

# CONNECTED BY THE SEA

*Proceedings of the Tenth International Symposium  
on Boat and Ship Archaeology  
Roskilde 2003*

Edited by Lucy Blue, Fred Hocker  
and Anton Englert

## ISBSA 10

Hosted by  
The Viking Ship Museum, Roskilde  
The National Museum of Denmark Centre for Maritime Archaeology  
The National Museum of Denmark Institute of Maritime Archaeology  
The Centre for Maritime Archaeology, University of Southampton

With support from  
The National Research Foundation of Denmark  
The National Humanities Research Council of Denmark  
Queen Margrethe's Fund

Oxbow Books

NATIONALMUSEET  
MARINARKEOLOGI

Published by  
Oxbow Books, Park End Place, Oxford OX1 1HN

© *Oxbow Books and the authors 2006*

ISBN 978 1 84217 228 5    1 84217 228 X

A CIP record for this book is available from the British Library

*Cover: Photograph by Werner Karrasch, Viking Ship Museum*

This book is available direct from  
Oxbow Books, Park End Place, Oxford, OX1 1HN  
(*Phone: 01865-241249; Fax: 01865-794449*)

*and*

The David Brown Book Company  
PO Box 511, Oakville, CT 06779, USA  
(*Phone: 860-945-9329; Fax: 860-945-9468*)

*and*

via our website  
[www.oxbowbooks.com](http://www.oxbowbooks.com)

Printed in Great Britain by  
Short Run Press, Exeter

# Contents

---

List of Contributors .....	viii
Preface .....	xi
Keynote address: An international forum for nautical research 1976–2003 by <i>Ole Crumlin-Pedersen</i> .....	xiii
Seán McGrail: Walking on water: Maritime archaeology by air, land and sea by <i>Jonathan Adams</i> .....	xvii
A. EXPERIMENTAL ARCHAEOLOGY	
1. Experimental archaeology and ships – principles, problems and examples <i>Ole Crumlin-Pedersen</i> .....	1
2. Experimental boat archaeology: Has it a future? <i>Seán McGrail</i> .....	8
3. Experimental archaeology at the Viking Ship Museum in Roskilde <i>Søren Nielsen</i> .....	16
4. History written in tool marks <i>Thomas Finderup</i> .....	21
5. Reconstruction of rope for the copy of Skuldelev 2: Rope in the Viking Period <i>Ole Magnus</i> .....	27
6. Trial voyages as a method of experimental archaeology: The aspect of speed <i>Anton Englert</i> .....	35
7. An example of experimental archaeology and the construction of a full-scale research model of the Cavalière ship's hull <i>Sabrina Marlier</i> .....	43
8. Reconstruction of the large Borobudur outrigger sailing craft <i>Erik Petersen</i> .....	50
9. The construction and trials of a half-scale model of the Early Bronze Age ship, Ferriby 1, to assess the capability of the full-size ship <i>Edwin Gifford, Joyce Gifford and John Coates</i> .....	57
10. The value of experimental archaeology for reconstructing ancient seafaring <i>Timm Weski</i> .....	63
11. The Pacific migrations by canoe-form craft <i>James Wharram and Hanneke Boon</i> .....	68
B. THEORETICAL ISSUES IN THE CONSTRUCTION OF SHIPS	
12. New light on the false clinkers in ancient Mediterranean shipbuilding <i>Patrice Pomey</i> .....	74
13. A preliminary report on the hull characteristics of the Gallo-Roman EP1-Taillebourg wreck (Charente- Maritime, France): archaeological evidence of regional practices of ancient flat-bottomed construction? <i>Eric Rieth</i> .....	78
14. The Dor 2001/1 wreck, Dor/Tantura Lagoon, Israel: Preliminary Report <i>Yaacov Kahanov and Hadas Mor</i> .....	84

