

Tools of Discovery

¹ Sailing ships crisscrossed the Mediterranean Sea during the Renaissance, bringing back the products demanded by the Renaissance consumer. Many ventured further, crossing the Atlantic Ocean in the hope of finding a sea route to the markets in Asia.



² How did they do it? Without the aid of global positioning devices or even a radio, how did Renaissance sailors stay on course as they crossed mile after mile with nothing in sight but water?

³ Sailors of the 1400's and 1500's depended on their navigators. These men were trained to use the tools available at that time to determine their ship's location and direction. Using tools including the compass, the astrolabe, improved maps, and charts, Renaissance navigators were able to accurately guide their ships even across the ocean.

⁴ The magnetic compass is a simple tool, but its discovery led to great advances in navigation. It is believed that the compass was first invented by the Chinese during the 11th century, and later brought to Europe by traders in the late 1200's. It is a tool that is still used today. A magnetic compass consists of a metal disc that is marked N, E, S, and W for the four directions on the globe. The disc floats on a pin so that it can turn easily. It is magnetized, and so it always turns to point north. Navigators used a compass to steer their ship in the right direction.

⁵ The astrolabe was a device that was invented by the Greeks long before the Renaissance, but a newer version, known as the mariner's astrolabe, was invented just before the time of Christopher Columbus. It is a tool that was used both for making observations and for calculating. By the later years of the Renaissance, it had become the most important tool that a young man needed to learn to use if he wanted to become a navigator.

⁶ An astrolabe consists of metal plates and rules. There is a plate with information about the earth and a plate with information about the stars and planets. The rules are used for sighting objects in the sky. All of the parts are

fastened at the center with a metal pin.

⁷ Mariner's astrolabes were made smaller and heavier than the earlier kind. They could withstand the rough treatment of months at sea but were small enough to be held in the hand.

⁸ With an astrolabe, a navigator could find the angle of a star or planet above the horizon. He could compute the position of stars and even tell time at night.

⁹ Mariners used maps and charts along with their compasses and astrolabes to keep their ships on course. Good mapmakers, or cartographers, were important members of the sailing community. As ships returned from the ocean voyages with new information about continents, islands, or bodies of water, mapmakers created new and improved maps that included the new information. An up-to-date map was a valuable sailing tool.

¹⁰ Charts also provided useful information for navigators. With a good chart in hand, navigators could easily check their position without having to do lots of calculations.

¹¹ One of the charts used by Renaissance navigators was called an ephemeris. It was a chart of the altitudes of the sun and stars at the equator. When a navigator took a reading with his instruments, he could then compare his reading to the reading listed on the chart by subtracting. This would tell him his ship's latitude.

¹² Along with more reliable navigational tools, Europeans designed larger and better ships. The Portuguese developed the caravel, which combined the square sails of European ships with Arab lateen, or triangular, sails. Caravels also adapted the sternpost rudder and numerous masts of Chinese ships. The new rigging made it easier to sail across, or even into, the wind. Finally, European ships added more armaments, including more advanced cannons.

¹³ With a compass and an astrolabe in hand and some maps and charts stored safely on board their new ships, navigators of the Renaissance were ready to go. They could cross the oceans, search for new trade routes, and explore new lands. This new era of exploration would become known as the "Age of Discovery".