Dawn of Science
9. The Conquest of the Seas

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The European voyages and the explorations of the sea and the distant lands laid the ground for the Copernican Revolution.

By about AD 1260, Kublai Khan had set up a grand Mongol empire in China. It was during this Mongol supremacy that China came into closer contact with Europe. With a fairly stable Mongol Empire stretching across the plains of Asia, it was easy for European travellers to visit China and establish regular trade links.

One among such traders from Venice who earned a place in history was Marco Polo. His father and an uncle made a trip to Kublai Khan’s China when Marco was still in his teens. The Mongol leader was fascinated by the Venetian merchants and sent them back to Europe to bring missionaries who would teach Christianity in China. The Polos could not persuade the papacy to send the clergy but Marco Polo accompanied his father and uncle on their second trip to China in 1275. He had cordial relationship with Kublai Khan and became the Emperor’s trusted diplomat. After spending nearly two decades in the eastern lands, Marco Polo finally returned to Venice in 1295.

This was the first time Central Asia was observed so closely by the Europeans. Marco Polo, who held command in a Venetian fleet, was captured in a naval battle in 1298 and had to spend a year in a Genoese prison. There he wrote his travelogue (The Description of the World), setting down in detail the affairs of Asia and Far East. The book was popular but its contents were largely not believed. For, the Europeans did not quite like the idea of the existence of a high civilisation and riches in the Far East and even coined the term “Marco Milioni” (Marco Millions) to describe the way Marco Polo dealt with large numbers in his
WHEN

Columbus
- Voyage around the World (1516–1519)
- Columbus reaches America
- Birth of Copernicus (1473)

Henry the navigator
- School of navigation established in Portugal (1418)

Marco Polo
- Voyages of Marco Polo

1526 battle of Panipat, won by Babar
- Cheltenham
- Guru Nanak

Vijayanagar and Bijapur
- 1453 Turks take Constantinople
- End of Byzantine empire

1399 Timur’s raid of Delhi
- Great Plague in Europe, Asia

1250 – Aladin – Sultan of Delhi
- Uthman Khayn

Ptolemy underestimates the size of Earth

WHERE

Figure 1.

Figure 2.
descriptions of the East. There was, however, one man who believed every word of what Marco Polo said. This was Christopher Columbus, the Italian explorer, who felt strongly that the almighty had chosen him to achieve great deeds. He wanted to acquire the riches of the Indies and Cathay (the terms by which India and China were known) and thought he could do it by sailing westwards from Europe. It is a popular myth that Columbus believed the Earth was round while everyone else thought it was flat; the European scholars of the time had accepted the Earth was round and the sailors certainly knew this. What prompted Columbus on his voyage was an interesting calculation error.

Around AD 100, Ptolemy had drawn up a map of the known world and gave estimates of the distances between various points on the globe. This map and the later versions of it claimed the length of one degree to be about 56.6 Italian miles, a mile being about 1,477 metres. Such a conversion made the equator about one quarter too small. A map produced along these lines by an Italian map-maker Toscanelli, came into Columbus’s possession. Columbus calculated the land distance between Spain and India to be 282 degrees and the distance over the sea about 78 degrees. According to the (wrong) conversion of degrees into miles, which he used, India should be about 3,900 miles from the Canary Islands in the Atlantic, which is more or less where America happens to be!

Figure 3. Marco Polo, on his return from China after serving the Mongols for nearly two decades, wrote a detailed account of what he saw in ‘The Description of the World’. It gave a lot of details about cities, canals, rivers, ports and industries in China and its neighbourhood.

Columbus tried to get several kings and nobles to finance his trip but met with a series of failures. In fact, it is interesting that the Portuguese king, John II, referred the project to geographers who pointed out that there must be something wrong with the maps Columbus was using. They felt that the surest way to Asia was around the southern tip of Africa and that, by going west, Columbus was going the wrong way. Of course, they were quite right but what they (or Columbus) did not know was that between Europe and Asia lay unknown continents (the American continent), roughly about 3,600 miles away.

Columbus finally managed to get a subsidy from the Spanish royalty—Ferdinand and Isabella—and set sail on 3 August 1492. After several ups and downs, he reached the eastern end of the American continent on 12 October. He explored various regions and was given a hero’s welcome on his return. Columbus’s voyage caught the imagination of Europe and the age of exploration continued in full vigour. It is true that there were great sailors before Columbus—for instance, the Portuguese prince, Henry the Navigator, who even set up a school for navigation in Portugal—but Columbus’s voyage added the necessary glamour to explorations of the sea. That the new lands which he discovered contained vast mineral wealth and riches which could be plundered...
rather easily was another motive for the explorations; indeed this is what prompted the kings and nobles to finance the expeditions in the first place.

Shortly after Columbus’s voyage, Spain and Portugal were at loggerheads on how the loot from the new lands was to be shared. The Pope had to intervene and negotiate a compromise. He drew a line, a hundred leagues west of Cape Verde islands in the Atlantic and ‘gifted’ all lands to the west of this line to Spain and those to the east to Portugal. This line, however, was not drawn completely round the Earth but only across the Atlantic Ocean. This fact was cleverly exploited by Ferdinand Magellan, the Portuguese explorer.

Magellan was in the service of the Portuguese army but was dismissed in 1517 for some minor offence. Bitter at this treatment he joined the Spanish service and rose high. He pointed out to Charles V of Spain that if the Spaniards kept sailing westwards they will always be on the right side of the Papal line but can certainly reach the Indies, which, going by the papal decree, was left to the Portuguese to explore. Magellan was essentially repeating what Columbus did but was doing it right, having realised that the American sub-continent was not the Indies they were seeking.

The Spanish monarch liked this idea and Magellan set sail on 10 August 1519 with five ships. The ships crossed the Atlantic,

Figure 5. Ferdinand Magellan, a Portuguese employed by the King of Spain, set out on a voyage from Spain in 1519.
Courtesy: http://epress.anu.edu.au/spanish_lake/ch02s07.htm
found a small passage (now called the ‘Strait of Magellan’) at the southern end of South America into the Pacific Ocean and just managed to reach the island of Guam near the present Philippines on 6 March 1521 at the brink of starvation. Magellan was later killed in a squabble with the natives of Philippines but one of his five ships, Victoria, managed to make its way across the Indian Ocean, around the southern tip of Africa and back to Spain, arriving there on 8 September 1522.

This circumnavigation of the globe proved beyond doubt three facts. First, the estimate of the size of the Earth by Ptolemy was wrong and the earlier estimates by Erosthemes were right. Second, there is one single ocean – not seven as thought by the Greeks – which girdled the Earth. And third, it showed that vast lands with new animals and plants, about which Aristotle and other ‘deep’ thinkers knew nothing, existed on the Earth. All this emphasised the insufficiency of the accumulated ancient knowledge and prepared the ground for the Copernican Revolution.

**Suggested Reading**