15. A hypothesis on the development of Mediterranean ship construction from Antiquity to the Late Middle Ages <i>Carlo Beltrame and Mauro Bondioli</i> .....	89
16. Geometric rules in early medieval ships: Evidence from the Bozburun and Serçe Limanı vessels <i>Matthew Harpster</i> .....	95
17. Oak growing, hull design and framing style. The Cavalaire-sur-Mer wreck, c. 1479 <i>Brad Loewen and Marion Delhaye</i> .....	99
18. Ship design in Holland in the eighteenth century <i>Ab Hoving</i> .....	105
19. Archaeobotanical characterisation of three ancient, sewn, Mediterranean shipwrecks <i>Stéphanie Wicha and Michel Girard</i> .....	111
20. Coating, sheathing, caulking and luting in ancient shipbuilding <i>Ronald Bockius</i> .....	117
C. BETWEEN LAND AND SEA	
21. Roman techniques for the transport and conservation of fish: the case of the Fiumicino 5 wreck <i>Giulia Boetto</i> .....	123
22. Land and sea connections: the Kastro rock-cut site (Lemnos Island, Aegean Sea, Greece) <i>Christina Marangou</i> .....	130
23. Local boat-building traditions in the Bristol region <i>Anthony J. Parker</i> .....	137
24. The harbour of Haiðaby <i>Sven Kalmring</i> .....	143
25. Money, port and ships from a Schleswig point of view <i>Christian Radtke</i> .....	147
26. Inland water transport in the Pre-Roman and Roman Iron Age in Northern Germany and its role in intra- and intercultural communication <i>Ulrike Teigelake</i> .....	152
27. Staraya Ladoga: a seaport in medieval Russia <i>Petr Sorokin</i> .....	157
28. The APES Archaeological Study: The North Carolina Sounds, an interface between land and sea <i>Lawrence E. Babits, Frank Cantelas and Keith Meverden</i> .....	163
D. LONG DISTANCE SEAFARING AND THE CONNECTIONS BETWEEN CULTURES	
29. The ends of the earth: maritime technology transfer in remote maritime communities <i>Valerie Fenwick</i> .....	171
30. The ships that connected people and the people that commuted by ships: The western Baltic case-study <i>George Indruszewski, Marcus Nilsson and Tomasz Ważny</i> .....	177
31. Early cogs, Jutland boatbuilders, and the connection between East and West before AD 1250. <i>Fred Hocker and Aoife Daly</i> .....	187
32. Couronian ship building, navigation and contacts with Scandinavia <i>Inese Karlina</i> .....	195
E. HISTORICAL, ICONOGRAPHIC AND ETHNOGRAPHIC SOURCES AND APPROACHES	
33. From Carl Reinhold Berch to Nils Månsson Mandelgren: On the concept of maritime history, (Sw. <i>sjöhistoria</i> ), and its meanings in Sweden since the latter 18th century <i>Carl Olof Cederlund</i> .....	199
34. Ships and subsidies <i>David A. Hinton</i> .....	205
35. Sea-lanes of communication: Language as a tool for nautical archaeology <i>Katrin Thier</i> .....	210
36. Medieval shipping in the estuary of the Vistula River. Written sources in the interpretation of archaeological finds <i>Robert Domzal</i> .....	217

37. Linking boats and rock carvings – Hjortspring and the North <i>John Coles</i> .....	223
38. Aeneas' Sail: the iconography of seafaring in the central Mediterranean region during the Italian Final Bronze Age <i>Claire Calcagno</i> .....	226
39. Western European design boat building in Buton (Sulawesi, Indonesia): a “sequence of operations” approach (SOA) <i>Daniel Vermonden</i> .....	234
40. <i>Balagarhi Dingi</i> : An anthropological approach to traditional technology <i>Swarup Bhattacharyya</i> .....	243
F. NEWS FROM THE BALTIC	
41. The Roskilde ships <i>Morten Gøthche</i> .....	252
42. Two double-planked wrecks from Poland <i>Waldemar Ossowski</i> .....	259
43. <i>Mynden</i> . A small Danish frigate of the 18th century <i>Jens Auer</i> .....	266
44. The wreck of a 16th/17th-century sailing ship near the Hel Peninsula, Poland <i>Tomasz Bednarz</i> .....	273
G. NEWS FROM AROUND THE WORLD	
45. Sewn boat timbers from the medieval Islamic port of Quseir al-Qadim on the Red Sea coast of Egypt <i>Lucy Blue</i> .....	277
46. A Roman river barge from Sisak ( <i>Siscia</i> ), Croatia <i>Andrej Gaspari, Miran Erič and Marija Šmalcelj</i> .....	284
47. Contributions of maritime archaeology to the study of an Atlantic port: Bordeaux and its reused boat timbers <i>Patricia Sibella, John Atkin and Béatrice Szepertyski</i> .....	290
48. A Roman barge with an artefactual inventory from De Meern (the Netherlands) <i>André F.L. Van Holk</i> .....	295
49. The Arade 1 shipwreck. A small ship at the mouth of the Arade River, Portugal <i>Filipe Castro</i> .....	300
50. A Black Sea merchantman <i>Kroum N. Batchvarov</i> .....	306
51. Medieval boats from the port of Olbia, Sardinia, Italy <i>Edoardo Riccardi</i> .....	312