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uses of ancient history at the end of the medieval period. The story of Jason, especially his association with Medea, required significant adjustments to promote Burgundian values; as Morse puts it: "Philippe le Bon may have been an avid collector, but no one has ever praised his learning; the choice of Jason and the fleece was an error of tact and a strategic miscalculation . . ." (p. 161). In order to make Jason worthy of the Burgundian greatness he was meant to prefigure, Lefèvre appropriated, expanded, omitted, and invented material. Morse especially notes that the *Histoire de Jason*, contrary to all previous textual renditions of Jason's story, invents an obstacle to the Jason-Medea alliance by representing Jason as already betrothed to a woman named Mirro when he met Medea. Lefèvre thus "defended the actions of this hero at that time by invoking contemporary marriage law" (p. 166). Lefèvre's narrative favors Jason over Medea and purposely excludes Medea's point of view. Nonetheless, through some remarkable twists on historical tradition, Lefèvre manages to reconcile Jason and Medea at the end of the text in accordance with the tradition established by Trogus. Chapter 4 includes a brief survey of manuscript illustrations to the *Histoire de Jason*; the visual component, like the text, focuses attention on the heroic stature of Jason.

The final chapter offers a rapid catalogue of texts in which Medea appears. Morse considers Guido delle Colonne, Jean Le Fèvre, Boccaccio, Chaucer, Gower, Christine de Pizan, and Lydgate—to name some of the authors that appear in chapter 5. Like the book as a whole, this chapter tends to be additive rather than synthetic. Overall, *The Medieval Medea* suffers from the richness of its topic, since Medea appears in such a wide range of texts and contexts that her tracks are everywhere. In attempting to trace Medea's textual journeys, Morse has provided a useful survey of Medea in medieval textual traditions. Perhaps as a result of the complexity of the portrait attempted here, *The Medieval Medea* often proceeds by assertion rather than analysis. This study would have greatly benefited from some engagement with theories of gender and sexuality in relation to medieval textual cultures. The lack of a strongly articulated theoretical or rhetorical framework means that all of the Medeas cited here are collected in a dense, textured, but ultimately unfocused view of the medieval enchantment with this ancient female figure.

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LAWRENCE V. MOTT, *The Development of the Rudder: A Technological Tale*. (Studies in Nautical Archaeology, 3.) College Station, Tex.: Texas A&M University Press; London: Chatham Publishing, 1997. Paper. Pp. xv, 218; black-and-white frontispiece, black-and-white figures, and tables. \$19.95.

"The one instrument that all ships, past and present, have in common is a rudder." With this introduction the reader is led into a fascinating study of the obvious, the essential, without which there is no control of a vessel. With a nod to the early utilization of steering oars by ancient seafarers, detailed examination of the history and evolution of the rudder begins with the Romans. Treated as an aspect of the history of technology, a clear frame of reference is established in the course of analyzing the numerous variations on the rudder, its form, shape, means of attachment to the hull, control by the tiller, and effectiveness. Primary source materials, archaeological, literary, and iconographic, are drawn upon to provide evidence in support of Mott's technological tale.

Evidence for the mounting and use of the side or quarter rudder is carefully documented from literary evidence and, as in all aspects of the work, through iconography in the eighty-nine illustrations provided throughout the text. Many of the illustrations will be known to the maritime historian and nautical archaeologist, but they take on a new look when placed under scrutiny to reveal what they might concerning the rudder and its effectiveness. Mott

contributes several drawings, such as the comparison of rudders from a representative trireme and the emperor Caligula's 224-foot-long barge at Lake Nemi, lost during the ravages of World War II. Other illustrative drawings of the means of bracing and lashing quarter rudders to the hull (e.g., figs. 2.3, 2.4, 2.7) contribute considerably to an understanding of how vessels functioned at sea. Data from the sailing of the replica trireme *Olympias* and other vessels are used to corroborate theory.

The rudder as "wing" (a Greek reference) provides a departure point for the author to move the discussion to hydrodynamics. The rudder as lifting surface leads to a technical and mathematical investigation of rudder effectiveness that concludes in appendices 1 and 2, where models for quarter-rudder flotation behavior consist of mathematical equations. What is reassuring is that the theoretical models were tested against the experience of replicas or models. This is a subject of some consequence when rudder mounting methods are examined. Mott explains clearly the problems but also the relative ease of mounting quarter rudders, which helps explain their popularity and continued use today in parts of southeast Asia and Indonesia. But of the gimbal system he states, "there is not a single shred of evidence, written or iconographic, that indicates that a pure gimbal system was ever employed" (p. 37). Mott also demonstrates that at least since the sixth century B.C. the drag of two quarter rudders on a vessel was reduced by simply pulling one of them out of the water. *Olympias* sea trials in 1988 affirmed that use of only the leeward quarter rudder worked well. Of course, lifting a rudder eighteen meters long weighing fourteen metric tons on a large Roman grain ship would not improve the vessel's sailing characteristics.

