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Sea-Level Changes in Mesolithic Southern Scandinavia: long- and short-term effects on society and the environment

Jutland Archaeology Society Series 106

PETER MOE ASTRUP

207 pp., numerous colour illustrations, Aarhus University Press, 2019, DKK 435 (hb + ebk), £35 (hbk), DKK 290 (ebk), ISBN 978-8793423299

This is an edited version of Peter Moe Astrup’s PhD thesis. In the first sections he provides an overview of theoretical concepts and the archaeology of Mesolithic cultures in southern Scandinavia including Maglemose (9500–6400 BCE), Kongemose (6400–5400 BCE), and Ertebølle (5400–4000 BCE). In the following sections the relative-sea-level (RSL) and coastal-change data is analysed and the relationship between coastal change and Mesolithic settlements is discussed. These include human responses to sea-level change, coastal adaptations, and sedentism. The author’s particular focus is the driving processes and factors which caused Late Mesolithic (Ertebølle) coastal sites to have much greater visibility in the archaeological record than Early Mesolithic (Maglemose) sites.

In order to search for new submerged Mesolithic coastal sites, 48 diver-surveys were carried out in the Bay of Aarhus by the author, and original research results are reported here. The work is illustrated with many high-quality colour palaeogeographic maps, photographs, and drawings characterizing Mesolithic societies and their palaeo-environment in southern Scandinavia. The author has developed a new empirical coastline-model for the Danish coastal zone from 8000 to 4000 BCE using more than 1300 geological and archaeological sea-level index-points (SLIPs). The dataset involves exceptionally well-preserved submerged Mesolithic settlement-layers with no analogues in Europe or elsewhere. Archaeological SLIPs include kitchen-midden layers of the Ertebølle culture, refuse layers of the various coastal sites and shallow-water fishing structures. For all these, different elevation correction has been applied to relate them to past mean sea-levels. Well-preserved archaeological data, together with data from inundated tree-stumps and -trunks and coastal peat-deposits make this database very useful to reconstruct Mesolithic RSL changes and to understand how prehistoric societies adapted to rising sea-levels.

Identified SLIPs were later grouped into different time-slices to interpolate eight RSL surfaces. These show higher RSL levels in the north-east, in areas of faster postglacial land uplift, and lower RSL levels in the south-east where surface elevations remain below zero. In general, these RSL surfaces reflect the combined effect of postglacial isostatic land uplift and Holocene sea-level rise and show good agreement with present-day land-uplift maps (Vestøl et al., 2019, NKG2016LU: a new land-uplift model for Fennoscandia and the Baltic Region, Journal of Geodesy 93: 1759–1779). However, based on these RSL surfaces it is quite difficult to assess how isostatic uplift has changed over time. For each time-slice between 8000 and 4000 BCE a different number of SLIPs from different geographic locations has been used (younger slices have more data-points). RSL isobases, therefore, tend to change their directions depending on chosen interpolation technique and distribution of the SLIPs. It seems that interpolation-dependent ‘border effects’ clearly affect the results and make it difficult to compare different RSL surfaces to follow the uplift change.

By subtracting the RSL surfaces from the present-day Digital Elevation Model, the author created eight palaeoshoreline reconstructions for the Danish straits and neighbouring areas, suggesting the early existence of the archipelago in the south-west Kattegat area since 8000 BCE. In offshore areas, however, these reconstructions are highly dependent on later marine-sediment accumulation and erosion. This is potentially the largest uncertainty in his models, affecting the precision of the reconstructions. To overcome the problem the involvement of high-resolution marine seismic and sediment-coring data is needed. These datasets exist for some areas, including the south-west Kattegat, and offer the possibility of improving significantly the accuracy of the reconstruction of the Mesolithic coastal landscapes in this area (Bendixen et al., 2017, The Holocene Great Belt connection to the southern Kattegat, Scandinavia: Ancylus Lake drainage and Early Littorina Sea transgression, Boreas 46: 53–68).

Various GIS techniques were applied by the author to compare the reconstructed shoreline positions with settlement data, and to test different scenarios about migration-routes and site-selection and -abandonment by the Mesolithic hunter-gatherer groups. For example, relief analysis was applied to identify coastal areas (depressions) that experienced most rapid shifts from freshwater to brackish conditions, or to contour the new Mesolithic islands developed in the south-west...
Kattegat area due to the RSL rise. Analyses of the length of the coastal zone in different periods between 8000 and 4000 BCE was used to discuss the development of the population. Viewshed analysis was applied to study possible migration destinations for Mesolithic islanders. Potential impacts of the Storegga tsunami event c.6200–6000 BCE to the Mesolithic coastal groups were analysed by creating palaeo-inundation maps.

Overall this volume is useful reading to collect ideas on how various GIS techniques can be used to analyse SLIPs, palaeo-landscapes and Stone Age settlement data. By creating detailed RSL and palaeoshoreline models it has been possible, probably for the first time, to analyse Danish Mesolithic settlement data in respect to coastal change with high precision. I would express my thanks to the author, and encourage him to improve his sediment-thickness models in co-operation with Danish geologists.

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### Sea People: in search of the ancient navigators of the Pacific

CHRISTINA THOMPSON


Polynesian archaeology is a world unto itself, with its dominantly maritime nature, vast distances, distinctive preoccupations, and often-innovative methodologies. In this book, the author presents a comprehensive and accessible introduction to a topic which is of unparalleled interest and significance to any maritime archaeologist.

Thompson begins by outlining the characteristics of the Polynesian Triangle and the limitations of the available evidence, recognizing (p.11) that ‘the problem … is that we are talking about prehistory … the evidence is all partial, ambiguous, open to widely differing interpretations, and in some cases so technical that it is difficult for a layperson to judge’. All the islands within this vast area were settled by the Lapita, ‘a clearly identifiable group of voyagers … with a single language and set of customs, a particular body of myths, a distinctive arsenal of tools and skills, and a “portmanteau” biota of plants and animals’. Without knowledge of writing, metal tools, maps or compasses, they occupied ‘every habitable rock between New Guinea and the Galápagos’ and established what was, until the modern era, the world’s largest single cultural area; the successive waves of ‘invasion’ beloved of the British archaeologist are notably absent.

In the core of the book, the accumulation of knowledge and the development of understanding are considered in broadly chronological sequence against the background of successive phases of geographical exploration, anthropological discoveries, increasing European influence, and (in recent years) Polynesian cultural revival. The expected names (Cook, Banks et al.) are described in commendable length, as are others unfamiliar to the reviewer. A glance through the chapter headings is instructive. Such titles as ‘The Aryan Māori’, ‘A Viking in Hawai’i’, and ‘The Moa Hunters’ indicate the varied (and sometimes quirky) approaches taken by successive generations of academics to investigate the Polynesian past. The innovative and specialized techniques of somatology (cranial biometrics), radiocarbon dating, computer simulation, and DNA analysis are summarized well and their value acknowledged.

Polynesian oral traditions are discussed at length (pp.126–149 and 161–171). Apart from their intrinsic interest, they present a classic case of the problem of reconciling the evidence of traditional accounts with that from material culture. More specific details of the motives for, and processes of, voyaging are provided than is the case in comparable traditions elsewhere. Detailed evidence for material culture is minimal, but there is a quasi-historical background account for the settlement of New Zealand. The description of the use of language without a developed and standardized system of writing (p.19) has fundamental implications for any understanding of the transmission of technological practice in prehistory (‘cognitive archaeology’).

By now, the reader may feel that something is missing. The minimal surviving (or, at least, recorded) direct evidence for ‘canoes’ is considered (pp.48–49) on the basis of the Nukutavake canoe (held in the British Museum) alone. Haddon and Hornell’s classic Canoes of Oceania (1936–1938) is mentioned only briefly, and canoes held in other museums not at all. Nowhere are the reasons for this major deficiency in the material-cultural evidence considered; humid tropical conditions are presumably inimical to the survival of organic materials. However, the rightly-famed experimental voyages of Heyerdahl (1947), Lewis (c.1967–76), Finney (1965–76), and Thomson (1978–1980) are summarized well. The discussion of Thor Heyerdahl (pp.237–249) concentrates on his hyper-diffusionist theory of South American cultural origins to the exclusion of consideration of the inherent natures and limitations of lashed-balsa construction and wash-through rafts. Given the position of such watercraft outside the mainstream Polynesian tradition, this does not affect the summary value of the work.

Less speculatively, the significance of traditional navigational lore and practice in any understanding of Polynesian seafaring are self-evident, and are considered against the maxim that ‘All scholars are landlubbers’. Experimental investigations (in a mixture
of modern yachts and traditional craft, and sometimes in the company of experienced traditional navigators) by David Lewis (pp.262–274) have demonstrated the potential value of such traditional knowledge, at least when exploited by skilled practitioners within the specific geographical and oceanographic circumstances of the South Pacific. The mention of Micronesian ‘stick-charts’ (p.271) attests to the use of a specialized form of recording which falls short of full literacy but achieves the same objective.

