Finding Your Way

The compass has been pointing travelers in the right direction for centuries

By Lisa De Nike

Benjamin Franklin once quipped that, "In this world, nothing is certain but death and taxes." Words of wisdom, indeed. But astute as he was, Franklin forgot to mention one other certainty: wherever you stand on the Earth, the needle of a compass will always point north. Thousands of years before the now-ubiquitous GPS was invented, travelers the world over could orient themselves by means of a simple magnetic compass.

According to the Encyclopedia Britannica, the modern compass' earliest relatives date back to about 226 B.C. in China, when fortunetellers used lodestones (stones made of magnetite, an iron oxide that aligns itself with the North and South poles) to tell fortunes. The lodestone would spin on a plate and point to various signs and constellations, predicting either good or bad fortune.

Eventually, mariners in China and Europe figured out that when floated in water, lodestones pointed to the Earth's poles, and thus could be used to help sailors navigate at sea. Early sailors created compasses made of square blocks of wood that contained markings for the constellations and north, south, east and west, with a lodestone needle (usually shaped like a spoon) pointing the way (no water required).

By the 12th and 13th centuries A.D., ships in China and Europe navigated the oceans by compass. Some say, in fact, that in 101 B.C., Chinese ships, guided by compasses, reached India's eastern coast for the first time. The Chinese also claim that Zheng He, from China's Yunnan Province, made seven ocean voyages using the early compass between 1405 and 1433.

Many historians assert that the compass was brought to the Europeans by the Asians via the Silk Road, the ancient trading route that linked China with the eastern Mediterranean. Other experts strongly disagree. According to historical records, people from Saudi Arabia and the Middle East were using magnetic compasses by the early 1200s and those in Scandinavia by 1300.

Though there continues to be some debate about who put the compass to work first, there is no question that it not only revolutionized sea navigation and thus increased trade between the Mediterranean and Northern Europe, but it also was one of the primary factors leading to the great age of exploration that would quickly follow.

By the time Columbus sailed the ocean blue, most sailors were quite adept at navigating with the help of a compass. In fact, by the time Columbus set out for the New World with the *Nina*, the *Pinta* and the *Santa Maria*, navigators had discovered how to magnetize iron, which meant that the lodestone "needles" on compasses could be replaced with smaller, thinner ones fashioned from iron and steel and magnetized. Thus, the pocket compass was invented and became very popular.

Today, everyone from weekend sailors to Boy and Girl Scouts continue to find the magnetic compass a useful and simple way to navigate on sea and land. It still always points north.

Invention of the Global Positioning System, or GPS

The Global Positioning System, also known as "GPS," is the simple magnetic compass' high-tech cousin and is becoming an increasingly popular feature in everything from cell phones to automobiles.

The system that so many use today can trace its history back to 1994, when the U.S. Air Force launched the 24th Navstar satellite, comprising a network of 24 satellites that were called the Global Positioning System. Thanks to this constellation of satellites, today anyone with a GPS receiver can almost immediately ascertain his or her place on the planet.

The GPS system was invented by the U.S. Department of Defense and a graduate from the Massachusetts Institute of Technology named Ivan Getting, who worked in the 1950s at Raytheon Co. While there and in response to a U.S. Air Force requirement for a guidance system, Getting worked with aerospace engineers to study the use of satellites as the basis for a navigation system, and worked on a three-dimensional, position-finding system. Both became building blocks of the current GPS system.