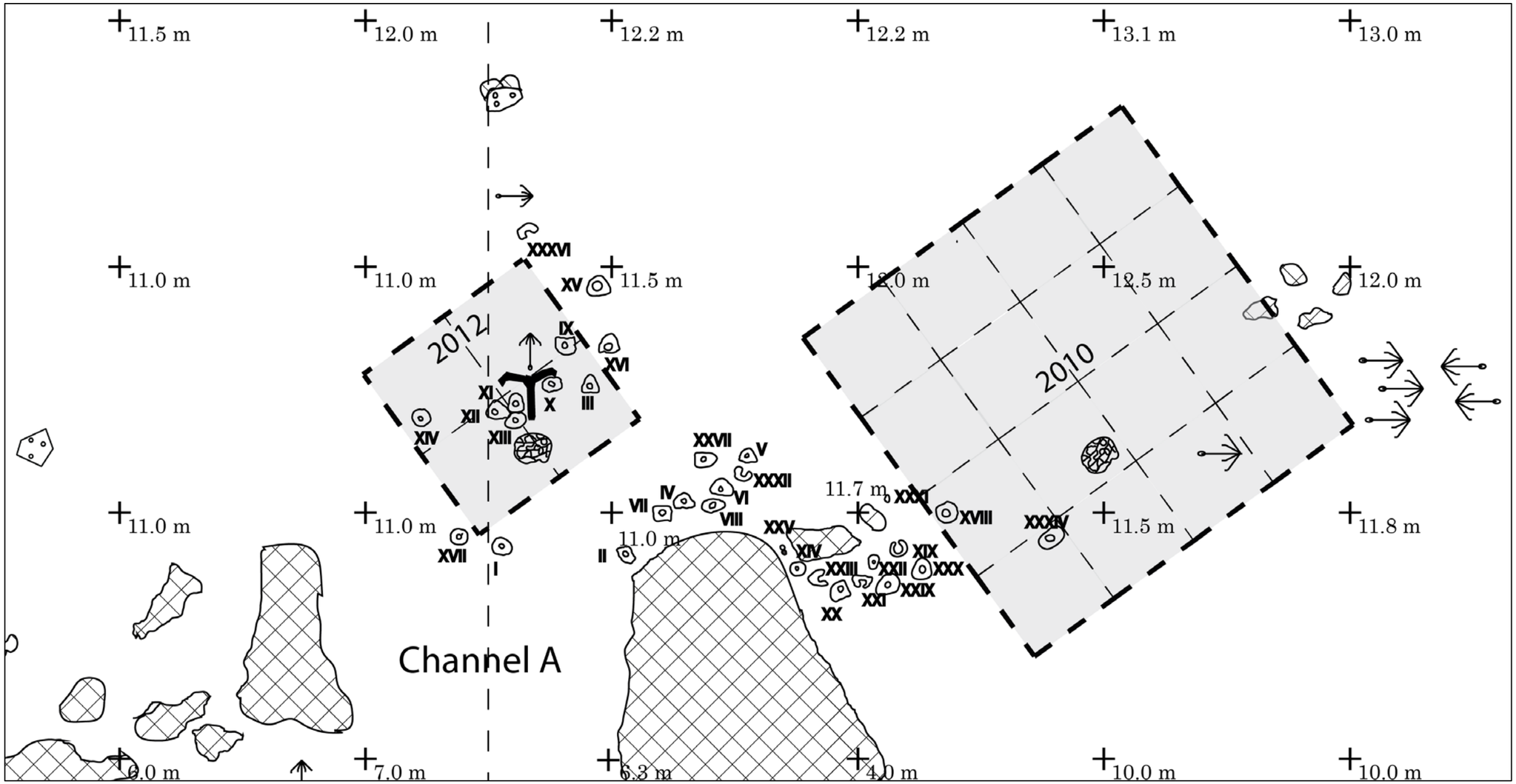

Fig. 3.14. The stone weight anchor/millstone assemblage, with roman numerals corresponding to the list in Fig. 2.12 above at L,4 – L,7: P,4 – P,7.

Indeed, alternate explanations have been posited for the entire assemblage. Arguments have been made that the artifacts best represent a collection of medieval millstones. While artifact XVII is unquestionably such a millstone, having many contemporary analogues in the region and abroad, it is the only example in the assemblage that can be thus termed upon appearance alone (Fig. 3.15).[95] While the general shapes of the artifacts fit accepted models for stone weight anchors, their extremely varied body types do not fit any standard models for millstones. The same issue is present for the highly varied sizes and shapes of the holes. While the broken examples such as artifacts XIX, XXI, XXIII, XXXII, XXXIII and XXXVI could easily serve as light makeshift anchors (that is anchor stones), they are useless as millstones. Again, the modification of artifact XXV, showing clear signs of the beginnings of an initial hole that were abandoned for a position below it, indicate that the hole on at least this artifact was not widened later to suit a different purpose, but was intended to have its current dimensions (Fig. 3.17).

One of the most promising theories concerning the nature of these artifacts is that they formed an element of saleable ballast for a merchant ship. Ballast, the additional weight added to a vessel to let it ride at its optimal sailing depth in the water in case of a lighter cargo, has been a common necessity in the seafaring community since time immemorial. A wise commercial tactic was to load a number of heavy, dense objects that

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[95] Zelenko 2008, 178. This example comes from the waters of the ancient harbor of *Limena Cale*, just below the Sudak Fortress.

might be sold at the destination port in addition to normal or prescribed cargo. This could take many forms, ranging from cobblestones to copper to extra anchors. Certain ceramic assemblages have even been postulated to be a form of such ballast. Indeed, nearly anything could fit criteria as long as there was a market for it at the destination, and for a seaport like Sudak, affordable anchors for small fishing boats may have been in high demand. In most any conceivable scenario for transport, whether the artifacts were stacked on poles or evenly spread across the deck or ceiling planking, their individual shape and hole shape would not matter.

The fact that a large number of similar stone anchors within a relatively tight 21 x 12 m zone, combined with the fact that a large 9 – 11th century Y anchor has been found amongst the same assemblage is incredibly significant, given that very little actual excavation has been carried out in the vicinity. What little excavation was done, in 2012, revealed several 11th century ceramic items. More work needs to be done, but given the overall pattern of artifact distribution collected over the last 13 years and the tight cluster of ship-significant artifacts in a tight cluster, the zone may represent the resting place of the 11th century shipwreck (Figs. 3.14, 3.15 and 3.16).

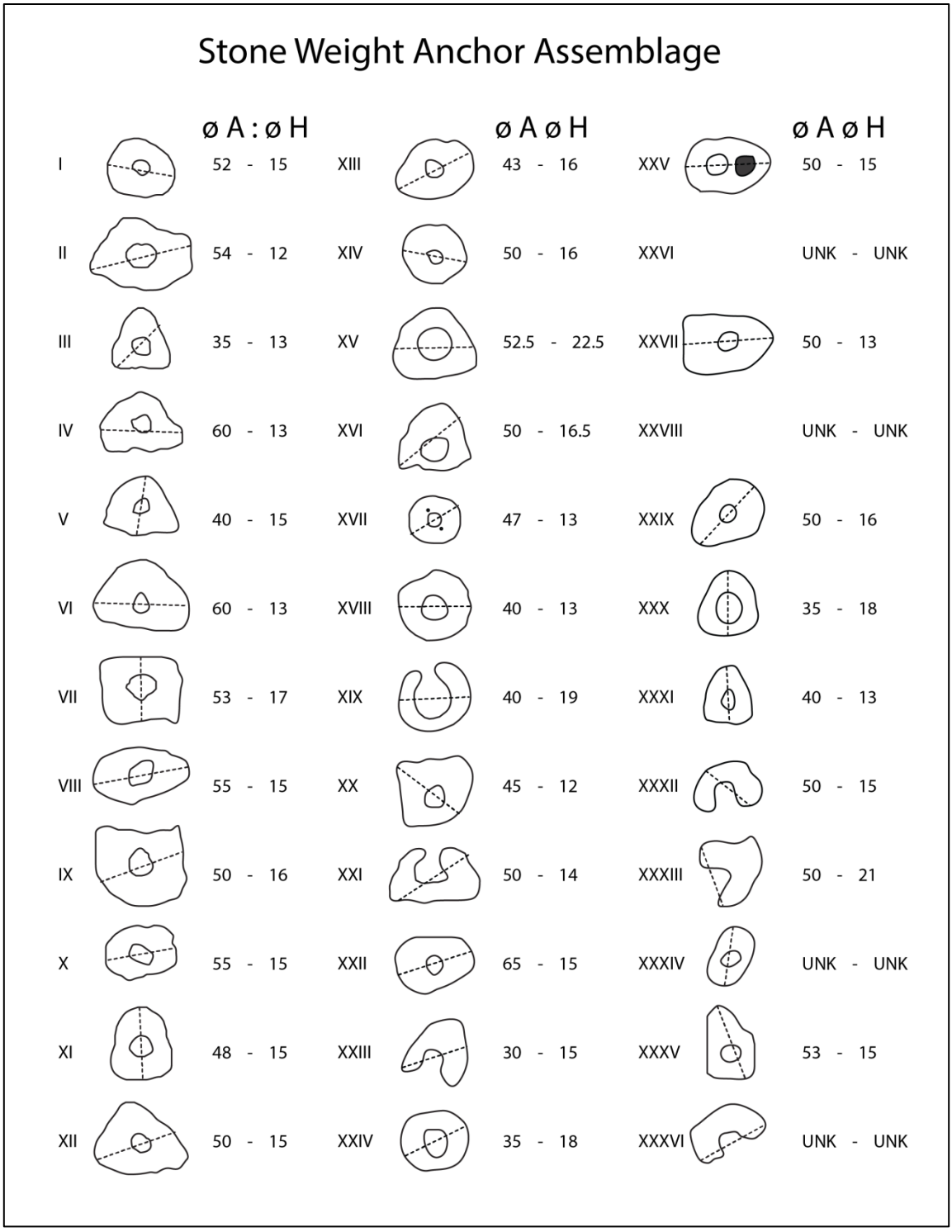

Fig. 3.15. The stone weight anchor assemblage.

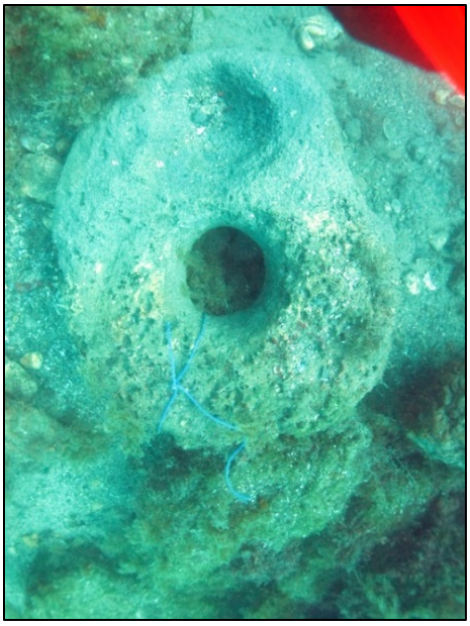

Fig. 3.16. Stone anchor XXV.

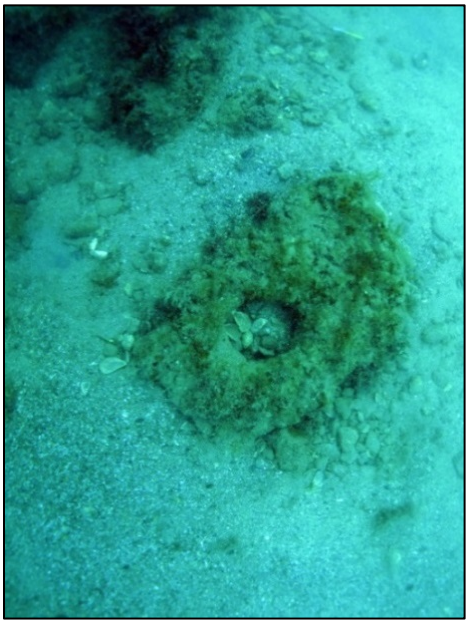

Fig. 3.17. Stone anchor XXVII.

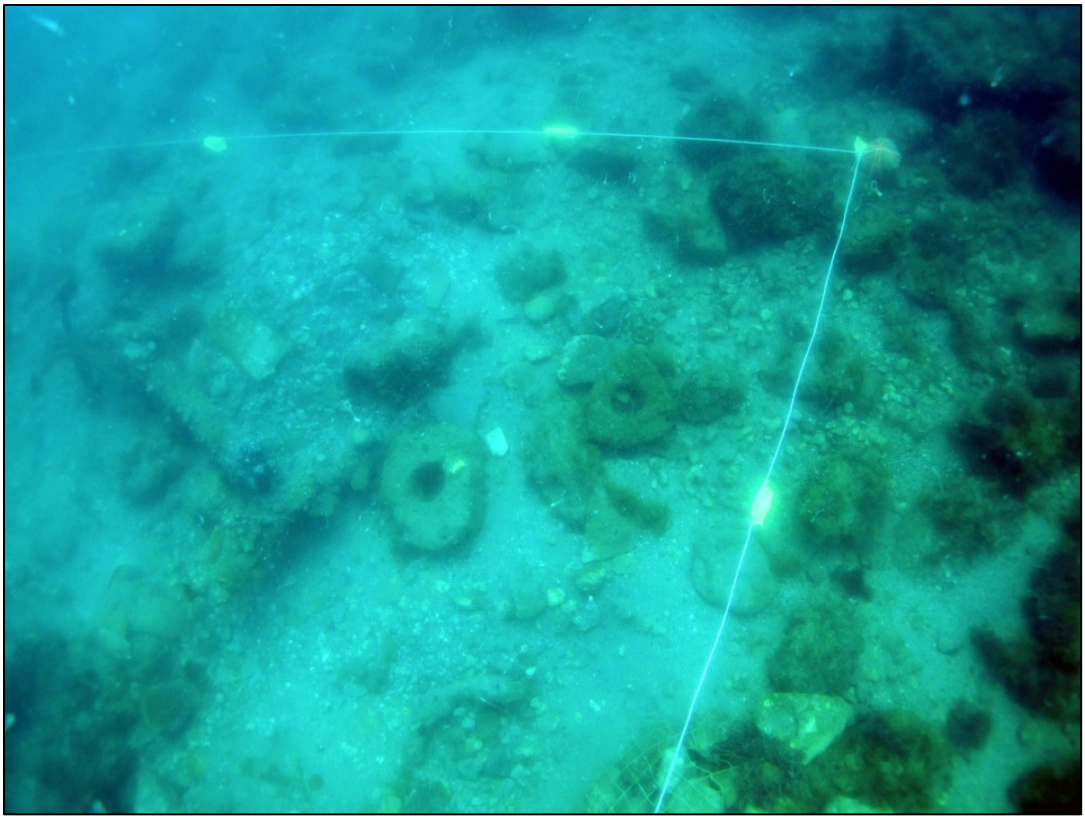

Fig. 3.18. Ancient and modern stone and iron anchors surrounding the large Y anchor.

The Brail Ring Assemblage

A collection of small, smooth lead rings discovered prior to 2007 were recently identified as potential brail rings.[96] Brail rings are rings typically made of wood, horn or lead that were sewn into the edges of square sails, and came in different sizes reflecting varying sizes of rope for different sails.[97] They are an exclusive feature of the ancient square sail.[98] Ropes run through the brails allowed the square sail to be manipulated and its shape changed, for example to become a triangular surface area similar to a lateen sail. The connection had been originally dismissed due to lack of exact analogues, and the fact that most lead brail rings have additional pierced lugs by which they are attached to the sail. However, the lead brail rings found at the *Grand Congloué a Marseille* site are extremely similar to those found at Novy Svet.[99] There are two superimposed wrecks there, one from the 2nd century B.C.E. and one from the late second or early first century B.C.E. It remains unclear from which wreck the rings are from, but the turn of the first century B.C.E. is a good assessment. A selection of brail rings from the 4th century B.C.E Kyrenia shipwreck are also allegedly analogous.[100]

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[96] Zelenko and Albertson 2005 – 2013.
[97] Whitewright 2007, 285-9. Single vessels could have different sizes and styles of sail, and therefore multiple sizes of brail rings.
[98] Polzer 2008, 239.
[99] Benoit 1961, 176-77. Examples 7, 8, 9 and 10 on Plate 30 and example 3 on Plate 31are almost exact analogues.
[100] Whitewright 2007, 288. Rings without lugs are assumed to have been attached by ties around the body of the rings.

Anchor Seriation and Association

The anchor assemblage is reflective of the bustling and complex nature of Sudak and Novy Svet throughout the ages. It includes examples of 21st century steel anchors, 19th and 20th century iron and stone anchors, early medieval iron and wood "Y" anchors, stone and iron anchors from late antiquity, and a host of basic stone weight anchors that would not be out of place from the Bronze Age to the late medieval period, but which are likely in an early medieval context. The addition of brail rings to the archaeological assemblage is significant. As they are exclusive elements of square sails, as we have seen above, they were likely out of common use by the fading of the square sail from literature and iconography in the early 6th century.[101] The presence of brail rings in and of themselves in no way indicates a shipwreck. Spare sails were probably stored "fully rigged with their brails strung through," and such a sail or a container of spare brail rings could certainly be lost overboard in a number of scenarios not involving shipwreck.[102] It is evidence, however, that a vessel was in the vicinity of the bay of Novy Svet prior to the 6rd century, probably much earlier. Brail rings do not reappear in the same fashion when the square sail becomes widespread again at the beginning of the Renaissance.[103]

Interestingly, there are no single outliers in the entire recorded anchor assemblage. Even in extreme examples, that is where an anchor is more than 50 m away from any other

[101] Castro et al. 2008, 347-48.
[102] Polzer 2008, 239.
[103] Whitewright 2012, 16.

assemblage, they always appear in groups: in no instance is one more than 10 m away from another. Often, those groups include both modern and medieval examples. The largest concentration, amidst what may be the 11th century shipwrecks, includes examples from every epoch, except perhaps the earliest.[104] Given the accepted foundation of the city in 212 and the association of the anchors to each other, it may be said that vessels have probably used Novy Svet as a harborage, and have anchored in similar locations, since at least the foundation of Sudak until the present day.

The Ceramic Assemblage

Ceramics are usually the most prolific items aboard ancient merchantmen from the classical period to the 13th century in the Mediterranean and Black Seas. This is not only due to the fact that large amounts of cargo were transported in amphorae and pithoi, but also that organic cargoes, including organic shipping containers such as barrels, are much more prone to decay and destruction than resilient stoneware vessels. Ceramic assemblages often facilitate the general dating of a wreck, can provide clues regarding the nature of the ships itinerary and crew, and may provide evidence regarding the ships direction of travel, in the cases of these three wrecks arguing for whether they were coming to or leaving port.

[104] Location data on the brail ring assemblage is forthcoming, but unavailable at the time of publication.

Such examples would be wine, grain, oil etc. Their presence may be deduced from residues left one ceramic artifacts; preliminary residue analysis is currently in process.[105]

The vast majority of the material present and recovered at Novy Svet is ceramic, including numerous transport amphorae from each assemblage, coarse and table ware, and glazed ware. The latter, as mentioned above, is of exceptional interest. These collections have been well and thoroughly published.[106] These ceramic assemblages are the key components defining the unique but overlapping 10th, 11th and 13th century material zones defined above (Fig. 2.6). Most recently, Claire Aliki Collins has published a well-written thesis on the 13th century ceramic assemblage, specifically detailing the collection's extensive *amphorae* graffiti and the insights it gives into trade on the Black Sea at this time.[107] During the 2012 excavations, several excavation quadrants were taken to depths of more than 1 meter.[108] One of these instances uncovered a beautiful amphora and ceramic assemblage lying together, stacked almost as if *in situ* (Fig. 2.12: J, 5-6). This is tremendously exciting, and excavation to this depth must become an absolute requisite uncover the full extent of the site.

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[105] Crimea produced a lot of wine and grain during the Middle Ages, but not much oil. A cargo of oil would therefore indicate a ship coming *into* port.
[106] Zelenko 2011; 2009; 2008, 126-70; Zelenko and Morozova 2010; Morozova and Zelenko 2012; Morozova and Albertson 2012; Morozova 2009; Waksman et al. 2009.
[107] Collins 2012.
[108] This was not common, because the excavation techniques available to team members, that is hand-fanning and reverse Scooter dispersion, create an excavation environment of significantly diminishing returns after ca. 40 cm of depth. Increasingly wider trenches must be excavated to compensate for the backfill, or the sediment must be manually moved a significant distance, greatly reducing efficiency.

An assemblage of ceramic material outside of the three defined density zones was discovered in 2012, and its location merits discussion and further inquiry. It is located along the varying levels of the undersea ridge at the southern lip of the bay, extending for the last 70 m along the bay edge and curving around towards Golitsyn's Grotto (Fig. 2.12 R, 4 – X, 4). The ridge, varying between 8 and 10 m in width, rises almost straight out of the sand in corrugated tiers. It is rife with niches and shallow grottos. Several ceramic fragments lay strewn over its surface at varying depths. Their position is such that they must either have fallen from above, either from a foundering ship being driven onto the rocks or trying to escape the bay, from the hand or a bored ancestor or been placed there by a modern diver. If the latter is the case, however, it must have been many years ago; the sherds were heavily embedded in old marine growth on the rock face. There is little visible surface material along the sandy base of the ridge, but the presence of a stone weight anchor, a small medieval Y anchor and a 20th century anchor warrants further investigation.

Ceramics were not the only transport container used in the Middle Ages: sealed, liquid holding wooden containers exist in the Western literary record since the 5th century B.C.E, first mentioned by Herodotus.[109] They were common in Imperial Roman culture, and their use seems first and foremost to have been regulated by abundance of raw materials: in lands where wood was more plentiful than clay, like the northern provinces,

[109] Twede 2005, 254. There is no reason to think his reference to wine being shipped down the Euphrates in Palm wood casks is fallacious.

barrels were used in preference to *amphorae* or *doliae*. In the Mediterranean world, ceramic transport vessels remained as the preferred transport container for a much longer period, but by the time of the Crusades, the barrel was a standard method of transport in Europe.[110] There are some distinct advantages to each method. Barrels are lighter and can and can more easily transport heavy loads, having, as it were, a wheel worked into their very design. *Amphorae,* on the other hand, could distribute smaller amounts of goods at one time, and their very weight could be an advantage, especially on ships whose cargo was so light that they had to include ballast to make their sailing weight. No barrels have found at Novy Svet to date, but that does not preclude their likely presence.

Wooden Remains

Since excavations began in earnest in 2000, wooden personal effects, worked fragments and rigging elements such as rope and a tackle block have been discovered, intermingled throughout the different period zones at Novy Svet.[111] These items are by far the most disarticulated of any assemblage studied here, as they are spread seemingly at random around the site. Most are broken and have lost all cellular integrity and are either charred or have teredo damage. Visible features identify some artifacts as pieces of side

[110] Twede 2005, 255.
[111] Zelenko 2008, 162-5; Zelenko and Albertson 2005-2013.

planking, ceiling planking or possible floor timbers, and in rare cases elements such as fastener holes are clearly preserved.[112] Samples from a few select pieces have been sent for dendrochronological analysis at a lab in Verona, Italy, but results are still pending.[113] Only one wooden artifact found to date is truly diagnostic.

During the 2012 excavation season, a ship timber was found amidst the 10th century artifact spread, and is shown on the site map (Fig. 2.12). It is a scarfed floor timber in fair condition, but bears a significant amount of teredo damage on its midsection and the scarf. The timber measures 1.23 m long, between 13 and 22 cm high and 14 cm wide (Fig. 3.19). The scarf begins 12 cm back from the non-curved end. This end is significantly shaved, with the lower terminus measuring only 4 cm in height. An elevated ridge rises along the midline of the shaved scarf, measuring 4 cm wide and 3 cm high. There is also a minimal amount of charring on the upper surface. About 35 cm from the scarf end, the timber is broken, featuring an irregular vertical split. The teredo damage stops at this point, perhaps showing where side timbers were attached (Fig. 3.20). This would provide the pivot point necessary to provide the leverage the breakage point indicates was exercised on it. It is doubtful that the timber lies *in situ*. It is, however, surrounded by 10th century pottery fragments and unidentified concretions. It is central to a new series of exploratory

[112] Albertson 2011.
[113] Pers. comm. Yana Morozova 2013.

excavations that were undertaken in the summer of 2013.[114] Dendrochronological samples have not been recovered to date, but will be as soon as another field season is able to be undertaken.

While no significant hull remains have been recovered to date, these data definitively show that organic remains, including hull timbers, can be and have been preserved at the site. Furthermore, members of the local sport diving community have alleged, in several separate instances, that over the last decades they have seen heavily damaged but still intact wooden structures with amphorae inside, usually uncovered by storm action.[115] This is especially true at depths below 50 cm, which have been difficult to obtain so far without dredging equipment.

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[114] Zelenko 2005-2013. The author was unable to participate in the 2013 field season, but PI Dr. Sergey Zelenko undertook this research.
[115] Pers. Comm. Eugene Archangelski, August 2012.

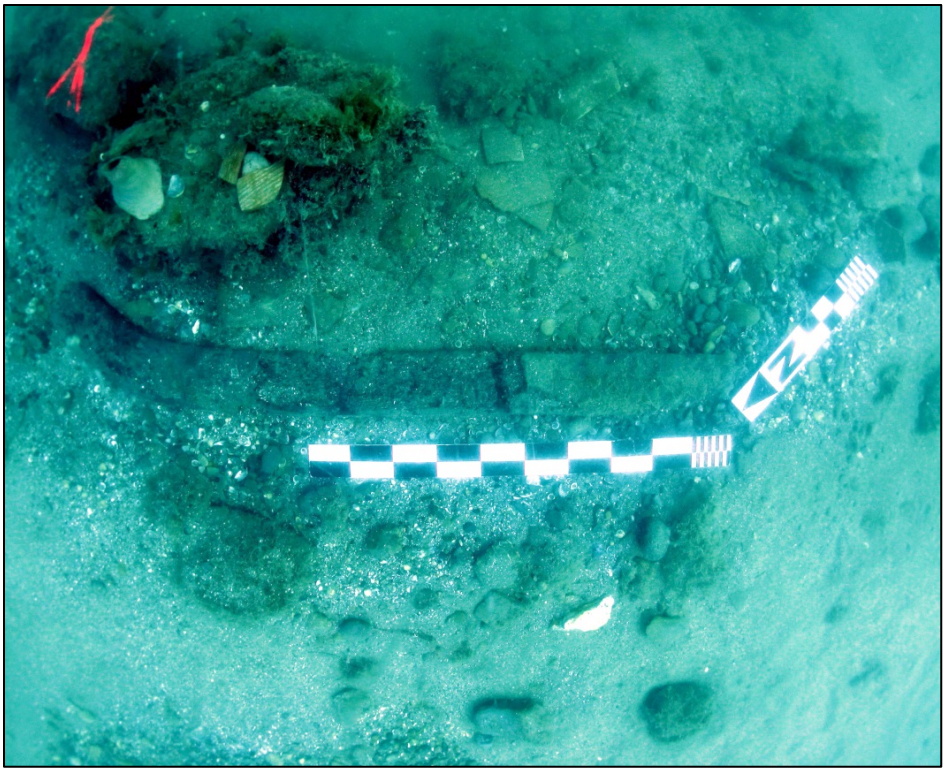

Fig. 3.19. Photo of the floor timber at Novy Svet.

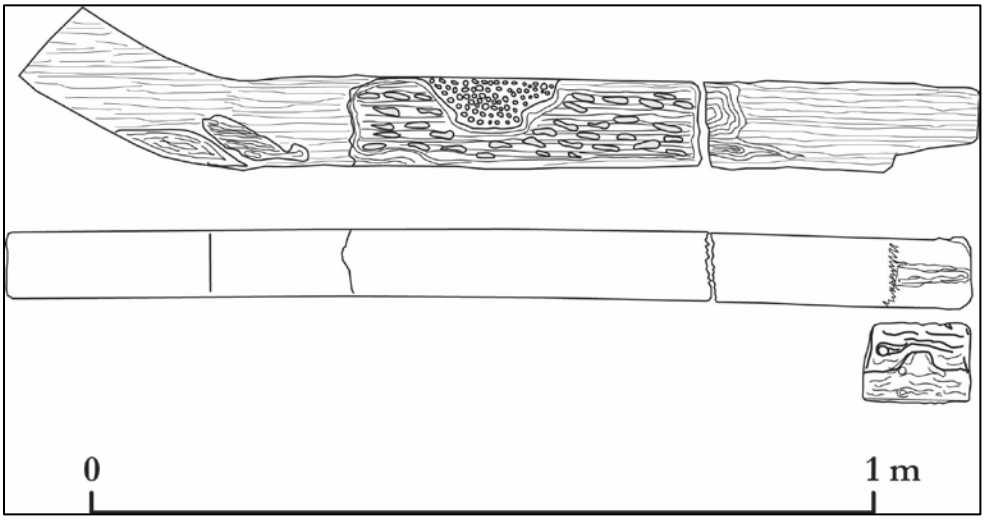

Fig. 3.20. Sketch of the floor timber at Novy Svet. Drawing by E. Archangelski, redrawn by author.

Concretions

Metallic objects, most easily iron, become concreted in seawater through a process of electrochemical corrosion. In brief, a galvanic cell is formed between to metal objects or two areas of the same metal object, one a cathode and the other an anode, are connected via an electrolytic solution, in this case seawater.[116] The greater the salt content, the faster the corrosion process occurs. As the metal bleeds away, surrounding seafloor material such as sand and rocks, as well as other artifacts, get bound together by the iron bloom to form a haphazard concretion. Data taken with a portable Refractometer over the course of the 2012 season indicates that the average salinity of the water over the wreck site is 17 ppm.[117] This is comparable to the findings of Dr. Zelenko in during the 2001 and 2006 seasons. This is quite low, but of course the longer an object is submerged, the great the amount of concretion it will accrue.

The concretion assemblage found at Novy Svet to date is moderate and highly diverse. Numerous examples of iron galley ware and shipboard appliances bearing little or no concretion have been recovered, but heavily concreted artifacts have for the most part been left on the seafloor until conservation resources are secured.[118] Exceptions include diagnostic samples of the large iron fastener assemblage, and a growing assemblage of swords

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[116] Hamilton 1998, 38.
[117] No reading, taken at depth, was over 21 ppm over 6 weeks of bi-weekly readings in 2012.
[118] Zelenko 2008, 162, Fig. 2; 165, Fig. 4.

and daggers, anchors and other miscellaneous objects (Fig. 3.21). The concretion level on many of the artifacts is quite heavy.