Ben Finney (pp.274–285) went further by investigating the suggested limitations of Polynesian watercraft by experimental voyaging in successive multi-hull canoes built to designs recorded by 18th-century European explorers, but partly in modern materials. These investigations subsequently continued under the leadership of native Polynesians. Nainoa Thompson and the Polynesian Voyaging Society (pp.286–295) subsequently investigated the practices of Polynesian celestial navigation, combining the goals of scientific research and cultural revival as part of an exercise in the rediscovery of community identity.

The presentation of the book is old-fashioned. The paper is coarse, and the illustrations few and generally far too small; the text deserves better. The index and notes are comprehensive but there is no bibliography. Given the unfamiliarity of the subject to many readers, summary lists of institutions and individuals active in Polynesian studies and holding collections of Polynesian material culture (including watercraft) might usefully have been included. Notwithstanding these minor reservations, however, the author offers a valuable synthesis, being simultaneously a well-written and reasonably-priced work of haute vulgarisation, a comprehensive summary of a maritime development without parallel, and a methodological revelation. Anybody inclined to minimize the intrinsic interest or dismiss the wider significance of ‘experimental voyaging’, ‘ethnographic watercraft’ or ‘pre-literate societies’ should read it without delay.

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The Political Economy of Classical Athens: a naval perspective
Mnemosyne Supplement 425

BARRY O’HALLORAN
978-9004386143 (hbk), 978-9004386150 (ebk)

This stimulating book comes from an author with an unusual background—economic journalism. In late 1979 he made a film to mark Greece’s accession to the EU, and returning to Greece many times in subsequent years he found a dissonance between what he could see at the ancient sites and the prevailing economic orthodoxy that they had been created by a society with only a primitive economy. He decided to study this further, enrolled at Trinity College, Dublin and wrote a PhD thesis in 2011–2015, which is the basis of this book. He notes (p.315 n.1) that in recent years a number of important studies on the ancient Greek economy have appeared, bringing a change in the debate; his work is, he writes, substantially aligned with them—and it is perhaps a pity that he does not incorporate them more fully. He has, however, a new perspective to offer.

The opening chapters summarize the century-old debate between the argument that the ancient economy was primitive and ‘not amenable to the tools of analysis of modern economics’, and reached Moses Finley’s conclusion that for ancient economic agents the motivation was status and not economic self-interest; and those who asked how that could explain the great cultural, political, and philosophical flowering of ancient Athens. Finley’s view was elaborated in the 1960s down to his great work The Ancient Economy, which first appeared in 1973. As someone who in my early career benefited greatly from his friendship and encouragement, I regret to agree, remembering his lectures on the ancient economy, that his views deadened debate; O’Halloran is more polite, writing of a ‘pervasively conditioning effect’.

Having summarized this debate between ‘primitivists’ and ‘modernists’, with the ‘defining quartet’ of Marx, Weber, Polanyi, and Finley, O’Halloran seeks to show that not all economic issues in ancient history were the unintended consequences of political decisions: he aims to offer economic explanations for economic outcomes, quoting North on ‘the task of economic history to explain the structure and performance of economics through time’; he concedes that neoclassical economics has not helped by becoming a highly mathematical discipline, concentrating on an instant in time, and has lost the critical dimension of time which is essential for the study of historical economic change.

O’Halloran focuses on the dynamic processes of institutional development unfolding over long periods; and applies this analytical framework, through a ‘path dependence comparative analysis’, to explain the very different historical trajectories of the two great cities of the classical period—Athens and Sparta (one wonders how useful it would be to apply this analysis to other great contemporary cities). Concentrating on Athens, he explains his choice of a naval perspective: he concludes, using an employment/demand framework, that Athens’s large-scale expenditure on its naval-defence economy laid the foundations of a period of exceptional growth. He justifies his choice: significant drivers of economic growth were key features of the naval economy; the naval sector dominated the Athenian economy for over 150 years; her strategy of conquest depended on a large, well-equipped fleet with
skilled crews; and that this had political consequences. This last point has been largely accepted, but he argues that the economic consequences have not.

His comparison of the political economies is stronger on Athens than on Sparta. His analysis gives emphasis to ‘path dependence’, and Sparta’s weakness in administration of public finance and inability to break out of its hoplite-defined institutional structures, though it made some attempts during the Peloponnesian War. A little more could be said about the Spartan navy: there is a tantalizing fragment of an inscription found south of Sparta, probably from a sanctuary at Amykli, which lists contributions by Sparta’s allies and individual supporters to the Spartan War Fund, probably (though this is disputed) between 427 and 412, and apparently including a contribution for a trireme(s) or trireme pay (Osborne and Rhodes, *Greek Historical Inscriptions*, 478–404 (2017) no. 151).

Clearly Sparta wanted to fund a navy, but could not rival Athens until she had access to Persian money late in the Peloponnesian War (as O’Halloran discusses later). But this must have gone mostly on sailors’ pay: in 413 Sparta contributed only 15 ships out of 100 towards a building programme for the allied fleet. One must not, however, underestimate the Spartan threat: the Athenians made it a priority to burn the Spartan dockyard at Gytheion as early as 457—having learnt the vulnerability of naval bases with the Spartan landing at Phaleron in 510 and the Aeginetan attack in 506.

Turning to Athens, O’Halloran follows van Wees in his account of the early development of her navy, from a private fleet of penteconters into a state fleet of triremes: in my view taking the development too far back into the 6th century; and a ‘hybrid public/private partnership’ sounds anachronistic. It is difficult to see how a large fleet could have remained based at Phaleron long after the attacks of 510 and 506, when the move to Piraeus is securely attested only from 493. One has to ask: what infrastructure was there at Phaleron, or at Piraeus before 493? O’Halloran can only say ‘presumably pre-existing’ at Piraeus (p.110), of building ships close to the timber source. There clearly was an annual shipbuilding programme, and I agree with him in accepting Andocides’ speech *On the Peace* as a source—also on new shipshed construction after the conclusion of the First Peloponnesian War (pp.226, 288–289).

O’Halloran also has an interesting section on the provisioning of crews on distant naval operations—a subject usually ignored.

Chapter 7, ‘Naval Institutions—Trierarchy’, describes its gradual development after the income from tribute declined. I think that he underestimates the amount of bureaucracy involved: it was an effective and efficient system, but not cost-free. The 4th-century Naval Lists illustrate its complex administration. Chapter 8, ‘Naval Innovation’, will particularly interest our readers, with a helpful table, drawn from others, illustrating the transition in Greek boat-construction technology. He explains the reluctance to shift from the sewn/lace technique to mortise-and-tenon in his ‘path dependence’ terms: changing routines and the supporting institutions was expensive. He suggests also, following S. Mark, a link with the move to the trireme, and a link of both developments with the emergence of state-financed navies (though I am not sure he understands the *parexeiresia*).

Naturally I agree with his emphasis on the sheer scale of investment in naval defence infrastructure (ch. 9): the shipsheds at Piraeus formed the largest roofed building complex in the ancient world; and he appreciates Jari Pakkanen’s study of the building costs. We now know more about the Zea Harbour Project, on which B. Lovén [sic] has recently published his second volume (2019). Shipshed construction was a permanent investment, unlike the cost of naval operations; in fact the cost of labour and material was spread over many years, as work continued, showing caution as well as confidence in the strength of the economy. The steady paid employment would have boosted that economy. Maintenance would have been a permanent feature, but on a smaller scale. In ch. 10, ‘Soldiers, Sailors, Citizens’, he turns to the men. Influenced by van Wees, he discusses the persistence of the ideology

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of the hoplite warrior and lack of appreciation of naval service, with few depictions of sailors and ships compared with those of infantrymen; but one must not forget Pericles’ speeches. We can now add the important book by David Pritchard, Athenian Democracy at War (2019), following up his earlier studies, some of which the author has cited.

Ancient sources and modern scholarship link seapower and the democratic institutions of Athens. This has been most eloquently expressed in Barry Strauss’s thesis of the ‘Trireme School of Democracy’: the thetes rowers developed a kind of class-consciousness and increased political assertiveness just by rowing together in triremes. O’Halloran counters that the trireme crews were not all citizens, and as time went on showed a primary concern for their economic interests—pay and subsistence allowances; but I would respond that slaves became an important element probably only in the later 5th century; pay for slave rowers must have gone to their owner, as O’Halloran admits; and only citizens could attend the assembly. I therefore retain some attachment to the Strauss thesis, while agreeing with O’Halloran on the reticence of modern as well as ancient sources to accept the role of slavery—stress on which was Moses Finley’s particular contribution.

O’Halloran argues that slavery was not incompatible with a functioning labour-market, and a naval labour-market developed in Athens and across the Aegean. Many will have come into Athens from the Attic countryside, leading to increased dependence on imported grain—requiring naval protection for the shipments—and also from allied cities which gave up contributing ships and paid tribute instead. This created a demand-led boom. Employment was not just at sea, but in a wider maritime sector for which O’Halloran rightly, if speculatively, argues. Payment became necessary to retain crews, and was in cash, in Athenian Oiws: ‘the hardest of hard currencies’. The scale of manpower was enormous, if we are to believe Thucydides (3.17), which O’Halloran and I do. In one year early in the Peloponnesian War Athens deployed 250 triremes in active service throughout the summer, requiring crews of 50,000 men and the money to pay them.

