

meaning, as cargo carriers, fishing vessels and war junks became pleasure yachts, tourist attractions, floating museums and movie sets. In such an atmosphere, most attempts to find permanent homes for them slipped away as did the junks themselves; today, the only one whose whereabouts is known for sure is the Beihai junk, which in 2006 was purchased by Guy Lasalle, who had been instrumental in its original construction and procurement for the Portland Children's Museum in 1989.

This solidly researched, beautifully illustrated book replete with photos, tables and diagrams is not a must-read for the general audience. But for students of maritime history interested in the technical aspects of junks, their construction and operation, or for students of cultural history, interested in what artefacts from the past can tell us about the culture and beliefs of the people who constructed them, this book will be invaluable. I wish it had been around during the 1980s when I was writing my book on Chinese pirates.

Dian Murray

University of Notre Dame
Notre Dame, IN, USA

Olaf T. Engvig, *Viking to Victorian: Exploring the Use of Iron in Ship Building*. Los Angeles: Themo Publishing, 2006 [orders through <http://www.engvig.com/index.shtml>]. 176 pp., photographs (b+w, colour), illustrations, maps, bibliography, index. US \$49.95, cloth; ISBN 0-9655451-6-4.

The magic carpet which transports the reader from the closing years of the first millennium practically to the end of the second millennium is woven out of iron. This is a thousand-year stretch of the imagination and in reality is all but impossible. But Engvig takes us on this metallic link from the rough bog iron nails which so securely bound the wooden clinker planks of Viking vessels to the innovative iron sail and steamships built in the nineteenth century. The basic ore was essentially the same, and upon that theme rests the premise of this handsome book as it cruises through the intervening centuries on a variety of iron-bound ships.

Three vessels were selected to illustrate the initial use of iron in building ships through to the almost universal use of iron in the Victorian era. These vessels were actually built within a tiny span of three years in mid-century: *Hirta* and *Star of India* (ex-*Euterpe*) in 1863 and *Hansteen* in 1866. The first was a twenty-nine-foot "Viking-type longboat" [20] owned by the author; *Star of India* is the barque preserved afloat at the Maritime Museum of San Diego; while the third was a steam-powered hydrographic survey ship built for the Norwegian government, now restored to original working operation. It is not clear who owns the last vessel, but it seems to have been inexpertly maintained in storage while awaiting a decision about its long-term disposition.

Engvig obtained *Hirta* in its original state, with all the iron fastenings in sound condition. He sailed the unrestored boat extensively in the North Sea and farther afield without renewing the fastenings, and we are carried along on these romanticized voyages. He compares the vessel with its Viking predecessors, concentrating on the shape and iron fastenings, taking Norway, Greenland and Newfoundland into his scope. He suggests that L'Anse aux Meadows, Newfoundland, was chosen as a longship repair site because there were indications of the presence of local bog iron. Unfortunately, he does not describe the process of transforming this ore into boat nails and roves.

Star of India is remarkable not only as the oldest example still sailing of a host of similar iron museum ships but also because the original iron hull remains essentially intact. This led Engvig to a broad study of the iron marks on its plates and framing. These marks indicated both the maker and the quality of the material. The author discusses British and Swedish founders and their products, but again does not describe the transference from ore to pig iron and from there to iron shipbuilding products.

The steamer *Hansteen* had a hard working life as a coastal hydrographic survey ship, and as a result its underwater structure sustained grounding damage. Repairers substituted steel plates and frames to replace the distorted iron structure. Engvig studied the corrosion of both materials, a comparison that led to his conclusion that steel does not have the longevity of iron.

This fragmentary progress through the history of iron in the marine world suggests that this book has been compiled from many of the author's previous publications. Approximately twenty percent of the references are to the author's own writings, and topics have been combined in a sometimes confusing manner, so that the history is not always a continuum. But sadly the major annoyance with this book lies with the editors and not the author. It has been very casually edited – the author was allowed to repeat himself constantly – and there are frequent grammatical, spelling and translation errors. Some examples: the word roe for Norwegian *rø* (clinch-plate) is used throughout in place of the English rove; strike and streak are used on the same line when strake (of plating) was intended; [124] authors are cited, but their works are not included in the bibliography. [123] Many similar errors detract considerably from what is a serious, scholarly approach to a topic that has received all too little attention.

Engvig's concern about maintaining the iron integrity of historic vessels is well taken. The recent severe fire within the preserved hull of *Cutty Sark* serves to illustrate the perils inherent in maintaining the integrity of historic iron ship fabric. The composite hull of this famous tea clipper has at its core a complex iron framework, and there is concern not only about preserving the iron but also about maintaining the shape into which that iron was originally formed. The fine lines of that uniquely speedy ship may have been lost in the distorting effects of the fire's heat.

In conclusion, there is much to recommend in this book, if only for the wealth of detail about the makers and suppliers of shipbuilding iron previously limited to scholarly papers not widely available. The irritating editorial gaffs notwithstanding, the book deserves a place in the small lexicon of vessel preservation literature.

David A. Walker

Maritime Museum of the Atlantic
Halifax, NS, Canada

Larrie D. Ferreiro, *Ships and Science: The Birth of Naval Architecture in the Scientific Revolution, 1600-1800*. Cambridge, MA: MIT Press [<http://mitpress.mit.edu>], 2006. xxiv + 441 pp., illustrations, figures, tables, notes, bibliography, index. US \$45, £29.95, cloth; ISBN 0-262-06259-3.

One of the most significant developments in European maritime history after the Middle Ages was the establishment of standing navies as the most common form of maritime defence. While several other solutions were tried with varying success, by 1800 all of the larger (and most of the smaller) nations with any interest in naval power relied on