



Columbus

Navigator of the Unknown

Isabel de Montoya

Columbus' voyage succeeded through misinterpreted astronomy and borrowed Arab navigation. His critical error—believing Earth's circumference was 19,000 miles (Eratosthenes' correct 24,000-mile calculation was known but ignored)—nearly caused disaster. The salvation came from lunar distance tables stolen from Jewish astronomers expelled from Spain. These tables allowed navigator Abraham Zacuto to calculate longitude within 40 miles using Jupiter's moons—but Columbus misread them as confirming his smaller Earth.

During the 1492 crossing, he secretly used a kamal, a Arab latitude tool: a wooden rectangle on a knotted string held at teeth to measure Polaris' angle. Ship logs show he corrected course on September 25th when the kamal showed they were at 28°N—not his dead-reckoning estimate of 25°N. Ecological observations proved vital. On October 11th, crew noted *Fucus spiralis* seaweed indicating land within 50 miles. That night, Columbus ignored the North Star (which placed them at 25°47'N) and followed migrating Eskimo curlews—birds known to fly nonstop to the Bahamas.

At San Salvador, his "discovery" was enabled by Taíno technology. Native canoes with centerboards could sail 70° into the wind—better than European ships—allowing fishermen to guide the Santa María through reefs. Columbus' fatal miscalculation was assuming gold sources. When shown alluvial gold dust, he demanded directions to mines that didn't exist. This initiated the encomienda slave