O’Halloran then turns to the ‘Naval Economy’ (ch. 11). He notes the recent burst of studies challenging long-standing consensus, and concluding that ancient Greece was on an upward trend, and particularly Athens; he stresses the link between institutional quality and economic growth, for example in developing international trade and market exchange; he contests Finley’s view that there was no serious economic analysis in the writings of ancient authors. The ancient Athenians embraced self-interest, but disapproved of politicians’ selfishness.

Concluding that ‘size matters’, he tries to assess the size of the naval economy, with a useful discussion of the sources in an Appendix. He accepts from Finley the need to be critical of ancient sources, but after initial scepticism about numbers in Thucydides as well as Herodotus, he moves towards acceptance: Thucydides had naval experience, and wrote for an audience familiar with naval logistics. He is wary about decimal multiples as ‘suspiciously round’, but the Athenian system was decimal: compare the 10 tribes which played a key role in Athenian institutions, including the navy. On the Athenian Naval Lists as a source he is too dismissive: for a specific period (377–322 BC) they give us a clear glimpse of detailed naval bureaucracy. O’Halloran draws together the evidence for fleet-size 480–322, showing that it amounted to 200–400 triremes (with tetrereis emerging towards the end); he rightly claims that the essential impression is valid: collapse in 404, but a remarkable revival in the 4th century. This gives him a basis for estimating costs, noting (p.303) that Gabrielsen had avoiding doing so despite the title of his book: Financing the Athenian Fleet.

In his final ch. 12, ‘The Wealth of Naval Athens’, he draws together earlier threads. He accepts the importance of the emergence of the trireme, but notes that the navy had a role in operations other than set battles, which were far fewer in the 4th century (the Second Athenian League being very different). He writes sensibly about sailors’ pay, and gives reasonable estimates for total annual naval expenditure in the three main periods of the 5th century at 500, 400, and 800 talents, which could translate into gainful employment for between 9500 and 19,000 a year. In a world where we have learnt about ‘quantitative easing’ since the financial crisis of 2008, we are not surprised to read (p.303) that ‘the Athenians became the first, if accidental, Keynesians’. Recognizing that Osborne is one of the few ancient historians to give credence specifically to the economic implications of increased naval expenditure, with its cumulative effect, he concludes that ‘as Classical Athens could not resort to deficit-spending (borrowing from global markets) to fund its naval expansion programme, it had to rely on silver-production, tribute and a novel public-private partnership with wealthy trierarchs for its funding’. ‘Public-private partnerships’ sound very contemporary!

The author’s conclusions may be predicted. He exaggerates in writing that the role of the navy in providing the economic foundations for Athenian prosperity has not been a significant feature of classical scholarship to date (p.315); but this book has certainly given it greater attention, and from an unusual standpoint: he confirms ‘institutional economic analysis’ as his primary methodological framework. He repeats his view that only recently has ancient economic history emerged from Finley’s long shadow; and hopes for agreement with his acceptance of a more complex set of human motivations than the two extremes outlined above. He makes the interesting comparison of Athenian naval expenditure with that of some of the wealthiest maritime states of the later Renaissance period. He describes how Athenian technical and especially institutional innovation in the
The diversity of subjects, periods, and approaches is probably the book's main attraction. Through this series of different papers, the reader acquires an inclusive and exciting image of the vibrant activity of new research in maritime archaeology, presented by those who are actively undertaking it and who share original and often innovative approaches, ideas, and results. Their enthusiasm and passion for their topics is evident. The inclusion of varied geographical areas and subjects in the contributions allows for a broader perspective on the progress of maritime archaeology and history inside and outside the Mediterranean, and offers an insight into fields and regions many scholars often know little about. In terms of presentation and quality, the volume follows the high standards of recent BAR publications, well printed and thoroughly organized, with black-and-white and colour illustrations and charts supplementing the text. In general, the publication works equally well for someone who wants to read the whole book as a collection of papers highlighting some of the latest developments in maritime archaeology, or to locate and study specific subjects within the volume (via the Table of Contents—there is no index).

Nevertheless, the multiplicity of topics and authors also constitutes this volume's main disadvantage, as is often the case with such collections of papers. Covering such a wide range of topics, it lacks any focus on a specific subject, period, or approach. There is also an imbalance in content and quality. Several contributions are extended summaries of postgraduate theses, failing to filter the studies’ results from their already known background and becoming too tedious to read. Another issue is the lack of thorough editing in several papers in which typos and mistakes are to be found, and in one case (Matés Luque) the quality of the English text leaves a lot to be desired, something that should have been taken care of by the editors. One last editing issue concerns the quality and number of illustrations. Some are of low quality, including some maps or satellite photographs. On some occasions, the illustrations, although essential for the comprehension of the dense text, remain too few and too obscure to be helpful (e.g. Raad).

Despite these shortcomings, however, which are mainly editorial, the book fulfils its aims. It offers an insight into the most recent research and promising developments in maritime archaeology, or to locate and study specific subjects within the volume (via the Table of Contents—there is no index).

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scholarship of maritime archaeology and history and includes several very interesting papers. It highlights the latest progress in various fields of study, while also emphasizing the future potential development and impact of new ideas and methods, not only as the result of these varied studies, but also as stepping-stones for further fruitful discussions and interpretations.

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Sailing to the Holy Land: crusader ships, seamanship, logistics and landing operations
BAR Int. Series 2904

DAN MIRKIN

Waves lap the walls of St Jean d’Acre (Akko), once a bustling Crusader port. What was it like for a European knight to sail across the Mediterranean Sea, and disembark in this strange place called the Holy Land? How was his ship handled, where did it anchor, and how did the knight and his horse come ashore? In an interesting and well-thought-out discussion, Dan Mirkin ponders these issues. A researcher of maritime history at Tel Aviv University, Mirkin is a lawyer by profession, but most importantly is an experienced sailor, who has sailed the Mediterranean for many years and has crossed the Atlantic.

The title of this book conveys its content well: it presents a detailed multi-disciplinary research project into Crusader ship-types, seamanship and ship-handling, and an account of a maritime shore installation. The research methods, including study of archival documents, water-jetting and underwater excavation, are not new to the maritime archaeology community. However, the methodological approach is refreshing, and the maritime experience of the author is exploited well. The book consists of two parts (plus Introduction and Final Thoughts): The first, ‘Of Ships, Seamanship and Fleets’, comprises five chapters, and the second, ‘Apollonia-Arsuf: a maritime installation below the castle’, two chapters.

The Introduction presents the research objectives and the various sections of the book, and summarizes previous work on maritime aspects of the Crusades. During the First (1096–1099) and Second (1147–1150) Crusades, armies, with their horses, equipment and supplies were transported by land, but the sea was the main route chosen for the Third (1189–1192) and Fourth (1202–1204) Crusades. Mirkin emphasizes that, although the Crusades have been intensively studied, some maritime questions have been only partially addressed, or not at all. These include, for example, the significant problem of landing the knight and his horse on the shores of the Holy Land.

The first part of the book examines various nautical issues based on the interpretation of two main primary sources: written documents and iconography. The author should be congratulated for successfully overcoming the challenge of translating and interpreting for the first time sources written in medieval French. The original quotations, along with their translations, are giving in the text itself, in the footnotes, or in Appendix I (excerpts from Ambroise). Chapter 1, ‘Types of Ships’, is dedicated to the various types of vessels used during the Third and Fourth Crusades. In ch. 2, ‘Between Text and Image’, the author discusses rig, rudders, and sailing based on his study of iconographic sources. Mirkin notes that illuminations do not present an exact representation of reality, and should therefore be interpreted with caution (p.10). He uses this iconography to discuss how the sails were set, and presents the case that Crusader ships, mostly lateen-rigged, were no better at sailing upwind than if they were square-rigged (p.10). The organized Crusader convoys arrived twice a year, at Easter and at the end of summer, using the prevailing westerly winds, and exploited the easterly winds in late April and late October on the return passage to Europe.

As previously discussed by McGrail in Boats of the World from the Stone Age to Medieval Times (Oxford, 2001: 89), despite advances in our understanding of past conditions in the Mediterranean, we can only analyse sea-voyages based on today’s conditions. Mirkin takes this a step forward, and in ch. 3, ‘A modern Simulation of Richard the Lionheart’s Passage from Acre to Jaffa’, he not only uses present weather-conditions for interpreting earlier sailing conditions, but also sails the same route at the same time of year. With this example of experimental archaeology, although in a well-equipped modern yacht, Mirkin was able to trace and analyse the problems of setting out to sea, anchoring and disembarking during the Crusader period from a seaman’s point of view. He also demonstrates that Ambroise’s description of Richard the Lionheart’s passage reflects reality, given the same sea conditions and luck with the winds (p.21).

