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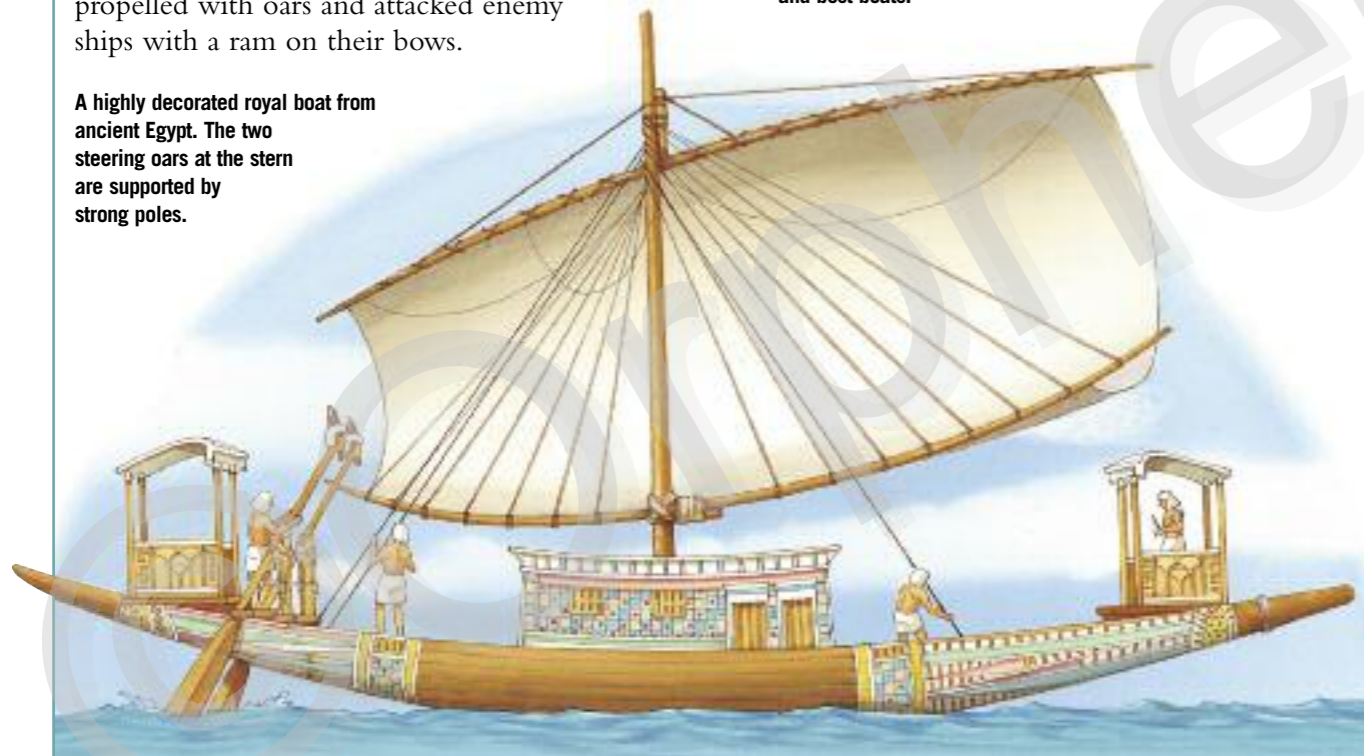
## SAILING SHIPS

**P**EOPLE made their first journeys across water tens of thousands of years ago. Their first craft must have been logs, used as buoyancy aids. Later, they tied logs together to make rafts, or hollowed them out to make canoes. Where there were no big trees, they made boats from locally available materials, such as reeds or animal skins. Their boats allowed them to travel on rivers and lakes, searching for better fishing, or visiting hunting grounds.

These early craft were propelled by simple paddles, or poles pushed into the river bed. The first sailing boats we know about were built in ancient Egypt in about 3500 BC. Some were built from reeds bundled together, others from wood. They had a single mast with a square sail, which was used in addition to oars when the wind was blowing in a favourable direction. The crew steered with long oars hanging over the stern (rear).

The ancient Greeks and Romans used sturdy, seaworthy cargo boats and sleek fighting boats called galleys, both with a square sail. In battle, the galleys were propelled with oars and attacked enemy ships with a ram on their bows.

