



Where in the world...

was Ferdinand Magellan?

by Stephanie Allen

Ferdinand de Magellan was 22 years old when Columbus sailed across the Atlantic Ocean. The exploration of the Americas must have had some impact on the young man. Later in life, he would pick up where Columbus had failed, in search of a western passage to the Spice Islands.

The spice trade could produce great wealth for the Spanish Empire. The Portuguese already controlled the shortest trade route around Africa, so the Spanish would need to find another way to the East Indies. (Although Magellan was Portuguese, he sailed under the Spanish crown.)

Magellan believed he could find a western passage through the Americas to get to Asia. Should he succeed, it would mean great riches for all involved. Astronomer Ruy Faleiro would help him use the stars to navigate uncharted waters for his fleet of five ships.

The Spanish had discovered the Rio de la Plata (between present-day Argentina and Uruguay) in 1516. Some believed that such a wide, deep body of water must be a navigable channel across South America. When Magellan reached the river in 1520, he discovered that the water upriver from the Atlantic was fresh, not salty. It could not provide the link to the Pacific Ocean.

Magellan decided to sail south to continue his search for a passage across the Americas. By this time, winter had begun in the southern hemisphere. The fleet was forced to spend several months on the Patagonian shores.

Although Magellan had renounced his Portuguese nationality, many of his Spanish crew still did not trust him, especially some of the ships' captains. Some of the men were already disappointed that the Rio de la Plata proved unsuccessful. Three of the captains attempted a mutiny. Because so many of the sailors respected Magellan, the mutiny failed. Magellan could have ordered the death of all the mutinous men, but instead left some of them on the uninhabited coast as he sailed on to find Asia.

Magellan hoped to resume sailing in August. One ship he had sent on a scouting expedition was wrecked in a storm, so he decided to wait a few weeks longer for better weather.

On 1 November 1520, the fleet finally found the passage it had been seeking. The crew decided to name it All Saints' Channel, because they found it on All Saints' Day. Today the passage is called the Strait of Magellan, and it is infamous for its strong currents and frequent storms.

Magellan set two ships to the task of exploring the strait. One of the captains deserted and sailed his ship back to Spain. The remaining three ships continued to the South Pacific, which Magellan named *mar pacifico*, "calm sea". Compared with the stormy seas of the Atlantic, Magellan thought the waters in this new ocean would provide smooth sailing.

No European had sailed across the Pacific Ocean before, and the fleet was ill prepared. Many

sailors from Magellan's crew died of disease or starvation on the three-month crossing.

Finally in March, the ships reached the Philippine Islands. Here, Magellan tried to form relationships with the local tribal leaders. Because he was a deeply religious man, he also tried to teach them his Christian beliefs. Some of the tribal leaders agreed to pledge their allegiance to the Christian God. In return, Magellan offered to help them fight against other non-Christian tribes. On 27 April 1521, Magellan was killed in one of these inter-tribal battles.

Even without their commander, the crew was determined to continue. By this time, there were too few men to sail all three remaining ships. As their ship *Concepcion* burned in the water (so that it could not be used in battle against the fleet), the two remaining vessels sailed towards the Spice Islands. They arrived in November.

The captains traded for spices and left the islands heavily laden with their valuable cargo. Not long after the fleet's departure, the crew of *Trinidad*, Magellan's flagship, discovered a serious leak. They were forced to return to the islands to make the necessary repairs.

Finally, the repaired *Trinidad* and her crew set out to return home to Spain. This time, they were captured at sea by the Portuguese, who had been searching for the fleet since its departure. The fifty-five remaining crew members from *Trinidad* were eventually returned to Europe, but