Chapter 4, ‘Crusader Fleet Seamanship’, focuses on the fleet, its organization, the support provided to land forces, naval tactics, and the use of small boats, which ‘were not always small’ (p.25). Anchoring, mooring and beaching are also discussed, and naturally Mirkin leads the reader to ch. 5, ‘Ports of the Holy Land and Resulting Influence on Choice of Ships’. This begins with a description of the historic walled port-city of St Jean d’Acre, which was the main harbour of the Holy Land during the Crusader period. According to Mirkin, even this port was not suitable for loading and unloading horses (p.33). Additional harbours and natural anchorages along the coast, such as Atlit, Dor, and Jaffa, are briefly described. The chapter then deals
with the issues of embarkation and disembarkation of the knights, horses, supplies, and equipment. Mirkin skilfully analyses the challenges of operating the ships, such as mooring stern-to and the use of gangways.

The second part of this book is dedicated to the maritime installation of Apollonia-Arsuf, about 20 nautical miles south of Caesarea, and comprises ch. 6, ‘General Description and Research Project’, and ch. 7, ‘Findings’. The maritime installation is located in the sea at the foot of the cliff on which Apollonia-Arsuf crusader castle stands. It is trapezoidal, about 80m from north to south, and 33m east-west. It has walls or breakwaters at its northern and southern sides, and the western side is a kurkar ridge bearing the remains of an ashlar wall. There are towers at the seaward ends of the walls, and an entrance at its south-western corner. Over the years, opinions have differed as to the true nature of the site: was it a real harbour? Was it a mooring-basin for small craft? Or, as some scholars claim, was it just an installation designed to prevent an approach from the coast to the cliff on which the castle itself stood?

In an attempt to find answers to these questions, the author conducted various investigations in and around the installation. Underwater investigation demonstrated that it was constructed using marine building techniques. In spite of its small and difficult entrance, once a boat had managed to find its way into the area protected by the walls, probably relying on local knowledge, it was relatively safe. Thus it could have served as a mooring-basin for small craft in good weather. With modesty, Mirkin concludes that the debate over whether or not this actually served as a mooring-basin has yet to be resolved, and that there are valid points to be made both for and against, mainly relying on determination of the water-depth in the Crusader period. However, he points out that most probably it could hardly qualify as a harbour (p.56). The author's 'Final Thoughts' provide a short summary of this work.

At the end of the book is a short glossary of technical terms. The bibliography is comprehensive, but perhaps the section 'General bibliography' could have been omitted, so that only works cited in the book were included. There are eight appendices. Appendix A presents the sub-bottom sonar scan inside the installation, but with no useful conclusions. Perhaps Appendices C and D could have been omitted, and Appendices F–H could have been incorporated as illustrations in the text. There are some minor technical points. Here and there typos occur (e.g. p.3), or a punctuation mark is missing at the end of a sentence (e.g. p.31, 35).

This book presents a detailed analysis from a maritime perspective, and is a significant contribution to our knowledge of Crusader-period seamanship and ship-handling. The number of illustrations is impressive, and their analysis innovative. The quotations from contemporary sources are wonderful, and some of their interpretations are enlightening. Sailing in the wake of Richard the Lionheart, the author arrived at important conclusions regarding the manner in which Crusaders with their horses and equipment sailed to the Holy Land and disembarked on its beaches. The primary and secondary written sources and the many medieval illustrations presented in this book, combined with maritime archaeology and the author’s practical experience as a sailor, draw a vivid picture of sailing and seamanship during the Crusader period. As Mirkin summarizes (p.60), it is this combination which led him to propose new thoughts regarding the use of sails, ships, and small craft by Crusaders arriving at the shores of the Levant.

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The Master Shipwright’s Secrets: how Charles II built the Restoration navy

RICHARD ENDSOR

304pp., over 200 illustrations and tables, mainly colour, Osprey, 2020, £65 (hbk), ISBN 978-1472838384

Much of the scientific knowledge, mathematical logic and technical innovation which underpins the modern world was developed during the 17th century, and nowhere is this more apparent than in the design and construction of warships, particularly in England. Earlier traditional methods had relied on accumulated experience passed on through the generations, establishing envelopes of what was possible (and determining what was not) by trial and error in an almost Darwinian process of evolution. Designs were based on what was known to work and looked right, often aided by simple rules of thumb. Flawed solutions were rapidly eliminated by natural selection. Such processes worked well (and still do) for small traditional craft across the world, but as ships became larger and more complex they were less suited to simple and intuitive design methods. This led to written treatises, calculations related to shape and stability, ship-draughts, models and detailed documentation. These sources have given historians a greater understanding of the design and construction processes developed during this period of scientific rationalization, particularly of English naval ships, for which the evidence is particularly rich and well-studied. More recently the resource has been augmented by the discovery and investigation of several contemporary wrecks.

There might seem to be little in common between a 17th-century master-shipwright and a computer programmer working in today’s aerospace industry. But such a link is at the heart of this book. In 1674 John Shish took charge of his family’s shipyard at Deptford
on the Thames, shortly after he had submitted a treatise entitled *Account of Dimensions of a Ship* to Samuel Pepys, Secretary to the Admiralty. In it he sets out 3-D mathematical formulae for determining the rising and narrowing lines of a 4th-rate warship. The figures allowed accurate curves to be drawn at full scale on the floor of a mould-loft for shaping the components of a designed hull. The treatise subsequently lay forgotten in the Pepysian Library at Cambridge until it was discovered by Richard Endor, precipitating a remarkable meeting of minds across three centuries.

Endor is a production engineer who specializes in computer programming for designing and machining aerospace components to high tolerances. He is also an independent nautical historian of international repute with a driving interest in 17th-century ship design and shipbuilding practice. Calculating, manufacturing, and assembling complex 3-D shapes are processes as inherent in a modern design-shop as they were in a 17th-century shipyard. This 'secret' treatise binds Endor and Shish together almost to the point of a two-way conversation. Thus armed with the formulae for determining the shape of a Restoration warship, Endor began gathering complementary evidence from other sources to 'design' one himself, and this process defines the structure of the book. As his subject he has chosen Tyger, a 70-gun 4th-rate completed in 1681 as part of Charles II’s 30-ship programme of scientifically-designed warships, initiated in 1677 and intended to make good losses incurred during the Dutch wars. The reconstruction is based primarily on Tyger but draws on evidence from other ships and sources where appropriate, so the outcome typifies both her and her contemporary sisters.

*Tyger* has an unusual history. She was not, technically, a new ship. Originally built in 1647, she fought in the Anglo-Dutch wars and in 1674 was sent to Deptford for a full rebuild. But shortly afterwards the hull sank in the dock and was broken up. However, a token sample of her remains was retained ashore so she could be kept on the books as a decommissioned ship. This was a generous wheeze on the part of Charles II (a naval man to his core) to enable retired and infirm members of her crew to continue receiving pay as warrant officers. Even more cunningly it allowed Shish to 'rebuild' a new *Tyger* in 1681—an important distinction, because although the 1681 budget for new-builds was exhausted, a balance still remained in the funds allocated for 'repair'. The only components actually re-used were two sections of the original keel and half a dozen lower frame components. So although in reality the 1681 *Tyger* was brand new and followed the latest design and constructional criteria, she was officially just an extensively repaired 34-year-old ship.

The first three chapters set the scene for the new *Tyger*’s story, introducing the Restoration navy, the background to the dockyard, and the various players involved—the king, Pepys, and the Shish dynasty of shipwrights. Design criteria and their evolution are discussed, and the various sources brought to bear—documents, including plans, draughts, contracts, scantlings, surveys, and estimates; shipbuilding treatises (notably those of Battine, Bushnell, Drummer, Deane, Sutherland and, of course, John Shish’s crucial *Dimensions*); iconographic sources (particularly from the pens and brushes of the two Van de Veldes), and the considerable and rapidly expanding evidence now being derived from nautical archaeology.

A reconstructed lines draught for the un-named ship formulated by John Shish in his *Dimensions* is presented inchs 5 and 6, together with detailed explanations of the process with reference to other contemporary or near-contemporary authorities. Some mathematical understanding is necessary to follow these calculations. No contemporary draughts of *Tyger* are known, but relevant information is preserved in two contemporary models of similar 4th-rates—*Mordaunt* of 1681 (in the National Maritime Museum) and *St Albans* of 1687 (Trinity House). There are also several spirited Van de Velde representations of *Tyger*.

Many other aspects of the ship are reconstructed. Arrangements on the orlop and upper decks show the careful management of available space. Masting, rigging, and sail-plans are explained with clear illustrations, while other sections describe the anchors and ship’s boats. Neither will specialists in naval artillery be disappointed. Although no identifiable specimens of *Tyger’s* guns are known today, a full inventory of her armament was made in 1698. At least some appear to derive from her demolished 1647 *alter ego*. In addition to regular demi-culverins and sakers it lists six lightweight ‘drakes’ and ‘cutts’, including a *Ruperto saker cutt*, a revolutionary lathe-turned and annealed type patented by Prince Rupert. These light pieces had a boisterous recoil, and required carriages with ‘dead’ (non-rotating) rear trucks to help absorb it. Endor has recorded a fine example of such a carriage complete with an iron saker preserved at Windsor Castle, while two others have recently been recovered from wrecks—a Cromwellian warship off Duart Castle in Scotland (1653) and the *London* (1665) in the Thames.

