

THE ARAB WORLD IN THE CLASSROOM



Center for Contemporary Arab Studies

Teaching Module No. 6

Tapestry of Travel

Contributions of Arab/Muslim Civilization to Geography and World Exploration

By Karima Alavi

Never, so far as possible, cover any road a second time.

—Ibn Battuta, 14th-century traveler

When Ibn Battuta went to Mecca* on *hajj* (pilgrimage) in 1325, few people realized that he would not return to his Moroccan homeland for another 30 years. Like many other young men of his time, Ibn Battuta wrote his memoirs in a form of travel literature called *Rihla* in Arabic. These memoirs offer us a wealth of information about a medieval Arab's view of the world and humanity's place within it. They tell us of religious pilgrims, traveling scholars, judges, traders, merchants, and adventurers who benefited from the expansion of Muslim civilization over a vast territory that once extended eastward from Spain to the outer reaches of China. As this expansion took place, the Muslim faith, the Arabic language, and Arab culture spread across the lands. Ibn Battuta could travel tens of thousands of miles without ever completely leaving the cultural framework with which he was familiar. Alongside this expansion of the familiar, however, developed a magnificent new tapestry of languages, peoples, cultures, and beliefs. Persians, Indians, Chinese, Africans, and Arabs all played a part in the spirited intellectual developments that took place during the Arab Golden Age, a period roughly dated from the 7th to the 13th centuries CE. As *Dar al-Islam* (the "abode" of Islam) spread across continents, Islamic laws, art, architecture, and social practices spread alongside the religion. Muslims and non-Muslims alike took advantage of this new opportunity to travel within the



The courtyard of the Attarine *madrasah* built in 1346 in Fez, Morocco. (Nik Wheeler/Saudi Aramco World/PADIA)

relative safety of a familiar social backdrop, recognizing the Arabic *adhan*, the Muslim call to prayer, in such diverse places as the Spanish city of Toledo, the Syrian capital of Damascus, and Samarkand in Central Asia. As the Arabs developed their golden age of scholarship, pagans, Jews, Christians, Muslims, Sabaeans, Hindus, and Buddhists enjoyed freedom of movement

*Scholars of Islam prefer "Makkah" as the transliteration of this commonly used city name.



Rendition of Ibn Battuta in Baghdad's *Bayt al-Hikmah* (Nik Wheeler/Saudi Aramco World/PADIA)

and support for their scholarly pursuits. Under the patronage of Muslim rulers, these intellectuals of many faiths joined in one of the most exciting exchanges of knowledge in history. As people traveled from one end of *Dar al-Islam* to the other, few branches of learning were enriched as much as geography.

There is no more striking example of the extraordinary breadth of this travel than the story of Ibn Battuta who, upon his return home near the end of his life, visited the town of Sijilmasa in southern Morocco, where he discovered that his host was the brother of a scholar he had met in western China several years before.

The Early Cosmology of the Arabs

The Arabs inherited a wealthy tradition of stories, legends, and knowledge about the world. Their world view was shaped by many cultures including those of the early Egyptians, the Babylonians, the Phoenicians, the Greeks, and the Romans. The Arabian Peninsula has also been traversed by desert nomads since the earliest times. Some of the greatest migrations in history took place across the Fertile Crescent and out of the Arabian Peninsula. Hebrews, Persians, Arabs, and others traveled along trade routes of the region, and faced life and death situations in this challenging terrain. For this reason, early nomadic tribes held a deep respect for the most dependable desert guide—the sky. Many of the region's early cultures had a highly developed knowledge of the constella-

tions and the movement of heavenly bodies. People like the Sabaeen “Star Gazers,” a group that traveled the deserts of ancient Mesopotamia, set the foundations of later studies in astronomy, mathematics, and geography. They had a highly developed understanding of astronomical phenomena.

The Arab understanding of the cosmos was developed by a combination of input from philosophers, desert nomads, theologians, natural scientists, and geographers. With the advent of Islam in the 7th century, the Arab cosmological view became an amalgam of ancient mythical traditions, scientific observations, and beliefs supported by Qur'anic revelation. At that time Arabs perceived natural phenomena such as islands, mountains, and rivers as cosmic symbols, representing a high spiritual level of consciousness. For example, central to this symbolism was the idea of *Qaf*, the Cosmic Mountain, which represented all the obstacles a religious seeker needed to conquer on the strenuous journey toward understanding the Divine. Other cosmological symbols referred to the inner meaning of the seven heavens and seven climates, which the early Muslim philosophers linked to the seven planets and the twelve signs of the zodiac. These strong beliefs in symbolism were supported by the following Qur'anic passage:

*Hast thou not seen how God citeth a symbol?
A good word is like a good tree, its root set firm,
And its branches in heaven; giving its fruit at every season,
...so God citeth symbols for men, that they can remember.*

(Chapter 14: 29-31)

The Wisdom of the Ancients

Arabs quickly developed a sophisticated view of the physical world by piecing together, interpreting, and augmenting ideas from many sources. Some of the geographic knowledge that the Arabs inherited was based on facts gathered by earlier explorers who wrote detailed reports of their travels, and some of the knowledge was based on an oral tradition that included tales of fantastic sea monsters and ships that “fell off the edge of the earth.” To medieval Arabs and Europeans, both the scientific and the fantastic traditions were equally valid; they believed that just about any kind of marvel was possible.