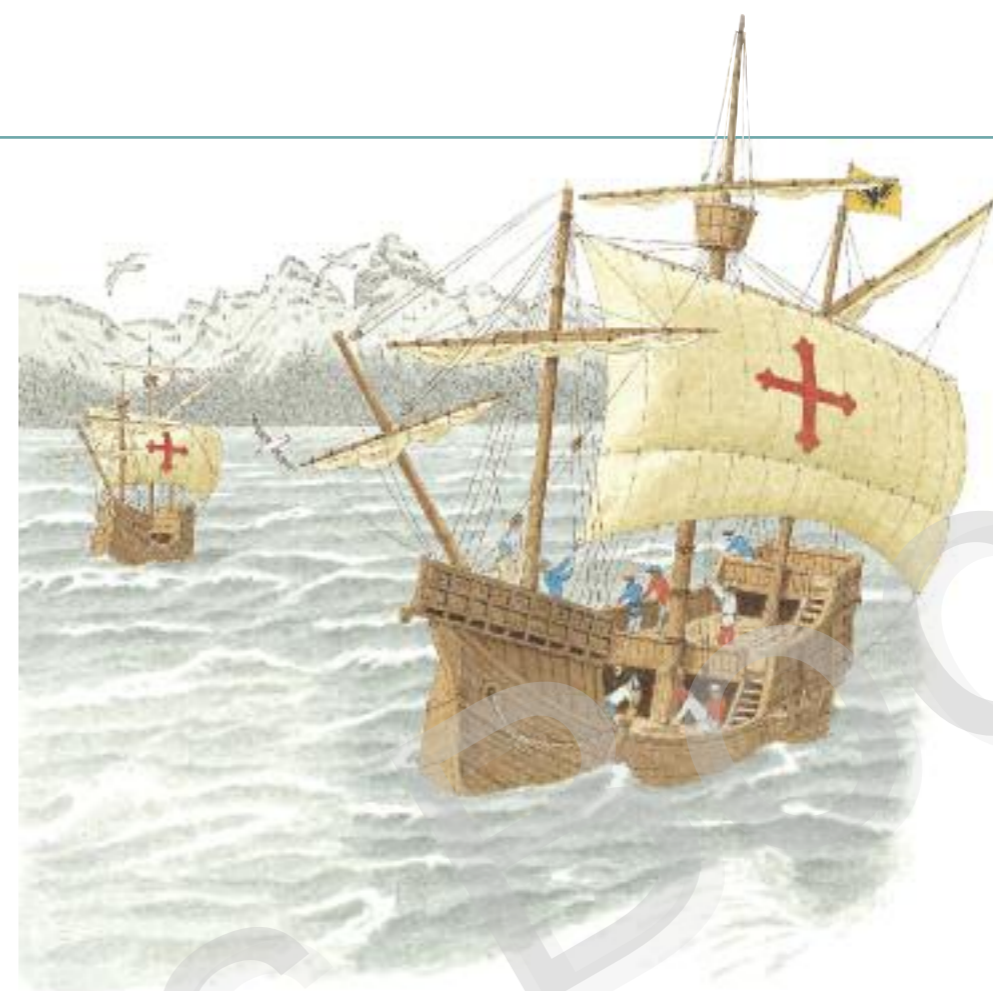
**A highly decorated royal boat from ancient Egypt. The two steering oars at the stern are supported by strong poles.**



**About 1000 years ago, the Vikings, who lived in northern Europe, started to explore new lands. Their ships were called knorrs (above). Each had a hull (body of vessel) made of overlapping or "clinkered" planks.**



**Chinese boats called junks (above) had sails stiffened by thick bamboo poles, and a sternpost rudder for steering. Until the 15th century they were the world's biggest and best boats.**