It is noteworthy that in spite of the plethora of primary written and illustrative sources that exist for these ships, a direct connection with the shipwrights who built them can only be made by examining surviving timbers. And although archaeology only rarely preserves a ship in its completed form, it is in carpentry details too small or well understood by contemporaries to require explanation that a properly-excavated wreck can make important contributions. For this period we possess an especially rich resource, particularly in British waters. Closely contemporary with *Tyger* are the Goodwin Sands wrecks resulting from the 1703 storm (*Northumberland* (1679), *Restoration* (1678), and *Stirling Castle* (1679)); *Coronation* (1691) off Plymouth; and *Anne* (1678), burnt after grounding...
near Winchelsea). All these wrecks are protected and some have been partially (and responsibly) investigated. Working in concert with Endors and other naval historians, this important aspect of British history looks set fair for productive collaboration with maritime archaeologists over the coming generation. In addition, archaeology will provide first-hand details of working routines, armament, provisioning, on-board domestic arrangements, health and recreation in ways no document ever can. A hint of what may be in store is provided by Endors’s illustration of an intact folding table recovered from the gunner’s quarters on the wreck of Stirling Castle.

The book is extensively and magnificently illustrated, mainly by Endors himself. His technical drawings, though scrupulously descriptive and accurate, are enlivened by figures to provide scale and human interest, while his reconstructive vignettes explain the workings of such mechanisms as steering systems and pumps. His ship drawings, whether formal draughts or exploded structural details, are models of clarity. They include triple fold-out sections reconstructing at 1:72 scale Mordaunt, St Albans, and Tyger. He is also a maritime artist of no mean accomplishment, and it is not always easy to distinguish between his paintings and those of his illustrious predecessors and personal heroes, the Van de Veldes. Pictures of Charles II’s visit to Tyger on 18 August 1681 are reproduced as two double-page spreads (pp.252–255), one by Van de Velde the Elder and the other by Endors. Though the latter is in no sense derivative, the similarities of style and approach are striking. This splendid book will appeal to maritime historians, archaeologists, model-makers and nautical enthusiasts across the board. Many will also profit from consulting Endors’s earlier works, notably The Restoration Warship (London, 2009) and The Warship Anne (London, 2017). All are essential reading for anyone involved in the excavation and interpretation of the iconic ships of this defining era.

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Ghost Fleet Awakened: Lake George’s sunken bateaux of 1758

JOSEPH W. ZARZYNNSKI

284 pp., 108 b&w illustrations, State University of New York Press, $32.95 (sbk), ISBN 978-1438476728

As a lifelong student of North American inland waterway archaeology who had his first professional underwater archaeology experiences just north of Lake George, I was excited to read Joseph Zarzynski’s synthesis of that lake’s bateaux. This is a project I have followed for my entire career. Zarzynski’s book, however, was not quite the description-and-interpretation-heavy archaeological text I was expecting: instead it is a history of the archaeological investigations of these wrecks aimed at a general audience.

Bateaux (plural of bateau) were the ubiquitous European boats of North American rivers and lakes during the 18th and early 19th centuries, heavily used by British, French, and American armies during the various wars for control of the continent. While they varied with time and geography, bateaux were often mass-produced for military campaigns. Lake George, located in central New York state, USA, contains a remarkable collection of these boats, mostly dating to 1758 when British troops sank a fleet of bateaux in the lake, planning to recover them the next year and continue a campaign against the French. While most of the vessels were recovered, several were not and lay largely undisturbed until the 1960s. Zarzynski catalogues at least 40 bateaux wrecks in Lake George, both individual vessels that were probably lost unintentionally, and groups of up to 12 that were intentionally sunk. The majority are British bateaux from 1758, but there may also be French bateaux from the same period and British examples from later periods among the wrecks. It is a truly incredible assemblage of 18th-century small craft.

The first four chapters describe the history and use of bateaux on Lake George, as well as providing a general description of the shape and construction of these vessels. The subsequent 11 chapters offer a chronological description of the efforts to record, raise, and preserve them. This includes descriptions of attempts to identify and raise bateaux hulls during the 1950s and 1960s, but the majority of the text is dedicated to the efforts of the Bateaux Below project and its predecessors, organizations that Zarzynski led from the 1980s to 2010s. These chapters are supplemented by two appendices describing the methods used during the early years of underwater exploration in Lake George. The final four chapters catalogue several educational initiatives based on the underwater archaeology, including replica bateaux, art exhibitions, documentary films, and public education programmes. An appendix describes in more depth the experience of building and sailing a replica bateau.

All these chapters are written primarily for a local audience. Local places and personalities are highlighted and Zarzynski repeats identifiers and details to ensure that the reader remembers exactly who or what he is referring to. The result is a story of diver interaction with the sites rather than a discussion of the sites themselves. The wreck-sites are not systematically described, and there is little attempt to compare the Lake George bateaux with each other or with bateaux found throughout much of eastern North America. As a result, this volume may not be useful to scholars interested solely in boat-construction or the use of archaeology to understand past events.
Ghost Fleet Awakened, however, will be of interest to archaeologists interested in the growth of the preservation movement and anyone interested in forming a grass-roots archaeological preservation organization. The development of Bateaux Below and Zarzynski’s personal journey from historically-minded SCUBA diver to professional maritime archaeologist are woven throughout the narrative and provide a blueprint for non-archaeologists who want to preserve their local submerged heritage. Bateaux Below, which won a prestigious Preserve America Steward award in 2009, is certainly a model for other organizations. The book also charts the development of underwater-cultural-heritage preservation in the United States through the example of the Lake George bateaux. Beginning with clumsy salvage for public display and moving to in situ preservation and listing on the National Register of Historic Places, Ghost Fleet Awakened records how the state of New York attempted to balance diver access, historic preservation, and public interpretation over the past six decades.

Zarzynski also offers a powerful argument for the necessity of local involvement in preservation. The Lake George bateaux are an impressive example of why local preservation is necessary. Of the more than 40 bateaux in Lake George, not a single one was unaffected by divers, and some were totally destroyed. The state of New York was unsuccessful in protecting these vessels, despite the interest of several state agencies. It will only be through the work of organizations like Bateaux Below and publications such as Ghost Fleet Awakened, which argue for the value of undisturbed archaeological sites to the general public, that submerged cultural heritage will be preserved.

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The Last Voyage

PALLE UHD JEPSEN


The subject of this book is the famous shipwreck of 1811 in which two British men-of-war, the 2nd-rate 98-gun ship-of-the-line St George and the 3rd-rate 74-gun ship-of-the-line Defence were wrecked on Danish shores. The book is squarely aimed at the general public. Within these limits it is informative, though not without problems. The translator and the English copy-editor have both let the author down.

Traditionally reviews begin with a list and brief description of the chapters, but in this case this is not a practical approach, for the average chapter length is three pages, including illustrations, and the book is 244 pages long. Thus perhaps a brief overview of topics covered may be more to the point. The first part is dedicated to the naval and maritime history of the Kingdom of Denmark-Norway in the later 18th century and through the Revolutionary and Napoleonic Wars. It begins with a general description of life at sea in the Age of Sail—the weakest part of the whole book. It contains the predictable, and by now refuted, description of naval life as only ‘starvation, horror, floggings, cruelty and mutiny’. Though Jespen lists N. A. M. Rodger’s seminal history of the Royal Navy in his bibliography, he would have been well-advised to refer to Rodger’s magnum opus, the Wooden Walls, where this image of naval life was destroyed decades ago. It is incomprehensible to find this sort of simplistic nonsense still repeated.

From this low point, the narrative improves significantly. The historical section on the route to, and the war(s) with Great Britain is well told and interesting. Jespen is outstandingly even-handed in presenting the evidence—one is not going to read anything about unprovoked attack and aggression on the part of ‘perfidious Albion’. Quite the contrary! Surprisingly, he places the fault for both breaches with Great Britain squarely on the shoulders of Denmark-Norway’s government (and specifically the Crown Prince). This objectivity and fairness is much to the author’s credit. The section presents well and interestingly what led the Dual Monarchy on the path to conflict and war with the foremost maritime power in the world, much to its detriment. It is particularly valuable because there is a fairly limited number of publications on Nordic maritime activities in the Age of Sail in English. This forms the strongest and most interesting part of the book. Very little original research, however, has gone into this section, which is mostly based on the work of Danish historian O. Feldbæk.

The second part is dedicated to the final voyage and wrecking of Defence and St George. It is a story well told, using the logbooks of the surviving ships. The author, however, has evidently found contemporary English handwriting difficult to read. Comparing photographs of the documents with the transcribed text, quite a few mistakes can be found, even when the text is in fact easy to read. An excellent example is on p.172, where the author has had a hard time identifying the words ‘Captain John Gaff’ (or possibly ‘Goff’) writing ‘C of T Ino Gaff’ (sic!). Still, this does not negatively impact the narration.

The final part is dedicated to the modern salvaging of the ship’s remains and, apparently, some limited archaeological investigations, though this reviewer found it hard to understand whether these interventions were done by archaeological contractors or salvaging/diving groups. It is not clear what was done, and how. It is mostly a chronological list of the interventions with the respective participants and
general remarks on finds and the condition of the site, but nothing that even remotely resembles an archaeological report. There are no site-plans, no sections, no measurements—just what one would read in a newspaper account of an archaeological project. It makes the book of little use to archaeologists, though admittedly they are not the target audience.