Iron fasteners, numbering in the hundreds, are found all over the site and throughout all strata, but have a much higher concentration in the 13th century artifact spread. They fall into four basic size categories (Fig. 3.22.). Fasteners of the largest size are often clenched, but whether or not they are double-clenched cannot be determined due to the present level of concretion. Future GIS density analysis of the assemblage may provide additional directive information in the ongoing search for diagnostic hull remains. The armament assemblage is currently comprised of 5 swords and a dagger, all heavily concreted, including two extremely well preserved examples found during the 2013 expedition.[119] The collection is currently being studied by Ms. Katerina Valenterova of the Taras Shevchenko University of Kiev. Several examples have lost all iron elements, and must be cast (Fig. 3.23). Other examples include several mysterious objects that could be parts of anchors or rigging elements, something that appears to be a brooch or buckle, and other unrecognizable masses. The only visually identifiable artifact is a medium sized thick iron ring (Fig. 3.21). It is most likely the attachment ring of an anchor, and was discovered lying next to the floor timber in the 10th century artifact spread zone. These concretions represent a vital source of potential diagnostic information concerning the wrecks at Novy Svet, and

[119] Zelenko 2008. 162, Fig. 3; Pers. comm. Sergey Zelenko, August 2013. Five of these are in the collections at the National Taras Shevchenko University of Kiev; one is in a private collection.

analysis and conservation will begin on the assemblage as soon as resources are available. Studying the marine growth accumulation patterns will be of especial interest, as there is a clear discrepancy between concretion levels on artifacts dated to similar time periods. Permanent submersion beneath the seabed can account for this phenomenon, but if so, the generally accepted theory that the top 40 cm of the seafloor over the research site is routinely churned up during storm surges requires reevaluation.

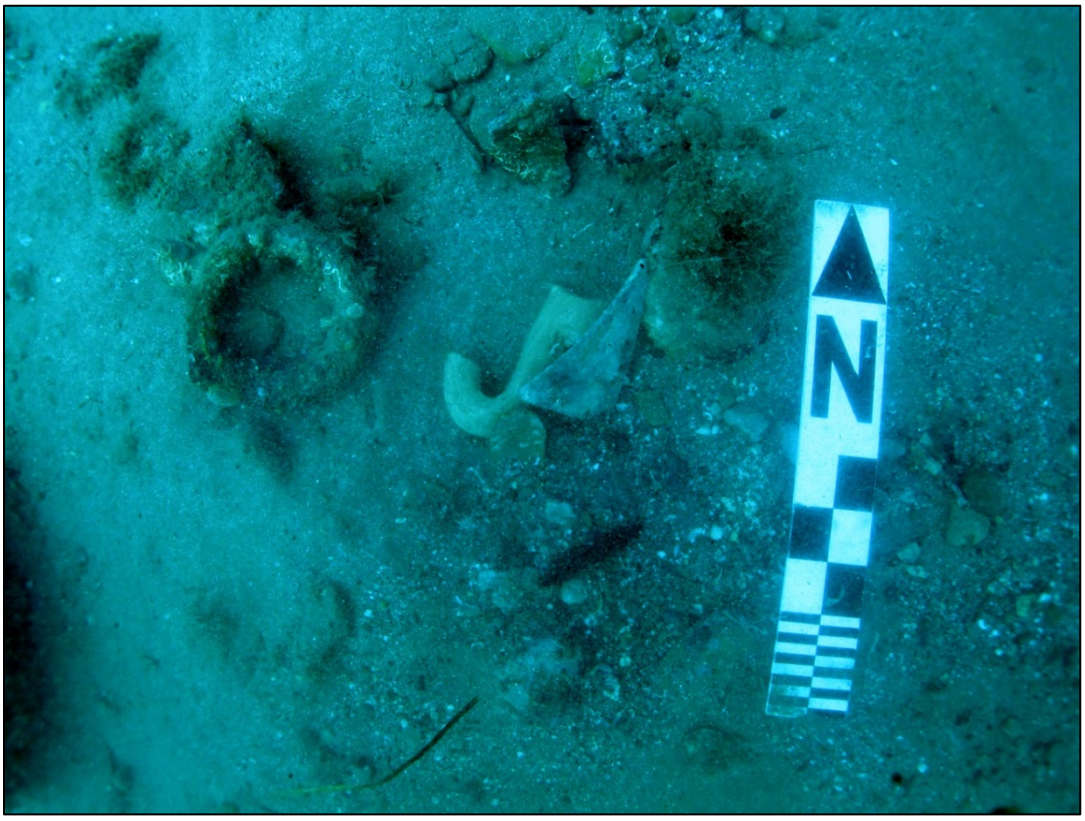

Fig. 3.21. The concreted iron anchor-ring in the 10th century artifact spread.

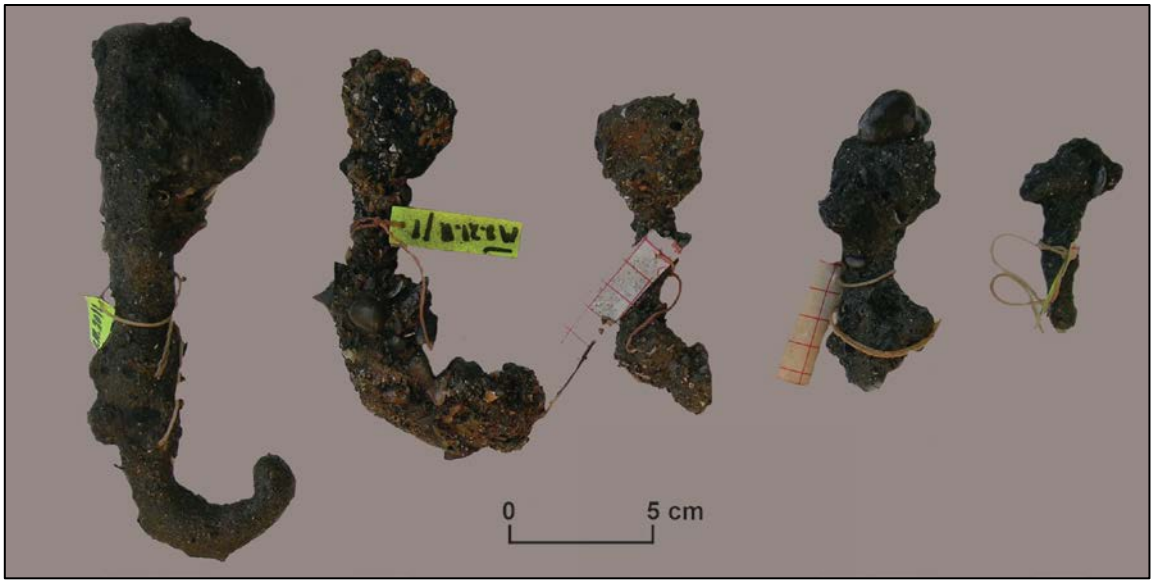

Fig. 3.22. The five basic size categories of iron fasteners. The largest is clenched, and may be double-clenched.

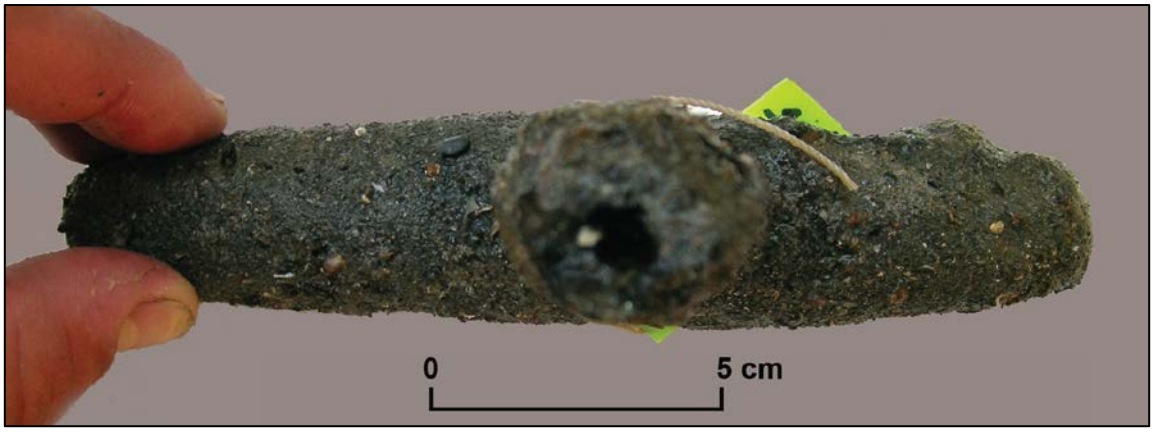

Fig. 3.23. A Spanish Windless whose iron parts have completely corroded away.

Conclusions

The modernization of the Juniper Coast and its introduction to the historic record, beginning in the 19th century with Golitsyn, has had a significant impact on the archaeological status of the assemblages at the site. The 13th century assemblage includes high density assemblages of ballast stones and iron fasteners, while the 10th and 11th century assemblages include lower density concretion spreads and a large number of stone weight anchors, some of which may once have served as millstones. The zones overlap each other to some degree, but maintain unique density profiles. The combination of complete site and bathymetric mapping presented in the present work offers an updated level of insight to the interactions of the material assemblages and their environment, and the historic implications that those assemblages have.

Even though it does not show up obviously in the historic record, the submerged anchor assemblage within the bay indicates that Novy Svet has indeed been a part of the maritime cultural landscape of Sudak since at least the late Roman epoch, and probably since the foundation of the city itself. This includes two new type E "Y" anchors, dating to the 9th to 11th centuries, and a stone weight anchor assemblage. Observing these finds in the bathymetric and geospatial contexts given by the maps discussed above, several preeminent facts emerged concerning anchor association. The submerged littoral breaks into a series of gently sloping channels, running from shallow depths directly outward from the coastline to

the large, sandy plain that forms the majority of the seafloor of the bay, mid-way along the western coast of the bay, between 11 and 13 m deep. At the base of one of these, Channel A, lies a tremendously compact collection of stone weight anchors, amidst which lies a large medieval Y anchor dated to the 10th – 11th centuries. The stone anchors have been interpreted as an assemblage of saleable ballast. While only extremely shallow, preliminary test trenches have been excavated in the vicinity, results show a high level of 11th century ceramics. The zone appears to be a likely candidate for the resting place of the 11th century wreck.

Six of the 37 stone weight anchors discovered are broken, and five of these lie within the main assemblage described above. They may be part of it, and this in no way detracts from the saleable ballast theory, but they may also represent the individual examples of small fishing boats. Novy Svet is a showcase scenario for resilience theory and Braudel's *longue durée*: people are coming together now for the same reasons as their ancestors, want the same things and to act the same way as they have, based on their environments. Governments and architecture may change, but local lifeways remain constant over vast stretches of time. The positions of the anchor assemblage show that people were anchoring in similar, specific areas from the foundation of Sudak to the modern day.[120]

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[120] The fact that the most recent anchorages are somewhat more towards the middle of the bay does not detract from this theory; the immediate coastal waters have recently become the province of tourist boats and traffic, and are no longer suitable for long term anchorage or fishing.

While no definitive hull associations have been made, a well preserved floor timber has been discovered surrounded by 10th century pottery and several concretions. This, along with the sizeable assemblage of worked wooden elements and organic artifacts found scattered over the entire site and at varied depths over the last decade, show that the seafloor environment is capable of preserving both large and small organics in excellent condition indeed remain on site. Depth is a significant factor, with better preserved examples found 70 cm or more beneath the seafloor. As research continues and potential wreck locations become more clearly defined, we should expect to find diagnostic hull remains buried, but not irretrievably erased, by this palimpsest of sand. Practical excavation at these depths, and indeed the next step in excavation at Novy Svet in general, requires the implementation of water dredge systems, as I discuss below in Chapter VI.

One of the most important and best studied archaeological assemblages at Novy Svet is that of the 13th century wreck, most notably it's beautiful and rare (for a maritime cargo) assemblage of glazed ware. Dr. Zelenko has presented a theory that this ship is, in fact, a Pisan galley mentioned in contemporary Genoese chronicle. While Pisa was a high profile actor in the maritime history of the Mediterranean and black sea up until the Renaissance, it is often overshadowed by the activities of Genoa and Venice. The story of Pisa is remarkable and compelling, providing the focus for a dedicated group of seafarers who utterly mastered their profession, in unbroken succession, from the dawn of the Classical era to the turn of the Renaissance. Their unique history led them to flourish into what may be the first true European Republic, and briefly dominate the western Mediterranean.

That story, its effects on Mediterranean and Black Sea seafaring, the Crimean littoral and potentially the 13th century wreck at Novy Svet deserves full contextual consideration. To this effect, chapter IV presents a maritime history of Pisa from its foundation through the dawn of the Renaissance, highlighting appropriate social, political and military characteristics. Chapter V acknowledges the fact that while the current discussion has been limited to the fact that the material dates to the latter 13th century, and some basic correlations exist between text and wreck location, the fact that both the

historical and the archaeological vessel existed is quite clear. Equally clear is the fact that Pisan vessels were regularly involved in trade in the Black Sea region throughout the 13th century. Careful study of Pisan maritime history and the *Annales Aevi Suevici* reveal that the vessel in the text was of a special, though common, archetype, a fighting, free willed merchant galley best classed as a merchant adventurer. To that effect, the chapter entails a detailed study of what a merchant adventurer and her crew sailing from Constantinople to Sudak in the late 13th century would have been like to provide a testable model for what might be discovered with further excavation of the 13th century assemblage.

CHAPTER IV

CITY OF SEAFARERS: THE MARITIME HISTORY OF PISA FROM ITS FOUNDATION THROUGH THE DAWN OF THE RENAISSANCE

"Whoever commands the sea, commands the trade of the world; whosoever commands the trade of the world commands the riches of the world, and consequently the world itself."

℘ Sir Walter Raleigh

It has been said that we are apt to forget Pisa if we are not historians, since the breaking of her naval prowess at the battle of Meloria by the Genoese in 1285(4) caused her to drop into obscurity.[121] This is a tragedy on both counts, for Pisa deserves to be remembered not just as fading note in the crescendo of Genoese conquest, but rather for the remarkable tenacity that saw an Iron Age city of seafarers rise to become a maritime empire, *Tusciae Provinciae caput,* and the first republican city-state in Western Europe.

The origins of Pisa as a maritime entity are shrouded in the eastern colonization myths common to the dominant cultures that arose on the Italian peninsula.[122] While no reliable dates for the founding of the city exist in literary sources, recent archaeological

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[121] Taylor 1960, 10.

[122] *Strabo* 5.2.5. Strabo offers the most popular of several tales: "As for Pisa, it was founded by those *Pisatae* who lived in the Peloponnesus, who made the expedition to Ilium with Nestor and on the return voyage went astray, some to Metapontum, and others to the territory of Pisa, although all of them were called Pylians."

research has provided an initial settlement date in the 9th century B.C.[123] Pisa has been spoken of as a maritime city since antiquity, Strabo attesting that it had been a city of seafarers since its foundation, using the plentiful timber of Tuscany to build their ships.[124] Local Italian archaeologists corroborate his claim, stating that much of Pisa's history is bound up with the sea, and that "the essentially seafaring…nature of the role played by the settlement at the mouth of the Arno from the very outset" has been clearly established.[125] Its role as a significant maritime power from its foundation until well into the 16th century is undisputed.[126] Modern historians attest the same with a profound sincerity: "of the sea she [Pisa] was born, from the sea she drew her life-blood, and when the sea was lost to her, she perished from inanition."[127] Some still affectionately refer to the city as the "Proud Queen of the Sea," a title earned during her period of Tyrrhenian dominance in the early Middle Ages.[128]

This description, however, is insufficient. Recent excavations at San Rossore have unearthed the remains of an ancient urban harbor.[129] Sixteenth-century histories mention a

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[123] Bruni et al. 2000, 21-32.
[124] *Pliny*, 1.13; *Thuc.* 1.13.1; *Strabo* 5.2.5. Strabo states that in his lifetime, during the first half of the 1rst century A.D., the timber of Pisa was used for the same purpose, although now it was transported to Rome.
[125] Nunes 2000, 9.
[126] Roncioni 1846, 15-18.
[127] Heywood 1921, 1.
[128] Bonanni 2000, 13.
[129] Bruni et al. 2000, 2. "…None of the vessels has been completely excavated…[and] the data presented here must be regarded as provisional and subject to revision." No further publications have been made, however, and while specifics may be revised, the general chronological, geographical and maritime story that these shipwrecks and harbor structures tell is remains data that can be worked with. Of especial note, the book

lost urban area of Pisa known as the *Porto delle Conche*, or Port of the Basins, which was an impressive inland harbor built on a lake near the Auser River.[130] The twice-buried ships and harbor structures that have been exhumed, in combination with the detailed hydrographical studies that have followed, argue for a re-examination of Pisa as far more than a simple seaport. Like Venice, it was a city in hydrological flux, surviving and thriving amidst a wide delta of tremendous lagoons, smaller lacustrine areas, powerful river channels and winding canals, all connected by a complex network of coastal, riverine and urban ports.

Pisa was indeed to lose the sea, and with it her soul, but that loss was not immediate; it was a fight drawn out over a millennium. Pisa, at the very least since its inception as an ally of the Roman Republic in the late 2nd century B.C., was a city subliminally struggling to keep its maritime status. The Pisans clung to their beloved sea with every fiber of their community, and as they had gone to it at for the foundation of their city, so in the ensuing centuries of delta and littoral buildup and natural distancing, they employed every art and muscle to bring it back to them. Pisa was encumbered with adverse hydrological and meteorological conditions. To help keep the waterways and harbors cleared of sediment, she required continuous traffic traveling up and down the Arnus and Auser rivers, and all the canals and lagoons in between, ferrying supplies, people, trade-goods and warships between the city and the sea. As will be developed in the following chapter, the Pisans were

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Bruni et al. 2000. 71. "*Problemi di Idrographia Pisana*" by Redi and Cosci which Bruni claimed to be forthcoming, has to my knowledge never been published.

[130] Roncioni 1846, 17.

remarkably adept at taming the land and water to allow them to maintain a maritime environment, but it was a created environment, not a natural one. They were working against nature since the days of mythology, when their founders negotiated for peace with the wild gods of the rivers. This would be the impetus for their initial Republican aspirations, the basis of their brief but glorious dominance of the Tyrrhenian and Ligurian seas, and the primal cause of their eventual humbling at the hands of Genoa in the 13th century.

The Hydrographic Context of Pisa

The modern coastline on the west of Italy has few natural all-weather anchorages, but in ancient times there was also a whole series of lagoons down this west coast, and the sea penetrated the land at regular intervals.[131] Pisa arose in a delta region characterized by the confluence of the two largest rivers in Tuscany, the Arnus (modern Arno) and the Auser (modern Serchio), and a complex system of coastal lagoons.[132] Strabo mentions three branches of the Arno in antiquity.[133] The ancient city of Pisa proper was built on a

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[131] Rickman. 1996, 283. "For example, below the Etruscan city of Rusellae, now some 25 km from the sea, there stretched a vast lagoon, the *Lacus Aprilius*, which covered the whole area between the rivers Bruna and Ombrone."

[132] Bruni et al. 2000, 11. Size is calculated on rate flow: according to physical size, the Arno is the largest and the Serchio the third largest in the region.

[133] *Strabo.* 5.2.4.

northern branch that has eluded detection, the course of the river as seen today was the middle branch, and a since-modified branch swung to the south.[134]

Recent reconstruction of the ancient hydrography of the city, based on remote sensing images, shows that the final stretch of the Auser split into two branches, one turning north and flowing directly to the sea and the other flowing remarkably close to the Arno.[135] These five river mouths comprise the arteries of the ancient Pisan delta. Their combined rate of alluvial deposition is shocking. In the early first century A.D., Pisa was roughly 4 km from the sea.[136] In the 10th century, the distance had increased to about 6.5 km, and by 1850 it was near 9.65 km inland. Today it is about 10.1 km from the mouth of the Arno.[137] Assuming a reasonable foundation date for the city at 850 B.C.E., the alluvial deposition ratio until the time of Strabo's measurement would have been about 4.73 meters per year.[138] In the following thousand years this dropped to 2.41. In the 850 years until Dennis's measurement, the ratio again increased to 3.79, dropping in the last century and a half to 2.70. On average, the coastline has extended 3.53 meters into the sea every year.

In Strabo's description of the city, he mentions a myth from his own time describing how the early Pisans had made a deal with the riverine gods of the Arnus and

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[134] Bruni et al. 2000, 51. In the 14th century, this lower course of the Arno was redirected.
[135] Bruni et al. 2000, 30.
[136] Strabo. 5.2.5.
[137] Heywood 1921, 1. The locations from which Strabo, the unknown geographer that Heywood references and Dennis measured from are unknown. I have made my own measurements from the excavations at *Porto delle Conche*, a solid reference point dating to the 5th century B.C.E., and the current mouth of the Arno.
[138] Bruni et al. 2000, 21-32.

Auser to calm the rivers' rage: they came down from the mountains with such force that the people feared they would inundate the country. Interspersed with the poetic description are details including the fact that the people "impeded" the rivers. Taken together with Strabo's claim that the rivers had so far kept their bargain, it seems likely that the Pisans had in fact modified the rivers' flow – certainly, it seems, with dykes, but also perhaps with dams and draining channels as necessary[139]. Some ancient authors say that the Arno had too strong a current to row up, and, indeed, river flooding could become violent enough to break levees.[140] This, at least, was the case in the 16th century, after the Auser had dried up: a canal was dug from the port of Livorno to service Pisa rather than using the Arno.[141]

Strabo, however, says that in Augustan times the Arno was difficult, but still passable.[142] Cassiodorus states that in 525 A.D. the Arno was navigable for all but the largest vessels.[143] The Pisan fleet that sailed to the conquest of the Balearic Isles in 1113 had no trouble navigating the river, though a few had considerable difficulty crossing a shallow sandbar at the river's mouth.[144] As late as the 13th century, long after the medieval Porto

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[139] Bruni et al. 2000. 32. Bruni cites Pardini in describing how in the 16th century Cosimo I de' Medici and his successors, to mitigate some of these recurring problems, built the *Canale dei Navicelli* to connect Pisa's harbors with the port of Livorno.
[140] Strabo. 5.2.2., Bruni et al. 2000. 90.
[141] Bruni et al. 2000. 31-32.
[142] Strabo. 5.2.5.
[143] Hodgkin 1886. *Var.* 5. 17, 20. "Concerning the formation of [Theodoric's] Navy…at this time Theodoric the Ostrogoth ordered the removal of any *sepes* [planted barriers] that were in place in many rivers at the time including the Arnus, so that ships might not be impeded." The *sepes* referred to may be constructions designed to mitigate the force of the river.
[144] Heywood 1921, 58-62.

Pisano was built at the mouth of the Arnus in the 1163, ships and even fleets were built "*ex utraque parte arni*" – in the urban dockyards of the city.[145] Due to alluvial deposition and the resulting increase in required care, the river would probably have been more difficult to navigate in the high Middle Ages, indicating that the previous examples from Classical times were certainly possible.[146]

Hydrographic studies show that by the 13th century the city center was becoming increasingly distant from the sea not only on account of natural alluvial deposition by the Arno but also by reclamation projects, although rising sea levels occasionally overcame these efforts. Sea-storms caused flooding along Pisa's canal-riddled coastal plain, blocking the mouths of canals and the rivers to which they were linked with debris.[147] Great rushing waves would roll over the lowlands between the city and the sea, breaking levees and depositing sand up along the river beds, a problem still unfixed in the 16th century.[148] Rutilius Namatianus, a Roman statesman and poet writing in the early 5th century A.D., refers to a similar instance, describing yellow, silt-filled sea water pouring into the midst of fields and overwhelming the land.[149] This may have been quite common: in his description,

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[145] Heywood 1921, 2-3. The statement that the fleets were built "in other parts of the Arnus," it is meant that they were *not* built at the *Portus Pisanus* at the mouth – therefor most likely in the urban dockyards.
[146] It is notable that the Auser is never mentioned in regards to difficulty or flooding, although references clearly state that it too had riverine ports and craft. Perhaps it was merely calmer than the Arno, or perhaps that Arno was an icon linked to the city as its only necessary riverine reference.
[147] Bruni et al. 2000, 90.
[148] Barsanti and Rombai, 1994.
[149] Namatianus 1982. *PLM* 2.7, 800. "We saw the sea yellowing with the disturbance of the sands and pastures covered with the scum it has belched forth, even as the Ocean pours into the midst of fields, when under

the phenomenon is associated with the tides.[150] Pisa, then, seems to have existed in a hydrological flux since its foundation, with its people, philosophy and ships born between the tamed wrath of the rivers and the onrush of the sea.

The Pisan Coast: A Network of Riverine, Lacustrine and Littoral Harbors

Urban and suburban harbors, located on rivers and lakes, or "*conche*" for which Pisa's main urban port was named, were functioning from the 5th century B.C.E. past the end of the western Roman Empire in the mid first millennium.[151] From at least the 2nd century B.C.E. onwards they were capable of handling both small craft and vessels 30 meters long.[152] Other docks and landing places were scattered throughout the city itself; "the relation of this harbor to the city…must be assessed in relation to the system of harbors and landing places that characterized Pisa's seaward projection...."[153] It may be that, like the river port of Ostia and the *emporiae* of Rome, the trading districts of Pisa were linked to the

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errant brine it whelms the lands from which it must ebb; whether the truth be that back-flowing from another world, it dashes against this world of ours, or that with its own waters it feeds the twinkling stars." *vidimus excitis pontum favescere harenis atque eructato vertice rura tegi; qualiter Oceanus mediis infunditur agris, destituenda vago cum premit arva salo, sive alio refluus nostro colliditur orbe sive corusca suis sidera pascit aquis.*

[150] Duff and Duff 1934, 821. Concerning the passage cited above, note 134 states "*Alio orbe* means the moon. Of the two theories here suggested regarding the cause of tides, the second refers to an ancient belief that sun and stars were fed on the waters of the ocean."

[151] Bruni et al. 2000. The "*Porto delle Conche*" or Port of the Basins.

[152] Bruni et al. 2000, 31-32. This branch has seen little discussion and is now completely dried up.

[153] Bruni et al. 2000, 31.

sea by an almost continuous accumulation of docks and wharves.[154] Nor was the phenomenon limited to the canals and lagoons directly seaward of the city. Two major seaports functioned in the vicinity: Portus Pisanus and Triturrita. Portus Pisanus was located at the mouth of the Arnus.[155] It was one of the most frequented in the Tyrrhenian and a starting place for expeditions to Marseille (*Masilia*), Sardinia (*Sardinia*) or Spain (*Hispania*).[156]

Triturrita was located 16 km down the southern coast near modern Livorno. It existed from the 6th century B.C.E., but it was not until late Hellenistic times that a major port was put in place there. It too had many small outlying harbors and landing places: significantly, they were all to the north of the port, towards Pisa. It was also unique among Tyrrhenian ports in that it had no protective moles or sea-works, but was rather an open anchorage relying on a remarkable growth of sea-weed to restrain the force of the sea.[157] With these deep-water ports at the heart, the capillary network of smaller ports, docks and harbors which Pisa either directly controlled or influenced stretched 100 km up and down

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[154] Rickman 1996, 283.
[155] Bruni et al. 2000, 28. The Augustan Portus Pisanus lies beneath the Basilico San Pietro a Grado, some 5 km from the mouth of the Arno.
[156] Heywood 1921, 2. In 398 the imperial Roman fleet under the command of Mazcazel assembled there before sailing to North Africa against the rebel Gildo. It silted up after the fall of the empire. This may imply that Namatianus was returning to the Gaulish port of Masilia.
[157] Namatianus 1982. *PLM* 2.7, 798.

the Tyrrhenian coast from the river Fine in the south to Luna (modern La Spezia) in the north, on the controversial border of Liguria. [158]

Around this time (180 B.C.E.), Pisa became a Roman colony bearing the name of Portus Pisanus. The *Via Aurelia,* built around 241 B.C.E., facilitated this by linking Rome with the growing city, which was of vital importance, as it was the only port between Rome and Genua (modern Genoa). The *Via Aurelia* was one of a series of great roads constructed during the middle Republic to serve the needs of Roman expansion. In 109 B.C.E. it was extended an additional 200 km by the connection of the *Via Aemilia Scuara*, linking Genua to Portus Pisanus and Rome.[159] In 89 B.C.E it became a full Roman *municipium* under the *Lex Iulia de Civitate Latinis Danda.* It still held this designation, a fully functional port at the waning of the Empire, when the late Roman poet Rutilius Namatianus passed through in 416 on his memorable journey home to Gaul.[160] His visit, as William Heywood eloquently writes, affords us "a last glimpse of the Roman colony [of Pisa] before the dark night of barbarian invasion settles down like a pall, hiding it from our eyes for more than six generations."[161]

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[158] *Strabo*. 5.2; Dennis 1907, 79-84. See notes 1-2. "Strabo speaks of Macra as a place - *χωρίον*; but Pliny is more definite in marking it as a river, the boundary of Etruria - *flumen Macra, Liguriae finis*. Much confusion has arisen from the contradictory statements of ancient writers in calling this territory sometimes Ligurian, sometimes Etruscan [Tuscan]"). There is no clear answer.
[159] Astin et al. 1989, 484-85.
[160] Namatianus 1982. *PLM* 2.7, 798-9. Questions as to why a high ranking Roman official such as Rutilius Namatianus would have had to take a carriage to the city when there was clearly harborage available remain unanswered.
[161] Heywood 1921, 3.

