Maritime Activity

Explain how cross-cultural interactions resulted in the diffusion of technology and facilitated changes in patterns of trade and travel from 1450 to 1750.

AP World History - September 21, 2018

Planisphere by Portuguese cartographer Alberto Cantino, 1502, Biblioteca Universitaria

Introduction

Topic 4.1: Knowledge, scientific learning, and technology from the Classical, Islamic, and Asian worlds spread, facilitating European technological developments and innovation. The developments included the production of new tools, innovations in ship designs, and an improved understanding of regional wind and currents patterns—all of which made transoceanic travel and trade possible.

What we need to understand is:

- What were the circumstances **(context)** that led to the rise in maritime activity?
- How did new and old technologies make this activity possible? **(causation)**

Your Task:

Below is a short reading by Prof. Cameron Addis of Austin Community College. Use the reading to answer the above questions and to answer our "aim" question for our summary.

The Age of Exploration
by
Prof. Cameron Addis

Contrary to popular opinion, medieval European sailors did not think the world was flat, but neither could they sail far outside the sight of land with simple broad-cloth sails and no terrestrial guides beyond the North Star. Better boats (My note: Caravels) and new navigational tools, imported from the East, allowed them to sail outside the sight of land.

Europeans also re-acquainted themselves with Greek cartographers like Eratosthenes, who measured the circumference of the earth and invented (east-west) longitude and (north-south) latitude, and the term geography. They learned to use astrolabes and quadrants and, after the 16th century, cross-staffs and sextants to measure the Sun and Pole Star to figure latitude. Europeans used Arab rig lateen (multiple) sails to explore the open ocean. The Chinese had discovered keels to stabilize boats and that lodestones (magnetite) orient themselves toward the South and North Poles when afloat. These compasses gave European sailors a sense of direction even when clouds blocked the Sun or stars.

Likewise, Arab cannonry allowed European rulers to lay siege to their rivals' thick-walled castles, as smaller fiefdoms gradually congealed into larger states. The political

centralization that resulted from better weaponry created governments large enough to finance overseas expeditions and underwrite their risk. Larger states raised taxes to acquire more muskets and cannons, giving Europeans the upper hand over populations in America, Africa, and parts of Asia.

Still, Europeans weren't the first to set out on the oceans. Under the Ming Dynasty, China had already expanded into the Indian Ocean, the Persian Gulf, and East Africa from 1400-1433, led by commander (and court eunuch) Zheng He. Their Treasure Fleet ships, or junks, were bigger than those Columbus sailed to the Americas later in the 15th century. Even before that voyage, the Chinese had geographic knowledge as far west as Africa, as seen in this 1402 map. Zheng He's 1405 fleet of 300 was bigger than all of Europe's navies combined. Yet, in one of those fateful decisions history hinges on, the Ming decided expansion was not worth the trouble and that international commerce was not in keeping with their kingdom's character. Mongol invasions in the northern part of their kingdom distracted them and renovation of the Grand Canal within China made foreign trade less pressing because they could move their own goods around better. The Chinese abandoned overseas trade just as European upstarts like Portugal started it. They even outlawed ship construction and burned their ocean-going ships and records in 1433. Never before or since has the world's dominant navy destroyed itself. Europeans, conversely, developed an infatuation with Asian goods like spices (and derivative perfumes), porcelain, opium, and silks at the very time the Chinese insulated themselves.

But in between China and Europe lay thousands of miles, including the Great Silk Road and dangerous places like Khyber Pass, in present-day Afghanistan. Middlemen eroded profit margins as goods made their way west toward European ports like Venice, Polo's hometown.

Muslim expansion into southeastern Europe created more obstruction to the Silk Routes. Muslims conquered Constantinople in 1453, renaming the seat of the Eastern Roman Empire Istanbul. Their key military advantage was a modification of the early guns invented in China into cannons. The Chinese usually fought with crossbows, but starting in the Middle Ages they used gunpowder for fireworks, medicine (thinking it lengthened life), and the first rudimentary muskets.