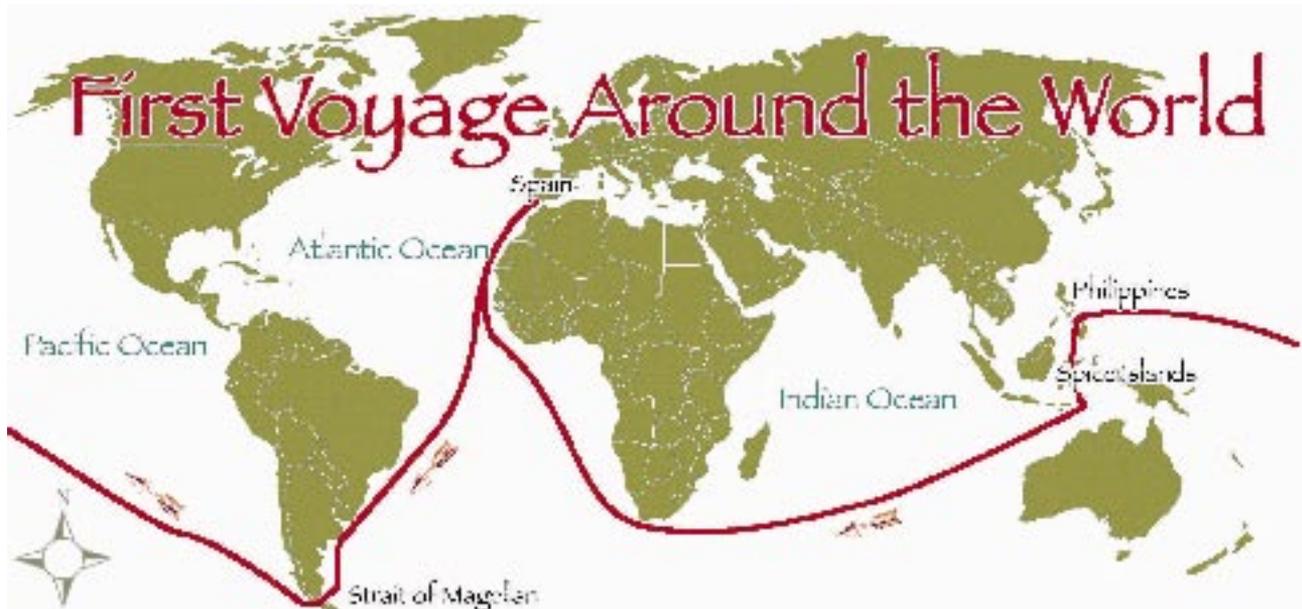
the ship later sank under Portuguese command.

Victoria, the only remaining vessel from Magellan's mighty fleet, carried on sailing across the Indian Ocean towards home. The *Victoria* managed to avoid the many Portuguese vessels that sailed the Indian Ocean. The Spanish ship successfully rounded the Cape of Good Hope and returned to Spain, almost three years after departing.

Victoria and her seventeen surviving sailors, under the command of Captain Juan Sebastián de Elcano, were the first to circumnavigate the world. Among their many discoveries were the distance around the earth—14,460 leagues (69,000km)—and new stars visible only from the Southern Hemisphere, including our two closest neighboring galaxies. The crew also realized that though they had carefully recorded events in the ship's log, a day was missing! This discovery led to the creation of the International Date Line. It is from this log and the journals of Antonio Pigafetta, a wealthy tourist who paid to be a part of Magellan's voyage, that we have so many details about the first trip around the world. †

Source: Laurence Bergreen, *Over the Edge of the World: Magellan's Terrifying Circumnavigation of the Globe*, HarperCollins Publishers, 2003.

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What in the world?

by Marianne Della Croce

Can you guess what this is?

- a. a stove burner
- b. a cross used in a ship's chapel
- c. a tool for navigation
- d. a piece of radar equipment

This is a copy of a mariner's astrolabe from 1550. The astrolabe is an old "computer" used by seamen to help them figure out where they were at sea.

A simple brass ring, it was marked with degrees and helped sailors find their latitude in the ocean. (Remember, lines of latitude run east and west and measure the distance north or south of the equator. Lines of longitude run north and south from pole to pole.) When traveling through heavy winds and high seas, a ship would stay on course by keeping its latitude. The ship would sail to a known latitude and then sail east or west along that line.

The outer ring of an astrolabe is something like a protractor that is used to measure angles. A mariner could measure the angle of the sun at a known time of day or a star at a known spot in the night sky, perform a simple mathematical calculation with that angle, and *voilà!* He had his latitude.