A Comparative City on the Tuscan and Ligurian Littoral – The History of Luna through the Fall of the Western Roman Empire

Throughout Pisa's history, it had a special relationship with several cities on the Tyrrhenian and Ligurian coasts. Though equally prosperous under the aegis of the Roman Empire, none of these survived that entity's collapse, in clear contrast with Pisa, which thrived. One of the most notable examples, and yet one of the least discussed, is the great port city of Luna. Luna, the shining white City of the Moon, was Namatianus' last recorded destination. Last of the capillary network of smaller ports, docks and harbors which Pisa either directly controlled or influenced, it lies some 50 km to the north of Pisa on the very border of Liguria.[162] It was an ally, one that was made a Roman colony a little after Pisa and which had been used as a gathering point for Roman fleets even before this. It was first named by the Greeks, the harbor and city of Selene (Σελήνη).[163]

Namatianus' description of his approach is filled with the clear, joyful enthusiasm of billowing sails on a sunny day: "on swiftly gliding course we bear towards glittering walls [of Luna]. In the color of its native rocks it surpasses smiling lilies, and the stone flashes bedecked in polished radiance. Rich in marble, it is a land which, reveling in its white light,

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[162] Dennis 1907, 79-84. See notes 1-2; Strabo. 5.2.. speaks of Macra as a place - *χωρίον*; but Pliny (*Plin*. 1.15.) is more definite in marking it as a river, the boundary of Etruria - *flumen Macra, Liguriae finis*. Much confusion has arisen from the contradictory statements of ancient writers in calling this territory sometimes Ligurian, sometimes Etruscan [Tuscan]"). There is no clear answer, save that the city is by definition liminal.
[163] *Strabo*. 5.2.5.

challenges the virgin snows."[164] The earliest mention of Luna is in 225 B.C.E. according to the historian Polybius, when just before the battle of Telamon, a Roman army from Sardinia was landed here.[165] Again, we have mention from the poet Ennius, who was a soldier before devoting his life to writing. He took part in the expedition against Sardinia, which sailed from Luna in 215 B.C.E. under the command of Manlius Torquatus. Inspired by the beauty of the gulf, he wrote "*Lunai portum est operro cognoscere, cives*" exhorting all Romans to see it.[166] The 20th century writer Dennis vividly corroborates his claim, stating that "to the tranquil beauty of a lake [the harbor of Luna] unites the majesty of the sea. No fairer bay could poet sigh for…never did purer wave mirror more glorious objects. Shining towns, pine-crested convents, luxuriant groves, storm defying forts, castled-crags on proud headlands, foam-fretted islets, dark heights prodigal of wine and oil-purple mountains behind, and naked marble-peaked Apennines over all…[167]

In 195 B.C.E., Livy writes that the Consul Cato collected a force in the port and sailed against the Spaniards at the town of Emporiae with 25 ships: 20 Roman and 5 from allies. Some of these vessels were picked up on the way north along the coast to Luna.[168] It

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[164] Namatianus 1982, *PLM* 2.7, 829; Dennis 1907, 65. Luna retained marble elements of its walls until the 15th century.
[165] *Polyb*. 2.27. "Just at that time the Consul Gaius Atilius had crossed from Sardinia, and having landed at Pisae was on his way to Rome; and therefore he and the enemy were advancing to meet each other." κατὰ δὲ τοὺς καιροὺς τούτους ἐκ Σαρδόνος μετὰ τῶν στρατοπέδων Γάιος Ἀτίλιος ὕπατος εἰς Πίσας καταπεπλευκὼς προῆγε μετὰ τῆς δυνάμεως εἰς Ῥώμην, ἐναντίαν ποιούμενος τοῖς πολεμίοις τὴν πορείαν.
[166] *Ennius*, ap, Pers. Sat. 6. 9. "Luna is a port that ought to be known about, citizens!"
[167] Dennis 1907, 64.
[168] *Liv*. 34, 8.

is mentioned again in the year 186 B.C.E. as a functioning port where reinforcements and a governor could be dispatched to Spain on account of casualties from military action against the Lusitanians.[169] Finally in 177 B.C.E., during the Ligurian War and just a few years after the foundation of Pisa, it received a colony of two thousand Romans."[170] Lucan records that in the civil war between Caesar and Pompey (49 - 45 B.C.E.), it is said to have been in utter decay.[171] Frontinus, however, assures us that it was recolonized by the Romans a few years later. Luna was never renowned for size or power; its importance seems to have been derived chiefly from its vast and commodious port.[172] Terrestrially, while Luna was famous for both wine and tremendous cheeses, it was most famous for its beautiful white marble, now called Carrara. It was because of Luna's quarries that Augustus could make his famous boast of finding Rome made of brick, and leaving it a city of marble.[173]

Few cities survived the collapse of the Roman Empire in the 5th and 6th centuries, and even then only with difficulty and modification. The success of Pisa as a thriving post-

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[169] *Liv*. 39, 21. "*Litteris de morte propraetoris recitatis senatus censuit mittendum, qui ad Lunae portum C. Calpurnium praetorem consequeretur, nuntiaretque senatum aequum censere ne sine imperio provincia esset maturare eum proficisci. quarto die qui missus erat Lunam venit…"* - "When the letter regarding the death of the *propraetor* was read, the senate decreed that a messenger should be sent to overtake the praetor Gaius Calpurnius at the harbor of Luna and announce to him that the senate deemed it proper that he should hasten his departure, that the province might not be left without a governor. The messenger who was sent arrived at Luna on the fourth day…"

[170] *Liv*. 41, 13. "*…Lunam colonia eodem anno duo milia civium Romanorum sunt deducta."* - …in that year a colony of two thousand Roman citizens was established at Luna.

[171] *Lucan* 1928, 686.

[172] Dennis 1907, 65; Strabo 5.2. In the ancient's opinion, the port was truly "worthy of a people who long held dominion of the sea."

[173] *Suetonius* 1913, 167.

Roman community remains quite rare in its survival; most cities fared like Luna which, the far superior harbor, collapsed into ruin and disappeared to return only in the Middle Ages.[174] The site of Luna provides evidence of an abrupt drop off of Roman amenities, beginning with the cessation of activity at the nearby Carrara marble quarry. To this day, the effects of the devastating visits of Germanic troops are discernible throughout the area, and the breakdown of the local aqueducts and abandonment of the roads and communal buildings are equally discernable.[175] Ward Perkins writes that "the arguments of esteemed scholars like Peter Brown to the effect that this period, rather than representing a classic 'decline and fall' view, represented a period when Roman culture was transformed and revitalized, seem…to be reaching for a dream that is hard to hold onto amidst the slowly silting ruins of what Rome had built."[176] That civilization continued is simply human nature, and that it improved, a testament to tenacity and intellect: but the societies that followed were more independent and more personal than their predecessor; they were cultures built on a Roman template, not Rome itself revitalized.

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[174] Ward-Perkins 2005, 4.
[175] Ward-Perkins. 2005, 4.
[176] Ward-Perkins 2005, 5; Brown 1971, 79.

At the turn of the 5th century, the great king Alaric united the Gothic tribes, which had continuously split into various factions after coming down from the north in the mid-3rd century, and, in the following years, a Gothic kingdom was created in Gaul and Spain. In the late 5th century, they united once again under the family of Theodoric, creating the Ostrogoths, who then carved out a kingdom in Italy after 489 (including, it seems, Pisa). Greater unification did not outlast Theodoric's death in 526. In 525 Theodoric ordered the removal of *sepes*, or obstructions, in the Arno, proving that he was interested and involved in shipping there.[177] Thus, in the 110 years between 416 and 526 Pisa was conquered in some way by the Ostrogoths, or were at least beholden to their influence.

Beginning in 536, the Byzantines began a strong campaign to reconquer Italy. In 553, Pisa voluntarily leagued with the Byzantine General Narses and the Empire. These years of struggle were darkened by the advent of the first great bubonic plague. Brought eastwards, from 543 the plague ravaged Italy, Spain, and a great part of Gaul for more than half a century.[178] Narses (478-573), together with the great General Belisarius, commanded the campaign to retake Italy for Justinian (482 (527-565)).[179] Returning to Italy as

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[177] Hodgkin 1886. *Var*. 5.17.
[178] Le Goff 1988, 32.
[179] Narses defeated the Gothic general Totila with mercenaries, as reported by Procopius, including navel battles fought as if on land.

commander in chief in 551, he fully defeated the Ostrogoths in pitched battles at Tadinum and Mons Lactarius, and thereafter gradually recaptured all Italy south of the Alps. The last years of his life were spent governing as Patrician from Rome, opposing the Lombards.

When and how the Lombards entered Pisa is a question which remains extremely doubtful.[180] Heywood states that the process was most likely a gradual one, continuing through all the first half of the seventh century. A further period seems to have elapsed before they established a regular government there. For more than two centuries, we have no records of public officials [of any empire or kingdom] residing there. He concludes that the Lombards most probably occupied the city little by little without any violent conquest, joining in the maritime enterprises of the Latin population which he deems half mercantile, half piratical.[181] The Germanic element, whatever the source, seems to have become the predominant one, and Pisa became the only Lombard port in the Tyrrhenian Sea.

Near the turn of the 7th century, audacious maneuvers are recorded that foreshadow the Pisan's later Ghibelline tendencies. In 603 they were preparing dromons for a naval expedition in direct opposition to papal entreaties, an action that would break a peace treaty

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[180] Sardo 1845, 75; Heywood 1921, 8. While generally providing solid information, Heywood extends himself beyond the bounds of reason when he states "the Barbarian invasions had infused a strong strain of wholesome northern blood into the veins of the citizens; it was no weak southern race that built up the might of Pisa." This is of course ridiculous - but the intermingled relations would have created a strong bond and connection between the regions, both political and familial, and possibly aristocratic. If the seven barons that came south to Pisa with Otto 1 in 972 are indeed the founders of the seven great houses of medieval Pisa, this is telling;

[181] Heywood 1921, 4.

which the Pope was attempting to broker. Pope Gregory I (Gregory the Great) was afraid for the safety of the Tyrrhenian islands even before this altercation, most likely on the Pisan's account.[182] One secondary source says that it, along with Sovona, were already governed almost like Republics.[183] This implies, in the context of controlling entities, that they were not a republic in the sense that they were independent, rather that the governing of their institutions was family-based and more democratic than imperial, and that they, while giving due diligence to the powers, were of independent mind.

The Rise of Pisa from the 9th to the 11th Century

About the year 808, a Frankish fleet partly manned by Pisan and Genoese sailors defeated a Greco-Venetian fleet near the lagoon city of Comacchio, some 90 km south and slightly west of Venice. As of 871 Pisa was still the only Tuscan city to have devoted itself to commerce and which possessed ships.[184] This implies that the Pisans were building their own ships at this time, and that they most likely had supplied them to the Lombards and equally to the Franks. In his descriptions of Viking raids on French soil, the 11th century Norman historian Dudo(n) of St. Quentin mentions a particularly adventurous war band that in 860, after pillaging up and down the Rhone, sailed eastward down the Italian coast.

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[182] Gregory XIII, 36.
[183] Heywood 1921. 3.
[184] Heywood 1921, 5. Note 4.

He describes how the northerners were amazed at the beauty of Luna, an ancient city famous for its buildings of white marble. According to Dudon, the northerners thought it was Rome and, wishing to boast of its downfall, took it by a ruse. Upon finding out it was not Rome, they flew into a rage, destroying the land and villages all around.[185] The historian Logan records this episode in his History of the Vikings, and here describes a "popular version" of the aggressor's first raiding up the Arno, "devastating Pisa and sacking Fiesole," before deciding to attack Luna.[186]

Reference to these attacks is not made in Dudon's text, and the scenario requires careful consideration, given the lack of references. It is strange that the Viking fleet should have traveled past Luna in their southward journey, stop at Pisa, and then turn to travel more than 100 km north again to attack Luna. That they were returning home at this time gives some reason, but the timing is strange nonetheless. Logan provides another possibility, stating that the episode referred to "may quite well have been another and different raid carried out not by Northmen but by Saracen pirates, for Saracens and northern Vikings, both heathens, can be easily confused in the Christian chronicles."[187] A critical reading of the epilogue that Dudon provides at the end of his third chapter, where

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[185] Dudo 1998, 2.2.
[186] Logan 1983, 110-11.
[187] Logan 1983, 209.

he discusses the events, causes doubt as to the veracity of his account. He himself seems unsure of its accuracy, and is wearied by the difficulty of teasing out the truth.[188]

Three quarters of a century later, Saracen forces, striking from their holdings in southern Italy, sacked and burned Burgundy and the Piedmont, leaving desolate the coastline from the Ligurian border (the river Macra) to the Provencal coasts.[189] Genoa itself was utterly destroyed in 935.[190] This episode is crucial in the history of Pisa, for it is an aspect, possibly the most important, of both its rise and downfall. While Genoa lay in ruins, Pisa flourished. The Lombard historian Liutprand, Bishop of Cremona, refers to Pisa as the capital of Tuscany in a treatise of 926.[191] This clearly indicates that the city must have been flourishing above its neighbors even without the additional culling of competition, but the destruction of the Ligurian seaport had another, latent effect. It showed the Ligurian communities that they needed to band together under a leader in order to survive in the future. That leader was Genoa, and when she did return to power, it was with incredible force, resource and efficiency.

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[188] Dudo 1998, Chapter 3 Epilogue. "Holding to wild, circuitous paths and proceeding along slippery, out-of-the-way roads and entering fruitlessly upon the tortuous bends of slippery routes, I earnestly request, book, that you now desist for a moment from the journey you have begun, that, wearied by the uncertainties of the subject matter, you now leave off labor…"

[189] Heywood 1921, 6.

[190] Heywood 1921, 6. Note 4.

[191] Muratori 1838, 557. *Venuto per mare, sbarrò egli a Pisa, quae est Tusciae Provinciae caput (lo dice Liutprando), ed appena giunto colà, vi comparvero gli am. basciatori di papa Giovanni, anzi vi concor sero a braccia aperte quasi tutti i principi d'I talia, per accogliere questo creduto novello ri storatore del regno, ed invitarlo a prendere la corona ch'egli vagheggiava da tanto tempo.*

The independent mindset and reality that had surrounded Pisa since its foundation, albeit supported by the Romans and Germanic and Lombard princes, fully blossomed before the end first millennium. In the tenth century…"Pisa was already practically free (on the sea), and her fleets may be said to have formed a floating republic."[192] These fleets were for the most part owned by an aggregate, compact group of families, the wealthiest in the city, made up of men of Lombard, Frankish or Germanic origin.[193] It is plausible that while the first legal recognition of Pisa's independence by Lothair of Saxony in 1132 remains as the first official benchmark of independence, the Pisans had ruled themselves in actuality for the previous 40 years under the auspices of Frederick Barbarossa, as attested by the appointment and dictate of Consuls and a Viscount finally in 1094.[194] This independence clearly had significant impetus in Pisa's naval strength and superiority, growing from an important Roman naval base into the only Lombard port, fiercely contested and coveted by the European powers, until emerging as one of the powerful Italian Maritime Republics in the Middle Ages.

This unique naval superiority in turn had its origins in the equally unique geographical struggle accorded the Pisan people since the foundation of their city, a struggle for survival between the terrible force of the sea and the seasonal rage of the Auser and Arno

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[192] Amari 1866, 46. *"I pisani, fin dalla seconda meta del decimo secolo, compariscono nella storia liberi in mari e sudditi in terra."* The Pisans, since the second half of the tenth century are seen in history to be free subjects on sea and on land.
[193] Heywood 1921, 8; Volpe 1901, 384.
[194] Muratori 1838, 111; Heywood 1921, 7.

rivers. Used to overcoming daily destructive trials, the calamity-hardened Pisans survived and even thrived where their Roman maritime colleagues failed. No legion or Imperial edict could save them or their livelihood from the forces of nature: they, even while swearing allegiance to various powers, were constantly aware that their immediate fate was in their hands alone. They exercised this attitude in increasing degrees after the fall of the Western Roman Empire, finally gaining acknowledgement of their independence from the German emperors in the 11th century, though this was merely reasserting what was already known. The authority under which the Pisans acted is of paramount interest to the discussion of the city's rise and decline. The details differentiating a pirate from a privateer, and a privateer from an accredited soldier, blend to the point of often bearing only semantic difference defined by opinion. From at least the time of Pope Gregory I in the early 7th century, it seems clear that while in naval action, the Pisans were moving in conjunction with other forces, and they were doing so on their own authority, an authority granted by their unmatched superiority in both ship construction and seamanship. Far from being the pirates that Gregory feared, their actions may well represent the first medieval Republican stirrings that would later sweep the Italian peninsula and the Western world.

The Dominance of Pisa in the 12th Century: An Aristocracy of Ships and Towers

We have seen that the hardihood and maritime savvy built into the Pisan population by almost two millennia of struggle and competition made Pisa an ideal candidate to try true self-rule. We have further seen that the Pisans achieved the wherewithal to claim it, and, indeed, to be recognized as independent. Given their head, they ran like the wind. Republican idealism began to swell as successful ship owners drew up a system of rules of interaction with each other and other traders, which they were not bound to follow but did so out of common interest, and out of respect for their oath-fellowship (*conjuratio)* or "code."[195] These men also owned towers and lands as well, however, and at the dawn of the 11th century, when, turning their hands to terrestrial matters, they found their neighbors hemming them in on all sides.

Most notable of these aggressors were the Lucchese, the conflict at their gates became a reality. This conflict would smolder through the 12th century and after, for while Pisa controlled the mouths of the Arno and Serchio and all the Tuscan sea-traffic, so Lucca controlled the roadways, the pilgrimage routes and the land based trade.[196] Indeed, the problems that haunt Pisa for the rest of her existence stem from the fact that her power was founded in maritime enterprise, and yet she could not avoid becoming encumbered with

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[195] Heywood 1921, 8-9.
[196] Heywood 1921, 82-4.

continental politics. This of course deteriorated ever more frequently into armed conflicts. Terrestrial warfare between 1000 and 1300 changed subtly, and both armies and warfare bore a common stamp clearly different from what came before and what came after. Four main factors contributed to the conflicts of the age: The dominance of land as a form of wealth, the limited competence of local and imperial government, the state of technology (which, broadly speaking, favored defense over attack) and the geography and climate of the west. Armies were generally small, and were *ad hoc*, only being kept together as long as necessary.

To be king, or ruler, or leader was to be the first landlord or association of landlords in the realm, backed by other landholders in possession of fortified positions. The numerous variations of these feudal relationships, like the *contadi* of Pisa, are best seen as *mouvances*, circles of influence based on landownership which often overlapped heavily.[197] "The common experience of medieval warfare - raid and counter-raid - could merge easily into battle...and when the prize was right, commanders were perfectly prepared to fight..."[198] The voluntary fellowship of the floating republic became codified as the laws of men working in each-others interests to serve their own, and blossomed into the Free Commune of Pisa.[199]

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[197] France 1999, 1-10.
[198] France 1999, 14.
[199] Muratori 1838, 19; Heywood 1921, 14.

The Pisans were, above all else, traders, and the reasons for all their wars and voyages were, at their core, economic reasons. The basic tenants of this commercialism are no different from our modern adage or that of any other age: buy low, sell high. The summary of Abu al-Fadi, a 9th century merchant of Damascus, can be taken as applicable to the age: "The foundation of all trade in relation to selling and buying consists of buying from a man who does not care for the article or whom need commands he accept the price [offered] and in selling to a man who is eager to acquire the article or who is under necessity to buy…the best things are always those which are happy in the present and reach a beautiful ending in the future."[200] And while the original author, with that poetic flair that permeates almost all the writings of the middle eastern peoples, titled his work "The Book of Knowledge of the Beauties of Commerce and of Cognizance of Good and Bad Merchandise and of Falsifications," it is better summarized in its essence as one of the earliest handbooks of the burgeoning field of commercial science.[201]

For the Pisans, the 11th century, when the Saracen invasion was at its height (catalyzed, as is so often the case, by the death of a great ruler and the division of their empire, in this instance that of Almansor in 1002), focused on cleaning up and securing the Tyrrhenian Sea and getting good trade agreements with their Saracen aggressors. Always the entrepreneurs, they at times allied with others to combat issues like the Muslim corsairs,

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[200] Lopez and Raymond 2001, 410.
[201] Ritter 1917, 64-5.

dealing with first problems first. One of the most notable examples is from 1015, when the united fleets of Pisa and Genoa put to sea to reclaim Sardinia from the Saracen commander Mogahid.[202] Two features stand out in the encounter. The first is that remarkably, like the wooden wall of the Athenian floating democracy fifteen hundred years before, nobles did not scorn to take to the oars, so fierce was their rage and their patriotism. The second is that the apparent catalyst for their anger was the sack, again, of Luna. While it has been suggested that their passion was fueled by the exhortations of Pope Benedict VIII, or for the oft-cited, and most probably accurate, economic argument, there may well have been a large measure of vengeance in their furious charge to the front. Wounded pride is not easily forgot, and the sack of their old sister city may well have brought fresh to mind a time when, after the collapse of their sheltering empire, the best they could do was shelter themselves while the white towers of Luna burned.

On the other hand, in 1092 they were prepared, alongside the Genoese, to help attack El Cid (Roderigo Ximines) at Valencia on behalf of Alfonso IV of Castile, but quarreled with their northern neighbors and returned home, causing the enterprise to fail. Events, however, were certainly not limited to these two powers. A joint venture involving navel representatives of much of the Christian west was the crushing attack against the massive Saracen pirate seaport of Mehdia, arguably one of the most formidable fortress cities

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[202] Heywood 1921, 18-22.

in the Mediterranean, in 1087. Often seen as the precursor to the Crusades, its overthrow effectively ended Arab piracy in the Mediterranean, and ceded maritime power unequivocally to the Italian republics.[203] A beautiful, poetic, and biased record of this victory, the "*Carmen in Victoria Pisanorum*" brings forth, if not the exact course of events undertaken, the spirit which "inspired the Pisan *armatori* in those devil-may-care days [at the turn of the 12th century], when a handful of private adventurers was ready to make war upon a nation."[204] All of this, of course, was conducted under the auspices of private enterprise – no bid to rule her neighbors was yet made. Yet the economic hegemony being established would prove to be the foundation for a political one.

The efforts of the Pisans throughout the long 11th century, the tireless conditioning and comradeship in arms that brought the merchants of Pisa together in the city as well as on the water, came to a culminating head at the end of the century with their acknowledged sovereignty and naval supremacy. J. W. Welsford wrote that in the Middle Ages "religion, politics and commerce were so closely intertwined that it is almost impossible to disentangle them."[205] For Pisa, this was most certainly true – their successes against the Saracens won them papal favor, which turned into territorial grants giving them control over Corsica and

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[203] Heywood 1921, 31-41.
[204] Heywood 1921, 35. As of the time of publication I have been unable to obtain the text of the "*Carmen Pisanorum*." According to Heywood's footnote, the full title is *Carmen in Victoria Pisanorum, Genuensium aliorumque Italiensium de Timino Saracenorum rege, ducibus Benedicto, Petro, Sismundo, Lamberto, Glandulpho, de expugnatione urbium Sibilia et Madia die S. Xisti,* in *Atti delle Societa Ligure di Storia Patria, IV, CCXVI et seq.*
[205] Welsford 1909, 31.

Sardenia, and vastly increased political clout as a new Archdiocese. The newly appointed archbishop Daibert, who attended the council of Clermont, was so inspired that he led the 120 vessels of the Italian invasion fleet of the first Crusade himself. The Archbishop, especially in times which preceded and followed a naval expedition, exercised a real and effective political and administrative authority. Upon reaching the Holy Land, Daibert, who exercised nearly limitless control over the Pisans and Genoese who followed him, was welcomed and affirmed by Godfrey of Bouillon and his knights. Two years later, he was invested as Patriarch of Jerusalem, arguing for and winning the right to rule solely within that City as God's vicar.[206]

The Pisan-led conquest of the Balearic Isles between 1113 and 1116 was again a response to piracy, and is the defining beginning of Pisa's temporary dominion in the western Mediterranean. The naval effort comprised the most powerful fleet yet built by the Pisans.[207] The Archbishop was again in command: he appointed 12 consuls to lead the attack, and with Papal blessing sets out to victory at the head of a joint fleet. Pisa was revered, and "of her neighbors only Genoa disdained to fight beneath her banners in common cause."[208]

While the Porto Pisano had been functioning for centuries, it was not to undergo its historic overhaul and rebuilding until 1163. The shipyards that built most of these vessels

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[206] Heywood 1921, 45-51, 11.
[207] Volpe 1901, 17-19; Roncioni 1846, 164; Heywood 1921, 61.
[208] Calisse 1904, vv. 135-6; Heywood 1921, 61.

and indeed most of the vessels constructed by Pisa during its existence ranged along both sides of the river Arno, close to the city.[209] Most ships in Classical times were 60 tons or less and had no need of elaborate port facilities; they could be beached and (un)loaded almost anywhere on the coasts of the Mediterranean and Black Seas. For small vessels and galleys, this practice continued during the Medieval period.[210] In these later years, countless shipyards were operating around the shores of the Mediterranean, "producing both naval and commercial vessels. Most were small-scale, with wooden sheds and wooden slipways. Generally these facilities were situated near towns, [often on flat stretches of beach or headland]."

Only the leading states such as Pisa had large-capacity shipyards with permanent structures. These yards built new vessels, produced spare parts and carried out repairs, and usually had structures where vessels could be safely over-wintered.[211] The aid given was not only in men and weapons, but in shipbuilding materials as well. And it was most necessary, as the pine forests surrounding Pisa were insufficient to the task of building a new fleet, having built so many previously. From Luna to Corsica timbers came, with larger beams and masts floating down the Arno from the interior of the peninsula.[212] Sardinia and Corsica represented valuable sources of wood, one of the most critical factors in the creation

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[209] Heywood 1921, 2, 62.
[210] Erdkamp 2005, 179.
[211] Daggülü 2009, 13.
[212] Volpe 1901, 17-19.

and maintenance of mainland maritime states after the middle of the 10th century. Along with Sicily, they comprised the 'route of the islands' that linked the Italian towns with the lucrative markets of the southern Mediterranean, the sea-lanes essential to Pisan and Genoese economic survival, and over the ensuing centuries they fought fiercely for them.[213]

The struggle between Pisa and Genoa began to escalate in 1119; the Tyrrhenian and Ligurian seas were too narrow and too economically stinted for more than one mistress. Centuries of sparring now turned to accepted political conflict. This was a war of piratical excursions and chance encounters, and one that was fought in the shadows of the overarching political and spiritual forces of the day: the Holy Roman Empire and the Papacy. Their struggle had arisen with the Investiture Conflict which began in 1075, with the first political truce being called at the Concordat of Worms in 1122. The division between Guelphs (supporters of the Holy See) and Ghibelline (supporters of the throne), however, would fiercely persist in Italy throughout the rest of the Middle Ages. Dante's expose of the traitorous Count Ugolino gnawing on the head of the murderous Archbishop Ruggieri, both Pisans, is a manifestation of the visceral hatreds born of that struggle still raging at the end of the 13th century.[214] It became one of the most defining political lines within the restructuring of European politics and thought processes, and did not really fade until well into the 15th century.

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[213] Bruce 2006, 133-4.
[214] Longfellow 1909, Inferno XXXII and XXXIII.

In 1162 a diploma from Barbarossa gave the Pisans control of the coast from Civitavecchia to Porto Venere and its hinterland, saying he would raise them above all others in Italy.[215] At this time, Pisa had no walls but was comprised of some 10,000 fortified houses, from which war was carried out should it come to her doorsteps.[216] She was now one of the great Feudatories of the realm. This had different economic reasons and implications, one of which was the beginning of a more bilateral government agreement between the sea captains and *armatori* who had founded the strength of the commune. It occurred alongside the rising power of terrestrial merchants who were making increasing headway in the surrounding cities and *contadi*, and were a necessary factor in the distribution of goods acquired and transported by sea. A significant indication of this is the mention in this year, and hereafter followed, of Consuls of the Merchants, a body concerned with internal trade legislation and disputes, quite apart from the military and international politics and economics of the Consuls of the Commune.[217]

Pisa was no longer able to play all facets of the field. Within the terrible churn of Papal turnover and the ever-changing political battlefronts that that entailed, she was eventually betrayed by the Church in the expensive matter of Corsica, losing to a quick-thinking Genoese investor.[218] At this time the Papacy was in accord with the Empire.

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[215] Heywood 1921, 131.
[216] Tudela 1939, 260.
[217] Heywood 1921, 248-49.
[218] Heywood 1921, 74-81.

However, this peace did not last long, and when the problem of two masters had to be reconciled, the rival cities chose their liberators: Pisa, the Empire that had given her true autonomy, and Genoa, the Papacy that had recently supported her and elevated her to an Archbishopric.[219] The Guelf and Ghibelline wars would not be waged only on the bloody fields of southern Europe, but on the sea as well.

Empires and Emporiae

Communes, emporiums and representative satellite populations from significant political entities began to blossom in the high Middle Ages, and the Pisans, rising to the height of their glory, were no exception. In 1131 the Pisans received a small holding, or commune, in Tyre, (expanded in 1156), one in Cairo in 1153 (already possessing one in Alexandria), a holding in Antioch in 1154 and a holding in Jaffa in 1157. In 1168 they received the ability, in the form of a diploma, to open an emporium at Acre (expanded in 1182), quite possibly the most important trading city and the capital of Syria after Jerusalem fell, and in Tripoli in 1179. The colonies of Nicosia, Famagusta, and Limassol were present

[219] Heywood 1921, 122. It can equally be said, however, that the Genoese had more leverage because of the protected nature of their city, and that the Pisans could not afford to oppose the Germanic emperor, and so sided with him utterly, firmly placing themselves against the Church and even risking their maritime enterprise, in a first act of capitulation, however calculated.

on Cyprus, and it is likely that colonies existed in Jerusalem and Caesarea as well.[220] So in the late 12th century, we have established Pisan presence at: Constantinople, Salonika (Thessaloniki) and Almyro (Almiros), Tyre, Antioch, Jaffa, Laodicia, Tripoli, Acre, Jerusalem, Caesarea, Alexandria, Cairo, Nicosia, Famagusta, and Limassol in the east; in Morocco they had Bona, Tripoli, Sfax, Bugia, Messina, Cagliari; in France at St. Gilles, Frejus, Narbonne, and Montpellier.[221]

Most of these communes, regardless of affiliation, were heavily walled and fortified. The quarters were similar in their general layout, including a palace of sorts, a church, cisterns, possibly some defensive structures like towers, and many warehouses, above which would be apartments and living quarters. These quarters, though small, were representative bases of the maritime republics, and of the maritime-military and commercial power that they represented.[222] Residents could often live and act under their own laws, while enjoying the commercial benefits of their adopted city.[223] At Constantinople, for example, the Pisans had reserved seats in the Hagia Sophia and the Hippodrome, a private cathedral, and lots of

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[220] Collins 2012, 73.

[221] Heywood 1921, 113-15; Salonika 2007, 36. As a case study, by the mid-12th century, the Pisans had been frequenting Alexandria for a long time. They were treated as relatives. They had a *funduq,* a special kind of accommodation. *Funduq* is an Arabic word for hotel: The *funduq*, or khan, was a common feature of medieval Islamic cities, and was usually composed of at least two floors of rooms arranged around a central courtyard. *Funduqs* provided traveling merchants with accommodation and storage space for goods and animals. Here, as in their streets and quarters in other harbors, they lived almost as if it were their own city, enjoying special legal status and, in this instance, paying fewer taxes than Byzantines and other Saracens.

[222] Prawer 1995, 220-23. Not all of these communes got alone peacefully; in early 13th century Acre there was highly controversial "War of the Communes."

[223] Heywood 1921, 107-9.

public respect. Indeed, captains would have been citizens of the city, almost, in their mobility and resource.[224] Certain sites even served as forward bases for deliberately attacking enemy shipping, such as the fortress city of Bonifacio in Corsica. At least in the East, these enclaves, autonomous as they were in most respects, were considered the allies and not the vassals of the Princes of Syria. In a sense the quarter was Pisa, or Venice, or Genoa, just as strongly in the minds of her citizens, perhaps, as the city itself. And indeed it is this very sentiment that was applied to the vessels of these republics as well. On the sea-washed decks of the Italian ships and in the streets of their *emporia*, sailors and citizens were as much at home and as proudly defensive as within the walls of their own cities.