Even within the book’s intended role as a general overview, it has some weaknesses. It does not follow a clear chronological sequence. To give just one example, p.217 discusses events from 1997–1998, but on p.219 the reader is sent back to 1985. The same is true in the historical section, which makes it harder to follow the narrative and understand the events. In places bizarre conclusions or explanations are offered that archaeologists are unlikely to accept. One example is the explanation offered as to why Defence is in worse condition than St George—that she was much older than St George at the time of stranding (p.220).

Mostly, however, the weaknesses are due to poor translation and equally bad—if not worse—English copy-editing, and are not the fault of the author. This is particularly clear in the maritime terminology. A few obvious terms, that are part of the vernacular, can be offered as examples. On p.31 we read that Defence is ‘dimensioned’ (the English editor must have been asleep!); a few lines further ‘top and bottom gundecks’ are mentioned. Other things are failures of research: it speaks of a 14-pounder gun, but this was not a calibre used by the British Royal Navy in this period (or any other, as far as the reviewer is aware). On pp.37–38, the author or, more probably, the translator, speaks of ‘shelling’, missing the point that during the Napoleonic Wars shells had not yet been invented. On p.117 shrapnel is described well in advance of its invention. Clearly it ought to read ‘grape’. The text also speaks of the hull, armament, and rig of the 74-gun ship Defence being designed around a crew of 550 men, when the crew-size is determined by the requirements of working the guns and rig of a ship—not the other way around.

Jarring expressions include the description of St George as ‘second-rated’, instead of ‘second-rate’. Mixing feet with metric tons displacement is a somewhat questionable combination. This reviewer would particularly like to know how exactly the tuns and tunnage were converted into metric tons displacement—no explanation is given. Yet there is no formula that can directly convert the one into the other as they measure different things. The only way to calculate displacement in metric tons would be to sit down and, from the drawings, calculate the areas of the sections, calculate the volume and convert it into weight displacement. Somehow the reviewer doubts this is what had been done, based on the overall impression of the research that went into the book.

The translator and copy-editor have failed to recognize that while the Danish rank is ‘cadet’, the British equivalent is ‘midshipman’. On p.137 Cressy is described as ‘reefing stunsails’, which cannot be. Stunsails did not have reef-points. Further on, p.139, the same ship is described as drifting, when it is clear from the context that she was ‘dragging’ her anchor. Other seamanship manoeuvres described in a way that makes them incomprehensible are ‘the jib-boom was set but torn by the leeches’ or ‘interim sails’. Interim until what? Elections appoint new sails? One can only guess what was the original and what the translators thought they were saying. Similarly on p.202 ‘guns are retracted from the gates’, though this can be deciphered to mean ‘guns were run in’; then ‘loading and cleaning rods’ for ramrods; ‘rudder bracket’ instead of ‘gudgeon’. On p.148 we read of a ‘towing wire’—a Google-translation of ‘towing cable’, presumably, for wire cables had not yet been invented. There are some expressions and word-usage that suggest the translators had no idea of a word’s meaning. For example ‘veer’ is used often, but always incorrectly. All these weaknesses could easily have been avoided by good copy-editing.

These shortcomings detract from the pleasure of reading an otherwise interesting book, and most are not the author’s fault. All in all, the book is not bad, but it is hardly a must-have for nautical archaeologists, nor is it likely to be of interest to professional maritime historians. However, it has a place as enjoyable presentation of maritime affairs that are rarely presented to English-speaking general readers.

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German Submarine U-1105 ‘Black Panther’: the naval archaeology of a U-boat

AARON STEPHAN HAMILTON


Osprey are well known to readers of military history. Their New Vanguard and Fortress series in particular are useful resources on military architecture and structures. The variety of authors can mean a variety of standards of content, but they generally provide helpful background for industrial and conflict archaeology. This volume is a slightly new direction for Osprey. It is a different format—a large, almost square, hardback. It is well presented, with more than 60 photographs, including historic images, technical drawings, maps and charts, while the final chapter boasts an additional 30 photographs of the wreck today. Archaeology is not Osprey’s typical fare. Only two previous works fall into the same category: Innes McCartney’s Jutland 1916: The Archaeology of a Naval Battlefield (first published
by Conway, like Osprey part of the Bloomsbury Group) and Scapa 1919: The Archaeology of a Scuttled Fleet. Perhaps it is not a complete surprise, therefore, that McCartney has written the foreword to this book.

U-1105 was one of several hundred German U-boats built during the war. However, although essentially an early war Type VIIC design, U-1105 incorporated several developments, including a snorkel to prolong her time under water, an Alberich rubber hull-coating to reduce her sonar signature and a GHG Balkon sonar array. It was the only U-boat that had all three of these innovations fitted and conducted a wartime patrol, establishing that this is a vessel—and archaeological site—of some historical significance. It became the state of Maryland’s first historic shipwreck preserve in 1995, and the publication of a dedicated book on the subject is very welcome.

After opening with his own initial interest in the submarine, Hamilton has sensibly constructed the narrative chronologically. He starts with the wartime innovations in the Kriegsmarine’s U-boat fleet that fed into her design, while subsequent chapters detail construction and a lengthy training period. This is followed by her only combat patrol in April 1945, details on her post-war evaluation by the Royal Navy and her journey across the Atlantic, before her testing and eventual sinking by the US Navy in 1949. The final chapters detail her life as a wreck on the riverbed before the final, photo-led chapter on her present-day archaeology. Archaeology then, really only appears in 24 pages towards the end of the book, and half of that consists of 30 underwater photographs.

The level of detail is impressive, enhanced by forensic examination of sources that helps clear up errors in the historical record. The service history is impressively thorough, including the lengthy working-up and training period (it is fascinating that even in this late period of the war, U-1105 did not begin her first patrol until a year after her launch). Combining an account written by the commanding officer, information from Ultra intercepts, and Admiralty reports, U-1105’s sole war patrol is well documented, including her attack on a destroyer-group that led to the successful torpedoing of HMS Redmill (this attack too, is forensically analysed) and sailing into captivity at the cessation of hostilities.

U-1105’s career with the Royal Navy and subsequent journey across the Atlantic are well described and illustrated, courtesy of detailed Admiralty records and even a personal account in the archives of the Submarine Museum in Gosport. It is an interesting example of post-war experimentation and the Allied forces’ attempts to unlock the secrets of German submarine technology. The transfer to the US Navy is an interesting puzzle that Hamilton has done his best to solve. The conclusion, that it was principally a means of preventing the Soviet Navy from getting hold of U-1105’s innovations, is hard to disagree with. Part of the evidence for this is the US Navy’s complete lack of interest in the submarine’s technology. After leaving Portsmouth and arriving at Portsmouth, New Hampshire, two weeks later, she was immediately made available for a variety of unrelated tests. These were eventually carried out on the Potomac River in 1948 and 1949, with U-1105 on one occasion spending nine months on the riverbed during salvage experiments. Finally, in September 1949, she was sunk during depth-charge tests. These experiments are well detailed and illustrated, again thanks to records compiled at the time.

The final three chapters deal with the wreck of the vessel from 1949 until today. Despite what was implied in media coverage in the 1990s, U-1105 was never really ‘lost’. However, the coverage sparked an interest in this forgotten boat and the first archaeological recording began. There is a description of the dive conditions and finally the detailed and photograph-led description of the remains. Unfortunately, there is less to see than there once was, as most of the vessel is buried in silt. Nonetheless, comparisons of the documented fittings, historical imagery, and modern underwater photographs is well done.

But this highlights a problem with the title of the book. The archaeology only occupies one fifth of the book, in contrast to the other Osprey archaeology books mentioned above. In one of those, the archaeology was part of the means of identification of the wrecks, but in this case it serves little purpose other than to highlight visible features on the riverbed. There is analysis of some of the damage caused to part of the submarine during the US Navy trials, but as Hamilton himself makes clear, the wreck was never really lost. Anyone looking for a detailed archaeological investigation of German submarines and how maritime archaeology can identify them would be better off with Innes McCartney’s The Maritime Archaeology of a Modern Conflict (see IJNA 46.1).

This is not a criticism of a fine historical account of a single submarine, rather it’s a comment on the title which might read better as The Story of a U-boat. There are some errors in detail, however. For example, the snorkel system is described as being proposed in 1943, which is true within the Kriegsmarine, but it was a pre-war concept and had been used on several submarines before then. There are repeat references to Operation Ultra cracking and intercepting Kriegsmarine Enigma coded transmissions, when in fact Ultra was the designation for intelligence derived from these intercepted transmissions. The various sources used to flesh out U-1105’s history have been edited together a little clumsily and on occasion the narrative and quotes are blended, leading to some confusing passages. Intermittent ‘the’s appear in front of HMS ship-names, a bugbear for many people. Their inconsistent appearances, along with some ungrammatical sentences that creep in on occasion, also suggest inadequate copy-editing.

