

Sea Travel

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Antiquity's Secret. Throughout history, increased mobility has come via navigable water, and the Middle Ages was no exception. The two main uses for water travel in the Middle Ages were for military action and trade. Though initially warships and cargo vessels were different shapes and used different propulsion systems, over time they came to resemble each other in shape and mobility.

Specialization. Warships require speed, high maneuverability, and sufficient space for the warriors. Long and narrow ships became the standard design for early medieval naval fighting vessels. In contrast, trading ships seek to carry the maximum tonnage of cargo with as few crew members as possible. The bulbous medieval merchant vessel was in effect a navigable bowl designed with as much freeboard as possible. Freeboard, the height between the waterline and open deck level, would determine whether a ship's cargo would be swamped in the high swell of an angry sea.

Human Power vs. Wind Power. Rowing (propulsion forward by the pulling action of an oarsman) and oaring (propulsion forward by a pushing action) were two means of moving early medieval vessels. With the need for increased freeboard on cargo ships, oars either had to be longer or placed well below the top deck. Both solutions posed difficulties. Oars became awkward with



increased length, and since the number, strength, and synchronization of the crew mainly determine the speed of a rowed ship, poor conditions for work below deck reduced the efficiency

of the oarsmen. Harnessing the wind with mast and sail presented a welcome supplementary source of propulsion in medieval vessels, both military and cargo. To allow ships to maneuver, sails and rigging had to undergo technical improvement. The simple large square canvas suspended from a single yard was joined by the lateen, or “triangular” sail, and rigging which allowed a sail to pivot on the mast to catch the force of the wind from any direction.

Surface Area and Maneuverability. Canvas area is the main factor in a sailing vessel’s speed. The larger and more numerous the sails the greater the canvas area. Hence, to gain speed medieval ships added more masts to carry more sails. Vessels rigged with the square sail had to have clear decks in an arc around the mast equal to the movement of the sail on the boom from which it was suspended. This situation meant that a single sail hanging amid ships monopolized much of the early ships’ decks.

Lateen Sail. Effective use of two masts and sails, which became standard in the Mediterranean by 1200, was made possible by the introduction of the lateen sail, a fore-and-aft sail (capable of catching the wind on either its front or back surface). With a ratio of length to breadth of about three to one, the lateen sail was fixed to a long yard in the longitudinal axis of the ship. A combination of square and lateen sails was used in many vessels, the main mast often carrying a square sail.

Independent Evolution. In addition to the many navigable rivers with which medieval Europe was blessed, there were two spheres of maritime travel by Europeans in the Middle Ages: the Atlantic Ocean and the Mediterranean Sea. For Atlantic and northern European river travel, ships were built in clinker fashion: ship-length planks fitted one over another from a center axis upward to form a hull. An internal skeleton, if there was one, was mounted within the strong yet flexible hull. Five types of clinker-built vessels plied the northern waters during the Middle Ages: the flat-bottomed cog of the southern North and Baltic seas; the molded-plank hull of river and North Sea travel; the flat-bottomed, straight-sided punt of river ports; the fishing buss of the Netherlands; and the keeled Viking vessels—the longships and the cargo ships, such as the large knarr, Mediterranean navigation had specialized crafts as to need, yielding the galley, a rowed fighting ship, and a sail-propelled trading vessel. The basic Mediterranean vessel was a flush-plank Venetian form of the cog, which went by the name buss, a full-bodied, high-floating two-masted lateen sailing ship, and in its later guise, the Mediterranean car rack, ultimately a larger three-masted cargo ship.

Speed. The Viking warships could cover roughly 100 miles a day, but a replica of the tenth-century Gokstad longboat logged its greatest distance sailed in 24 hours at about 250 miles. Although Viking cargo ships were undoubtedly slower, supply voyage times to and from Iceland by the Norse indicate expected speeds in favorable weather of from 100 to 150 miles in 24 hours. Most medieval cargo ships, whether under sail exclusively or oar-and-sail-equipped, seem on extended trips to have averaged only about 20 miles every 24 hours; nonetheless, a river barge or raft apparently averaged only 7 miles a day.

Cross-Maritime Interchange. The story of medieval European navigation is one of interaction between technical developments in the two bodies of water defining Europe. The rise of oceanic navigation began when the cog passed through the Straits of Gibraltar carrying crusaders from

England and the Netherlands. During the reign of Richard I of England (1189–1199), the cog made its way northward again, now transformed into the Venetian buss with castles or enclosed deckhouses at the bow and stern, and a bellied bow for increased cargo capacity. Sailors from Bayonne in southwestern France were thought to have introduced the Mediterranean carrack into northern European waters in the fourteenth century.

Technology and Psychology. This cross-fertilization had both technological and psychological components. The art of medieval navigation was improving, aided by the use of sails and a rudder instead of steering oars. A single large steering oar was first attached to the “steer-board” (starboard) side of the boat, being opposite from the port, or docking, side of the vessel. A straight post rudder was then adopted and firmly attached to the stern for greatest effect. By 1252 the port books of Damme in Flanders distinguished ships with side rudders from those with stern rudders. While the compass was known in Europe at the end of the twelfth century, it was not until two centuries later that the magnetic properties of the lodestone began to be used consistently in navigation and that serious, long-distance travel was mounted with its aid. Crusader voyages introduced northern Europeans to forays longer than the coasting and North Sea navigation they had previously undertaken. Also, the technical modifications to familiar northern ships were considered to offer greater security for ocean travel for the Atlantic-facing regions of France, Spain, and Portugal. In 1418 the Portuguese reached Madeira and in 1427, the Azores, about a third of the way to the Americas. Ferdinand Magellan’s circumnavigation of Earth followed within the century, as did Christopher Columbus’s voyage to the Caribbean.

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