The political, military and mercantile value of these *entrepots* was greatly enhanced by additional privileges granted by the regional powers. Of these, perhaps the most effective was the waiving of *commercium*, or commercial fees.[225] The Byzantines chose to judiciously apply their hefty 10% tax, granting the Venetians complete exemption and the Genoese a reduction to 4%.[226] The Black Sea colonies in the jurisdiction of the Golden Horde, on the other hand, paid a flat rate of 3% of the value on all goods, raised to 5% for the Venetians

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[224] Heywood 1921, 54.
[225] Cosimo 2005, 396. From the Greek *kommerkion*, the Imperial sales tax.
[226] Collins 2012, 52-4.

in the last third of the 13th century. These taxes extended to land use fees in the early 14th century, and were maintained and levied by the Crimean Mongol governor in Solgat.[227]

Alongside its close alliance with the Holy Roman Empire, Pisa's beneficial commercial relationship with the Byzantine Empire and its diplomatic and commercial presence in Constantinople arose in 1111 with the publication of the Chrysobulum (or chrysobull, a kind of official statement) of the Emperor Alexius. After sparring for minor territories and victories over the beginning of the century, the Pisans agreed to end hostilities against the Empire, and Constantinople to end all major import and export dues. All the harbors of the empire were opened to her commerce, and they were given a defended port that was larger than most on the southern shore of the Golden Horn, and situated such that it was the first to be reached upon entering the gulf.[228] In the 12th century, the Pisans held middle status with the Empire, between the Venetians and the Genose. The Venetians were the first make official commercial contact with the Empire; in 1082 the Emperor Alexios I Comnenos issued a chrysobull granting the Venetians incredibly lucrative trading rights with the Byzantine Empire. They could conduct business more cheaply than anyone else, essentially tax free, and were gifted a personal quarter within the city of Constantinople. This was in large part due to the ongoing Venetian repayment of the

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[227] Cosimo 2005, 396. This man acted as the Khan's legate, and was charged with maintaining orderly relations amongst the Italians. He often acted as the Khan's diplomatic representative in disputes.
[228] Heywood 1921, 54-6.

Empire's early protection, as they were now protecting Byzantine interests from the threats of the Lombard invasions.

Chrysobulls providing somewhat less lucrative, but still incredibly beneficial trade agreements and a fortified port near Constantinople were issued to Pisa in 1111, and finally trading rights and a wharf in Constantinople to Genoa in 1155. A full quarter in Constantinople was not granted to the Pisans and Genoese until 1170, when Emperor Manuel I Komnenos signed a chrysobull to that effect. These events infuriated the Venetians, exacerbating the problems that had plagued their Byzantine relations during the 12th century. It fueled their decision to default on damages in 1171 that led to the brutal capture and impounding of all Venetian assets in Imperial territories, which in turn which in turn led to their eventual division with the sack of Constantinople in 1204.[229]

For Pisa, the last half of the 12th century is full of small battles, both internal and external: they and the Genoese fight almost every year, and yet sometimes still succor each other. They gain and lose footholds in cities and with treaties, including the economic engine of Constantinople. In 1162, the same year as their grand endorsement by thy Germanic throne, their expatriates at Constantinople attacked their Genoese counterparts and fought so viciously that both parties were expelled for almost a decade. Indeed, they fell in and out of favor with the Empire, and were in fact betrayed by it and finally banned from

[229] Collins 2012, 52-5.

it for a short month, only to be welcomed again when their fleets were needed.[230] The last part of the 12th century was riddled with paradox. Internal conflict raged between the archbishops of Pisa and the consuls, a divide between secular and clerical power that foreshadows the strife of later years. And yet, this was contrasted against an international military and social reputation of epic proportions. When the Sultan Saladin (Ṣalāḥ ad-Dīn Yūsuf ibn Ayyūb) captured Jerusalem in 1187, the blood of the West was inflamed for Crusade once again. Meanwhile the reigning Pope died while at Pisa, and the new one is raised there; when the fleets of the Third Crusade set sail for Palestine, the archbishop of Pisa is once again the Papal legate, and that power is present at the retaking of Acre in 1191[231]. Taking a position of leadership, she entered into beneficial treaties with the rising power of Florence, while remaining the most loyal of the Imperial holdings in Italy; her *contadi* were never confiscated, and in 1195, a Pisan was elected Potesta. At the turn of the century they were feeling very smug, on the cusp of a vast maritime empire. "Not just commercialism", but "the adventurous heart of the race, lured on by the magic of the sea, its receding horizons, its danger and its change, spread the glory and the terror of the Pisan name from the shores of Syria to the Pillars of Hercules."[232] Less than a decade later, that world would change forever.

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[230] Heywood 1921, 180-200.
[231] Heywood 1921, 217-218.
[232] Heywood 1921, 116.

The Decline of Pisa in the 13th Century

One of the most influential factors in terms of world history and economics was the destruction of Constantinople in 1204. Leaving Egyptian aspirations for an easier return on their investments and pride, the Venetian fleets of the fourth Crusade changed course from Egypt for the Golden Horn. Eyewitness reports of the destruction of Constantinople say that the admiral of the Empire had sold the fleet down to its anchors and hull fasteners, leaving not a single heavy ship to aid in the siege.[233] In days, the greatest city on earth was reduced to a smoldering ruin. It reset the political board in the east, and paved the way for the flourishing of the Italian maritime republics in the eastern Mediterranean and Black Seas. Until the 4th Crusade, the armies marched through Constantinople; after it was sacked, sea travel became paramount, and it was done at the pleasure of the maritime republics.[234] This is not to in any way mitigate the role played by early Italian shipping in the Crusades up until that point, but this event put seafaring at a premium that, arguably, has never lapsed. [235]

New Rome's fall sparked the nearly equally influential foundation of the Empire of Trebizond in the southeast corner of the Pontus by two grandsons of the Byzantine

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[233] Partington 1999, 11.
[234] Lacroix, 1878. 119.
[235] Heywood 1921, 34. Note 3. Even Godfery of Bouillon, the first Crusader King of Jerusalem is said to have sailed to Alexandria in the Genoese ship "Pomella" in 1094-5.

Emperor Andronikos Komnenos in the same year. The small Empire prospered throughout the 13th century and after the final fall of Byzantium, both by its own considerable exports and, later, by revenues from transit trade from the east after the Mongol capture of Baghdad in 1258.[236] Pisa continued to maintain peak levels of control, but underwent significant internal changes. Consuls of the Sea were introduced to match their counterparts on land - until this point all power had been with the consuls, but now the aristocracy was reverting to early 11th century conditions where there was a floating republic and terrestrial matters were left to the bishop and the Visconte. This too changes, and after 1214, leadership lay in the hands of Potestas alone.[237] In 1220, with the crowning of Frederick II in Rome, things take a new turn. Florence had been rising as a power, and with the formation of the Tuscan League, a collection of Ghibelline powers at this time, in conjunction with Pisa's open hostilities, the first signs of the decline of Pisa become apparent: she is losing her position as leader of Tuscany, and beginning to lose her hegemony of the Tyrrhenian.[238] Relegated to a more average role, the Pisans remained impregnable in their sovereignty but impotent to further exert their will as a power competing for rule.

While the Grand Interregnum (1254-73) shook the Germanic Empire, these decades were exceptionally busy for the Byzantine Empire, midwifed to a new position of power through the efforts of Michael VIII Palaeologus (1259-82). His reign was

[236] Bryer 1966, 7.
[237] Heywood 1921, 264-5.
[238] Heywood 1921, 234.

distinguished by his vigorous resumption of control over the weak and disorganized Latin Empire left over from the Latin occupation of 1204, begun with the re-conquest of Constantinople in 1261. Reclaimed territories included Black Sea ports. In a weakened state, the empire was playing a political game of alliances, effectively ceding control of the Black Sea to the Maritime Republics, and playing them off each other, though for these years Genoa was favored above all others, using their fleet even for defense. The result was that while alive, the Empire was driven still deeper into a vicious cycle of economic dependence.

It was not without victories, however. If the treaty of Nymphaem of 1261, in which Genoa took over dominance of Byzantine trade, ceded power, the great political victory of the Council of Lyon in 1274-5 that saw the Union of Churches and Byzantine dominance of the Aegean show a differing trend.[239] The destruction of Baghdad in 1258 instigated a lucrative shift of the western terminus of the Silk Road to the southeastern Pontic kingdom of Trebizond.[240] And, in the end, with St. Louis' shattered regiments sounding retreat in 1272, after nearly two centuries of turmoil, the age of the Crusades left its indelible contribution to the burgeoning Mediterranean and Black Sea trade. While "there are those historians who are convinced that [the expansion of fleets from the Italian maritime

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[239] Fossier 1986, 195-6; Collins 2012, 63. "The Genoese navy sent 50 galleys to aid in the recapture of Constantinople and protect the Empire; in return, the Genoese enjoyed access to all imperial ports. The Genoese were given the city of Pera, also known as Galata, a suburb of Constantinople right across the Golden Horn, as well as quarters in all other major ports."
[240] Bryer 1979, 371.

republics to the shores of Egypt and the Levant] was inevitable, even without the Crusades, [as] a result of dynamics based on the economics and social development of European society and… the Muslim empire,… no one doubts that the Crusades, even if they were not the main reason for the sailing of the fleets…, definitely speeded up the process, dictated its tempo and served as a catalyst."[241]

Pisa's naval power and threatening influence were broken by the Genoese fleet at Meloria in 1287, and the Ghibbeline cause on land broken by the Guelfs at the battle of Compaldino in 1289, where the legendary poet Dante Alighieri supposedly rode with the Florentine cavalry, and after which he took to politics and poetics:

"What violence or what chance led thee astray so far from Campaldino, that never has thy sepulture been known?...I ran to the lagoon, and reeds and mire did so entangle me I fell, and saw there a lake made from my veins upon the ground."[242]

Pisa remained marginally active in the Black Sea throughout the remainder of the 13th century: the famines ravaging Europe made them as dependent on foreign grain sources as the other Maritime Republics.[243] However, though ever warlike, Pisa was now of small consequence compared to Venice and Genoa. She remained a minor, though active

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[241] Prawer 1995, 215.
[242] Longfellow 1909, Purgatorio V, vv. 82-93.
[243] Cosimo 2005, 397.

political and maritime entity until fading into servitude in 1328, and finally full bondage to Florence in 1406.[244]

Conclusions: Corsairs and Citizens – The Liminality of Nationalism in the Age of Rappresaglia

One of the most significant tropes within the scope of Pisan history is the question of the role and legitimacy of its seafarers. Active in trade and warfare since their earliest beginnings, they would often attack and capture, loot or destroy ships and cities. Within the contexts of Roman, Papal or Imperial mandate, Pisan maritime aggression is usually referred to as naval activity. Outside of this, most historians have a tendency to exclusively refer to Pisan maritime activity as piracy. The term is a highly charged one, and deserves consideration. In 1972, Michel Mollat pointed out how difficult it is to distinguish between piracy and corsair warfare. From the point of view of the law, piracy is an elementary action, without institutional backing, exerted against any merchant ship.[245] The second edition of the Oxford English Dictionary adds precision, stating that piracy is "the action of committing robbery, kidnap, or violence at sea or from the sea without lawful authority, esp. by one vessel against another. Piracy does not appeal to any justification but force and

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[244] Heywood 1921, 260-69.

[245] Mollat 1972, 473. "*est une action élémentaire, sans caractère institutionnel et s'exerce contre n'importe quel bâtiment de commerce; elle n'invoque aucune autre justification que la force et ne rend de compte à aucune autorité*."

does not give account to any authority; it is timeless, unconnected to politics and present wherever merchandise is traded by sea." Corsair or privateer warfare, by contrast, was maritime aggression legalized by a state, emerging where and when that state found such tactics useful to help strengthen its law and institutions in an effort to control shipping routes.[246]

Clearly the propriety of the action taken is dependent upon the instigating authority. Authority, according to the same edition of the Dictionary, is the "power or right to enforce obedience; moral or legal supremacy; the right to command, or give an ultimate decision." Unquestionably, to the unbiased observer, the definition is dependent upon the speaker. Indeed, in simplest terms, the ability to enforce one's will upon another, while barbaric to consider, is the basis for all such definitions. In the following treatment of Pisan history and maritime enterprise, the longstanding theme of the pirates of Pisa, while admitting that some piracy was of course present, is questioned. At worst, most of their independent maritime actions were rather those of community-backed corsairs, and, at best, were demonstrations of the fledgling aspirations of the first affirmed Italian Maritime Republic.

Italy was not like the rest of Europe, because it was not ruled by empires or large powers - it was a realm of small city states and free communes, the majority of which ended

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[246] Mollat 1972, 473. "*jouit de l'aveu des autorités publiques dont le corsaire est ressortissant et s'exerce soit à titre de représailles contre des coupables ou leurs complices présumés, soit contre les étrangers ressortissant d'un Etat ennemi*."

up in a position of inferiority and extreme weakness compared with the major powers. Consequently, they were forced to orbit around tyrants, sect leaders, or foreign princes, and over time more stably around the major cities and the strongest principalities. New cities did not arise in north central Italy between the 12th and 13th centuries - land and *contadi* were merely transferred, and no city state ever really solved the problem of incorporating new territories and new populations into its life. Either the city-state became the nucleus of an empire…or it remained small, militarily weak and, sooner or later, the victim of conquest."[247] The majority of Italians who lived in the 13th and 14th centuries never heard the word "Italy." It was a country in which only the literate lived. Consciousness of its meaning, however, eventually blossomed from three sources: the classics, xenophobia and exile. It was from outside Italy that the word found the strongest response, among merchants and expatriates. In an alien world without the protection of their cities' laws, Florentines, Venetians and Milanese were likely to draw together and find in one another men whose minds and habits were less strange, men with whom it was sometimes necessary to form working alliances and with whom there was some common background.[248] No hotter battleground could be found, I deem, than the hearts of rival seafarers far from home.

One of the hardest phenomena to understand in the history of Pisa and all of the Italian maritime republics is their constant habit of squabbling. From the disintegration of

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[247] Strayer 1970, 11
[248] Larner 1980, 1-5.

Roman authority through the 14th century, the cities, and especially Pisa and Genoa, would engage in hit and run raids, vicious ultimatums, heinous betrayals and violent grandstanding of the highest degree, interspersed amongst acts of solidarity, daring rescues, joint ventures of plunder and defense and acts of nobility, benevolence and brotherhood. These people were capable of killing each other one day, and defending each other the next, on and off over the course of half a millennium. The explanation of this baffling phenomenon lies in a complex social construct known as *rappresaglia,* or the "right of reprisal." The act may best be seen as simple, unbridled human emotion in one of its worst lights: a special form of revenge that could, in accepted practice, be taken out on any representative of the alleged offending party. The practice entails the arbitrary arrest or seizure of goods, and whatever violence might ensue, for debts for which they were neither sureties nor guarantors. While this was common practice amongst the communes and maritime republics of Italy, it was somewhat nebulous in its general validity; some commercial treaties, for example, might include language that would temporarily ban the practice between the signatory powers. These same treaties, of course, were entered into and annulled with impunity over the course the 11th and 12th centuries. [249]

Written agreements existed describing how parties should react in different situations. In the mid-12th century, there were agreements between the government of

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[249] Heywood. 1921. 232.

Alexandria and Pisa outlining what should happen if one or the other committed atrocities at sea. This is interesting because, rather than precluding the possibility, it seems a certain amount of misconduct was almost expected to some degree.[250] Piracy was an inseparable incident of Mediterranean life, and the normal depredations of individual adventurers were not regarded as acts of war. The approach was practical; rival governments knew that commercial treaties are useful while in port, but once out of sight of land more basic human reasoning becomes predominant.

This seems to be one of the most logical and tangible effects of the policy of *rappresaglia*, where home governments, aware of the gains and losses, made agreements that would be able to handle the instances of individuals giving in to anger or greed, and is further evidence of a commune built on individual strength coming into a true government. That such revenge, or *vendetta* as it was known, could be said to be the only form of punitive justice known to men in the 12th and 13th centuries, as Heywood asserts, goes too far. Closer to the mark would be that such revenge might be the only effective course to which an average person could refer if they wanted something done, the extent courts and magistrates being as fickle and corrupt as the weather. This reprisal for offence became, in the communal era, a communal act and, eventually, a sacred duty. The city became a larger

[250] Salvatori 2007, 34

example of the family unit, where all were to some degree connected to all, with leaders responsible for the actions of their subordinates and for what was done to them.[251]

As for Pisa, her story is that of a brilliant comet across the pages of fabric of history. The very sea to which she trusted fought against her and betrayed her, silting up her ports and leaving her, at the last, stranded and forsaken. For the maritime power of Pisa was an artificial creation, and, in the long run, could not compete with a rival power of natural growth. Her story is nothing less than majestic, and her full legacy worthy of remembrance. She was "born amid the clash of arms and cradled on the waves - what wonder if the Pisan Commune sprang, as it were at one bound, into full and vigorous life? What matter if her day was short? It was crowded with splendid hours, any one of which was worth living for."[252]

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[251] Heywood 1921, 255-7.
[252] Heywood 1921, 14.

CHAPTER V

THE MERCHANT ADVENTURERS: VESSEL AND CREW

"The only true voyage of discovery, the only fountain of Eternal Youth, would be not to visit strange lands but to possess other eyes, to behold the universe through the eyes of another, of a hundred others, to behold the hundred universes that each of them beholds, that each of them is…"[253]

℘ *Marcel Proust*

Merchant adventurers, both vessel and crew were, as we have seen, versatile entities at the very cutting edge of seafaring throughout the rise and struggle of the maritime republics over the course of the Middle Ages. They were dexterous traders and transporters, capable of conducting commerce on their own terms, engaging in single handed or fleet combat, or representing their respective political affiliations abroad with equal ease and efficiency. The adventurous merchantmen were "as capable of using a sword as their abacus", not only seeking the material gains of trade but ever ready to pursue the glory and fame at the expense of their enemies.[254] Fundamentally, they seem to have held audacity to be their greatest currency.

Throughout the Middle Ages, it is critical to remember that in general, long distance sea travel and transport was far cheaper, and usually faster and safer, than travel by

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[253] Proust 1929, 208.
[254] Dahl 1998, 36-40.

land.[255] During these centuries, a remarkable number of different ship types plied the waters of the Mediterranean and Black Sea, and Pisa herself is on record as having the capability to produce many types. A suitable example of this is the Balearic wars, where the Pisans built the greatest fleet that they had ever assembled.[256] It was comprised of many different types of craft, including "swift galleys of a hundred oars, each with its deck-tower and bulwarks ranged about with shields; larger galleys called *gatti* or cats, steered by two great lateral oars, one on either side of the poop, and furnished with rams for breaking the sides of the enemies' ships; huge horse transports or *uscieri*, with doors in their sterns which opened outwards and downwards so as to form a bridge over which the horses could be led in and out, skiffs and cruisers for landing and scouting."[257] Small coastal and riverine transport craft, like *griparions*, comprise the lower end of the tonnage spectrum, while the largest ship of the age and region was the massive *navis bucius*, introduced into the Black Sea

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[255] Lopez and Raymond 2001, 239.
[256] Heywood 1921, 62.
[257] Calisse 1904, 106-119. These wars lasted between 1113 and 1116.
"Gatti, drumones, garabi, celeresque galee, / Barce, currabii, lintres, grandesque sagene. / Et plures alie variantes nomina naves. / His ponuntur equi, sunt quedam victibus apte, / Ingentes alie possunt portare catervas, / Servitiis norunt possuntque subesse minores. / He numquam metuunt vininas tangere terras, /Adducunt lattices, homines ad litora vectant; / Iura galearum iuvenum sunt apta lacertis, / Harum quamque solent centum propeller remi, / Ordine qui bino plana nituntur in unda, / Et freta scindentes fugiunt sic atque sequuntur / Ut celeres capreas et aves superare volantes / Veloci valeant undosa per equora cursu."

in the 13th century when the Zigana route to Tabriz was reopened.[258] Of all these, the galley and its variations was the most prestigious vessel of the medieval Mediterranean.[259]

A galley, that is, a vessel able to rely on both oars and sails for propulsion, was arguably the most versatile craft of the times. Sleek and maneuverable, what it lost in low freeboard and lack of space for long term provisioning and rest, it made up for in speed, defensibility and ease of harborage. Some makes of galleys in the 13th century were reported to be so responsive as to "turn as quickly as you can turn a saddle horse."[260] A Saracen poet who was probably an eyewitness, recording a Pisan assault on the fortress city of Mehdia in 1088, paints a compelling mental picture:

"*…galleys that looked like mountains, save only that their summits bristled with spears and swords, gently the breezes wafted them whither they would go. Alas, for us it was a tempest! When the wind had fallen, their oars propelled them, so that they came upon us like serpents."*[261]

Galleys have both a rich history and diversity. There are "few images more representative of the Mediterranean Sea in the Early Middle Ages than that of the famous Byzantine war galley known as the dromon. At sea, the succession of the *dromon* to the Roman bireme *liburna* and its predecessors, especially the Greek *trieres*, has been presented in the conventional historiography of the of the maritime history of the Mediterranean as

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[258] Bryer 1966, 11; 6. These ships were as much as 110 feet in length and ranged from 400 to 600 tons burthen.
[259] Daggülü 2009, 13.
[260] Joinville 1908, 300.
[261] Amari 1866, 62-3. Translation by William Heywood 1921, 39.

marking a transition from Rome to Byzantium...Similarly, the succession of the Western *galea* to the *dromon* in the late 11th and 12th centuries has been presented as marking a transition from the Early Middle Ages to the High Middle Ages insofar as the maritime history of the Middle Ages is concerned."[262] Terms, however, are fluid, and it is an assumption only that when writers mention specific ship types that they indeed meant that kind of vessel, and were not using the term as a generic. Gradual evolution is almost always the norm in terms of naval development. Indeed, seafaring at all levels "involves constant change and a diversity of solutions" [263]

The hallmark of the merchant adventurer, of course, was that it was as equally suited to trade as it was to combat. The bulk of overseas commerce until near the close of the 13th century was carried in sailing ships, while galleys, decked over, were chiefly used for the short haul of merchandise.[264] In the last quarter of that century, however, when the transport of Crusaders and pilgrims to the East became negligible, galleys were drawn into general use for trade throughout the breadth of the maritime world, from the Levant to

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[262] Pryor and Jeffreys 2006, 1.

[263] Castro et al. 2008, 350 Archetypes slowly change, and after a while enough has changed that a new ship type can be discerned, defined and come into literary use. When we say "ship" we conjure the Platonic idea of "shipness," of a general form open to further clarification, as opposed to the Aristotelian higher definition of a specific defined idea. The same issue permeates the question of the nature of vessels mentioned in ancient literature: recorded terms cannot necessarily be taken at face value.

[264] Byrne 1930, 5. A short haul, of course, is relative, ranging in this source from between Genoa and southern France, to Sicily and Barcelona

Flanders.[265] They were swifter, less costly, more easily defended, and permitted a quicker turn-over of investments. Rather than view the end of the Crusades as a stark line in the sand, however, we should view it as a gradual fading, starting perhaps after the fall of Constantinople during the 4th Crusade in 1204 and ending with the last of what may best be considered transient Crusaders leaving Acre in 1274.[266] Business-minded individuals would have observed the trend, and the galleys that had been built for the Holy Wars probably began to be introduced to long distance trade much earlier in the century. By the turn of the 14th century, Venice was sending fleets of merchant galleys to ports on a fixed schedule, just like the common trading fleets of sailing ships.[267]

While it is beyond the scope of this thesis to examine exactly what type of galley would have best fit the profile of a merchant adventurer, it is appropriate to outline some details as to general construction and rig for the period.[268] Hocker and McManamon state that underwater archaeological excavations and hull reconstructions have shown that the shipbuilding system of incremental modification, known as *partisioni*, first described in literature in the Michael of Rhodes manuscript of 1434, was in use as concept in the 9th

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[265] Taylor 1960, 9. The Genoese had begun in 1277 to trade by sea (instead of through the usual intermediary of the French fairs) with Flanders and England, and as a consequence the Atlantic and channel coasts are present on some of the earliest Mediterranean charts.

[266]Louis IX, who called for the Crusade in North Africa, having died there in 1270, and Edward of England, his companion, having taken the fight to the Holy Land one last time, though with little effect.

[267] Hocker and McManamon 2006, 9.

[268] Pryor 1984b, 214-18, Table 5; Ubaldini 1640, 258 ll. 27 – 260 ll. 34; Jal 1841. These sources have excellent lists of round-hulled ships' equipment from the mid-13th century and galley equipment from the turn of the 14th century respectively.

century A.D. and all through the Middle Ages. This is a technical reflection on the gradual change from the shell-first, mortise and tenon joinery of the Classical shipwrights, who viewed their vessels as a series of longitudinal curves, to a craftsmen who increasingly saw ships as a series of transverse curves, built around specifically designed master frames at first, and expanding through the centuries to increasingly tailored frames throughout the vessel. Modification of the tail frames, for example, was of great import for both sailing vessels and galleys: on round hulled ships, they established the limits of useful cargo space - on galleys, they delineated the space available to oarsmen. Contractual evidence from 1275 indicates that by this time a ship could be "reduced to a list of dimensions comprehensible to shipwrights in two places," places as diverse as Provence and Brindisi.[269] And, by 1300 at the latest, shipwrights were using a *mezzaluna* to calculate frame curvatures, possibly outside of Venetian influence.[270]

During the middle of the 14th century, the Genoese began to take direct governmental pains to preserve the lines of any ship that did well in commerce. This implies that up until that point each vessel was to some degree unique. Maximum measurements for galleys were mandated, yet interestingly revised, after more than a decade of testing, for galleys traveling to the Levant and the Black Sea.[271] This seems to imply that for longer voyages, or different environments, there was a different type of galley used, or at

[269] Hocker and McManamon 2006, 7.
[270] Hocker and McManamon 2006, 8.
[271] Hocker and McManamon 2006, 9.

least a clear recognition that certain attributes were more effective under certain conditions. The larger swells on the Black Sea leaves the question open for consideration as to whether there was a "Black Sea Galley," perhaps with a slightly deeper keel and higher freeboard. The concept seems likely to have been present at least to some degree among the seafaring community before being recorded as law; perhaps there were "lucky" vessels or shipyards to work with in regards to commerce in the Black Sea.

Rigging was fairly standard during the Middle Ages. After a long introduction beginning in the second century, by the first half of the 6th century the lateen sail almost completely replaced the square sail in literary reference and iconography. Both lateen and square rigs coexisted in the Mediterranean world throughout the Middle Ages, of course, as some references to square rigs remain.[272] By the 13th century, basically all Mediterranean ships shared the use of lateen sails in a fore and aft rig.[273] These sails had to be changed in bad weather, and spare yards and sails were kept on board.[274] Their use has been correlated both with the transition from shell to skeleton first ship construction techniques, and to smaller and faster vessels.[275]

While lateen-rigged craft could sail better into the wind, were more suited to complex coastal sailing and could defeat square-rigged naves in combat due to their superior

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[272] Castro et al. 2008, 347-8.
[273] For an excellent report of a medieval lateen rig, see Mathews 2004, 171-88.
[274] Pryor 1984a, 363.
[275] Castro et al. 2008, 348.

maneuverability, they were expensive in terms of deck labor.[276] For galleys, whose crews were large by definition, this presented little problem; they could tack with impunity. Little changed in the lateen rig throughout the Middle Ages save one thing: In the first half of the 12th century the iconic hook of the lateen mastheads was replaced with a kind of barrel or basket that some manuscripts refer to as a tower.[277] This has clear implications for the use and access of rigging elements, as well as military advantages, combined with increased load bearing considerations for the mast. This kind of innovation was not limited to rigging alone: galleys could be and were modified to better prepare them for war of diverse kinds and such modifications were doubtlessly applied to other vessels as well, both round-hulled and oared. [278] There are numerous famous precedents for the concept of fighting merchantmen and the modification of both sailing and oared vessels, both in antiquity and the Middle Ages. Caesar himself pressed merchant galleys into service when vessels were needed, possibly setting the precedent for the enterprise.[279]

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[276] Castro et al. 2008, 349; Pryor 1984a, 363. For comparative tables of square rigged and lateen/settee rigged performance, see Whitewright 2012, 12. Tables 1 and 2.
[277] Whitewright 2012, 17. In military encounters, this would be a fighting top.
[278] Pryor and Jeffreys 2006, 15. At Ostia in the 6th century, General Belisarius fortified 200 dromons with wooden parapets with bow-slits and made other modifications to aid in the ascent of the river Tiber.
[279] Caes. Gal. 1.15.1 – 1.23.3; Davis 2009, 52-3. Caesar was known for modifying his equipment to serve specialty purposes, including adapting enemy modifications and tactics, as in this example from his Gallic campaigns.

The Pisa Ship: A Case Study

While the fighting merchants of Pisa were willing and able to participate in joint maneuvers with a fleet should circumstance dictate, merchant adventures usually worked either alone or in small groups, trading and raiding around their chosen commercial zones. As we have seen, the galley, which throughout the Middle Ages and into the Renaissance was considered the best watercraft for commerce and war, is the vessel almost exclusively referred to for use by merchant adventurers.[280] Indeed, this is the very case that we find regarding the only currently available potential literary source concerning the wrecks in the harbor of Novy Svet. In 2007 a document was discovered by CUA researchers that detailed the burning (and presumed sinking) of a Pisan merchant galley by a rival Genoese galley on August 15th, 1277. [281] The account was recorded by Genoese scholars some years after its alleged occurrence, stored in a chronological collection of documents titled the *Annales Aevi Suevici* and hidden away among details of minor political change and economic enterprise. The full account and its translation follow.

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[280] Bellabarba 1999, 81-93. In the author's opinion, the fact that the crew all pulled and worked together must have been amazing for moral and unity: of all ships I feel that the crew of a galley must have been the closest unit. This may also have played a part in its choice for the far-ranging merchant adventurers: when alone in the wilderness, you want to be with people that you trust implicitly.

[281] Zelenko 2008, 137-40.