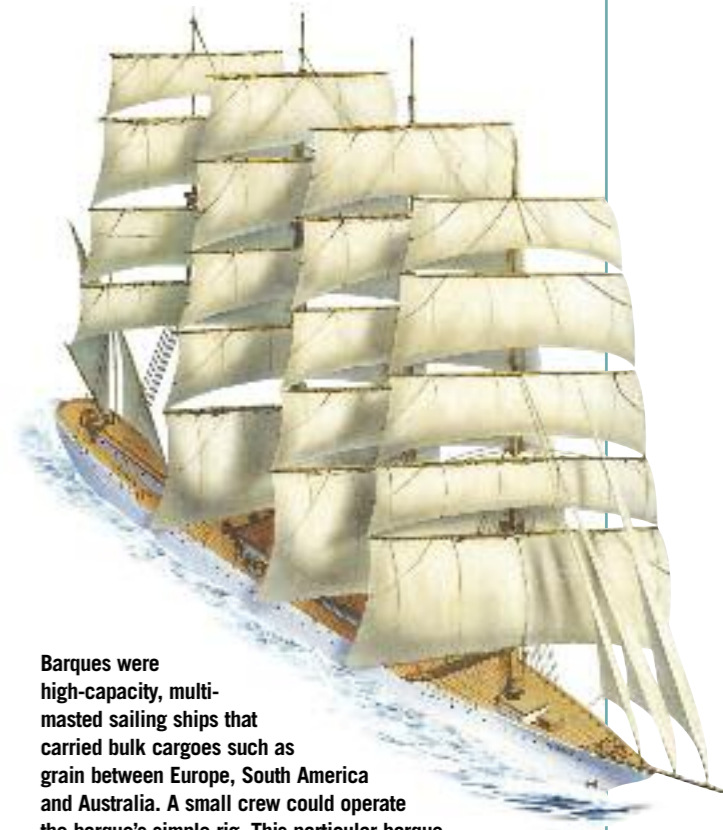


**By the 16th century, small, sturdy ships such as carracks (left) and galleons were capable of long ocean crossings. With the aid of compasses to stop them accidentally sailing in circles, sailors set out from European ports to explore the world and to try to find new sea routes to the Spice Islands of Asia.**

**Among these explorers was the Portuguese navigator Ferdinand Magellan, who left Spain in 1519 with five ships to sail to Asia around the southern tip of newly-discovered America. Magellan himself was killed in the Philippines, two years into the voyage. Only one of the ships, the *Vittoria*, under the captaincy of Sebastian del Cano, finally got back to Spain, 1082 days after it left. It was the first ship to circumnavigate the world.**

The arrangement of sails on a boat is called its rig. A square rig consists of sails hung on a boom across the boat (as in ancient Egyptian and Viking boats). This sort of rig cannot make the best use of wind blowing from side-on. The fore-and-aft rig, with a triangular sail hanging from a boom parallel with the boat's sides, is more effective. The Chinese had developed a similar rig on their early junks in about 500 BC. It was developed in the Mediterranean in the third century AD. In Europe in the fifteenth century, ships began to appear with a mixture of rigs—square-rigged sails on some masts and fore-and-aft rigs on others. Through the centuries, sailing ships grew larger, with more, taller masts and more sails on each one.

The fastest sailing ships were the "clippers", which had a huge sail area to take advantage of light winds, and streamlined hulls. They were used to carry important cargoes around the world, such as the new crop of tea from China to Europe.



**Barques were high-capacity, multi-masted sailing ships that carried bulk cargoes such as grain between Europe, South America and Australia. A small crew could operate the barque's simple rig. This particular barque, *France II*, built in 1911, was the biggest sailing ship ever built. Its steel hull was 127 metres long.**

## STEAMSHIPS

**D**URING the nineteenth century, large sailing ships almost completely disappeared as steam power took over. The first successful steam-powered vessel was a river steamer built in the USA by Robert Fulton in 1808. On early steamships the steam engine turned paddle wheels that moved the ship along, but by the 1850s most ships were using propellers instead. Ocean-going steamships kept sails, too, because they could not carry enough coal or water for long-distance voyages, and their engines were not very reliable.



Fifteen hundred people lost their lives when the liner *Titanic* (above) sank after hitting an iceberg on its maiden voyage in 1912. Following the disaster, new safety regulations for ships were introduced.