Ancient Greek thought had a particularly strong influence on the way the Arabs viewed their world. As early as the 3rd century CE, Aristarchos of Samos had put forth the idea of a helio-centric universe in which the planets rotated around a stationary sun (as opposed to the idea that the sun rose out of the sea, traveled across the sky, then sank down into the sea again at the opposite side of the earth).

The most influential geographic text of the ancient scholars, however, was that of Ptolemy, a 2nd century CE Greek philosopher who studied in Alexandria, Egypt. His *Geography* served as the primary text of scholars for several centuries. This important work was translated into Arabic by 826 CE under the title *al-Majisti* (The Majesty), or *Almagest* in Latin. Ptolemy's writings inspired Arab and Muslim scholars to investigate the size and shape of the earth, the shape and features of the land, and the best methods for mapping the physical environment. Although Ptolemy was a respected philosopher, Arab scholars corrected many mistakes in his original work, added their own observations, and eventually passed on this knowledge to Europe. The Arab *Almagest* served as the primary geography text in European universities until the 17th century.

The Flowering of Baghdad: Seeds of the European Renaissance

In the 7th century, a new impetus for scholarship appeared in the form of Islam. This religion, which arose in the Arabian Peninsula, quickly spread across several continents, bringing together many cultures under the banner of a shared religion. By the 8th century, the political center of Islamic power moved from Damascus to Baghdad, where rulers of the Abbasid Caliphate filled their capital city with libraries, schools, and centers for scientific exploration and the translation of ancient scholarly texts.

The most famous of these centers of learning was the *Bayt al-Hikmah*, or House of Wisdom, which was built in 830 CE. The rulers of Baghdad supported and encouraged scholars, philosophers, and other learned men. From far corners of the known world they gathered scholarship and texts of ancient wisdom that had previously been ignored. This famed round city attracted the greatest scholars of the time, whose task was to translate ancient thought from Greek into Arabic so the ideas could be studied and expounded upon. Arab Nestorian Christians who wanted to escape the persecution of the Byzantine Empire gladly fled to Baghdad to participate in this great flowering of learn-

Some Fishy Stories

As new advances in navigational technology enabled medieval explorers to travel longer distances, they did so with newfound confidence. Explorers sought knowledge of unfamiliar lands through manuscripts, *mappaemundi* (world maps), and stories told by sailors returning home. The 13th century saw the development of a more accurate tool, the Portulan Charts. These were highly accurate mariners' maps of the coasts, islands, and seas. Both written and oral traditions intertwined to create a fascinating mixture of fact and fantasy that was fed by the imagination of a medieval audience eager for tales of adventure, danger, and exotic lands.

Both European and Arab maps of the era are sprinkled with notations that offer strange stories of islands inhabited by giants, cannibals, people with beards to their ankles, humans with animal heads who swim in the ocean, and women with enormous canine teeth and eyes that flash like lightning. Other tales speak of the Island of the Two Brothers, believed to be two men whom God had turned to stone as punishment for piracy. A more bizarre tale states that "long ago a people arrived in this place by sea; they had inflexible tails, like crocodiles. In order to sit down comfortably, they used stools with a hole in the middle." (*Aramco World*, vol. 43, no. 3, p. 45) Other people were described as having umbrellas at their feet; when they lay down, they would protect themselves from the sun by lifting these umbrellas over their bodies. In 1492, Columbus was warned of men who had dog faces and ate human flesh. In 1675, Elias Ibn Hanna, a Chaldean Christian, left Baghdad to travel to South America, and wrote the first Arabic description of the New World. He told of grass that rose up and slashed people to death unless they commanded it to "get down, O dog!" Even religious figures made their way into these legends, the most famous being the legend of St. Brendan, who encountered a fish that was so large that he mistook it for an island. When he lit a fire, the "island" swam away. The astonished saint fled in a small boat to the safety of his ship.

ing. They took the lead in the early translation movement because they had the skills to translate Greek manuscripts into Syriac, the language of the Nestorian Church. Different people were then able to translate the Syriac pieces into Arabic. Additional translators were welcomed because of their knowledge of Persian, Greek, Sanskrit, and other tongues. Adventurous travelers went to Baghdad to seek work as librarians, bookbinders, copyists, calligraphers, and illustrators. Some of the scholars were so revered that they often received payment in pure gold equal to the weight of the manuscripts they translated.