"Ipso etiam anno cum due galee Pisanorum iuissent armate Costantinopolim, et ibidem moram traherent, aliqui ex illis galeis fecerunt insultum in duos lanuenses qui intus Costantinopolim erant. lanuenses uero qui erant in Peyra hiis auditis, illuc cucurrere uelociter, et aliquos ex Pisanis contumeliis afflixerunt; quare ipsi Pisani de dictis duabus galeis unam fatientes, cogitauerunt intrare in mare maius et in lanuenses qui ibi erant in magna quantitate offensiones inferre; et intrantes peruenerunt Sinopi (a) expectantes tempus et locum offendendi. lanuenses uero qui erant ibi in Peyra, in continenti parauerunt armare unam galeam que iret post ipsam Pisanorum galeam. set intérim galea Bancheriorum honerata mercationibus de lanua applicauit in Peyra; et auditis predictis, in continenti insequi cepit predictam Pisanorum galeam et uentis prosperis in Soldaiam peruenit. dumque ibidem moraretur, ecce quod superuenit predicta Pisanorum galea in uigilia béate Marie de mense augusti. nostra uero exiens eidem obuiam, prelium inter ipsas est commissum durissimum in conspectu hominum Soldaie. nam cum prope terram per miliare unum esset prelium incoatum, ornnes exiuerunt uidere; sicque Domino concedente, nostra galea inde uictoriam reportauit; et acceptis mercatoribus Pisanis qui superuixerant ex ipso prelio, et positis in terra cum eorum mercibus, galeam Pisanorum in conspectu omnium combuxerunt".[282]

"In this same year, when two galleys belonging to the Pisans had gone armed to Constantinople, and prolonged their stay there, some men from these galleys made an attack on two Genoese who were at Constantinople. Then the Genoese, who were in Pera, having heard these things ran there quickly, and thrashed some of the attacking Pisans; wherefore these Pisans from the same two galleys made one, and planned to enter the Black Sea to launch strike against the Genoese who were there in great numbers; and entering they reached Sinop, awaiting the opportunity and place for attack. The Genoese, who were there in Pera, immediately prepared to arm a galley to go after the galley of the Pisans. But meanwhile, a galley belonging to the Bancheri, laden with merchandise from Genoa, docked at Pera; and hearing the aforesaid things, immediately began to pursue the aforesaid Pisans' galley, and, with favorable winds, they arrived at Sudak. And while they tarried there, the aforesaid Pisan galley unexpectedly caught up with them on the Eve of Blessed Mary in the month of August. Our galley going out to meet them, a very harsh battle was engaged between them in sight of the people of Sudak. For when the battle had been started, one mile off shore, they all went out to see; and thus God willing, our galley thence brought back victory; and having received the Pisan merchants who had survived the battle, and placed them on land with their goods, they burnt the galley of the Pisans in view of all".[283]

[282] Stanconus et al. 1863, 285, ll. 25-41.

Claire Aliki Collins has accurately pointed out that while it is tempting to connect this account with the 13th century assemblage, it cannot be allowed to "'drive' the interpretation, [as] this would privilege a written source over the archaeological record, simply because it is convenient or attractive to do so."[284] However, even if the wreck site and the Pisan ship discussed in the record are not one and the same, both most certainly existed and met their fate in the same place during the same age of the world, that is, off the coast of Sudak in the highly transitional latter half of the 13th century. Furthermore, while there is no proof of connection, there is no extant reason to disqualify the theory either. Indeed, the locational data provided by the Genoese chroniclers, and the presence of burned strata and artifacts within the 13th century assemblage published by Dr. Zelenko, places the final actions of the Pisan galley and the 13th century wreck site in firm potential context (Fig. 5.1).[285]

The account states that conflict took place one mile off the coast from the fortress of Sudak, that the surviving Pisans were placed on land with their goods, and that the Pisan galley was then burnt in sight of all. There are a number of technical aspects to these actions that, when considered, show that the defeated Pisan galley was probably brought ashore at Sudak's port community of Limena Cale, offloaded, and then towed some distance away and set alight. Firstly, the galleys involved in the conflict were most certainly

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[283] Translation made by Katherina Zei in 2007.
[284] Collins 2012, 38.
[285] Zelenko 2008, 126-43. The full translation of this chapter can be found in Appendix B.

supernumeraries, that is vessels with more men aboard than their standard complement, up to a double crew. That the Pisan galley was a supernumerary is incontrovertible: there can be no other interpretation of *quare ipsi Pisani de dictis duabus galeis unam fatientes,* that is, the Pisans making two galleys out of one. [286] That the Genoese was a supernumerary also is not certain, but probable. The text states that while the Genoese were making preparations to follow in pursuit, another Genoese galley arrived and *in continenti insequi cepit predictam Pisanorum galeam*; that is, they *immediately* took pursuit of the Pisan ship.[287] As will be discussed below, one of the most important tactical aspects of galleys was the fact that motion generally required the expenditure of human energy, and thus crews had to make arrangements to rest daily.

Having a larger crew, enough for rowers to take shifts, was an accepted practice for overcoming this point, albeit with logistical consequences such as increased water requirements. If the Genoese galley left just after arrival, that is after a probable full day's rowing, it is almost impossible that they could have done so without the fresh strength of the preparing Genoese crew. Furthermore, they would have been well aware that the Pisans had sailed with an expanded crew. Being merchant adventurers, they would have known that their hoped for conflict would likely end in brutal, close-quarters engagement. To not

[286] Stanconus et al. 1863, 285, ll. 28-9.
[287] Stanconus et al. 1863, 285, ll. 31-2.

counter the Pisan's supernumerary status by increasing the number of their own crew would not have been merely tactically lax: it would have been suicidal.

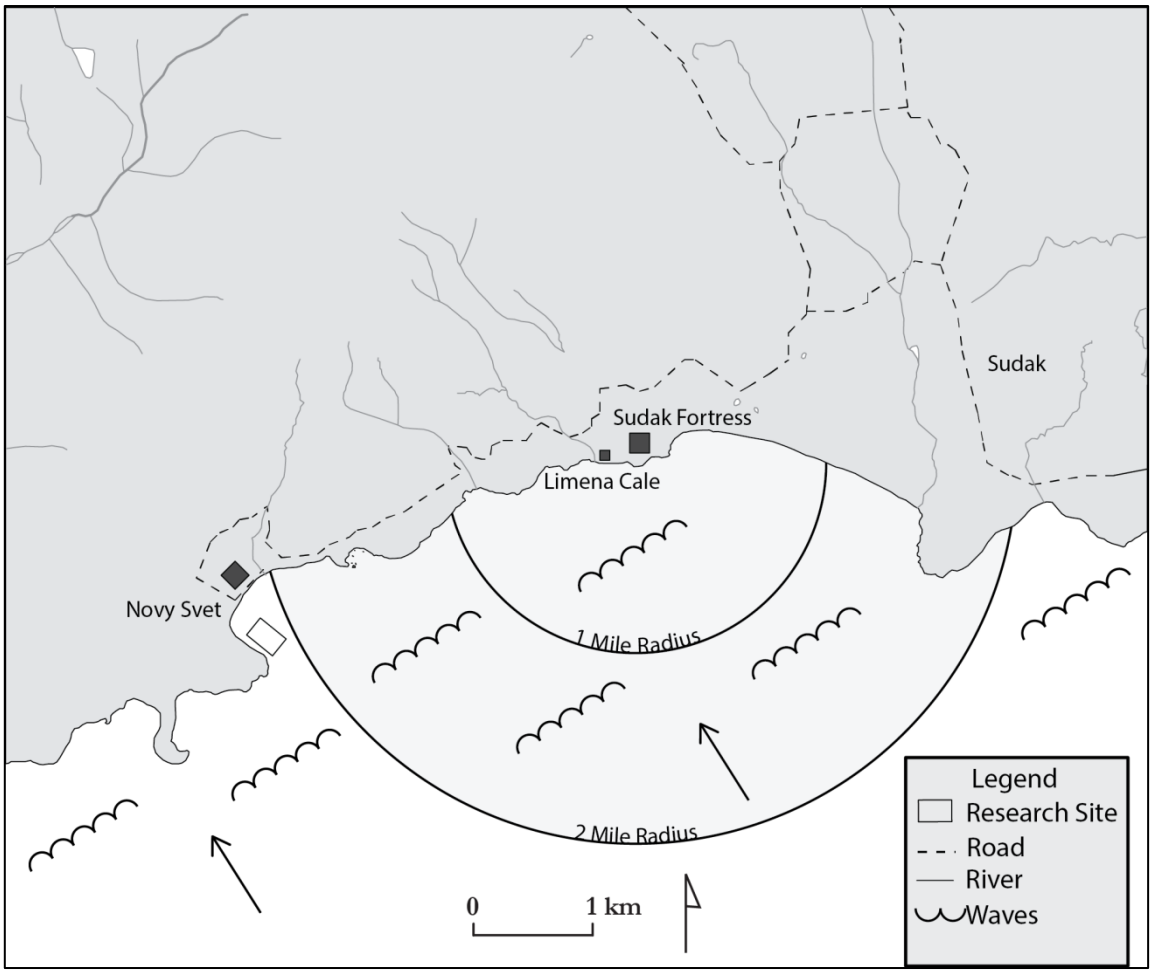

Fig. 5.1. General wind and wave patterns at Sudak during August. 1 and 2 mile radii around the Sudak Fortress are highlighted.[288]

[288] 5,280 foot mile radii are depicted.

As the warrior merchants on board the Pisan vessel were inflamed by the passion of *rappresaglia*, that special form of vendetta that could, in accepted practice, be taken out on any representative of the offending party, they were unquestionably in search of Genoese targets: *et intrantes peruenerunt Sinopi (a) expectantes tempus et locum offendendi*.[289] At the end of the 13th century, the majority of Genoese holdings in the Black Sea were in Crimea, and it is logical that they would set course there. Perhaps, as the middle course via Sinope was the most popular at the time, as will be discussed below, they were waiting at the crossroads, as it were, sure to catch a Genoese ship. It appears that they decided, after more than a week at sea (apparently without satisfying their grudge) to sail to Crimea. The Pisan crew, then, were heading to the *most likely place* that the Genoese would be. Here a strange turn of events occurs; as the Pisans approach Sudak, the Genoese who have been hunting them come out to meet them in battle – they had, by favorable winds (*uentis prosperis)* arrived before them. One possible explanation is that the Genoese had laid a counter-trap: assuming that the Pisans would head to the heart of Genoese holdings in the Black Sea, which in late 13th century was the city of Caffa just north east of Sudak, they may have taken the less-used, open-water route directly from the Bosporus to the Crimean peninsula and lain in wait for the Pisans on the route they must take to Caffa. Another explanation is that they simply missed each-other on the sea for unrecorded reasons. The latter is perhaps

[289] Stanconus et al. 1863, 285. ll. 30-1. They were lying in wait for the opportune time and place to take revenge.

more likely, as the text states that the Pisan arrival at Sudak was unexpected "*dumque ibidem moraretur, ecce quod superuenit predicta Pisanorum galea in uigilia béate Marie de mense augusti".*[290] As the Pisans simply caught up with the Genoese there, it cannot be ascertained if they had intended on sailing further. The nature of the currents on the projected route implies that they probably came in sight of the Cassarian coastline somewhere to the west of Sudak, and were working their way east.

That the Pisan vessel was not sunk during the conflict is also clear: there is no need to burn a vessel at the bottom of the sea. This is common of galley conflict in the age; as we have seen vessels were often taken as prizes, not only for their cargoes but for the ships themselves. In what condition it was in besides its basic hull integrity is unknown, but the nature of the struggle is summed up clearly: *prelium inter ipsas est commissum durissimum* – they engaged in an extremly harsh battle amongst themselves.[291] This was no street brawl like the one that started the entire conflict between these men.[292] Rather, it was chillingly recorded as being a *prelium durissimum,* a full-fledged battle augmented with the superlative form of a terrible adjective, one coldly seething with brutal struggle, with inflexibility, and with cruelty. Between the vast, seasoned, battle hardened crews of these supernumerary

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[290] Stanconus et al. 1863, 285, ll. 35-6.
[291] Stanconus et al. 1863, 285, ll. 36-7.
[292] The word used to describe the initial Pisan affront to the Genoese is *insultus*, a simple attack or assault. The Genoese response is described by '*afflixerunt'*, from *affligere*, a verb which can mean to knock down, batter, injure, damage, distress, afflict, strike, ruin, lessen and, figuratively 'crush'. It has definite overtones of a street brawl, implying no more than wounded people and wounded pride.

galleys, their over-crowded, oar-locked decks must have witnessed a terrible spectacle: an in-depth discussion of the parameters of this battle follows later in the chapter. The ending of the account, *et acceptis mercatoribus Pisanis qui superuixerant ex ipso prelio,* leaves no room for doubt of casualties; supervixerant means those that outlived something, implying that some did not.[293] The scenario is a case in point concerning how the concept of *rappresaglia*, that specialized form of vendetta that played so crucial a role in the lives of the multinational merchant adventurers, could arise and play out; a street insult becomes a private war with numerous casualties in a matter of two weeks.

After the battle and before the Pisan ship was burned, the Pisan merchants were "placed upon the shore" with their trade goods: *mercatoribus Pisanis…. positis in terra cum eorum mercibus.*[294] Clearly, that place upon the shore would have been Sudak's fortress harbor, Limena Cale. Due to the crowded conditions caused by supernumerary crews, it is highly unlikely that all Pisan personnel and goods were transferred to the Genoese ship, and from there brought to land.[295] The easier and more logical course would be to sail the captured ship into harbor, unload the prisoners with their merchandise directly. From there, the vessel could be fired at leisure, although it was unquestionably transported out of the harbor first; such a conflagration would have been a serious threat to other vessels and

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[293] Stanconus et al. 1863, 285, ll. 39.
[294] Stanconus et al. 1863, 285, ll. 39-40.
[295] The thought of small dinghies ferrying countless men and trade goods between vessels, after a brutal battle with, no doubt, numerous wounded and safe harborage and medical facilities no more than a mile away, is nearly too outrageous to consider.

harbor structures, and for it to sink in the shallow harbor would have been an unacceptable nuisance. The only questionable aspect of this scenario is phrasing describing how the Genoese treated the defeated Pisans: *acceptis mercatoribus Pisanis* - the Pisans were somehow received by the Geneose.[296] While this could mean receiving them onto their galley, I submit that a better interpretation would be receiving their surrender.[297] If the former, however, and if the Pisan galley and the 13th century Novy Svet wreck are one and the same, perhaps it is the explanation for why there was any cargo left aboard her at all: the Pisans only took their most precious wares with them on account of the constraints of the transfer.

In either scenario, the problem remains of what to do with the Pisan galley. It was consigned to the fire; but where to carry out the sentence? Two clues guide the discussion. Firstly, the vessel would not have been burned in the harbor of Limena Cale, nor anywhere that might interfere with Sudak's shipping. Secondly, the Genoese chroniclers record that the ship was burned *in conspectu omnium,* in plain view.[298] In the late 13th century the vast majority of Sudak's population lived within or close to the great fortess. Thus the initial torching of the vessel most likely took place within clear sight of the fortress walls, a vantage

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[296] Stanconus et al. 1863, 285, ll. 39.

[297] Whatever the case, the fate of the defeated Pisans remains unknown. After the rage of *rappresaglia* faded with victory, perhaps they were subjected to no further abuse than the burning of their ship. An interesting point is that the fate of the war dead remains unclear. Heywood 1921. 69. A record from the Balearic conflict reports that amazingly, the Pisans apparently took their dead, nobles and regular soldiers both, to Marseilles after the Seige of Majorca in the early 12th century, a conflict which lasted for years. The tombs of the Italians remain on the islands; they must have unearthed their buried dead, and apparently taken their recent dead as well. Why this was done, and why Marseille was chosen over Pisa (a similar voyage) is a mystery, but one that poses the possibility of similar action, or at least consideration, at Sudak.

[298] Stanconus et al. 1863, 285, ll. 40.

recreatable today. That location would have been one either safely out to sea, or securely in a relatively unused location where it would not get in the way. Remarkably, the bay of Novy Svet fits both scenarios: wind, wave and current action in the region in August would push a hull free-floating seaward of Limena Cale directly towards the western coast of the bay, and the research site is clearly visible from both the fortress walls and Limena Cale itself (Figs. 5.1 and 5.2 and 2.3). It is therefore no mistake, but rather a useful framework upon which to suspend useful lines of inquiry, to begin the discussion of what a Pisan merchant adventurer in Crimean waters in 1277 would have been like.

Fig. 5.2. A direct view of the bay of Novy Svet and the 13th century wreck site, as seen through the ruined window of a watchtower on the Sudak Fortress walls. Modified from Vechers′kyĭ and Tarasov 2005, 224.

Maritime Ownership & Authority

A remarkable characteristic of medieval society is the frequent lack of distinction between public and private war and conflict. Rather than keeping large standing armies, political entities gathered soldiers, for limited purpose, *ad hoc*. Small groups of men that were gathered and armed by private citizens for small conflicts could be banded together to make larger forces.[299] For the Maritime Republics of Pisa and Genoa, this was true of naval strategy as well as land based warfare, with small groups of tough, versatile vessels owned and commanded by wealthy citizens roaming the seas as they would, and coming together to make war fleets when necessary. An assessment of the ownership and authority of a vessel such as a Pisan merchant adventurer requires consideration of four main factors: the ship itself (and its owners), the captain, the crew, and the cargo. The status of a vessel at any given time is a blend of these.

While a variety of scenarios existed under which all conditions could be met, the most common form of mercantile seafaring in the Middle Ages was done under contract, and, of these, the most prolific was the *commenda*. Incredibly complex in its details, the basic tenant of the contract binds one party to invest their capital, (either money or merchandise), and the other to invest their labor, to mutual benefit.[300] A simpler loan, the

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[299] France 1999, 6.
[300] Pryor 1987, V 5-6.

foenus nauticum or Sea Loan, was also available. It too was favored, though of high interest, and was a great stimulus to trade.[301] Permits were required in order to trade both by land and by sea, in the form of written directives either from leading authorities or their accepted representatives. Failure to do so, even in terms of or cabotage, could result in a fine.[302]

Until the late Middle Ages, ships' crews were made up of sailors who were paid a wage and were governed by a skipper (*patronus*) who did not have absolute authority. He had to make the more important decisions in consultation with the other officers or with the entire crew—and sometimes even with the merchants on board.[303] Unlike their Roman predecessors, the medieval Italo-Byzantine ship-owners were generally seamen and warriors as well as entrepreneurs. They not only organized the maritime ventures, but also sailed as the captains of their ships. The medieval sailors, in turn, were "free men who shared their captains' diverse qualities. When Mediterranean ship-owners became owner-captains (*naukleroi* or *patroni*) toward the end of antiquity, they forged a new, communal business relationship with their crews that shaped the contours of the maritime mercantilism from the 7th to the 12th centuries. This was the hiring of crewmembers *ad partem*, or for a designated share of the profit of a voyage."[304] The phenomenon has analogues in modern popular literature, most strikingly in the 19th century example of the young man Ishmael,

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[301] Byrne 1930, 13.
[302] Lopez and Raymond 2001, 38. The phrase they use is "no one is to wander around in order to transact business…", a scenario that is best translated as tramping or cabotage.
[303] Salvatori 2007, 46.
[304] Jackson 1989, 606.

who when seeking adventure in the whaling business of Massachusetts signed as crew of the *Pequod* for the 300th lay, that is, the 300th part of the total net profits of the voyage.[305] The earliest mention of this practice is in the Byzantine Sea-Law, where the owner-captain claimed a portion of the venture's profits that was equal in value to the shares of two sailors.[306] This was a sizeable percentage when considering the small crews of early medieval merchantmen. In response to larger crews, this eventually developed into a system where the captain-owner received half and the other sailors split the difference.[307]

It was a mutually beneficial system in many ways: this custom allowed the risk of the voyage to be shared, as well as, undoubtedly, assuring the utmost efforts by everyone involved. Sailors were "more than likely as informed as the captains of the risks and potential markets overseas, so their choice to join a venture reflected a shrewd economic choice on their part. Once the itinerary was set and agreed upon, the captain could not deviate without the sailors' communal consent, and sailors could, if they wished, attempt to generate more trade for the vessel when opportunity arose, an activity that was rewarded."[308] This system of mercantile versatility was a powerful improvement upon older systems where permission to change itineraries had to be granted by non-present parties. As a medieval

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[305] Melville 1998, 79.
[306] Ashburner 1909, II, 1-7.
[307] Jackson 1989, 608.
[308] Jackson 1989, 612.

merchant has been recorded as complaining "if I must wait for your written instructions, good business opportunities may be lost…while the dog pisses, the hare disappears".[309]

Fighting, as well, was expected and accounted for; "if a sailor was wounded while in service of the ship, profits were paid on his share in the venture even if he was incapacitated. Furthermore, captains would pay the ransoms of sailors captured by pirates."[310] Medieval marine customs gave "legal expression to the practical interdependence of all the members of the ship, making them, in a way, partners" submitted to a democratic discipline.[311] The relationship between captains and their men belonged to a different world—not the feudal world of chivalry, but the much more volatile, mutually dependent world of trade and piracy.[312] A medieval merchant adventurer, in its essence, was a community of fortune.[313]

In the 12th century, a shift from profit sailing to a system where owner captains paid their sailors a fixed wage, or wage sailing, occurred in the major maritime centers of Genoa, Pisa and Venice.[314] Of note is that this phenomenon seems to have taken place as soon as prevailing economic conditions allowed, of which no small part was played by the greatly

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[309] Dahl 1998, 17.
[310] Jackson 1989, 613.
[311] Lane 1973, 406.
[312] Salvatori 2007, 49; Lane 1978.
[313] Tangheroni 1992, 369.
[314] Bonaini 1870, Vol. 2; Jackson 1989, 617. The *Constitutum Usus* (The Use of the Agreed Arrangement), dating from the mid-12th century, is a pivotal work concerning medieval Pisan sailing practices. It points out that Pisan owner-captains did not practice profit-sailing at this time, and never did to the extent of their contemporaries. They simply redistributed risks among all parties involved in a venture in order to reinsure themselves against specific losses caused by pirates or sovereign powers. This had the effect of interesting the sailors more directly in the voyage's successful outcome; the knowledge that they would lose their wages provided a strong incentive to fight rather than surrender to pirates.

increased availability of maritime loans to ship-owners. The system provided greater profits for owners in the long term while providing greater security for sailors. In the 12th and 13th centuries, the established *modus operandi* where one owner fully controlled a small vessel began to shift to a state where a group of owner-captains owned shares in larger vessels and sold shares in the same to finance them.[315]

Up until mid-12th century, captains and ship-owners had been entirely distinct from the merchants they served, being little more than shippers. With the introduction of shares, (called *loca* in Genoa and so referred to hereafter) however, these entities are no longer so distinct, and all three readily gained partnership in maritime ventures. This new method of financing met the growing demand for shipping and encouraged it by dividing *risicum*, or risk of loss, amongst many, while allowing investors to possibly have hands in many profitable ventures. Men and women of all ranks of society could hold them, with families grouping resources, leaving actual individuals owning mere fractions of *loci*.[316] *Loci* were as elastic as capital, and used as such. In general, a vessel had as many *loci* as the accepted number of mariners required to man the vessel type. This varied from 16 to 70 for round-hulled ships, with the most common amount in the 13th century being 40. The owner of the *loca* was required to pay the wages and expenses of the mariner taking that spot.[317]

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[315] Jackson 1989, 615.
[316] Byrne 1930, 13.
[317] Byrne 1930, 15, 40.

After the middle of the 13th century, *loci* almost vanished from commercial practice. By then, "the accumulation of capital in the hands of individual investors, of family combinations, of fairly permanent associations in trade, and of organized banking houses, had increased to such an extent that it was possible for smaller groups of men safely to build, own, and operate their vessels profitably without division into many *loci."*[318] By the late-13th century, the complete specialization of capital and labor had become the rule in Mediterranean wage-sailing. In most major ports, owner-captains were now prepared to assume the full risks of the maritime venture themselves and sailors could expect to earn regular monthly wages as a matter of course. Captains agreed to increase their crews' wages whenever a change in their trading itinerary unexpectedly prolonged a voyage, and only in rare circumstances could the crew's earnings be used to compensate in part for jettisoned or lost cargo.

Indeed, legislation now provided sailors with the status of preferred creditors such that if a voyage failed, their back wages were given initial priority in the case of the liquidation of assets such as the merchant vessel.[319] By the early 14th century, the change is made complete with the increase in the perceived value of the sailor, a direct result, perhaps, of the institutionalizing of the trade. Captains, for example, were now required to leave a security deposit in case all assets on the voyage were lost so that sailors could still be paid.

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[318] Byrne 1930, 19.
[319] Jackson 1989, 623-6.

These changes seem to have heralded the "final breakdown of traditional, personal bonds between capital and labor in medieval shipping." As personal ties diminished and labor became a commodity rather than a relationship (sailors used to dine at the table of the part-owner who hired them and change ships as he did – a practice unheard of by the 14th century), the sense of mutual risk seems to disappear and desertion, unsurprisingly, increases.[320] These myriad innovations and changes in the organization of maritime trade and exploit "all shared one common purpose: they served to mobilize the capital resources of an expanding economy for investment in overseas shipping."[321]

Documentation of some form of maritime credit exists since early antiquity.[322] However, it is thought that proper marine insurance "began to evolve towards the end of the 13th century, when Italian merchants stopped travelling with their cargoes…" This is logical, as the merchant was no longer running the same risks as his cargo. A hybrid form of protective maritime loan called an 'insurance loan' was developed at the very end of the 13th century, but were replaced by a system of premium insurance by 1350."[323]

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[320] Jackson 1989, 628.
[321] Jackson 1989, 616.
[322] Millet 1983, 50. Millet claims that the largest group of identifiable maritime creditors are the professional money-lenders.
[323] Millet 1983, 44

13th Century Navigation

"O wild west wind, thou breath of autumns being,
Thou from whose unseen presence the [sails billowed],
Are driven like ghosts from an enchanter fleeing
Yellow, and black, and pale, and hectic red"…

℘ *Adapted from Percy Bysshe Shelley*[324]

The late medieval seafarer lived during a time of navigational revolution. Indeed, until the 13th century most navigational techniques, routes and rhetoric were quite similar to those of the Classical world. Sources from Classical times were rife with oratory against sailing the seas, and several *topoi*, that is ancient literary conventions or archetypal themes, expressed a highly negative attitude toward the sea and seafaring.[325] The peak of maritime activity has always, in general, naturally centered on the summer months when time spent at sea was safe, productive and lucrative, but precisely how far seafaring stretched into marginal times, and even into winter, is a matter of debate.[326] By the fifth century, what was once a sailing season governed by *lex naturae* had become a *lex iuris*, at least for state-sponsored commerce. The body of imperial law known as the Codex Theodosianus of A.D. 438 mandated a suspension of navigation between 15 October and 13 April for shippers with

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[324] Shelley 1919, 707. Adapted opening lines of "Ode to the West Wind."
[325] Davis 2009, 3. The included such examples as the Storm scenes in Books V and XII of Homer's *Odyssey* and Book I of Virgil's *Aeneid.*
[326] Davis 2009, 65.

African itineraries. Thereafter till the Middle Ages, Rome, Byzantium and the various maritime republics implemented numerous edicts attempting to legally confine commercial seafaring to only the safest months. Shippers, however, continued to sail winter seas for a variety of reasons, not least for routine commerce.[327]

The nautical culture of the late antique and medieval maritime traders would have fostered zones "dominated by local shipping focused around [a] main hub."[328] This is not to draw the conclusion that Braudel did of the 16th century, that the entire Mediterranean was composed of 'half-enclosed local economies'.[329] Rather, it is to suggest that the relatively safe ranges that local mariners commonly pursued during the Middle Ages may have been the precursors to and progenitors of the later, more fully defined regions. These areas were constrained by both physical and political boundaries that limited, to an extent, the intimate knowledge of coast and resources that successful littoral navigation required.

The seas in which these zones grew are unique, and are full of capricious energy. In general terms, "the Mediterranean and Black Sea may be considered variously benign and hazardous for navigation—benign in the sense that both seas are limited in size, are nearly tideless, have elevated shores, exhibit weak currents (except in certain straits), and boast clear skies and moderate winds throughout numerous months of the year. The physical configuration of both seas may be considered to have facilitated navigation when compared

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[327] Davis 2009, 101-4.
[328] Erdkamp 2005, 171-3.
[329] Braudel 1995, 150, 382.

with other historic areas of seafaring, such as the North Atlantic, Indian Ocean or South Pacific. Generally absent are the weather conditions and geography that produce the great tides and monstrous storms and rollers of the global oceans. And yet they are also hazardous, their complex geography and climate presenting their own challenges and leaving an indelible imprint on how Greek, Roman [and Medieval] seafarers solved the universal problems associated with intended movement within maritime space."[330]

Navigators relied heavily on knowledge of routes for long journeys, called *peleggi*.[331] Maritime movement was determined largely by the various wind regimes particular to each region and locale. Safe navigation, then, entailed the accumulation of experience and knowledge of winds at both the macro and micro level, and the formulation of sailing strategies for each environment—diurnal winds for departing harbors, synoptic winds over open water for making effective and safe way along planned routes, and diurnal winds again for safe landfall and harborage.[332] Three forces were available to move a ship along its journey: first, the currents, running in their various and often known patterns around the world; next, the wind, able to be harnessed by masters of sailcraft to carry a ship across the seas. Lastly, there is the power of muscle and sweat, of men driving long oars into the deep waters, hour after hour.

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[330] Davis 2009, 16-17.
[331] Campbell 2003, 387.
[332] Davis. 2009, 45.

Throughout antiquity, sailors of the highest caliber had been successfully navigating the waters of the Mediterranean and Black Seas. While the "capabilities of ancient and medieval ships were barely adequate to give man that mastery of his physical world which he desired and for which he designed them, [so that to] a large degree man had to make his crossings of the sea in harmony with the forces of nature rather than in spite of them or against them," this in no way prevented these bold seafarers from high enterprise.[333] Indeed, recent research has shown that contrary to "much conceptualized theories of the helplessness, timidity, and unskillfulness of ancient navigation, both coastal and open-sea sailing were matters of routine in the commercial sector."

Commercial seafarers sailed at night and employed the stars to deduce navigational information. Winter sailing, for all its dangers, was a widespread practice, and navigational strategies existed to weather storms, and were usually successful.[334] The last point is of particular interest in regards to the Novy Svet wreck; in the Classical age, merchant galleys generally stuck to near shore activity and cabotage, yet in the Middle Ages, they began making open sea crossings, though visibility was highly variable, and often less than 10

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[333] Pryor 1988, xiv. The modern age has been described as an age of the idea that man controls his environment, and is master of it, rather than being subject to the whims of nature and of god. This concept is connected to the enlightenment and the rise of science and reason over dogma. It is interesting in this light to view the ships as Pryor sees them, tools designed to give man mastery of his world, and yet due to limitations, still subject to nature or god, bending to wind and tide. They are liminal, and carried us from the Middle Ages to the modern.

[334] Davis 2009, viii.

nautical miles no matter how high the landforms.[335] It is often argued that the open sea was to be feared in ages past, and this is true, but far from the whole truth. Indeed, areas closest to land often prove to be the most dangerous.[336] What is certain is that for the sailor the 'problem of the point', was a matter of life and death."[337] When visual references are unavailable, the problem of position can only truly be solved by mathematics, and an interesting phenomena began to arise among sailors in the Middle Ages, in part to balance the dangers of the deep with the dangers of the shallows. The craftsman-sailor - whose skill rested on tradition and experience, began to transform into a technician-sailor - who relied increasingly on established scientific principles.[338] This gradual change took many different forms, but was based in a solid history of navigational lore and tools.