The mariner's astrolabe was heavy so that it would not blow around on a ship in the wind and waves. It was invented by the Portuguese and was popular during the 1400s and 1500s. Those who sailed at sea would not dare to leave the shore without one. (Magellan's navigator would have used one like this to map the route around the world.) Nonetheless, the astrolabe was not very accurate. Errors of four to five degrees were common (one degree of latitude is sixty miles), making sailors quite lost. Over time, newer and more accurate instruments were invented to achieve the same purpose.

Only after the seagoing chronometer was perfected could navigators measure longitude and get a "fix," or position, on a chart. That expensive tool was beyond the means of many navigators when it was invented in the mid 1700s.

The astrolabe shown here is on display at the American Merchant Marine Museum in Kings Point, NY. If you guessed that this is a tool for navigation, you found your way to the correct answer!

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Who in the world...is a nautical archaeologist?

by Stephanie Allen

Seventy percent of the earth is covered with water. It's no surprise, then, that people have been traveling by boat for thousands of years. Most vessels reach their destinations without many problems; some sink to a watery grave. They lie on the sea floor, waiting to be discovered.

When a boat sinks, it doesn't necessarily go down in one piece. Instead, it may break up, spilling its contents across the seabed. Nautical archaeologists view the pieces they can find as parts of a puzzle. Each part tells a story—about the lives of the people who built the ship and sailed it, and how the ship was lost. That is why it is so important that archaeologists carefully record every detail before touching or removing anything from a wreck. If one object

few people can imagine how a wreck might appear after years beneath the waves. A ship might look like a pile of boards or be covered with plants and tiny marine animals. It might be buried completely under mud or sand, to be found only with high-tech equipment. Nautical archaeologists study ships carefully to understand what they are looking at when they find a shipwreck. They must also become experts in identifying ship construction materials and building techniques. These skills help them determine the period when the ship sailed and the purpose for which it was used.

Underwater archaeologists use remote sensing equipment to “see” underwater and find shipwrecks. Magnetometers, which are like giant underwater metal detectors, and side scan sonar, which uses sound waves, help create a picture of the bottom. When archaeologists find a wreck, they may use SCUBA gear to dive on the wreck and record it. Some archaeologists use Remote Operating Vehicles (ROV). These remote-control robots let them reach wrecks that are too deep for humans to access.

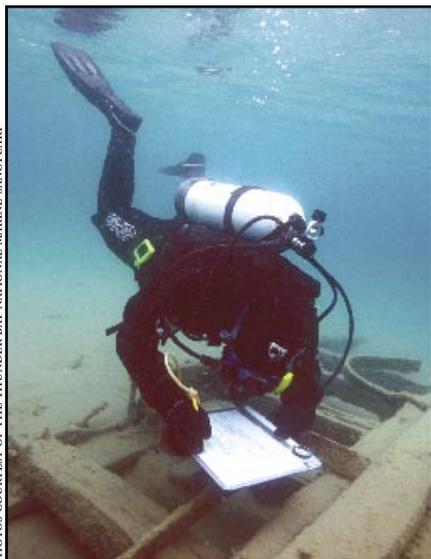
In the field, nautical archaeologists typically spend most of their day without speaking. They



Nautical archaeologists document shipwrecks using SCUBA equipment and simple tools like a measuring tape, pencil, and sheets of Mylar taped to a slate.

use sign language to communicate on the wreck site, but these messages are mostly limited to emergencies. They write with a pencil on Mylar, a special underwater paper. They document the wreck by drawing what they can see, measure, and feel on sheets of Mylar and record any information they can gather from the wreck itself.

Nautical archaeology is hard work. It requires paying close attention to details so important information is not overlooked. Unlike archaeologists on land, nautical archaeologists must deal with the dangers an underwater environment can create. Sometimes the water is icy cold, very deep, murky, or turbulent. Being an underwater archaeologist is not for everyone, but the thrill of discovery makes enduring the long hours and challenging conditions worthwhile. †



PHOTOS COURTESY OF THE THUNDER BAY NATIONAL MARINE SANCTUARY

is moved, the whole story can be interpreted differently. Remember, too, these puzzles may have missing pieces.

Though we can all picture a ship sailing across the water,