Is this book useful reading for maritime archaeologists? For anyone studying wartime wrecks—and
Second World War U-boats in particular—yes. It is a very good case-study, and demonstrates the level of historical detail it is possible to obtain, even for just one of many hundreds of German submarines. Additionally, it provides details of the evolution of some of the key technology deployed by the Kriegsmarine and highlights an archaeological site of considerable significance—this is almost certainly the best (and possibly only) surviving example of a vessel with the three key innovations fitted. Hamilton’s final thought, that such a significant vessel would be better placed in a museum, is a fair point, although how this might be achieved and whether the submarine’s preservation makes it feasible is not really discussed.

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On War on Board: archaeological and historical perspectives on Early Modern warfare

JOHAN RÖNNBY (ed.)

Too often nautical archaeology is inward-looking, focusing on the immediacy of a single wreck and its associated artefacts. Yet ships and what they contain are much more than collections of interesting objects. As archaeological closed groups they form interacting microcosms of their parent cultures, the historical processes and evolving technologies which lay behind their construction and function, and the everyday realities of work, social hierarchies, subsistence, health and recreation which ordered the lives of those on board. Almost no evidence recovered from a shipwreck stands on its own; it cannot be properly understood, or its full relevance extracted, unless it can be set against data obtained from other relevant sources. In the first instance these may be wholly archaeological, such as artefact studies, parallels, typologies, statistical analyses and materials science. But although scientific applications must be brought to bear whenever appropriate, archaeology is not a science but a humanity, as indeed is history. This brings us into the irrationalities of human behaviour, including semi-scientific areas such as sociology and psychology, and more subjective disciplines like costume history, artistic convention, oral tradition and legend. ‘Irrational’ inputs might also include the causes and consequences of human idiosyncrasies such as organized violence at sea.

The interaction between often apparently antithetical disciplines, and others, is discussed in this eclectic compilation of papers on the archaeology of maritime violence, mainly in the Baltic from the 16th to 19th centuries. Two factors focus attention on this area. First, naval conflict was endemic in the region throughout the Early Modern period, leading to many shipwrecks. Second, the Baltic’s low salinity and other environmental factors have ensured often extraordinary levels of preservation. Many wrecks are of warships, and include such iconic sites as Mars (1564), Vasa (1628), and Kronan (1676). The archaeological resource is therefore enormous, and already well and responsibly studied, while the potential for further work (within the constraints of preservation imperatives) is almost open-ended. This book addresses some of the issues and interactive research pathways that have already been followed, and where they might lead.

In his introduction Professor Rönnby takes us to a sunken battlefield near the island of Öland in the southern Baltic where, on 31 May 1564, Sweden’s king Erik XIV’s flagship Mars exploded and sank during a battle with a fleet from Denmark and the Hanseatic town of Lubeck. The ship and its contents, though partly scattered by the explosion, lie much as they have done since that fateful day, freezing in perpetuity a chaotic moment in the complexity of a 16th-century sea-battle.

In an age before the introduction of uniform, or a clear ranking system, dress and appearance were the only denominators of status and hierarchy aboard a ship. Kekke Stadin considers the behaviours of Scandinavian admirals in the 1560s, who were expected to project an image of naval heroism. Dress was the primary signifier, and since appointments were invariably from the social elite this defined the nature and quality of their attire. Surviving portraits provide details. A black hat was a common accessory. As an act of surrender, officers’ headgear would be raised along with the lowering of the main topsail and flag. Status was further indicated by gold chains and insignia, of which examples may sometimes be found in archaeological contexts (as on the Spanish Armada wreck Girona).

Although aspects of status and appearance may be identified and quantified from archaeological evidence, the raw and often conflicting emotions which spill over during physical conflict defy rational interpretation. Annasara Hammar’s chapter on notions of fear in maritime combat is thoughtful and revealing. The core of her argument derives almost entirely from court proceedings. It rests on a comparison between an ordinary seaman whose case rested on proving that he was justifiably afraid because he was being posted to a more dangerous employment, and a ship’s captain accused of cowardice whose concern was to demonstrate that he ‘had never shown any fear’. The concept of fear was in each case quite different. Sailor and captain were divided socially and professionally.
in ways that made the latter obliged to be fearless (or appear to be so), while ordinary seamen were not required to be brave, only obedient.

Patrik Höglund looks at the symbols which defined rank on 17th-century warships. Of these the most common was the simple baton, as carried by an admiral or a general in the field. More symbol-laden was the great two-handed sword, which seems an unlikely weapon for shipboard combat. That was not its purpose. It had no combat function, but was a visible signal that the man who waved it around and shouted orders was the person in charge. Emblems displayed by less senior officers were the gorget, the speaking-trumpet, and the boatswain’s call. The latter two had, of course, the practical function of conveying instructions, though the boatswain’s call was the prerogative of senior officers before being adopted by warrant ranks in later periods.

Niklas Eriksson considers the maritime archaeology of the Scanian war (1675–1679) in which four well-preserved wrecks have dominated. Three sank in June 1676, and substantial parts of all have survived. Kronan has been professionally investigated for nearly four decades, while the deeper offshore wreck of Svärdet, discovered less than ten years ago, has so far been monitored on an amateur basis to protect it from looting. Riksäpplet’s remains lie at a shallow depth close inshore at a location which has been known since her sinking. The site was salvaged at the time of the event, again in 1863 with the introduction of standard diving gear, and more extensively after the First World War. It was used thereafter as a training-ground by the Swedish Navy (which technically owns the wreck) until the 1960s. Although the wreck has clearly been extensively disturbed, Eriksson (who has dived on the site) believes not only that much archaeological potential remains but that its location in sheltered waters within an hour’s journey of Stockholm would have made work more cost-effective than the logistically demanding and expensive projects which have been mounted on the other wrecks. He believes that Kronan and Svärdet attracted investigation because of their stronger historical associations and connections with famous individuals, but questions whether such selection criteria should be relevant. Riksäpplet would have produced similar cohorts of evidence, he argues, at lower cost and with less intrusive excavation.

Rolf Fabricius Warming covers a greater time-span and geographical zone—from c.1210 BC to AD 1600, and from Scandinavia to the Eastern Mediterranean—in his coverage of hand-to-hand combat at sea. He demonstrates that its apparent chaos is often illusory, masking underlying tactics of considerable complexity. Particular attention is paid to the latter part of the period, with the introduction of effective gunnery. The archaeologies of Mary Rose and the Armada are cited as milestones in understanding this historically significant process.

Shipboard artillery is the theme of Fred Hocker’s illuminating chapter ‘Understanding the Gundeck Experience’. While the evidence from Mars offers us a snapshot of frozen violence, the lethal consequences of combat are reconstructed here through the medium of experimental archaeology. Much has been written about the effects of smooth-bore gunnery against a wooden hull, but no living person has experienced it, and it cannot be understood or quantified by imagination alone. Vasa has produced guns, carriages and associated furniture which enable the reconstruction of a full assemblage which could be tested against a replica section of the ship’s hull. The results were revealing: for example, much depended on the thickness of impacted structure. Splinters were the main cause of human casualties, so hits on the thinnest parts of the hull—typically between the frames—which would seem to be the most vulnerable, actually caused the least damage and fewest casualties. Strikes on reinforced elements, as on the supporting knees, were much more damaging to both hull and crew, for they not only smashed what they passed through but produced splinters which although slower moving were much bigger. The effects are recorded graphically by high-speed photography.

Matilda Fredriksson and Sabine Sten describe work aimed at recording human osteological evidence on shipwrecks using non-invasive methods. The impetus for this project is the wider long-term investigation of Mars, for which in situ recording is planned, at least during its preliminary phases. So far only one human bone has been recognized on the wreck, and experiments involving animal bones have been carried out to refine the methodological process. Three-dimensional robotic photogrammetry is the chosen medium, and preliminary results are encouraging, although resolution may be a problem where visibility is unpredictable. The chapter provides a useful summary of the ethical, scientific, and practical techniques employed in such studies, drawing on well-published assemblages from Vasa, Kronan, and Mary Rose.

Jonathan Adams and Johan Rönby have for many years, jointly and separately, been leaders in the fields of hands-on shipwreck archaeology within social, economic, and technological contexts, often spiced with dashes of theory and philosophy. Their chapter here is no exception. ‘The Consequences of New Warships—From Medieval to Modern and our Dialectical Relationship with Things’ looks at changes and approaches in maritime technologies and applications through their material attributes from the Medieval to Modern periods. Ships and their changing forms and functions influence and are influenced by these processes, the complexities of which are illustrated by five well-chosen case-studies.

Ingvar Sjöblom has investigated Mars as a naval historian specializing in the integration between history, archaeology, and war studies. His topic is the ship’s crew: its size, its members’ varied functions, their
professional and social ordering, and where they came from. Of the recorded 672 souls on board Sjöblom has identified 347 individuals from documentary sources, 347 mariners and 37 soldiers. He rightly emphasizes that a ship’s complement is a highly specialized society, and although it will have many parallels with its parent society ashore it will in no sense be a microcosm of it.