Of these elements of the craft and burgeoning science of navigation, the use and representation of the winds is perhaps the example with the longest tradition. Homer recognized only four winds.[339] Four only were recognized in the Old Testament, and remarkably in the New Testament as well, though by the time of its compilation many more had been generally recognized.[340] The Wind Rose of the Rhodian General

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[335] Davis 2009, 50-65. This is due in significant part to suspended particulate matter, the Mediterranean "haze."
[336] Campbell 2003, 387.
[337] Taylor 1960, 2.
[338] Taylor 1960, 2.
[339] Odys. V, ll 290-300.
[340] Thompson 1913, 17. Old Testament: Jer. Xlix 36, Ezek. Xxxviii.9, Daniel viii.8 and xi. 4. New Testament: Matt. Xxiv. 31, Mark xiii. 7, Rev. viv. 1, and Acts xxvii 12-14 regarding the voyage of St. Paul.

Timosthenes, from the 3rd century B.C.E., marked 12 directions. Its use, and the theme of giving direction in terms of the following wind persisted into the Middle Ages, at least until the 12th century, , when a wind rose of sixteen and thirty-two points, or 'rhumbs' appeared.

This wind rose was developed in concert with the advancement of the magnetic compass.[341] In its initial iteration, this device was known as a lodestone, which means leading stone and is related to the lodestar, Polestar, *stella nautica.* It is an oxide of iron and is quite common (Fe_3O_4).[342] The attractive power of the lodestone, and its ability to transfer that power to iron or steel, was known to the ancients. They did not, however, recognize that it pointed north. That crucial aspect of the technology was certainly known in the West by the latter half of the 12th century, and was used throughout the 12th and 13th, centuries by laying a magnetized needle on a reed or a cross of reeds in a basin of water.[343] Of note is the fact that records of 1250 indicate that the "empowering" of the needle was ritualized, or made into a conjuring trick before skeptical, superstitious and fearful crewmembers and citizens.[344] This is a remarkable example of the changing times, showcasing the fact that the practical inventions and concepts could push the limits of belief on account of their usefulness. In 1269, the first pivotal magnetic needle in a box, with a

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[341] Davis 2009, 88.
[342] Hitchins and May 1955, 13.
[343] Thompson 1913, 2-3.
[344] Hitchins and May 1955, 12.

glass lid and divided scale and azimuth "sights" for taking bearings is recorded.[345] The innovation of affixing an empowered needle to a wind rose, however, did not appear until the beginning of the 14th century.[346] It is important to note, however, that while these were certainly "magnetic directional devices," a true scientific "compass" did not exist until the mid-18th century.[347] The name itself, compass, is not a contemporary name; in 13th century Italian, however, the word "*compasso*" meant a sailing direction.[348]

Sailing guides existed as well. The first of these are the *periplui*, or maritime itineraries, detailed descriptions of travel along sections of coastline. They date from Classical times, and many included data concerning the Black Sea. For example, the 4th century B.C. *periplus* of Pseudo-Scylax describes a coasting voyage from the Thracian Bosphorus to the mouth of the Ister (Danube), then due east across the open sea of the Gulf of Karkinitis (some 200 nm) to Kriou Metopon on the southern tip of Crimea, a voyage of three days and three nights. The *Periplus Ponti Euxini* of Arrian, the governor of Cappadocia under Hadrian (76-138 A.D.), is a remarkable account, detailing the "utility and dangers, of using diurnal winds for coastal voyages along the southern and eastern shores of the Black Sea."[349] All save one, however, lack port to port data; they are works of

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[345] Hitchins and May 1955, 22; Thompson 1913, 2-3.
[346] Thompson 1913, 3.
[347] Klinkert and Grant 1970, 71. For an in-depth look at the physics of magnetism behind compasses, see chapter five.
[348] Hitchins and May 1955, 22-3.
[349] Davis 2009, 135-7.

erudition intended for educated travelers, not sailors, and included data unrelated to navigation including historical and mythological notations.[350]

The late Middle Ages saw vastly technologically improved writings, including increasingly precise estimates of distance in terms of sea-miles as well as of direction in relation to individually named winds within these books, now including the appellations of pilot-books, nautical guides and *portolans*.[351] A 13th century Italian pilot-book details the same region, and states: "From Trebizond to Surmena 24 miles east, from Surmena to Rissa 30 miles north-east (9reco), from Rissa to Sentina 20 miles north-east.' And further on: 'From Faxa to Sevastopol 80 miles north north-west" (tramontana ver maestro). Harbor details are then added, including the direction that the anchorage is under the castle, and to "drop your prow anchor in 20 or 30 fathoms and your poop anchor will be in 3 fathoms."[352] Many examples of these *portolans* existed. They were often combined with other commercial texts into a single volume, often creating a comprehensive overview of the seafarers spheres of influence and activity, being both symbolic cultural and practical articles of the trade.[353] The earliest known and one of the most cited of these is the "*Compasso da*

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[350] Dalché 2002, 64.
[351] The name is derived from the Italian adjective *portolano* (relating to ports or harbors), and is quite modern, coming into usage only in the 19th century.
[352] Taylor 1960, 3.
[353] Dalché 2002, 67, 71.

Navigare," composed in the middle of the 13th century.[354] Almost immediately, it reached such a level of integration that contemporaries wrote of its "necessity" for navigation.[355]

In the mid to late 13th century, however, an amazing phenomenon appeared, unprecedented in the historical or archaeological records: the nautical chart. The chart, as opposed to the woefully (geographically) inaccurate *mappaemundi* of the age, and in contrast to the aforementioned nautical tools, aimed first and foremost at precisely rendering the sea-coast. The "medieval *mappaemundi* are the cosmographies of thinking landsmen. By contrast, the charts preserve the Mediterranean sailors' firsthand experience of their own sea..."[356] Contemporaries seem to have referred to these charts by a number of names, broadly termed as the local version of nautical or sea chart, world map, or guide.[357] The first chart within the archaeological record is known as the *Carta Pisana,* most commonly dated to 1275-1300. Its origins remain ambiguous, but of all final contenders, Genoa currently appears most likely as a compiler of the map from several regional databases.[358] It was austere, with its limited illumination reserved only for the wind rose and small, though brightly colored, flags showing the political affiliations of individual sea-ports.

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[354] Motzo 1947, 1-137; Campbell 2003, 382; Dalché 2002, 61.
[355]Taylor 1956, 95.
[356] Campbell 2003, 372.
[357] Campbell 2003, 375. Literary and archaeological evidence suggests that these charts, which were made of vellum and usually were of one skin, were normally kept rolled, on wooden rollers, held tight by a leather thong that was sometimes passed through a pair of incisions in the vellum.
[358] Campbell 2003, 404; 456. The most probable candidate for the second oldest chart, the Cortona Chart, is dated to the very early 14th century. It preserves the entirety of the Black Sea, which the *Carte Pisane* does not.

Most important of all, and the first of its kind found to date, the chart carried a double-ended scale; it measures 100 miles divided into lengths of 50 miles, and one of these into sub-divisions of five miles. Place names run inland to leave the coast clear. A network of rhumb-lines covers the chart, the rays were ruled in different colored inks and laid out in orderly sequence.[359] These lines clearly show the work of a person who had, for that time, the still-rare knowledge of Euclid's geometry: in other words, a mathematician. These skills were not limited to the cartographer; to correctly use the chart, the shipmaster was obliged to carry and use a pair of dividers and to have command of elementary arithmetic.[360]

For all their surprising accuracy, however, these charts were not without issues. Discrepancies and errors include minor magnetic offsets, the enlarging of islands and capes, for reference, and the simplification or generalization of geographical features like straits. Bathymetric data is entirely lacking, and warnings scant, relegated to a small number of cross-like symbols that seem to indicate dangerous places.[361] While the "artificiality of these coastal conventions reduces confidence in the accuracy of the very small hydrographic details, it suggests that the draftsman's main concern was to locate headlands (which had to

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[359] Taylor 1960, 5-6. To use the chart the pilot laid a ruler from their present position to their port of destination, and holding one point of their dividers against it searched for the ·most nearly parallel rhumb. traced this to the rose, identified it, and set course accordingly. No parallel rules existed in those days. Lines of Constant compass bearing are also referred to as loxodromes; rhumb line grids and loxodrome nets are both used to describe the entirety of them on a map. The scale was double-ended so that the chart could be accurately viewed from multiple angles.

[360] Taylor 1960, 4.

[361]Campbell 2003, 378;

be rounded) and estuaries (which provided both fresh water and access to the interior). With these features as fixed points, a remarkably accurate overall picture of the Mediterranean was achieved."[362]

In 1270 we have the first recorded use of a nautical chart; the chronicler of King Louis IX of France relates a scene where they were sailing on a Genoese ship from Aigues Mortes to Tunis, to begin the 8th Crusade. They were caught in a storm and forced to put in at the port of Cagliari on the southern coast of Sardinia, and the chart was employed to show the concerned monarch their position at sea. The chronicler called it a *mappa mundi*, but it cannot have been one of the common, mythology-rich "T" maps of the time that held so little detail. It must have been a chart. [363]

The Wind Roses on these charts, as noted above, could be quite ornate. Their coloration was not out of mere decorative purpose, however. The standard practice was for "the eight (or a multiple thereof) 'winds' (i.e., north, northeast, east, etc.) to be drawn in black or brown, the next eight half winds (north-northeast, east-northeast, etc.) to be in green, and the sixteen quarter-winds (north by east, northeast by north, northeast by east, etc.) to be in red." This consistent convention allowed the navigator to pick his wind or direction without having to count around from one of the recognizable primary

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[362] Campbell 2003, 377.

[363] Taylor 1960, 10. There is clearly some broad leeway in the usage terms for this object. Joinville refers to the object discussed as a *mappa mundi*, but it cannot have been as such in the current sense of the word, one of the T maps that hold so factual geographical detail. In a similar instance, a ship's inventory of 1294 mentions three *'mappae mundi* '. These instances almost certainly refer to charts.

directions.[364] The value of these tools was such that by the end of the 13th century, some vessels are recorded as being ordered to carry multiple charts.

The Carte Pisane can be taken as a probable example of these charts.[365] Nevertheless, it appears that all surviving copies of charts, including this one, were meant for the library or terrestrial map room, not for shipboard use, due to lack of navigational data on them.[366] Nevertheless, the amount of data and ideas that they brought together in a single format is remarkable: "Arabic" numerals, rumbh lines and hardline mathematical approach, scale for distance - made with drawing compasses and a ruler, all set within a new visual context that emphasized the coastal geography of the Mediterranean and Black Seas. Although there is no direct evidence, the trigonometrical *Toleta*, known colloquially as the Circle and Square and used, in conjunction with dividers, to determine position if a vessel went off course out of sight of land, were probably available in the late 13th century as well.[367]

Many medieval voyages, of course, were made without losing sight of land. Indeed, the relatively small distances involved in the Mediterranean meant that it was most unusual for a ship to be more than a week out of sight of land; in the separate Mediterranean basins,

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[364] Pelham 1980, 8-9.
[365] The original is held in the Bibliothèque nationale de France and is listed as "*Carte marine de l'océan Atlantique Est, de la mer Méditerranée et d'une partie de la mer Noire, connue sous le nom de Carte Pisane*".
[366] Campbell 2003, 441; 382. Older theories contemplated whether or not the *Carte Pisane* and the *Compasso da Navigare* were created from the same datasets are incorrect, despite correlation between them. The Black Sea, an area largely damaged on the *Carte Pisane*, is considered to have been added later to *Lo Compasso* at some point before 1296.
[367] Campbell 2003, 443. These tables could "solve the nautical triangle" or "resolve a traverse": that is, make the necessary adjustments when tacking or if blown off course. But this of course depended on the correct judgment of initial position and course sailed, leaving the sailors' skills still paramount to the solution.

the coast would be seen most every day and errors would never be allowed to accumulate.[368] On such ventures, charts still supplied valuable information, such as the sequence of coastal features, the location of offshore islands and the relationship of these islands to each other, etc. The true relevancy of the charts at this early date, however, is limited: access to them and the atlases followed was scarce until well into the 15th century.[369] Acknowledging a significant lack of literary and archaeological evidence, it seems that they were uncommon at best in the late 13th century, and not a necessary commodity until nearly a century later.[370]

Two categories of navigational tools were at the disposal of late 13th century mariners, mental and physical. Of the mental, the most powerful tool may well have been the now common knowledge that they "sailed the surface of a sphere."[371] To this was added diverse knowledge of the landmarks that adorn its coasts, the tides and currents of its seas, and of the winds and stars that roam its wild skies. The lode-stone and iron needle, sounding lead and *portolan* descriptions of places, ports and distances comprised the physical compliment to the crew's knowledge. So prepared, the crews of ships and galleys could brave the common sea-lanes and specialty routes of the maritime world with greater impunity, pushing boundaries of distance and season. The last voyage of the "Pisa Ship"

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[368] Teixeira da Mota 1958, 138.
[369] Foncin and Monique 1963, 10. Atlases appear at the turn of the 14th century, and essentially are "loose" charts that comprised a full map divided up and spread over several similarly-sized sheets of vellum. These could be bound, as in a book, or tacked to boards to prevent shrinkage and distortion when exposed to salt water.
[370] Campbell 2003, 439-40; 437.
[371] Taylor 1960, 7.

would have been no exception. Knowledge of navigation was always constrained by the physical capabilities of the seamen aboard. This has never been truer than of the galleys of the merchant adventurers, which, like all oared vessels, were constrained in their movements by the availability of fresh water to replenish the toiling rowers.

More even, however, than the "soupy stew of salt meat and legumes" that provided medieval crews with their staple nourishment, it was fresh water that fueled the galleys of the past. It was absolutely vital: if it ran out, crews would reach dehydrated exhaustion, and be stranded, in a matter of hours. The average rower needed a liter an hour to stay hydrated; at a bare minimum, a ton of water was needed per hundred men per day. Current research indicates the best arrangement for water needs, which effectively governed the range of a galley, was for each person to bring their own water in an amphora or *kados*, a small barrel, of 27 and 40 liters respectively, comparable to the Genoese *quartarolo* (39.75 l) or the Neopolitan *barile* (43.625 l).[372] While barrels had been in use to some extent since at least the 5th century B.C., they began to coexist with *amphorae* more frequently, and by the 10th century Byzantine fleets were using both barrels and *amphorae* to transport water. By the 13th century, the barrel had almost replaced the amphora in western nations, although the east and Byzantine territories did not follow suit until the end of the 14th century.[373]

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[372] Pryor 2002, 52-57. For stowage see Fig. 2.5, p. 56; Tweede 2005. See above; Kilby 1971, 51-63.
[373] Collins 2012, 88.

From Constantinople to the Taurican Coast

"The Black Sea lies in a deep depression between the Pontic Mountains of Anatolia to the south, the Caucasus Mountains to the northeast, the Crimea to the north and the Balkan Peninsula to the west. The sea has an east-west length of 1,150 km, an average north-south width of about 400 km and a coastline of some 4,300 km that encloses an area of about 423,000 km^2." [374] The Crimean peninsula extends southward into the basin from the steppe and splits the basin into a western and eastern half; the narrowest crossing (263 km) is between Cape Sarych in Crimea and Krempe Burnu on the Turkish coast. From antiquity, these two capes formed natural bridgeheads for north-south routes. The fortress city of Sudak, one of the most influential cities in Crimea during the Middle Ages, lies midway along the south eastern coast of the peninsula. Built near the midpoint of the 20 km long Bay of Sudak, of which the bay of Novy Svet and the present research comprise the western terminus. It lies between the ancient city of Chersoneos and the bustling medieval trading center of Caffa.

For vessels traveling from the Thracian Bosporus to these cities, there were innumerable potential routes. Countless major and minor maritime corridors crisscrossed the Mediterranean and Black Seas and paralleled their shores. Some connected with far-

[374] Davis 2009, 25.

reaching riverine routes.[375] Navigational "choices, decisions and preferences were subject to change on a daily (if not hourly) basis while en route due to any number of circumstances, whether evolving weather and sea conditions or more human agents such as piracy, trade agreements, commercial rivalries, inflated port tolls and political unrest affecting destinations."[376] In general, however, four routes are available to bring a vessel from Constantinople to Sudak.

Perhaps the oldest is a difficult route running against the current up the coast of Bulgaria towards the Istros/Danube River, and then sailing along the northern Black Sea coast to Taurica. A second route led straight from the Thracian Bosporus to the peninsula, cutting across the open sea and heading for the city of Chersonesos. A third, much longer and less often used route followed a course along the Anatolian coastline to the kingdom of Trebizond, and from there northwards along the coast to the Cimmerian Bosporus, and then to Taurica. By far the most popular route, however, was a middle course, turning northwards at Sinop on the Cape of Karamby and heading directly for the Crimean peninsula. This route could take as little as 24 hours on the open sea, (Fig. 5.3).[377] As the

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[375] Zelenko 2008, 141.

[376] Davis 2009, 88; 142. Each of these corridors was "trafficked by various kinds of ships serving various purposes—bulk grain freighters under government commission, point-to-point merchantmen, caboteurs, fishing boats, ferry and passenger vessels, dispatch galleys, warships in convoy and generals fleeing naval defeats by the quickest and safest route."

[377] Morozova 2009, 159; Davis 2009, 78. Taking into account the multitude of variables involved in each voyage even in optimal conditions, we should envision these sea 'routes,' whether short- or long-haul, as wide maritime corridors of general movement between one place and another.

record of Stanconus states that the sailors made their way to Sinop, and thence met the Genose in Sudak within two weeks of setting sail, it is clear that it was the middle course they took.[378] They were following firm precedent, as the route was known and used as early as the 6th century B.C.[379]

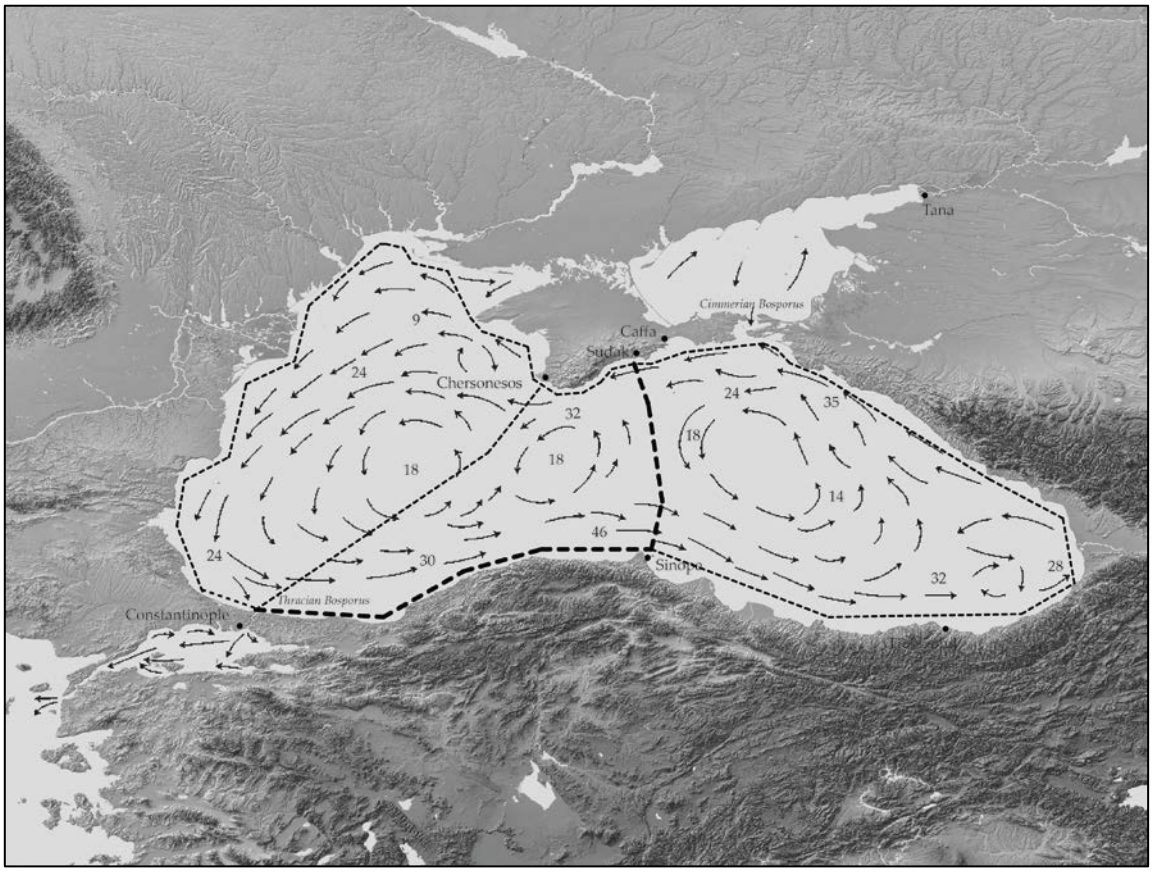

Fig. 5.3. Black Sea sailing routes and currents, highlighting the route taken by the Pisan vessel mentioned in Stanconus et al. Adapted from Davis 2009, 257. Figures indicate rate of current in nautical miles per day.

[378] Stanconus et. al. 1863, 285, ll. 25-40.
[379] Davis 2009, 141.

This middle route has 4 stages, two of which are extremely difficult, and two of which are, in general, not: The Golden Horn to the Black Sea mouth of the Thracian Bosporus, the mouth to Cape Karambis, the Cape Crimean coast, and from thence to Sudak. The Bosporus itself is a relatively straight, 30-km-long channel ranging between 700 m and 3.7 km in width, its widest expanses found toward its northern end. It has a difficult, 3 knot (72 nm/d) surface current. In addition, winds out of the northeast prevail here, especially in July and August, and shoot down the Dardanelles into the Aegean as part of the same annual summer flow of etesian winds that affect the Aegean and Eastern Mediterranean.[380] The journey to the mouth of the Bosporus would have been grueling (Fig. 5.4). From the mouth to the cape there is a favorable 1.25 knot (30 nm/d) current. It is about 360 km (194.4 nm) in a direct line from the mouth to the tip of the cape, and with this route the ship is never more than 45 km from land, and is usually much closer to it. Most likely the crew would be fighting wind from the northeast.

The open sea crossing from the cape to Crimea has a favorable 0.75 knot (18 nm/d) current. From the tip of the cape it is 265 km (143 nm) to the nearest point on the Crimean shore, and 330 (178.2 nm) km in a direct line to Sudak. A galley under sail could certainly make the crossing in less than two days.[381] Over the sea, winds from the northerly quarter and the west slightly predominate. Again, this would have been against them until

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[380] Davis 2009, 43

[381] Morozova 2009, 159; Davis 2009, 31.

getting closer to the coast. The final leg, from the Crimean landfall to Sudak would have been a tough finish, working against a 1.45 knot current and avoiding a weaker 0.75 knot current swinging back south to Sinope. Winds over the Black Sea are highly complex, in accordance with the diverse littoral terrain, though winds from the north and west predominate slightly.

Sailing from one port to another along any shore would have entailed a comprehensive local knowledge of river valleys on which these land and sea breezes acted, as well as the relative times of their changeover. More localized effects are felt along the mountainous northeast coast, where a northeasterly bora wind, fueled by frequent outbreaks of continental Siberian air, often occurs during the winter months, creating choppy seas that reach as high as 7 m.[382] These storms are in no way confined to the winter months, however.[383] Both literary and experimental archaeological research have given a range for galley speeds between one and six knots; five to six over open water under favorable conditions, three to four along the coasts or islands and between one and two and a half

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[382] Zelenko 2008, 16; Davis 2009, 44-5. Northerly gales of Beaufort scale 8 or stronger and their resultant tall seas are also frequent along the west coast; Pryor 2002. 45. For bireme galleys and dromons, waves over 1.6 m would render the lower oar-ports inoperable. Such conditions begin to occur under moderate breezes, winds of Beaufort scale 4.

[383] Albertson 2005-13, 2012. In August of 2007, 2011 and 2012 there were storms with 3 m high waves hitting the beach at Novy Svet.

under adverse open water and coastal conditions, where the wind was forward of the beam.[384]

Fig. 5.4. The Black Sea Mouth of the Bosporus.

[384] Severin 1985, 22-6; 83-4. Tim Severin's Argo managed between 5 and 6 knots when under sail in his recreation of the initial voyage of the Jason and his Argonauts, between Volos (Iolkos), Greece and Georgia (Colchis) on the far south-eastern shore of the Black Sea. He incidentally showed that a 20 oared vessel could have made the journey from Iolkos to Colchis, clearing the Bosporus; Davis 2009, 62; Casson 1951, 143; Casson 1995, 283, Table 1, 295-97. The reconstructed trireme *Olympias* also reached a maximum of six knots under sail.

Sailor, Warrior, Merchant, Man: The Medieval Merchant Adventurer

"A me ed a'miei primi ed a mia parte"[385]

℘ Dante Alighieri

The Middle Ages, and the 13th century in particular, were a time of transition and elevation for the common sailor and all seafarers alike. The world of the seafarer, however, has never been an easy one, and this transition to a less segregated common worldview was slow, and built on common profit. The negative feelings expressed in the ancient *topoi* mentioned above were often applied not only to the sea but to the merchant marine as well, and in many ways those who sailed and invested in maritime enterprise were reviled from Classical times up through the Middle Ages. Negative accusations routinely included lust for gain, sly bargaining and general poor citizenship, based upon a mistrust for those who made their living on something as terrifying and untrustworthy as the sea. The Classical concept of the pursuit of wealth requires clarification. At its root, the idea is tied to the Roman ideal of *otium*, that is, acceptable leisure, in contrast to *negotium*, that is unnecessary action and pursuits. In terms of gain, the expressed idea was that once you could afford *otium*, or the ideal, pursuit of more wealth would be for wealth alone and therefore unsocial.

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[385] Longfellow 1909, Inferno X, 47. The quote is discussing the allegiance of a Tuscan man of the 13th century, who, when discussing being wronged, states that the enemy was averse "to me, to my fathers and to my party." This fundamentally describes the familial relationship between the family and the Commune.

Medieval topoi in hagiographic and travel literature express themes of fear and mistrust of the sea, although there is often a strong sense of confidence in travel when together with a holy person, and sometimes a sense of danger when travelling with sinners.[386] In the East, the opinions of Byzantine writers were similar and remarkably close to the Roman ideals of their predecessors: self-sufficiency, no involvement in trade or lust for gain.[387] But as the Middle Ages drew on and the maritime world expanded, this sentiment, at least to some degree, began to change. Along the northern and western shores of the Mediterranean in the 11th and 12th centuries, the Italian merchant "lived and breathed in a world of contracts, partnerships, agencies, commissions and loans; his status was that of a senior partner, a junior partner, or a factor; the structure of his commercial relationships was clear, defined, and very well labeled."[388] The agriculture and filial, that is imperial, piety that was often cited as the solid, respectable status of the good citizen began to be questioned.

A showcase example is the Pisan account of the conquest of the Balearic isles in the early 12th century, recorded in the *Liber Maiolichinus de gestis Pisanorum illustribus*. The author contemptuously speaks of the agrarian Luchhese, who abandoned the Crusade

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[386] Mullett 2002, 260-1; 265-84. "There are five rhetorical travel genres: the *propemptikon*, which 'speeds its subject on his journey with commendation', the *syntaktikon*, which is the farewell of the departing traveler, the *porsphonetikon*, which is an address to someone arriving,...the *epibaterion*, the speech a traveler makes on arrival…[and the] *hodoipoikon*, a traveler's account of a whole journey."
[387] Collins 2012, 50.
[388] Erdkamp 2005, 97.

islands, as "tillers of the soil, fit only to follow the plow and tread the winepress."[389] Maritime warriors from the Iberian Peninsula who joined the fight also joined in the criticism, implying that the Luchhese were weak, only able or fit to work on land, and thereby lending a kind of prestige to those involved in maritime efforts.[390] This is striking because Pisan maritime warriors and merchants are constantly associated – they are at all times one and the same. While the people who join them may well have been just soldiers, the fact that Pisan maritime merchants are being praised above agrarian contemporaries is clear, and this association of acceptance and respect for fighting traders seems to only increase with the centuries. Of course, the elite strata of society had always played role in maritime activity. Imperial houses and navies, monasteries temples, and innumerable wealthy individuals could not help but be heavily involved to maintain their borders and wealth. Like so many of the lower classes, many merchants "were simply beyond the scope of Byzantine [and other] authors, who [served only] the elite.[391]

These actions of the upper classes were not wholly based on distaste or superstition, but had a far darker purpose: as the buffoonery of the Classical actor acted as a foil for the *gravitas* of the declaiming senator, so the untrustworthiness of the seafarer served as a foil for the earth-bound financier. The latter was protected from all blame and infamy, protected

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[389] Calisse 1904, ll. 394-402. This is the "Majorcan Book of the Illustrious Deeds of the Pisans." Majorca is the largest island of the Balearic archipelago.
[390] Calisse 1904, ll. 678-782.
[391] Collins 2012, 50.

by the formers shame, though both shared in the denigrating activity. By the later Middle Ages, however, many ship owners and merchants of the maritime republics were members of the greatest families. The early medieval orders of merchants (*negotiores*), that is the leading *maiores et potentes*, the followers or *sequentes* and the lesser *minors* began to come onto an equal footing with the landowning *possesores.*[392] As the importance of maritime technology and trade grew, so attitudes changed towards the men involved; in a complete reversal, the maritime merchant now held a highly honorable status.[393]

Education

In 12th century Pisa, Genoa and Venice, the wealthy and important classes were not the great landowners and prelates of Europe at large. While noble, they were merchants, ship-owners and bankers, who needed educated staff-factors, clerks, secretaries, pursers, accountants and the like. Consequently there were lay schools and even lay schoolmasters in such cities as well as the more usual monastery and cathedral schools. Education was not only more general than elsewhere, it was directed towards business life rather than merely to the mastery of Latin grammar, including rudimentary arithmetic.[394] By the 13th century there were few if any illiterate merchants in Italy - special schools taught basic courses in business practice and many went through university courses, usually graduating with a

[392] Lopez and Raymond 2001, 36; 41; 56.
[393] Byrne 1930, 55.
[394] Taylor 1960, 5.

degree in law. Books are often found in lists of merchants' equipment, including books for leisure as well a technical works on law, medicine and business. Most western merchants could speak French [old], and Italian was understood all over the Mediterranean and beyond. But apart from varied knowledge of local languages, medieval seafarers had a common "*lingua franca*," a mixture of languages that allowed for basic international communication while engendering new local terminology from foreign phrases.[395] Multi-lingual dictionaries and practical grammars tailored to mercantilism were available, for example the *Codex Cumanicus.*[396]

With the advent of the portolans during the same century, captain and navigators, and even some regular sailors, began to become familiar with basic mathematics. This is a remarkable phenomenon, for it describes the first flourishes of an educated lower class in a society that was very widely illiterate. The requirement of applied knowledge that came with advanced navigation and mercantilism helped usher in a new age of education for a stratum of common people. Its uses were immediate and infinite. Among the merchant's tools would be numerous manuals, covering nearly every subject of interest to a trader: descriptions of wares, measures, moneys, tariffs and itineraries; portolans; arithmetic

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[395] Kahane and Andreas 1961, 5.

