

# Contents

List of Figures.....	vii
List of Tables.....	x
Abstract.....	xi
Introduction.....	1

## PART 1: OF SHIPS, SEAMANSHIP AND FLEETS

Introduction to Part I .....	7
<b>1 Types of Ships .....</b>	<b>8</b>
The Ships of the Third Crusade .....	8
The Ships of the Fourth Crusade.....	9
<b>2 Between Text and Images .....</b>	<b>10</b>
Maritime Transport in the Crusader Period – Iconography and Rigs .....	10
Could Crusader Ships Sail Upwind?– The Peculiar Use of the Lateen Rig .....	10
Rudders and Manoeuvrability .....	17
<b>3 A Modern Simulation of Richard the Lionheart’s Passage from Acre to Jaffa.....</b>	<b>18</b>
Why Was Richard Held up near Haifa? .....	19
Some Questions about King Richard’s Timetable .....	20
The Simulation.....	20
Landing in Jaffa.....	21
<b>4 Crusader Fleet Seamanship .....</b>	<b>23</b>
Keeping Order.....	23
Skiffs and Other Small Boats .....	24
Small Boats in the Seventh Crusade .....	25
Naval Support of Land Operations .....	27
A Spectacular Naval Attack in the Fifth Crusade.....	30
Mooring, Anchoring Landing or Beaching .....	31
<b>5 Ports of the Holy Land and Resulting Influence on Choice of Ships .....</b>	<b>32</b>
Landing on the Coast of the Holy Land.....	32
Port of Acre (Akko).....	32
Other Ports and Anchorages along the Coast.....	34
Atlit.....	34
Dor.....	34
Caesarea.....	34
Apollonia-Arsuf.....	34
Jaffa .....	34
Yavne Yam.....	34
Ascalon.....	35
Landing on Beaches .....	35
Side (Quarter) or Stern Doors? .....	35
How to Get off the Beach.....	38

**PART 2: APOLLONIA-ARSUF: A MARITIME INSTALLATION BELOW THE CASTLE**

<b>6 General Description and Research Project</b> .....	<b>43</b>
Apollonia-Arsuf in the Crusader Period .....	43
Evidence of Use as a Maritime Installation in Crusader Times .....	44
The Research Project .....	45
Sub-bottom Sonar Scan .....	45
Water-jetting .....	46
Water-jetting Attempt 1 .....	46
Water-jetting Attempt 2 .....	46
Water-jetting Attempt 3 .....	47
Significant <sup>14</sup> C Results .....	47
The Excavation .....	48
Workforce .....	49
Tasks .....	49
Clearing the Seabed .....	49
<b>7 Findings</b> .....	<b>51</b>
The Northern and Southern Walls (Breakwaters?) .....	51
The Western Seawall .....	52
Depths .....	53
Entrances .....	53
Evidence of Sea Traffic near Apollonia-Arsuf .....	54
Did Apollonia-Arsuf Have a Port? .....	55
<b>Final Thoughts</b> .....	<b>60</b>
<b>Glossary</b> .....	<b>61</b>
<b>Bibliography</b> .....	<b>62</b>
Works Cited – Primary Sources .....	62
Works Cited – Secondary Sources .....	62
General bibliography .....	65
<b>Appendix A: Sonar Investigation: The Harbour of Apollonia-Arsuf, Oct-Nov 2010</b> .....	<b>69</b>
<b>Appendix B: Positions of Targets Discovered by Sonar</b> .....	<b>87</b>
<b>Appendix C: List of Samples from Apollonia for Radiocarbon Dating Submitted to the AMS Lab (Institut für Teilchenphysik Eidgenössische Technische Hochschule Hönggerberg, CH-8093 Zürich, Switzerland) by Prof. Nili Liphshitz, Dan Mirkin and Prof. Oren Tal</b> .....	<b>88</b>
<b>Appendix D: Equipment Transported to Expedition Camp by Boat</b> .....	<b>89</b>
<b>Appendix E: Locations of Water-jetting in the ‘Port’ (redrawn by Ms. Michal Semo-Kovetz after original)</b> .....	<b>90</b>
<b>Appendix F: Original Underwater Drawing of the Western Part of the Northern Wall (J. B. Tresman)</b> .....	<b>92</b>
<b>Appendix G: Tide Table for 6 November 2013</b> .....	<b>93</b>
<b>Appendix H: GIS Representation of the Apollonia Installation</b> .....	<b>94</b>
<b>Appendix I: Excerpts from Ambroise – L’estoire de la Guerre Sainte, in Old French</b> .....	<b>95</b>