Art Cohn moves from the Baltic to the inland waters of Lake Champlain, which straddles the US-Canadian border and was the theatre of a remarkable naval campaign fought between Britain and America during the War of Independence. Both sides built ships on opposing banks, and during subsequent fighting several were wrecked. One was an American gunboat called Spitfire, the remains of which have recently been discovered. Plans are afoot to raise and preserve her. Nearby the forward end of a bronze cannon was found, broken off as though by an explosion. Later documentary research revealed that a cannon had burst aboard Spitfire, killing one man and wounding another. Further investigation located the gravestone of a Lieutenant Thomas Rogers, ‘Killed by the Splitting of a Cannon on the Lake Champlain on the 11th day of Oct 1776’.

Carlo Beltrame summarizes his work on Mercurio, a brig of Napoleon’s Regno Italico sunk during the Battle of Grado at the head of the Adriatic in 1812. This is a classic excavation of a partly disarticulated wreck formation, admirably researched and now fully published (see review in IJNA 49.1).

The volume ends with cogent reflections by its editor, Johan Rönnby, who is that rare combination of a ‘dirt’ (perhaps one should say ‘wet’) archaeologist who moves effortlessly between the practical and theoretical. This is as it should be: neither approach stands comfortably on its own. Discovery prompts questions, questions yield answers, and answers stimulate further research which is often interdisciplinary in nature. And this in turn can stimulate well-founded theory, as this interesting collection admirably demonstrates.

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**Maritime Cultural Heritage and the Challenges of Capacity Development**

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LUCY BLUE and COLIN BREEN (guest eds)

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Capacity-building and international collaboration are seen as cornerstones in the 2001 UNESCO Convention on the Protection of Underwater Cultural Heritage. In this special issue the nature of capacity-development programmes in the field of maritime archaeology/maritime cultural heritage management in the ‘Global South’ is discussed. The papers are based on presentations given during the ‘Maritime Archaeology, Capacity Building and Training in the Developing World’ session, sponsored by the Honor Frost Foundation, at the Sixth International Congress on Underwater Archaeology (IKUWA VI) held in November 2016 in Fremantle, Western Australia.

Based on their vast international capacity-building experience, guest editors Lucy Blue and Colin Breen took on this initiative having identified a need to start an open discussion amongst practitioners in an expanding field that has not yet built an extensive body of scholarly and reflective publications. Both the conference session and the now published papers are an important contribution to a more systematic and critical academic approach to understanding and improving this key component of a global effort to protect maritime and underwater cultural heritage. This special issue is built around three parts: an introduction, in which the various elements of the proposed discussion and evaluation are outlined, followed by three case-studies showing distinctive approaches to capacity-building in various parts of the world. In the last papers, a more systematic approach to evaluation and planning of capacity-development programmes is proposed as ‘work in progress’.

In the introduction, ‘Maritime Archaeology and Capacity Development in the Global South’, Lucy Blue and Colin Breen touch on the elements that challenge international collaboration programmes aimed at protecting maritime and underwater cultural heritage in the ‘Global South’, including capacity-development programmes that would support the management of these important (global) sites. Some of these elements, like the lack of funding, political support, and public awareness are well known. Other issues, such as the understanding of the term ‘capacity’, and intercultural obstacles, deserve thorough consideration. The requirements, challenges, barriers, and opportunities touched on in the introduction resonate throughout the case-studies and the papers that propose systems for improvement.

The first case-study, ‘Building Knowledge and Connections: the success of the UNESCO International Capacity-Building Programmes for Cultural Heritage Management of Underwater Archaeological Sites’, by Chris Underwood and Martijn Manders, presents a globalized capacity-building approach. Both authors are very experienced archaeologists and international trainers who formed part of a team of international experts who developed UNESCO foundation courses based on the proven training programmes developed in Europe since the 1980s. Although this model can be regionally adopted for short- to medium-term training the authorized UNESCO framework forms the guiding principle behind programmes. The model aims to achieve...
sustainability though a ‘train the trainers’ programme and formal UNESCO and intergovernmental collaboration.

The second case-study model, based on a long-term international collaboration with a specific country, is evaluated in ‘Choice, Values and Building Capability: A Case Study from Vietnam’. The authors, two senior maritime archaeologists with a long international track record, Paddy O’Toole and Mark Staniforth, provide an in-depth reflection on many of the topics raised by the guest editors in their introduction. Despite the overall success of this continuous programme, they consider the many challenges faced in the sphere of intercultural collaboration in which expectations and difference between ‘universal’ and local values are key issues to consider.

In the third case-study, the development of maritime archaeology in three countries in the maritime and underwater cultural heritage-rich Eastern Mediterranean are compared by three international experts and regional champions: Stella Demesticha, Lucy Semaan and Ziad Morsy. In ‘Capacity Building in Maritime Archaeology: The Case of the Eastern Mediterranean (Cyprus, Lebanon and Egypt)’ they describe how the long tradition of hosting international research teams has exposed them to the importance of the field to their own heritage and identity. However, priorities for developing local infrastructure are low due to the many political-military tensions and the social-economic situation of the region. Egypt is an exception and has managed to develop an internationally-renowned institute for the study of maritime archaeology and underwater cultural heritage. Despite challenges, Cyprus and Lebanon can proudly report on how they have built and developed capacity through various programmes run with the support of international universities and organizations like the Honor Frost Foundation. The community-based programmes really stand out as sustainable and relevant models that allow these states to broaden support for the tangible and intangible aspects of maritime cultural heritage without being dependent on expensive infrastructure.

In the last two papers, Robert MacKintosh, Katherine Recinos and Lucy Blue try to further the discussion and plot a way forward by introducing a framework to help evaluate and improve capacity-development programmes. In the contribution ‘Capacity in Maritime Archaeology: a Framework for Analysis’, by Robert MacKintosh, the lack of a set of theoretical concepts based on a body of academic studies is seen as an obstacle for planning and evaluating successful, long-term capacity-development programmes. Based on his wider PhD research he proposes a framework that is rooted in the well-established theoretical concepts used in the environmental sciences. He demonstrates the viability of this model to do justice to the complexity of aspects that determine the success of a programme by comparing three southern European countries in various stages of developing their maritime archaeology and management programmes. He concludes that a systematic evaluation of past and current programmes should help to build an academic framework. This is in line with the call by Katherine Recinos and Lucy Blue for a systematic approach to enable practitioners to understand the various aspects of capacity-development and to be able to improve and finesse their programmes. In ‘Improving Capacity Development for Threatened Maritime and Marine Cultural Heritage Through the Evaluation of a Parameter Framework’ they propose a model that would help researchers and practitioners to gain insights into the complexity of the elements that might determine the success of their programmes. The 10-parameter framework, addressing technical and logistical aspects as well as the intentions of the stakeholders, is more than worthwhile as a ‘work in progress’ model. Although designed for heritage under threat, I believe it does not need much adjustment to make it generally applicable.

Both the conference session and the special issue of JMA highlight the need to understand the nature and politics of knowledge and how it is transferred (capacity-building) from western institutions and experts to the developing world. The authors touch on the challenges of developing capacity-training programmes in the context of the maritime archaeological discipline that, over the decades, has evolved to focus on shipwrecks scattered over the former colonial shipping-routes. Often these shipwrecks, seen as both shared and dissonant heritage elements, were the starting-point for international collaboration where international experts showed occasional local teams how to protect sites using the international standards and guidelines laid out in the 2001 Convention, or in established western heritage management frameworks. Programmes seem to be driven by bilateral government co-operation to protect maritime and underwater cultural heritage sites that are seen as ‘shared heritage’ from the colonial past. Recinos and Blue’s proposed parameter framework would allow a better insight into the subject and intention of such a co-operation.

In light of this, some issues in the discussions about capacity-building programmes in the developing world stand out in the three case-studies. In all three models, international experts and support play a substantial role. The socio-economic realities of applying the maritime archaeological guidelines and protocols of the 2001 UNESCO Convention, that require specific expertise and funding, limit what is possible in regions where such expertise and resources are scarce. Often programmes require a strong international commitment to protect maritime and underwater cultural heritage as a ‘world resource’. As the authors point out, this uneven, outsider-driven situation creates barriers in intercultural collaboration.
In their recommendations for improvement, authors suggest that approaches such as teaching in the local language and at appropriate local training sites may go some way to address challenges. This more mutually-beneficial approach is taken in Vietnam, for example, where understanding the choices and values of both the host institutions and international trainers are seen as an important driver to success.

What this collection makes clear is that there is no one-size-fits-all approach to capacity-development and there is, therefore, a need to build a body of academic research based on an analytical framework that will support improvement and allow trainers to understand more deeply what capacity building means. Intercultural collaboration will greatly assist this process. These discussions raise questions about whether we should also re-examine the systems that we take for granted. What exactly do we mean when we say that a maritime-heritage or capacity-development programme is successful? It would be interesting to know how participants in maritime-cultural-heritage capacity-development programmes perceive the western-based systems they are taught and required to implement. The Lebanese case-study, as well as work being undertaken in southern Africa, highlights the importance of creating a two-way platform that allows for the inclusion of multiple heritage values and perspectives. Understanding specific foci will support stakeholders in navigating the global and the local. This can also contribute to less-capital-intensive, more inclusive, knowledge transfer and thus more sustainable programmes that would create a true ‘world resource’.

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