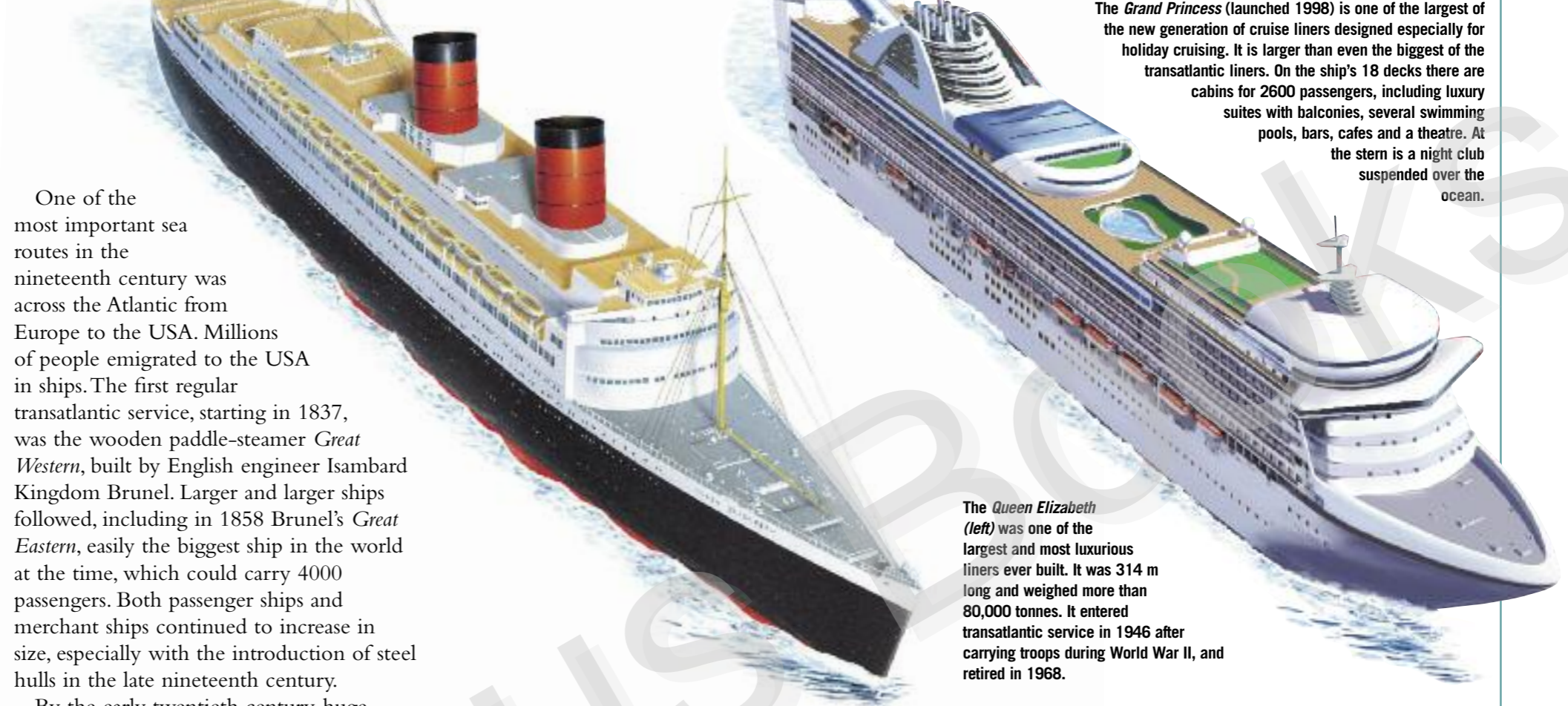
One of the most important sea routes in the nineteenth century was across the Atlantic from Europe to the USA. Millions of people emigrated to the USA in ships. The first regular transatlantic service, starting in 1837, was the wooden paddle-steamer *Great Western*, built by English engineer Isambard Kingdom Brunel. Larger and larger ships followed, including in 1858 Brunel's *Great Eastern*, easily the biggest ship in the world at the time, which could carry 4000 passengers. Both passenger ships and merchant ships continued to increase in size, especially with the introduction of steel hulls in the late nineteenth century.

By the early twentieth century, huge luxury liners were crossing the Atlantic, and steam-powered merchant ships were carrying most of the world's cargo. The fastest liners used the new steam turbine engine, in which the steam turned a fan-like turbine, which turned the propellers at high speed.

The largest modern oil tankers (1), up to 450 m long, and known as ultra-large crude carriers (ULCCs), dwarf a 16th-century Spanish galleon (2).

The French liner *Normandie* (3), launched in 1935, was nearly 300 m long, accommodated 1975 passengers and needed 1345 crew. It was the first of what were called the "1000-foot" liners.

*HMS Dreadnought* (4), launched in 1906, was the first battleship driven by steam turbines.



The *Grand Princess* (launched 1998) is one of the largest of the new generation of cruise liners designed especially for holiday cruising. It is larger than even the biggest of the transatlantic liners. On the ship's 18 decks there are cabins for 2600 passengers, including luxury suites with balconies, several swimming pools, bars, cafes and a theatre. At the stern is a night club suspended over the ocean.

The *Queen Elizabeth* (left) was one of the largest and most luxurious liners ever built. It was 314 m long and weighed more than 80,000 tonnes. It entered transatlantic service in 1946 after carrying troops during World War II, and retired in 1968.

In the middle of the twentieth century, steam power began to give way to diesel power. Diesel engines are smaller, cleaner, far more efficient, and need fewer crew to operate them. Steam had almost completely disappeared by the 1980s.

As air travel became convenient and cheap in the 1960s, passengers stopped travelling by sea and the age of the liner came to an end. But as cruise holidays became popular in the 1980s, construction of new, giant cruise liners began.