Mott's chapter entitled "Pushing Technology's Limits" analyzes the efforts to modify and perfect the quarter rudder. Use of iconographic evidence from medieval sources make clear the continued efforts of mariners and shipwrights to improve on the basic design, especially by experimenting with mounting systems. Joinville records in *The Life of St. Louis*: "On the ships of Marseille there are two rudders, which are attached to two *tisons* (large timber or beam) so marvelously, with which as easily as one turns a horse, one can turn the ship to the left or right. The King sat on one of the *tisons* on Friday" (quoted on p. 81). This ease of control is impressive considering the size of rudders on larger thirteenth-century merchant ships. Medieval quarter rudders measured up to eighteen meters in length and weighed between seven and eleven metric tons. Mariners replaced or repaired lost or damaged quarter rudders at sea. Rudders were mounted so that they could be removed in transit and in port. A common practice by harbor authorities was to require the removal of a vessel's rudders and placement ashore as security against an unwarranted departure. The earliest example cited by Mott comes from twelfth-century Alexandria. The 1397 maritime statute of Ancona, clause 68, required all foreign ships to remove their rudders on arrival. This citation and others drawn from medieval contracts or inventories that relate to the history of the quarter rudder are included in an appendix.

Chapters 6 and 7 focus on the northern solution to the problem of vessel controls. Beginning in the fifth century, when the Romans withdrew from Britain and northern Europe, the Mediterranean quarter rudder employed by the Romans quickly disappeared to be replaced by the forms developed by northern Europeans. Scandinavian practices are evident in the Nydam ship (c. 350–400) and later examples through the Viking era. The Mediterranean quarter rudders were supported by structures integral to the hull, which helped absorb stress placed on the rudder, while the northern system required the withy, a rope that holds the rudder to the hull, to withstand all of the forces generated by the movement of the vessel. Because of the inherent weakness of the system, northern rudders were smaller than Mediterranean quarter rudders (the largest example, the Bryggen rudder, is 4.1 meters long) and were a technological dead end. The solution was the sternpost or pintle-and-gudgeon rudder in the twelfth century. The gudgeon straps into which the

pointed pintles are inserted were always mounted on the vessel for ease of rudder repair. The pintle-and-gudgeon rudder was stronger than the quarter rudder but was hard to repair at sea, especially in the cold northern seas where it was difficult to put divers into the water. Mott explains how the northern pintle-and-gudgeon rudder was not the success presumed by many scholars until its modification through Mediterranean influences in the twelfth and thirteenth centuries. A straight sternpost was necessary to properly mount a pintle-and-gudgeon rudder, and that required modification in hull design. The addition of a mizzenmast and foremast resulting in the full-rigged ship facilitated the use of the sternpost rudder.

So when exactly did the pintle-and-gudgeon rudder mounted on a sternpost, the principal form still in use today, come into existence? Joseph Needham argued for a Chinese origin and Arab transmittal to the Mediterranean, or even the Baltic by Russian traders. But since Chinese vessels had no sternpost, an effective pintle-and-gudgeon rudder must have been invented by the Arabs. Mott suggests, however, that they did not utilize the tiller, preferring lines to control the rudder. And since there is evidence for a stern-mounted rudder in Egyptian funerary boat models, he rejects Needham's Chinese origin for the sternpost-mounted rudder. Mott argues for the Indian Ocean and Middle East and an Arab origin with evidence from the late tenth century and iconographic evidence from 1130. But this was not the pintle-and-gudgeon rudder. Thirteenth-century traveler John of Montecorvino called Arab rudders "flimsy." The pintle-and-gudgeon rudder is clearly illustrated on the Winchester baptismal font (ca. 1150–80). Mott postulates that it was commonly used in the north by the twelfth century and reached the Mediterranean by 1147 as part of the 190-ship flotilla for the Second Crusade. Its subsequent use is closely tied to the emergence of the principal new bulk carrier, the cog. Mott concludes that the pintle-and-gudgeon rudder was in use in the Mediterranean in the mid-thirteenth century but did not come into widespread use until the early fourteenth century—a gradual adoption.

Quarter rudders continued in use into the seventeenth century on galleys for reasons of efficiency and suitability. Long, narrow-hulled galleys required more force to turn them than round ships. Only some war galleys were fitted with sternpost rudders to better protect the helmsman during conflict. Mott effectively argues for the virtues of the quarter rudder, convinced that its use would have continued were it not for alterations in hull design and sail plans of sailing ships that favored the sternpost rudder.

The technological tale told in this concise and well-documented study concludes with speculation on the causes of change. Do radical new technologies arise from a human desire to experiment, or are they generated by crises that demand solutions? In the case of the rudder the author concludes that necessity was the mother of invention.

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MIREILLE MOUSNIER, *La Gascogne toulousaine aux XIIIe–XIIIe siècles: Une dynamique sociale et spatiale*. Preface by Pierre Bonnassie. (Tempus.) Toulouse: Presses Universitaires du Mirail, 1997. Paper. Pp. 482; 1 color photograph, black-and-white figures, maps, and tables. F 240.

Mireille Mousnier has subtitled her study of Toulousan Gascony "A Social and Spatial Dynamic." In the margins between Aquitaine and Languedoc, how does one define "Toulousan Gascony"? The area between the Garonne, the southern route to Compostela, and the valley of the Arratz forms a frontier zone with distinctive characteristics throughout its long history—as early as the Carolingian era, Gascon was spoken as far east as the Gimón and Arratz, and even today one can find locals who aspirate *h* and substitute it for *f* (e.g., *hils* for *fls*).