[396] Lopez and Raymond 2001, 346. A famous contemporary example is *The Travels of Marco Polo*, written by Rustichello of Pisa, who met Polo in a prison in Genoa and became his ghostwriter in the late 13th century. The original title of the work (in Old French, which was then the predominant literary language in northern Italy and in which the book was first published) was *Le Divisament dou monde*, or The Description of the World.

formulae to calculate compound interest; perpetual calendars; methods to make alloys and to test chemicals; economic theories, and advice on how to dodge customs inspection. One of the most common was the art of distinguishing inferior wares from good.[397]

Mercantilism

A merchant adventurer is not just any merchant: they were maritime, held general allegiance to one ship, were capable of both military and mercantile affairs, and had some freedom of action and choice in those affairs. They could work in fleets and on state business, but, in their essence. they were talented, capable, and most importantly free to make their fortunes as they could. In terms of trade, Pisa and all Italian maritime republics seem willing to bend the rules on agreements and promises, seemingly willing to say anything, work with anyone, and fight with everyone.[398] Evidence is more widespread in the 13th century. In an exemption emanating from Acre in 1245, Pisan consuls in Syria acted for those who were *Pisanorum nomine censentur*, namely, people from Florence, Pistoia, Siena, San Gimignano, and Tuscany in general. In a document of the same year, some Tuscan traders in Acre swore they were Pisans and, as such, should benefit from the special conditions afforded such citizens. Again, merchants from Marseilles often traveled to the east on Pisan ships, granting them the status of "Pisans upon arrival in the Middle

[397] Lopez and Raymond 2001, 342-44.
[398] Salvatori 2007, 39-40. This should not be considered an accepted practice in any regard, and provoked hostile responses including the direct written displeasure of Saladin.

East."[399] This "sailing under a flag of convenience" - as David Abulafia succinctly puts it - was practiced widely in the West.[400]

This type of occurrence was not limited to merchants. Evidence of mixed crews on Pisan and other western vessels is prolific in the Middle Ages, especially following the second Crusade. In the case of Pisa, this included crews comprised of Pisans and Franks, Pisans and Muslims and at times a combination of all three. Indeed, the graffiti on many of the 13th century ceramics found at Novy Svet, and their parallels corroborate a "multi-lingual, multiethnic trade network in the Black Sea that included Byzantine Greeks, Hellenized Bulgarians, and Arabs."[401] The reasons for this are rooted in the Pisa's ambiguous place on the political chessboard of the Eastern Mediterranean, combined with their willingness to do whatever it took to facilitate success for themselves and their city.[402] Along with profit, however, there was an element of risk mitigation – citizenship was conferred upon merchants of other allegiances not only to facilitate trade, but to insure that those entities did not act in a way to endanger the vessel, as their fate was now sealed to it.[403] The concept is plainly laid out in a "mandate" that the Pisan consuls gave their merchant vessels plying the eastern Mediterranean after the First Crusade, an action probably dictated by pragmatism. This directive ordered her captains to intervene wherever it profited them,

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[399] Salvatori 2007, 39-42; Mollat 1972, 483.
[400] Abulafia 1987, 20.
[401] Collins 2012, ii.
[402] Salvatori 2007, 39-42.
[403] Salvatori 2007, 46.

to try not to disappoint anyone, to be careful to respect the agreements with Muslim states (without letting "Westerners" realize how close they were), and to sell arms and give help wherever needed without worrying under whose flag they were sailing.[404]

The merchants of the Middle Ages, while "primarily traders, were also pirates and slave-dealers, lawless and violent men who shrank from nothing which would bring them gain of money."[405] The hot-headed behavior of Pisan crews at Constantinople in the summer of 1277, and indeed all acts of maritime violence under consideration in this work, need context. They may best be viewed in the context of what was considered a truly serious offence by contemporaries. While *rappresaglia* was commonplace and, as we have seen, even accounted for in treaties, true atrocity is certainly not without literary precedent. The definitive example for the citizens of Pisa is found in the actions of the late 12th century merchant captain Trapelicinus.[406]

This merchant committed sensational atrocities amongst Pisa's Saracen trading partners in Egypt, brutally betraying and murdering civilian families taken aboard his vessel in good faith, and looting vessels protected under treaty. His actions condemned both himself and his crew to an unprecedented permanent exile from the community. This punishment was prescribed for what may best be described as a breach of national security:

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[404] Salvatori 2007, 40.
[405] Heywood 1921, 32. In 1063 Pisan corsairs seized a ship full of Benedictine monks, burned it and killed most aboard, leaving the survivors on shore with only their clothes.
[406] Salvatori 1972, 46.

his actions threatened the very foundations of the maritime activities of the city and thereby its survival. Trapelicinus sought refuge under the flag of Genoa, but the fury of the Pisans was such that this was no deterrent, and they began what became a ten year war to seek revenge upon him.[407] Brutal as it was, however, "war as fought within western Europe was not without restraints, which resulted largely from its proprietorial nature. Its leading combatants were landowners who were commonly neighbors and kin." In a relationship of frequent conflict, like that between Pisa and Genoa, the current victor might well be vanquished in the next engagement; self-preservation, along with the ever-present thought of the rich rewards or ransom, may well have inclined men to mercy.[408]

Religion

For the medieval Italian, after the Cross, the Major Ecclesia of his native city was the symbol and embodiment of all he held most sacred, of home and civic liberty and glory. Devotion to the commune was very closely related to devotion to the patron saint of the city and the main church. Medieval people *knew* that the heavenly hosts fought on their side, and they could not conceive of a state where the forces of religion were not one of the principal institutions.[409] For the medieval citizens of Pisa, the visible monuments of their devotion were intimately tied to the sea: the Cathedral that stands in Pisa today was built

[407] Salvatori 1972, 43-7.
[408] France 1999, 10. The fact that both were Christian groups undoubtedly had some effect.
[409] Heywood 1921, 56; 215.

with spoils from 11 ships taken in an attack on Saracen Palermo in 1063.[410] Joseph Campbell, in his seminal work on heroism throughout history, points out that the symbols in which so many of this period placed their trust, their hope and their faith are no more than convenient vehicles for communicating ideas *en masse*, more often than not secular rather than ecclesiastical in nature. The "task of the [true] theologian," he states, is "to keep his symbol translucent, so that it may not block out the very light it is supposed to convey."[411]

It is interesting to note that he draws this powerful summation from the example of St. Thomas Aquinas, a 13th century theologian and philosopher whose application of Aristotelian logic to theological problems was foundational. Aquinas argued powerfully that people should challenge themselves to throw their minds against issues of life that their reason was not adequate to investigate, to mentally strive to understand that which he acknowledged was above human understanding.[412] For then only, he wrote, "do we know God truly, when we believe Him to be above everything that it is possible for man to think about Him."[413] Aquinas' entire life (1225 - 1274) was lived within the active crusading period of the 13th century. It is not surprising, although it is pleasing, to find him expressing these sentiments within the first chapters of his *Summa Contra Gentiles,* a book

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[410] Heywood 1921, 29. Six ships were brought back to Pisa, and 5 burned.
[411] Campbell 1973, 236.
[412] Aquinas 2012.
[413] Pegis 1957, I. V.

designed to help Christians logically debate their faith with others, most especially Muslim believers. It is clear that he believed the Cross to be a guide, not a destination, and that both the Cross and the Crescent could block the light of truth if placed before it. His career culminated in the production of the "first monument of the modern university," the free-thinking organization that brought together for the first time, in chartered halls, the monastic and philosophical approaches.[414] While his wisdom was not enough to end the bloodshed, it took the thinking world by storm, and may well have given sailors like those of this study pause in the harbors and markets of the east, to wonder if the questions they settled with swords and siege engines might not have less violent solutions.

Although a full treatment of the subject of how magic and astrology may have influenced this voyage, it would be grossly negligent to ignore the topic completely. As knowledge of Arabic learning was spreading into the West in the Middle Ages, so too was the thought that people's lives could be, if not ruled by, at least interpreted by magic. Much of the thinking along these lines was debated and disseminated in the courts of the wealthy and the scriptoria of the wise. Indeed, by the end of the 13th century, every [western] court could boast of its resident astrologer.[415] However the occult arts were not the exclusive preserve of the learned; many merchants' handbooks of the times had sections with astrological information concerning when to buy goods or engage in trade. This aspect of

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[414] Boorstin 1992, 109. The institution was founded in Paris and first officially chartered about 1210.
[415] Larner 1980, 9-15.

magic, the science of the stars, was held to be a valid pursuit even by those who denigrated and reviled the rest of occult studies, and few lived who would not have considered it a sin for an astrologer to allow a ship to leave port when he had presaged bad weather.[416] They were conscientious people, and festival days and the days of Saints had great meaning.[417] It is significant that the fleet that sailed to the conquest of the Balearics left on the 6th of August, a date famous in Pisan Annals, and one close to which the galleys must have left from Constantinople. And so the galley departed, drawn out by the rhythmic oar-strokes of men secure in the auspices of heaven, fearless in the bosom of the peak sailing season. Well may we imagine the intrepid sailors of our ship watching the late summer stars with keen interest the night they sailed, hearts filled with the rage of *rappresaglia*, still whispering soft prayers to Mary.[418]

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[416] Larner 1980, 15.

[417] Heywood 1921, 69. See 272 above.

[418] Davis 2009, 40, 59; Stanconus et. al. 1863, 285, ll. 25-40. Seafarers from antiquity to the end of the age of sail planned their departures, transits and arrivals by the diurnal winds, the sea and land breezes resulting from the differential heating of land and sea. Stanconus makes no special mention of leaving in haste or in obverse conditions, so the Pisans most likely sailed with the evening tide, though probably not on the same day. The division of the year into cold and warm seasons is particularly applicable to the Black Sea, where differences in temperature between summer and winter are on a higher order than those in the Mediterranean. The transition periods between seasons here are also shorter, occurring for the most part in May and September, when weather characteristics of both seasons are experienced. Weather over the Black Sea in each season is also not as straightforward, complicated as it is by the dynamic interactions of numerous air masses throughout the year.

Equippage

It is hard to pin down the type of equipment that the sailors of these vessels would have used. Broad themes can be described, however, and a few interesting things can be said. Even though specific regions of the late medieval world had distinctive types of armor and weapons, nearly everything was interchangeable for the individual soldier save equipage that might show his allegiance or rank, such as a sigil, blazoned shield or banner.[419] After conflicts, survivors of the battlefield were often able to "trade up" to better gear. Nowhere was this more apparent during the second half of the 13th century than amongst soldiery in the embattled Crusader Kingdom on the eastern shores of the Mediterranean, where the very different styles of what may, for our purposes here, be loosely called "Eastern" and "Western" armor and weaponry, were plentifully available.[420] The far ranging merchant adventurers of Pisa, men of exceptional personal experience in both travel and combat, would doubtlessly have modified there equipment to their personal tastes, drawing upon extensive observation and trial to come to optimum balances of maneuverability, defense and damage. A seasoned crew operating in the eastern Mediterranean and Black Seas, therefore, would likely be quite motley in appearance, hardened men comfortable and alert in the equipage of their choice.[421]

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[419] Nicolle 1992, 330-2.
[420] Nicolle 1992, 332-40.
[421] Zelenko and Albertson 2005-2013. Weapons recovered from the bay of Novy Svet to date include a collection of 3 narrow-bladed swords, 2 wide-bladed swords and 2 thin-bladed knives. These are in storage at

Medieval Navel Armament: The Prerogative of Angels

The history of sea power, while embracing in its broad sweep all that tends to make a people great upon the sea or by the sea, is largely a military history…conditions and weapons change, but to cope with the one or successfully wield the others, respect must be had to [the] constant teachings of history [in terms] of strategy…[422]

Captain A. T. Mahan

In naval warfare, the recognition and assessment and use of the weather and lee gage have always been and remain paramount; not in the original sense of the advantage of the wind, necessarily, but in the deeper meaning of the term: the power of giving or refusing battle at will.[423] While descriptions of mass naval maneuvers and conflicts abound in Classical and Medieval literature, ranging from pitched battles on the high seas to prolonged maritime sieges, beachhead troop deployments and supply convoy raids, examples of one on one conflicts between vessels are much less frequent, and few give any real detail. In general, this type of vessel on vessel action would have quickly closed into hand to hand combat between crews. That is not to say that navel projectile weapons did not exist at the time, for they certainly did. Cannon did not become the major weapon of naval warfare until the 16th century, and even rudimentary propellant driven arms appear in the West only in the

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the University of Kiev, save one narrow-bladed sword which is in the possession of a private collector. The assemblage is being studied by Валентирова Екатерина (Katerina Valenterova) of TSNUK, and published analysis is forthcoming.

[422] Mahan 1989, 1-7.

[423] Mahan 1989, 6.

14th, but there were still Greek Fire siphons, and ship-mounted artillery, in the form of bolt, stone or other projectile hurling engines, have existed in western literature since the campaigns of Julius Caesar.[424]

One of the major differences in galley warfare between antiquity and the Middle Ages was the rise of the bi-reme or mono-reme *dromons* to replace the trireme and roman fighting galley. The first mention of *dromons* is in the late fifth century, but the first detail is from the mid-6th century, provided by Procopius of Caesarea in his *History of the Wars.*[425] The two-masted *dromon* was the product of a four-fold evolution: superiority of faster monoremes over bi and triremes as naval combat evolved, pointedly after the defeat of Licinus by Constantine at the battle of the Hellespont in 324, evolution of the square sail into the lateen, application of a fully decked cataphract concept to a monoreme and switching from a *rostra* to a *calcar* ram.[426]

The armaments of a late medieval fighting galley were plentiful, diverse and devastating in the scope of their offensive power and their cruel ingenuity. Key in many navel engagements would be to take the other vessel a prize, often making such tactics as ramming to sink and inflammation undesirable, and requiring suitable strategic compensation. Standard equipment during the late 13th century included personal weapons and equipment such as those discussed in the previous section, deck and hull-mounted

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[424] *Caes. Gal.* 5.
[425] *Procop*. 3; Pryor 1988, 54.
[426] Pryor 1995, 101-4.

structures and offensive rigging elements. Across the board, these would have included *calcar* rams (spurs), mounted well above the waterline on the prow. Attached to the stem post with a coupling chain, these medieval rams were designed to damage oar banks and ship structures as opposed to their classical counterpart (the *rostra*), whose unequivocal function was to sink enemy vessels.[427]

Deck-mounted crossbows with standard and incendiary quarrels, small iron anti-infantry caltrops, large caltrops wrapped in incendiaries, and cranes to drop stones and poisonous items, even including baskets of live scorpions and snakes: "The surprise of frightfulness has never been lacking in warfare in any period."[428] Pots filled with quicklime and soft caustic soap, containing potash, were hung in the rigging (and top castles) of ships to be thrown into the eyes of the enemy, and blades could be swung out to cut enemy rigging.[429] Ceramic grenades, and hook-covered wooden containers swung on chains were filled with blinding and choking powder, quicklime, lubricating solutions, liquid naphtha and mixtures that would combust when exposed to water or sunlight. [430] The use of

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[427] Pryor 1995, 101-2.
[428] Partington 1999, 18; Pryor. 1995, 101.
[429] For the implementation of top castles, see above; Partington 1999, 10.
[430] Partington 1999, 5;9;10;12. Reactive substances mixed with quicklime, which would burn upon contact with water, were often used as timed traps in land warfare during antiquity - for example, leaving the substance in a houses thatch or other flammable location and waiting for the morning dew. Partington argues that such devices would be nearly useless in naval combat, but I disagree - Water would be all over a ship during combat, and having random flames spring up here and there would be a terrible distraction for the enemy.

weaponized ceramic vessels was so common that they were even included poetic list of necessaries for sea travel, written to counsel young lovers to prudence.[431]

One of the most remarkable contemporary sources available concerning the matter is a brief chapter on naval combat written by the lady Christine of Pisa. She not only includes a plentiful list of armaments in her text, but their usage and tactical methodology as well. Even though she wrote at the end of the 14th century, the weapons and applications that she describes fit perfectly with the established scene of the late 13th century, the equipment being universally applicable. Her list includes: incendiary grenades filled with black pitch, resin, sulfur and oil mixed together and wrapped in tow or oakum; a strange type of two-armed iron crusher that, when tied to the mast, could be dropped onto enemy vessels with great force and then re-elevated to attack again; broad-headed iron arrows to rip holes in enemy sails; sharp rounded sickles on long poles so that sailors could cut enemy rigging; iron grapnels and fasteners to grapple and hold an enemy ship fast alongside for boarding; fragile vases filled with lime or dust to blind enemies; containers filled with slippery agents which when broken on enemy decks would cause sailors to lose their footing; and finally, sailors who can hold their breath a long time, that are tasked with swimming under enemy vessels and boring holes in them. Interestingly, she states that soldiers at sea needed to be even more heavily armored than their land based counterparts, since they did

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[431] Ubaldini 1640, 257 ll. 2-7. The author, Francesco Barberino, was an almost exact contemporary of Dante Alighieri (1264 – 1348).

not have much physical room to move about but were still threatened by arrows and other projectiles. She seems to imply that a marine was expected to be able to receive blows from bladed weapons and arrows and keep fighting.[432]

This remarkable assemblage was meant to be utilized in the most efficient and brutal way. General tactics began with information – if possible, spies were to be employed to learn the enemies' weaknesses and capabilities. Next, consideration had to be made for the crew (or at least part of the crew in the case of supernumeraries) to be fed, hydrated and well-rested. The enemy was to be pushed towards the shore, if possible, and friendly vessels kept seaward for better maneuvering.[433] Galleys were designed to fight bow to bow.[434] The initial, furious charge of the attacking ship, or perhaps of both vessels going head to head, would have been a tremendous, boiling fury of frothing sea and splintering wood. If one vessel had the lee gage, or defensive position, it would be pouring incendiary arrows and catapult stones at the attacker, while maneuvering to make the enemies eventual charge as ineffectual as possible.[435] The attacker would be intent on smashing their galley along the hull of the enemy, allowing the *calcar* ram to shear off those banks of oars and render the

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[432] De Pizan 1836, 60-1. The full text and translation of Chapter 38 can found in Appendix A. Concerning the crushing weapon, the most logical fit for the wording is that it was the bars were designed to fall horizontally, on to port and one to starboard, so that the weapon was available in a higher percentage of situations and so the mast was balanced.
[433] De Pizan 1836, 60.
[434] Pryor 1987, V 119.
[435] Mahan 1989, 6.

opponent virtually un-maneuverable. Whoever had the most fighting men aboard would from the outset be attempting to maneuver to grapple the enemy ship.[436]

Until the point of grappled engagement, the vessels would subject each other to sagittarial enfilade, catapult and grenade fire. The various vases and jars, filled with incendiaries, poisonous creatures, blinding powder and slippery substances were not subjective, but to be used in a methodical manner. They had their greatest effect when deployed in conjunction with an offensive maneuver, so that the enemy crew would not have the freedom to immediately handle the fire, burning lime or slithering poisoners now rampant on their decks.[437] When the grapples would pull the ships alongside, opposing crews would begin a brutal hand-to-hand struggle, while sailors attempted to cut enemy rigging and offer artillery support.[438] Crushing weapons like iron bars or stones would have been dropped from mast-mounts or cranes.[439] It seems unlikely that area-of-effect weapons like grenades would have been used after this point, as the chance of harming friendly troops would have been great, but marksmen in the rigging may have been able to deploy

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[436] De Pizan 1836, 61.
[437] De Pizan 1836, 61.
[438] This could include heavily armed marines, but in the case of merchant adventurers it would have been the regular sailors and crew, each as adept at melee combat as they were in nautical affairs. Rather than the predictable actions of regular troops with standardized weaponry, each man would have used his preferred personal weaponry, or whatever he could get his hands on. It would most likely have been closer to what we would imagine as they engagement of two pirate vessels today than anything else.
[439] Pryor 1995, 104. A falling mast would almost certainly smash the fragile hull of a galley and sink it.

specialty weapons to devastating effect. It would have been a bloody, chaotic inferno on the water.

Many of these weapons are chemical in nature. Indeed, dry and liquid incendiaries have been used since the beginning of the first millennium B.C. in the near east.[440] Of significant lack, however, is the mysterious substance known to history as Greek Fire. According to current scholarship, the Italian city-states of the 13th century had lost access to its secret. Greek Fire was invented in Constantinople in the 7th century, along with the siphons to project it onto enemy ships and buildings.[441] It was revolutionary in its terror and its effectiveness, and it irreversibly changed the world and nature of naval combat. In the 7th and 8th centuries, even Chinese and Arab trading ships in the Persian Gulf were defending themselves with naptha-based weapons, but no one had a recipe like this: it shot further, was harder to put out, stuck better and burned longer than previous combinations[442].

Greek Fire was a Byzantine state secret, but by the Crusades (c. 1100) the Saracens had become familiar with it, and maintained knowledge of it throughout its effective lifespan. Other Western powers were aware of it as well, both in terms of having it used against them, as the Pisans did in 1103 and in capturing the finished product as Richard I

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[440] Partington 1999, 1.
[441] Partington 1999, 12; 15. Hand pumps for use by foot soldiers were developed in the 9th century.
[442] Partington 1999, 240.

did at the end of the 11th century.[443] Venetians (and probably other representative powers such as Pisa and Genoa) at Constantinople learned the secrets of Greek Fire by the 3rd Crusade (1189-92). This, however, was by no means their introduction too it. One of the most memorable scenes of the *Alexiad* of Anna Komnena is the account of the Pisans first experience with the weapon. A Byzantine fleet put to flight a huge fleet of Pisan vessels in 1103, somewhere amongst the myriad isles off the southwest coast of Asia Minor, between Patara (in Lycia) and Rhodes. Although arrayed in battle formations, they did not formally engage; rather, Byzantine ships began to dart in and out of the Pisan formations, spraying Greek Fire in dazzling streams. As a terrible storm broke, one daring captain charged the stern of a Pisan ship, entangling his galley between the long dual steering oars dragging behind the ship. Thinking quickly, he poured liquid fire over it and successfully disengaged. That same galley proceeded to burn three more ships before the Pisan fleet took flight, showing that one vessel could carry enough of the substance to destroy at least four ships of the line.[444] It was still used by western powers during the Fifth Crusade's attempt to destroy Ayyubid Egypt (1213-1221), but after that it falls out of mention in Western literature; it seems that in the 13th century the Italian powers did not really have access to it, although they came to possess it again some hundred years later.

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[443] Partington 1999, 17. His fleet captured a Saracen trading ship which was loaded with incendiaries, including ceramic containers of Greek Fire.
[444] Dawes 2000, 207-8; Partington 1999, 19.

When mounted on ships, the siphon was usually placed at the front of a ship and elevated, sometimes on a special platform, but it could be and at times was placed along the sides and stern. They had a limited range of lateral and vertical motion within a fixed outer casing, had mouths in the shapes of terrifying animals and were operated by specialist troops.[445] Defenses against such flammable, chemical weapons was quite standard from early antiquity to the end of the Middle Ages. Vinegar, although actually not greatly effective, was the deterrent and retardant of choice, along with other salty liquids. Wool and leather soaked in vinegar were used as coverings to protect ships and siege engines alike: they prevent combustion, dry more slowly than items wetted with water, and burning oil tends to run off of them. Far more complex recipes did exist, however: layered leather, felt, more leather, sand, linen and more leather, all thoroughly soaked in vinegar and urine.[446]

The mid-13th century was the time of Roger Bacon and (St.) Albertus Magnus, and, some attest, the birth of the science of chemistry. Infernal technology was a high research priority, but it was certainly not the only use for such energies. Many books were written on the subject, describing different formulae and uses. One of the most famous is the early 13th century manuscript called the Book of Fires of Mark the Greek. In it, he describes 35 different recipes for "fires," by which he means chemical mixtures. They are subdivided into four categories: fires for war, meaning direct military use (including incorrect recipes

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[445] Partington 1999,18.
[446] Partington 1999, 5; 12; 88.

for Greek Fire), for creating fire arrows, for creating odd effects (like making people see things that are not there), and for general illumination.[447] While never going out of effective use, Greek Fire and less effective liquid incendiary weapons held unchallenged superiority until the appearance of solid propellant firearms at the turn of the 14th century, after which more conventional weapons were used side by side.[448] These weapons of terror and pain, and indeed all weapons, were not "the prerogative of angels or emperors"; they were made and wielded by common people, and humanity now and forever bears the responsibility.[449]

Conclusions

The vessels of the medieval merchant adventurers would have been sleek, powerful and modified for one trait above all: survival. Some of the best interpretive data for this mindset is drawn from later centuries, for the modification of ships was not something relegated to the ancient world. Indeed, it is one of the hallmarks of, arguably, the most knowledgeable practitioners of short-term, high-risk, scorched-earth navel combat: the

[447] Partington 1999, 62-3; 30-55.
[448] Partington 1999, 93. Gunpowder was invented in the West around 1250, probably in modern Germany, and was carried to the surrounding territories by soldiers.
[449] Partington 1999, 21.

ruthless crews of the Golden Age of Piracy.[450] The hallmarks of this trade are fourfold: trading up, removing all items and physical infrastructure unnecessary to survival, speed and combat, over-arming the vessel with as much firepower as it can hold and holding supernumerary status as normal. Trading up is the act of acquiring and moving to a vessel deemed better. This includes the underlying concept of holding the vessel to be a tool for a purpose rather than an unchangeable aspect of the mission.

Clearing the decks is the epitome of practicality. Style and comfort were sacrificed for freedom of movement and the capacity for greater armament. Over-arming and supernumerary status go are attributes often found together.[451] In general, it meant having as large a crew as possible aboard, and as many elements of ranged artillery as possible for their use. Deadly simple, these vessels were refined to the point of true specialization. They were working ships, remarkably correlative to many of the tactics and practices that we see throughout antiquity and the Middle Ages. Perhaps most importantly, they were created by men who *knew* in the core of their beings that at any hour of any day they could be engaged in combat, and that combat in the near future was no mere chance, but a guarantee.

The men who crewed these vessels would have been experienced, educated traders and warriors, adept with both swords and slates. As for the vessels under consideration, it

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[450] Johnson 1724, 186. "…a Galley came into the Road while they were there, which Davis insisted should be yielded to *La Boufe* according to his Word of Honour before given ; Cocklyn did not oppose it, so *La Boufe* went into her with his Crew, and cutting away her half -Deck, mounted her with twenty four Guns."
[451] Johnson 1724, 187. "…Davis fitted up the Dutch Ship for his own Use, and called her the Rover, aboard of which he mounted thirty two Guns, and twenty seven Swivels…"

must be remembered that when Stanconus et al. relate that it was a Pisan ship, it was a ship under Pisan control, not necessarily of their design. Given the nature of the account rendered, however, it is clear that this vessel was not sailing under a "flag of convenience," but was of true Pisan nature. Deeply religious and superstitious, they were a multilingual, multicultural band, quite possibly including Franks and Muslims besides Tuscans and native Pisans that relied on each other's courage and unique knowledge of weaponry, coastal features or trading policy to make each voyage successful. Independent thinkers, the common sailors comprised a democratic body along with the captain and merchants aboard, coming to agreements not only in terms of safety but of economic decision making as well. They were truly versatile men of the world, in an age where his skilled craft was recognized and compensated, and where a workman could have a choice of employment. Hateful and merciful, these men were driven by the joint forces of *rappresaglia* and the fact that reprisal was always looming on the horizon. They embodied a strange fusion of open mindedness and fierce bias, often bridled or incensed by the joint catalysts of profit and pride.

They were talented navigators, able to go, in general, where they would. Much of their movement, however, was governed explicitly by trade, with complicated commercial contracts changing if voyages changed or were deterred by even a few weeks. They would not have had access to a chart, but would have had standard tools, like the lodestone and wind rose, as well as up-to-date tools like the *compass da navigare*. They were not running on dead reckoning, estimating position based on time, speed and direction alone, but rather

on well-established routes with at least one person on board who intimately knew every local wind and every inch of coastline that they were traversing. As a supernumerary galley, their voyage would have been dictated more than anything else by water. The captain of the Pisan ship probably kept a ledger and account aboard the vessel, and may have left a ledger listing payments, loan agreements and salaries, etc, at his port of departure.

The Byzantine Sea-law and its profit-based system of contract and recompense left comparatively little mark on later custom in the western Mediterranean, but the basic tenents persisted in a number of ways. [452] Sailors in crusading navies, for example, took material spoils of war as part of their military compensation, but piracy is the classic example of the practice: it always has and always will function on the basic principle of shared loot, and 13th century Genoese archival materials leave no doubt that it remained alongside wage sailing as the *modus* of their privateers at that time. [453] The practice continued into and fueled the exploits of the Golden Age of Piracy.[454]

While at sea "every little fleet was practically an autonomous republic, every ship an independent dominion, and every captain a sovereign who made war or peace at his own good pleasure."[455] The sentiment of that reference, though made under the influence of early crusading ideals, may well hold for all merchant adventurers throughout their

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[452] Jackson 1989, 609.
[453] Jackson 1989, 607-9.
[454] Sanders 2007, 109.
[455] Volpe 1901, 125.

independent history. As of the date of publication, the author is aware of no mandate in effect during the late summer of 1277 that would have encouraged or ordered a special attack on Genoese assets. General beliefs and common, shared historical practice are not enough to title the perpetrators corsairs. Nor were they pirates, for the prime impetus of their actions (indeed the actions of both parties) was clearly not monetary gain. Their hot-headed actions, rather, fall under the nebulous jurisdiction and appraisement of that prevalent practice, *rappresaglia*.

CHAPTER VI

CONCLUSIONS

"Is it possible, I wonder, to study a bird so closely, to observe and catalogue its peculiarities in such minute detail, that is becomes invisible? Is it possible that while fastidiously calibrating the span of its wings or the length of its tarus, we somehow lose sight of its poetry? That in our pedestrian descriptions of a marbled or vermiculated plumage we forfeit a glimpse of the living canvases, cascades of carefully toned browns and golds that would shame Kandinksy, misty explosions of color to rival Monet? I believe that we do. I believe that in approaching our subject with the sensibilities of statisticians and dissectionists, we distance ourselves increasingly from the marvelous and spell-binding planet of imagination whose gravity drew us to our studies in the first place"[456]

℘ *Alan Moore*

"The archaeologist of today must necessarily be a specialist, for our knowledge has developed so rapidly during the past few years that it is no longer possible for even the wisest and most gifted scholar to go far outside his own province and expect the perfect results demanded inexorably by science. On the other hand, the very expertness of the special student and the breadth of his preliminary education should, it seems, have moved him to greater efforts than they have to connect his findings with those of his fellow workers in cognate if not actually contiguous fields….If archaeology is anything, if its significance to us is to be more than external and material, it is worth treatment not only as a whole, but with thematic and comparative emphases rather than mere geographical and racial considerations."[457]

The abilities of precise measurement and analysis, the insistence on exacting every particle of data and accurately recording all pertinent features of an artifact or place are absolutely requisite to our field: without them, we are nothing better than scavengers. But I emphasize that there is a second element that I believe is equally important, equally requisite

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[456] Moore and Gibbons 1987, VII, 29-32..
[457] Riggs 1942, xvii-xviii.

for the archaeologist, something that must be present before ground is broken or the first dive is made. That element is true, pure passion – a love of the field and a keening desire not only for data, but for intimacy with the site and the people whose stories we are seeking to share. It is this and this alone that will grant the special sight needed to observe the wreckage strewn about the seafloor as the elements of a greater story, to see the palimpsest spread before us in the gloom as the four-dimensional dataset of all ages past that is.