Gunpowder — the combination of sulfur, charcoal, and saltpeter (potassium nitrate, often bat guano) — worked its way down the Silk Routes to the Middle East. Muslims built the first cannons capable of laying siege to city walls and bombarded Constantinople for 53 days before conquering it. Newly-named Istanbul became the capital of the Ottoman

Empire and blocked spice traffic between Asia and Europe. Little did the Ottomans know that disrupting pepper would help trigger the European Age of Exploration. Ottomans also introduced Europe to kahve, or coffee, which became another important commodity in world trade and colonization.

It's no surprise that Portugal, the kingdom furthest cut off from trade on the western coast of Europe, circumvented the Eurasian continent by sailing around Africa. They'd had the notion even before Muslims conquered the last vestiges of the old Eastern Roman Empire.

Behind Prince Henry the Navigator, the Portuguese threw themselves into maritime expansion, building on the latest advances in nautical equipment, cartography, and shipbuilding. Their rulers built naval colleges and they lionized their explorers — men like Bartholomew Diaz and Vasco de Gama, whom they buried in cathedrals with sailing ropes carved into the ceilings. Portuguese were the first Europeans to initiate contact with sub-Saharan Africa and traded salt, wine, fish, guns, and whiskey along the African coast in exchange for ivory, copper, gold, Raffia cloth, exotic animals, and slaves. On a 1483 voyage led by Diogo Cão, they laid anchor near the mouth of the Congo River in what's now Angola. By 1488, they'd exchanged ambassadors with the Kingdom of Kongo and were converting Africans to Catholicism. In our upcoming chapter on slavery, we'll learn more about how Portuguese Europeans pioneered the overseas slave trade on the west African coast.

The Portuguese discovered that favorable trade winds returned them to Europe if they sailed further west off the African coast. In 1500, this led to Pedro Álvares Cabral's accidental landing on the far eastern coast of what's now Brazil, in South America. Portuguese eventually made their way around the southern tip of Africa, and the Cape of Good Hope, and established trading colonies in India and Southeast Asia. The European market for dyes (colors for clothes and art, e.g. saffron) and spices for flavoring and preserving meats drove these early explorations. Cinnamon, black pepper, cardamom, and clove were among the highest demand items of the Spice Trade.

Cartography wouldn't have flourished during the Renaissance without improvements in printing and paper. Chinese and Korean movable-type print invented in the 11th c. CE lent itself well to European languages, which have fewer letters than Chinese. Incorporating the screw press design of traditional wine presses and using lead rather than wood type, Europeans including Johannes Gutenberg built printers that made books like Marco Polo's possible. Gutenberg, the son of goldsmiths, created a tin and lead alloy for letters and an adjustable mold to make the letters bigger or smaller. He also developed an oil-based ink that, unlike water-based, was viscous enough to adhere to the letters. Printers combined their

presses with another Chinese and Arab import: paper. Italians along the Amalfi Coast advanced the art of making paper from wood along with traditional animal parchments. Printing allowed for knowledge to accumulate, opening the path for more progress than oral traditions allowed.

Paper also led to paper money. Along with Arabic numbers, the Hindu zero, and loosening of restrictions against usury (lending at interest), paper money gave rise to modern finance. Capitalism as we know it — with capital, credit, risk-taking, public contractors (publicani), etc. — was invented in ancient Rome and reborn and refined during the Renaissance. Merchants in European ports like Venice needed more precision to track trade and Arabic numbers(really Indian) proved easier to calculate with than Roman numerals like the type we mark Super Bowls with or you see in movie credits. Imagine doing long division with a string of XLVIII's or even punching them into a calculator, let alone keeping precise books with fractions. The problem with Roman numerals is that they aren't numerals to begin with and neither were the number-letter hybrids used in Greek and Hebrew math. Those symbols allowed mathematicians to tally the results of calculations done on an abacus (counting frame) but didn't provide a mathematical tool in their own right. Math was a good example of the two-way flow of ideas from Europe to the Middle East and then back to Europe. The Caliph in Baghdad — the hub of medieval mathematical research — retained Jewish scholars to translate the work of Classical pioneers like Ptolemy and Euclid, the "father of geometry." Algebra and trigonometry developed early in Mesopotamia, were refined in Greece and Rome, and refined further yet in the Islamic Arabia and Persia before working their way back into Renaissance Europe.