Future Excavation

While the Novy Svet excavations have already yielded tremendous results, excavations are just beginning to reach their full potential. Each year excavations have become more precise, as zonal targeting builds off of the previous seasons' results, sending out new excavation trenches into areas that previously showed high returns. The current work has placed all previously completed ventures into the context of the major 11th and 13th century material spreads, touching on the western edge of the 10th century assemblage.

Each excavation season has added to the predictive data that are used to estimate where main cargo assemblages may lie. Since beginning excavations in 2002, trenches have slowly progressed seaward, and then circled Pyramids A and B. The 2011 season uncovered several potentially artifact rich environments that the 2012 season, the trenches of which were based on that data, confirmed (fig. 2.12, 2011 and 2012). In the author's opinion,

2012 excavation data indicate that more trenches should be sunk to the east and west of the main 2012 excavation, heading south towards the shore. Deeper trenches reaching 1m in depth should be re-cut through the central portions of the previous excavations quadrants with a water dredge. In addition and of equal importance is the need for a full excavations to be begun in the in the exploratory quadrant surveyed by the stone weight anchor assemblage and by the hull timber and 10th century ceramic assemblage. Dr. Zelenko has already begun expanding research zones into the 10th century artifact spread, excavating there during part of the 2013 field season.[458]

A recurring issue with the Novy Svet excavations is the relatively shallow nature of all trenches dug to date. Considering that the available techniques initially consisted of hand fanning only, then a combination of hand fanning and reverse-scooter sediment dispersal, the excellent work done so far shows remarkable hardiness and dedication on the part of the teams involved. Max sediment penetration, however, never exceeded 70 cm, and that only in rare instances where deeper, probing pits were dug. Significantly, well-preserved organics, articulated ceramic assemblages and notable concretions. Typical excavation depth has remained between 30 and 50 cm. Backfilling as work progressed down a trench line allowed a moderate amount of efficiency, but after nearing 30 cm of depth, returns begin to diminish exponentially on account of slope and gravitation,

[458] Pers. Comm. S. Zelenko, August 2013.

requiring much more labor for each successive centimeter. After about 50 cm, penetration is no longer really feasible without exceeding quadrant and excavation plan limits. These techniques cause heavy silting, and the extremely minimal current in the area takes several minutes after intense excavation to clear enough for a reliable view or picture. The necessary answer to these difficulties is the introduction of water dredges and screening decks.

While airlifts would perform very weakly at the relatively shallow depth of 13 meters, water dredges are able to work very well in these conditions. Functioning on the principle of vacuum, these dredges pump water at high velocity through a specially crafted "head" that creates a depository outflow on one end and powerful suction force on the other. This tool allows swift, accurate and above all clearly visible sediment removal, physically transporting all inhibitive seafloor material to a remote location. It has the further benefit of being able to send that material up to a surface screening platform for real time analysis, deposit it in underwater bags for future analysis or simply jettison the material onto the seafloor at a location that will not impede the excavators. Sending the material to a screening platform is ideal as informative small finds are present within the research zones, such as very small buckles and organic remains including seeds. Furthermore, this system is feasible under the conditions presented by the Bay of Novy Svet if operational parameters remain as they have been during the course of this research.

Ideally, this platform will comprise a selection of "nested" screens, as described and implemented by Dr. Jessi Halligan in her excavations on the Aucilla River of Florida (Fig. 6.1).[459] The system is simple and effective, employing removable 1/4-inch (.635cm) and 1/16-inch (.159 cm) (U.S. window screen) layers mounted on floating deck structures. Sediment brought up through the dredge is washed through the successive screens by the application of water and manual pressure. Anything larger than the mesh grid remains, while the sediment is washed through back into the water. When paired with skilled screeners this system is capable of recovering artifacts as small as seeds, the presence of which has been verified at Novy Svet.

While the screening deck is highly effective and should be employed if at all possible, its lack does not preclude the use of the dredge alone. In and of itself, when handled correctly, a water dredge can serve as an invaluable excavation tool in terms of clearing overburden. It removes the problem of silting, and give the ability to designate a refuse pile at any reasonable distance from the excavation zone, greatly facilitating backfilling. The author used an absolute bare-bones system of these parameters, in depths and conditions equivalent to those of Novy Svet (13 m max depth), during Chad Gulseth's 2012 excavation of the *Ranger* in Port Royal, Jamaica. Running a small 15 hp Honda trash pump out of a 3 ½ meter john boat, we ran 20 m of 4" hose down to the site, and sent the

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[459] Halligan 2012, 82-5.

debris into collection bags, later sorted on shore. It is a labor intensive operation, but absolutely feasible, even with a less than ideal setup. For example, in that scenario the pump had 2" ports but the dredge head was 4," so the throughput was not as efficient as it could have been. Again, in Dr. Halligan's excavations on the Aucilla River over the past several years, similar parameters have been followed. At 11 m depth, 4" dredges are very successfully run on 8 hp pumps, and a 6" dredge on 15 and 18 hp pumps (Fig. 6.2). TSNUK already possesses dredge heads and hoses, and a suitable pump was purchased with the help of INA funds for the 2013 season. While current events have hindered these efforts, most of the infrastructure is in place to begin dredging. The implementation of just one of these systems would astronomically improve overall productivity.[460]

[460] Gulseth and Albertson 2012. Equal thanks are due to the other team members, Mr. Christopher Cartellone and Mr. Rodrigo de Oliviera Torres.

Fig. 6.1. Dredge screen setup.

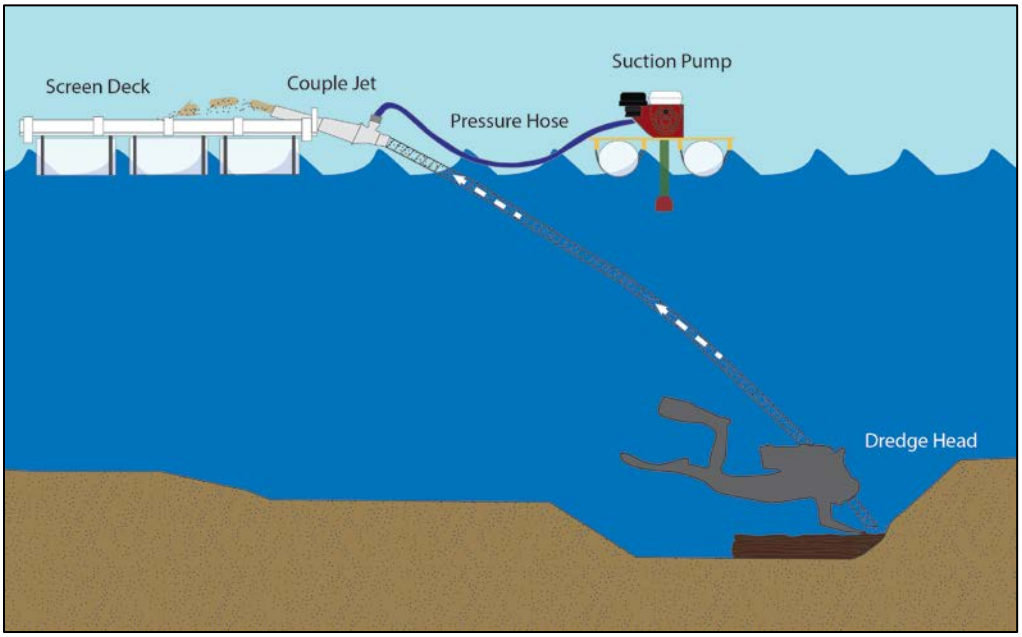

Fig. 6.2. Dredging methodology schematic.

Future Research

"A shared history should be familiar to all, especially in a day when an inevitable civilizational clash has once again gained currency."[461]

℘ *Stepthen O'Shea*

Several new avenues of research have presented themselves over the last few seasons, outside of the clear direction, outlined above, that future excavation would benefit from taking. The most universal of these is updating and adding to the site map and bathymetric map presented in this research. The potential for the improvement of our datasets is almost infinite, and every dive will make these definitive charts more accurate and comprehensive. The combined data must be compiled into a GIS as soon as possible, making theoretical tools like hull fastener density profiles a real option. The greatest facilitator for these options will be maintaining a survey team alongside the regular excavation teams, as demonstrated in the 2011 and 2012 seasons.

In addition, the introduction of tagged markers may facilitate our understanding of the seafloor dynamics at the site: while this was attempted in 2011 and 2012, results were wide ranging and inconclusive.[462] That the sediment and some artifacts move to some

[461] O'Shea 2006, 7.

[462] The objects that I placed in 2011 had very different reactions: the 3 different sized pieces of pottery that I laid along one of the pottery walls built around an old excavation unit did not move more than a few

degree each year is clear, but to what extent is not known. Easily recoverable test markers of different sizes and weights will provide vital statistics on artifact movement and burial. The excavation of a test trench, in a select zone, to the depth of 2 m will also be invaluable in determining if any stratigraphy remains intact beneath the seafloor. This will be feasible only with the use of at least two dredges simultaneously.

Anchors and Concretions

The stone anchor/millstone assemblage, currently numbering 37, needs to be fully measured, photographed and analyzed so that it can be compared to other assemblages with greater accuracy. The small Y anchor just to the northeast of the bay of Novy Svet needs to be photographed and recorded, and the alleged small Y anchor to the south west investigated. A complete tally of the concretion assemblage can be categorically organized and entered into the site map GIS.

Ceramics

Neutron Activation Analysis can be performed on ceramics to improve data sets indicating potential places of manufacture.

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centimeters. Two pieces that I placed out on the sand disappeared completely, though whether due to hydrological action or looting is uncertain.

Dendrochronological Analysis

A dendrochronological sample of the floor timber associated with the 10th century material needs to be taken and analyzed. A thin slice of the timber must be obtained by a diver, and permits acquired to send it to an appropriate lab, perhaps that same one in Verona that CUA has used before, or the Laboratory of Tree-Ring Research at the University of Arizona. That the artifact in question is the floor timber of a round-hulled ship or galley is without doubt. If the timber is indeed from the 10th century, as initial artifact context may imply, it will provide excellent evidence not only for the preservation of larger sections of the 10th century hull, but for the potential preservation of the hulls of the later vessels as well. A date referring to the 11th or 13th century wrecks will speak to the significant mobility of artifacts on the sea floor, and a date later (or earlier) than any of these three will pose significant new questions as to what other material may lie dormant beneath the Bay of Novy Svet.

Literary Avenues

The record of Stanconus et al. has more potential data to give us, most importantly a name, that of the Banchieri family that owned the Genoese galley that sank the Pisan one.

This clear and unmistakable association, that of a *galea Bancheriorum,* provides a new line of inquiry into potential literary records of the conflict or its outcome.[463]

The questions of correlation between the Pisan galley of Stanconus' account and the 13th century wreck posed above, pose equal queries into the nature of the 13th century artifact spread itself. That certain perishable cargos such as furs or textiles may have perished is clear; equally clear is the possibility of personal effects and valuables being recovered by survivors, contemporary salvors or looters, or, if the two vessels are one and the same, by the merchants before they disembarked as discussed above. What remains unanswered, however, is why any cargo remained at all. Numerous whole examples of *amphorae* and coarse ware, and well over a hundred examples of whole beautiful glazed ware have been recovered by CUA's Novy Svet excavations over the past 15 years. Many have been recovered from the surface of the seafloor or just beneath it, and new examples can be uncovered by hydrologic action each year. The site has been known to the archaeological community and to looters since 1958, and that a lot of material has been taken from the site is well known to the local population and archaeological community.[464] The assemblage of usable artifacts was undoubtedly much more visible after the vessel sank.

That no-one knew the ship sank there is improbable: ships would not be so common that one could just "go missing" in sight of the fortress and no one would notice,

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[463] Stanconus et al. 1863, 285, ll. 33.

[464] Pers. comm. Sergey Zelenko August 2012.

save in a great storm. Even if that were the case, as we have seen, the bay of Novy Svet was in use from the foundation of Sudak, and floating wreckage or masts would have been visible, at least, to sailors. That the cargo was not worth diving for is also improbable. It is hard to imagine that the demographics of medieval Sudak held a population in which no one would benefit from this material. Furthermore, based upon the argument above, I find it improbable that the entire population would not know that a ship had sunk 5 short kilometers from their city: news like that travels. The site is not too remote: a fair hike overland, to be sure, but easy enough by boat.[465] Regarding free-diving for artifacts, the assemblage lies in 13 m of water or less, with acceptable visibility. The recovery of a plate or bowl lying on the seabed would be a reasonable feat for an average swimming enthusiast: an amphora would be too much, but a rope could be attached to it.[466] The site has no physical parameters that would deter object recovery by someone with something to gain, unless the ship was simply covered with sediment extremely quickly on account of abnormal hydrologic activity, or overturned during descent making recovery impossible[467].

Cultural parameters may then have been the deterrent. Perhaps there was some kind of interdiction on salvaging, wrecks perhaps being "government property" or

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[465] I have traversed the full length many times, including walking through the woods along the shore instead of the road. It is a few hours pleasure.

[466] CUA divers routinely free-dived the site for fun. Of course, our skillsets are not to be compared to the 13th century peasants imagined in this scenario, but it can be done.

[467] The potential pressure crater of such a vessel in the sediment of the bay seafloor and necessary comparative hydrologic data must be analyzed.

remaining the sole property of its owners, at least those friendly with local authorities. Then again, the initially visible cargo may all have been broken, and efforts stopped. Another possibility is that there was a stigma or curse attached to such salvage, some kind of theological or mythical reason why people wouldn't want to go near it, for example people having died aboard. If the vessel in question is indeed the Pisan galley, perhaps there was a ban on salvaging the cargo of defeated enemies, or it was assumed that all goods were destroyed in the fire.

Finally, further literary research into the historical and naval history of Sudak, Novy Svet and their hinterland is being currently undertaken. No real resources besides the present work, the thesis of Claire Aliki Collins and the brief account of the history of the Sudak Fortress by Vechers′kyĭ and Tarasov provide an overview of the region in English. Understanding in detail the exact cultural and physical change of the littoral over the last two centuries is paramount to accurate analysis of the modern detritus on the seafloor, and what effect it may have had on older material.

Conservation

As with any archaeological excavation, the conservation of recovered material is of the utmost importance. The greatest factor in the chemical degradation of artifacts immersed in salt water is the salinity level: in general, the greater the salt content, the more quickly artifacts will corrode, concrete and become impregnated with salt. At Novy Svet, the salinity level is 17-18 ppm on average. While more than enough to concrete and damage artifacts, it is low enough to present a less immediate threat, and will present relatively short conservation periods for recovered artifacts. Material recovered so far has mostly been ceramic, including *amphorae*, *pithoi* fragments, course ware and glazed ware, metal shipboard equipment and personal effects. These have been desalinated and conserved at TSNUK before being put on display. One of the greatest challenges, and yet at the same time one of the greatest opportunities for the Novy Svet wrecks is the possibility of more extensive, future conservation of the available, but currently impractical, material. This corpus is vast, and includes the several iron Y anchors found at the Novy Svet site, as well as the two others discovered in the Bay of Sudak along with numerous other concretions. These range from iron fasteners, numbering in the hundreds, to bladed weapons, to iron fastening rings, and further include numerous mysterious and intriguing concretions whose nature cannot be guessed in their current state.

Maritime archaeological conservators, however, can safely and effectively reveal what lies within by de-concreting the artifact with manual and pneumatic tools and stabilizing and consolidating the recovered artifact. In the case of more heavily damaged artifacts, where the iron has rotted away and only the non-ferrous concretion remains (as is the case with many of the recorded Novy Svet concretions) casting them in epoxy and thus revealing their true forms is still a viable option. Once begun, the conservation process must be brought through in its entirety, bringing the artifact to a stable, museum-quality state.

Extent ship timbers and other organics can also be conserved and analyzed. While numerous methods exist for the conservation of such objects, only two methods are truly viable for the conditions under discussion: Polyethylene Glycol (PEG) and Silicone Oil treatments. [468]

[468] Honey or Sucrose methods seem initially promising, but they are severely temperature dependent and can attract bugs.

The bay of Novy Svet comprises and has comprised both sides of the historical perspective. On the one hand, its secluded, embracing nature has served to protect the material beneath its waters from excessive natural damage. On the other, the capricious storms of autumn more than likely sent some of that material to the bottom: captains expecting a haven from the storm had their vessels shattered on the looming rocks of the coast, driven there by the hammer of the wind. Again, the quiescent, remote nature of the this Green Bay may have played a role in deterring looting or salvage while memory of the wrecked ships remained, and yet those same qualities made it the desirable resort town that it is today, a jewel of the Russian Riviera that has remained in vogue. The bay has probably seen seafaring activity since before the foundation of Sudak in 212, and a holds the physical remains of a complex maritime cultural landscape that extends from this initiation to the present day.

That an incredibly significant artifact assemblage exists beneath the waters of Novy Svet, and that it is in serious danger of destruction from both natural and manmade hazards has been proven beyond doubt. But the truth about the Novy Svet excavations is that there is more there, preserved beneath the seafloor in those shadowed depths, than has previously been seen or hoped. Each excavation season not only adds new data to the significant artifact and data assemblages that are already known, but herald the discovery of entirely

new, additional assemblages! A new geospatial association of 11th century anchors in clear contextual relation with probable ballast piles and the 11th century artifact spread has been presented in this thesis. A preserved ship timber, surrounded by concretions and 10th century ceramics within the 10th century artifact spread has been shown as well. Archaeological and historical exploration of the 13th century shipwreck are proceeding at a record pace, with several M.A. students at TSNUK, Texas A&M and other affiliate institutions taking on portions of the study for their degrees. Taken together, these solid advances provide a clear and cogent argument for the probable presence, discovery and recovery of data-rich remains of the wrecks themselves.

As Dr. Zelenko has pointed out from the beginning, the assemblage at Novy Svet is on the verge of destruction. The wrecks lie in the shallow littoral zone, silent witnesses to the eternal struggle between the land and the sea.[469] All possible effort for data recovery must be made with all possible speed. We lie exposed between the hammer of time and the anvil of natural decay, with our technology and indiscretion serving as the catalyst for terrifying change. In the Nuclear Age, Nature's shield is no long sufficient; we have brought ourselves to a point of intelligence that we can only hope we will match with wisdom.

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[469] Zelenko 2008. 126, 19.

At Novy Svet, that means keeping the living memory of all the people who made the maritime cultural landscape of the Juniper Coast what it is today, from Greek settler to Genoese Crusader, Soviet soldier to multi-national, modern day citizens, vacationers or archaeologists, in joint mental array. The true anthropologist must have these skills while retaining the ability to embrace the marvelous wonder of awe and discovery, whose *alma mater* is the imagination. This is the strength to take Proust's journey of discovery, to behold the world through another's eyes and feel the wonder of their hundred universes, while maintaining scientific discipline and outlook. That is the key, in my belief, to truly engaging with the mysteries of the past to the benefit of the future. As for the present, "can there be a more beautiful and soul shaking experience than to catch ageless silence breaking [once again] into song?"[470]

[470] Suzuki 1959. 221.

Post Scriptum

For the underwater archaeological community, and increasingly for the aware general public, the maritime cultural landscape does not stop at the waterline, it does not stop at the end of the pier or wharf, it does not stop at the deceptively reflective surface of the sea. That landscape continues on unchanged, beneath the lapping of the wind and waves, ensconced in its own liminal world of water and light. Like the hero Arthur, most mortals sail the surface of the waters mystified at the Fay arm that reaches from the depths and holds aloft Excalibur.[471] But the bay, like that mystic Lake and all marine environments, is a volume, not a surface; a three-dimensional object rather than a plane. Through courage and innovation the league of explorers who, like Sir Launcelot and Sir Pellias, know the truth of the lake, is growing. They know that it hides beneath its refulgent illusion the most beautiful of kingdoms, visible only to those born to it or who adventure far enough (Fig. 6.3). [472]

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[471] Pyle 1992. 68-71.

[472] Pyle 1992. 277-8. *"And Sir Pellias said, 'I shall go to yonder wonderful city of gold and azure which lieth in yonder valley of flowers.' And Sir Gawaine, 'I see no city but only a lake of water'. Whereupon Sir Pellias replied, 'Nee'theless, there is a city yonder, and thither I go…'"*

"Nowadays, when I observe some specimen of Caine noctua, I try to look past the fine grey down on the toes, to see beyond the white spots arranged in neat lines, like a firework display across its brow. Instead, I try to see the bird whose image the Greeks carved into their coins, sitting patiently at the ear of the Goddess Pallas Athene, silently sharing her immortal wisdom. Perhaps, instead of measuring the feathered tufts surmounting its ears, we should speculate on what those ears may have heard. Perhaps when considering the manner in which it grips its branch, with two toes in front and the reversible outer toe clutching from behind, we should allow ourselves to pause for a moment, and acknowledge that these same claws must once have drawn blood from the shoulder of Pallas."[473]

Fig. 6.3. The sunrise over the bay of Sudak. We will never, ever give up.

[473] Moore and Gibbons 1987, VII, 29-32. Archaeology is a living, vibrant science that calls upon the most profound depths of feeling from its adherents. We who would understand these precious sites must not simply research, excavate and conserve them: we must *live* them, and experience ourselves what transpired there. To paraphrase the great scholar Fernand Braudel, archaeology never was, archaeology is, in the hearts, minds and willing hands of present and future scholars. For the sake of the preservation of the past, that the wisdom of its experiences may preserve our future, may it ever be so.

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APPENDIX A

A TRANSLATION OF CHAPTER 38:

THE FLEETS THAT KING CHARLES KEPT AT SEA

FROM

THE BOOK OF THE DEEDS AND GOOD HABITS OF THE WISE KING CHARLES

BY

THE LADY CHRISTINE OF PISA

Le Livre des Fais et Bonnes Meurs du Sage Roy Charles
par
Christine de Pizan Damoiselle

Chap. XXXVIII
où l'on dit les flottes que le roi Charles tenoit en mer.

La flotte que le roi Charles tenoit en mer causa, comme on l'a dit maintes fois, de grandes dommages aux Anglois, et prit sur eux des nefs et des barques, et d'autres vaisseaux qui leur portoient vivres et marchandises; elle fit des prisonniers, s'empara de maintes richesses et incendia une partie de ces navires.

Quelquefois les nefs du roi faisoient des courses jusqu'en Angleterre; mettant le feu aux villes et faisant des prisonniers, comme on a coutume en pareil cas.

On prit de la sorte, on pilla et on brûla une forte ville nommée Larre, où il y avoit des richesses considérables.

The Book of the Deeds and Good Habits of the Wise King Charles
by
the Lady Christine of Pisa[474]
Translated by
Maximilian Pschorr

Chapter 38
where one tells of the fleets that King Charles kept at sea

The fleet, which King Charles kept at sea, caused, as one has oft said, considerable harm to the English, and took from *nefs* and *barques*, and other vessels which carried supplies and merchandise; the fleet took prisoners, seized many riches, and burned some of those vessels [the vessels which the fleet captured].

From time-to-time, the King's ships went on missions as far as England; setting fire to villages and taking prisoners, as one is accustomed to in such cases. In the same way, it plundered and burned a fortified city named Larre, where there were considerable riches.

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[474] De Pizan 1836. 60-61. Charles VI was king of France from 1380 to 1422, and Christine was writing in Paris from 1399 to 1429, both in the midst of the Hundred Years War between England and France from 1337 to 1453. In many instances, her description of the armaments of the ships of Charles may be taken as back-datable in terms of lower technologies and some chemical weapons.

Ainsi les Anglois et les François se combattoient sur terre et sur mer, où il advenoit maintes sortes d'aventures.

Au sujet des combats sur mer, ou sur les fleuves, Végèce dit d'abord comment on doit construire les nefs et les galères.

On ne doit point couper au mois de mars ni d'avril les arbres dont on les veut fabriquer, parce qu'à cette époque la sève y est abondante: on les doit couper au mois d'août ou de juillet, leur humidité étant presque évaporée alors.

Avec ces arbres on doit faire des ais, et les laisser sécher, afin qu'ils ne se déjettent point.
Ceux qui combattent dans les nefs et les gallères doivent être mieux armés que ceux qui combattent en pleine compagne, car ils ne se meuvent pas autant et reçoivent néanmoins de grands coups de traits.
Ils doivent être bien pourvus de vases remplis de poix noire, de résine, de soufre et d'huile; le tout mêlé et enveloppé d'étoupe.

Thus, the English and the French fought on land and on the sea, where many kinds of adventures took place.

Concerning fighting on the sea, or on rivers, Végèce first said how one must construct ships and galleys.

One must not cut in the month of March, nor in the month of April, the trees with which one wishes to fabricate them (ships and galleys), because during this period sap is abundant: one must cut in the month of August or of July, at which point their humidity is nearly evaporated.
With these trees one must make planks of wood[475], and let them dry, in order that they do not warp.
Those who fight in the ships and the galleys must be better armed than those who fight in open country, because they do not move as much, and nonetheless receive great blows.[476]

They must be well supplied with vases filled with black pitch, with resin, with sulfur, and with oil; all mixed and wrapped in oakum.

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[475] *Des ais* is an old term, and in Modern French would be: *des planches de bois*.
[476] Blows of barbs or shafts? The term *coup de traits* is unusual, but it is something having to do with a type of being struck forcefully by something sharp.

On doit mettre le feu à ces vases et les jeter dans les nefs et les galères des ennemis; puis on attaque vivement ceux-ci, afin qu'ils n'aient pas le loisir d'éteindre l'incendie.

One must set fire to these vases and throw them onto enemy ships and galleys; after, one strongly attacks them [the enemy ships and galleys], in order that they do not have the freedom to extinguish the fire.

On doit avoir des espions, pour savoir quand les ennemis manquent de ressources.

One must have spies, to know when one's enemies lack resources.

Ceux qui combattent doivent toujours tâcher de pousser leurs ennemis à la côte, et de tenir, eux, la pleine mer.

Those who fight must always try to push their enemies to the coast, and to keep themselves in the open sea.

On doit lier au mât de la nef une poutre ferrée des deux côtés. On peut ainsi férir la nef à l'aide d'un certain engin avec quoi on retire la poutre et on la rechasse à grand' force; ces coups réitérés brisent la nef ennemie

One must bind to the mast of the ship "a large iron rod" on both sides.[477] Thus, one can strike the [enemy] ship with the aid of a certain device which removes the rod, and expels [drops] it with great force; these repeated blows break the enemy ship.

On doit avoir des flèches à large fer pour tirer aux voiles et les percer, afin qu'elles ne puissent plus s'enfler sous le vent, et avoriser la fuite du vaisseau.

One must have broad iron arrows to shoot at the sails and pierce them, in order that they can no longer swell in the wind, that which facilitates the escape of the vessel.

On doit avoir un fer tranchant, arrondi en faucille et lié à une longue perche: on coupe avec ce fer les cordages des voiles; par là, la nef ne peut plus si bien manœuvrer pour combattre.

One must have an iron edged, rounded sickle bound to a long pole: with this iron one cuts the sail riggings; as such, the boat cannot maneuver as well to fight.

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[477]This directly translates as a railway beam; the above rendering is an estimate of best fit. Perhaps it is a type of suspended battering ram?

Avec des crocs et des crampons de fer, on attache quelquefois la nef de l'ennemi à la sienne, quand on a sur eux l'avantage de la force, afin qu'ils ne puissent échapper.

With iron fangs and crampons/cleats/studs, one sometimes attaches an enemy boat to his own, when one has over them the advantage of force, so they cannot escape.

On doit avoir plusieurs vases fragiles, remplis de chaux ou de poussière; on les jette dans les embarcations ennemies, où ils se brisent, et aveuglent de leur contenu ceux qui s'y trouvent.

One must have many fragile vases, filled with lime or dust; one throws them into the enemy boats, where they break, and their contents blind those found there [in the enemy boat].

On doit avoir également d'autres pots remplis de savon mou; on les jette sur les vaisseaux des adversaires; le savon se répand à la brisure du vase, et rend le plancher si glissant que les ennemis ne peuvent plus s'y tenir sur leurs pieds et tombent dans l'eau.

One must also have other pots filled with soft soap; on throws them onto the ships of their adversaries; the soap spreads at the breaking of the vessel/vase, and renders the deck so slippery that the enemies can no longer find their footing[478] and fall into the water.

On doit être pourvu de marins qui sachent nager long-temps sous l'eau. Ils ont des perçoirs aigus et tranchants avec quoi ils forent les nefs en plusieurs places pour que l'eau y puisse pénétrer. En ce cas, lorsqu'on voit la nef pencher davantage d'un coté, on doit jeter en cet endroit quantité de grosses pierres, et des barres de fer bien aiguës pour la percer et la rompre.

One must be provided with sailors who know how to swim a long time under water. They have sharp borers and awls with which they bore into the ships in several places in order that the water can penetrate in those places. In this case, as soon as one sees the ship lean/list more to one side, one must throw a great deal of large rocks, and sharp bars of iron in order to pierce and break the ship.

[478] The literal translation is “stand on their feet”.

APPENDIX B

VITA

VITA

John Albertson attended Memorial High School in Eau Claire, Wisconsin from 1998 to 2002, and is an Eagle Scout. After graduation he attended Gustavus Adolphus College in St. Peter, Minnesota where he began studying Classics and History. While enrolled there he completed semester courses at both the Intercollegiate Center for Classical Studies (ICCS) and John Cabot University in Rome. During the summers, he participated in terrestrial and underwater archaeological field schools through the Centre for Underwater Archaeology (CUA) at the National Taras Shevchenko University of Kiev at Novy Svet and Sudak, Crimea, Ukraine. He also worked as a Ranger at Philmont Scout Ranch in Cimarron, New Mexico. He graduated with a B.A. *cum laude* in 2006. In the autumn of 2010 he entered the graduate program in Nautical Archaeology at Texas A&M University in College Station, Texas. While pursuing graduate studies he has worked at the University's Nautical Archaeological Conservation Research Laboratory (CRL), and has continued to work with CUA in Ukraine in affiliation with the Institute of Nautical Archaeology (INA). In addition, he has worked on INA projects at the Bodrum Research Center (BRC) in Bodrum, Turkey and Port Royal, Jamaica, and has worked on both terrestrial and submerged archaeological sites in Florida with the Center for the Study of the First Americans (CSFA) at Texas A&M.