The translations facilitated brilliant advances in many fields, including physics, the natural sciences, medicine, philosophy, astronomy, and mathematics. Geography, however, received special attention because of the links between the rapidly spreading Muslim faith and scholarly pursuits.

Why Islam?

Although scholars of many faiths contributed to the academic advances that took place at *Bayt al-Hikmah*, it was the rise of Islam that gave the impetus and support for the intellectual achievements of the time. Muslim rulers began to compete among themselves to attract the most famous scholars. Caliphs received higher status by supporting the best Jewish, Christian, Muslim, and even pagan scholars. Rulers surrounded themselves with writers, scientists, poets, philosophers, and musicians who added a crowning touch to the luxurious lifestyle of the courts. There are many passages in the *Hadith* (sayings of the Prophet Muhammad) that encourage scholarship, so many consider it a religious duty for Muslims to study.

Islam effected advances in geography for many reasons:

- Making the *hajj* to Mecca is one of the five pillars of Islam, and hence, a religious obligation. As Islam spread, pilgrims had to travel to Mecca from places as far away as Spain and China. Like the Christian pilgrims who felt compelled to visit Jerusalem, Muslims had to understand geography to carry out this religious duty.
- Muslims all over the world pray five times a day facing in the direction of Mecca. Therefore it was

necessary to understand geography to determine the location of Mecca.

- Guidelines for many Islamic duties like prayers, fasting, and religious celebrations require accurate time keeping. Time was calculated by studying the position of the stars, sun, and moon. This link between astronomy and mathematical calculations drew much of its information from the Arabs' geographic knowledge and understanding of the heavens.
- The Qur'an is filled with passages that point to the wonders of the natural world as signs of God's mercy and majesty. It also talks about how God offers protection to those who are traveling. These words encouraged many people to travel simply to appreciate the wonders of creation.
- An elite group of Muslim scholars such as Ibn Battuta traveled to gather and disseminate knowledge. Taking this *rihla fi talab al-'ilm* (travel in pursuit of knowledge), like-minded adventurers trekked across Africa and Asia in search of texts, manuscripts, famous teachers, and religious guidance. Their travel writings, called *Rihla*, laid the foundation for further geographic studies both in the Arab-Islamic region and in Renaissance Europe.

HAKEEMS: RENAISSANCE MEN OF THE ARAB GOLDEN AGE

With the spread of Islam and its profound support for scholarly pursuits, a number of figures emerged whose accomplishments were comparable in scope and depth to those of Europeans such as Leonardo da Vinci and Michelangelo. These Arab scholars were called *hakeems*, a term that stems from the Arabic word *hikmah*, or wisdom. A *hakeem*, like a Renaissance Man, was a scholar of religion and philosophy; he was also expected to be a writer, a scientist, a teacher, and a person who has traveled in search of knowledge and understanding. Because the Arab *hakeem* preceded the European Renaissance Man by several centuries, the philosophical discourses and scientific discoveries of the *hakeems* planted many of the seeds that eventually blossomed into the Renaissance.

Their learning entered Europe through the travel, trade, and exploration that brought scholars of Europe and the Middle East into contact with each other. The Crusades, which pitted European Christians against Muslims, also facilitated the reciprocal transfer of knowledge and technology. The Bubonic Plague brought the former enemies into scientific alliance as they battled this deadly disease that swept across the Afro-Eurasian continent. Finally, Sicily and Andalusian Spain, which came under Muslim dominion from the 8th to the 15th centuries, became the most critical transfer points of Arab-Muslim knowledge into the rest of Europe. It was here that Jews, Christians, and Muslims consolidated, synthesized, and expanded the world's wisdom, much as they had in done in 9th-century Baghdad.

Many of the scholars who worked at Baghdad's *Bayt al-Hikmah* and at other centers of Islamic learning are still revered today for the contribu-

tions they made to the field of geography. In the process of translating ancient Greek scientific texts, these scholars developed their own contributions to science and philosophy—contributions that catalyzed the later European Renaissance. Arabs were able to appreciate the wealth of knowledge they discovered from the Greeks despite the fact that they considered these ancient philosophers as pagans. Though the Greeks had a different world view from the monotheistic Jewish, Christian, and Muslim scholars, the Arabs were nevertheless able to fuse Greek learning with an Islamic world view. Until the Renaissance, Christian European philosophers struggled with the idea that one could not study the world in a “scientific” manner without risking the danger of losing one's complete faith in the Divine. For example, there could be two different reactions to an event like the Bubonic Plague: by scientifically studying and analyzing its causes and remedies; or by viewing the plague as an act of

Al-Azhar University: Continuing the Tradition of Islamic Education

The tradition within the Islamic world has been to attend a *madrasah* (Islamic school) to study “the religious sciences.” Around the world one can still find centuries-old *madrasahs* in which people study a variety of subjects such as literature, science, medicine, and engineering. The difference between the *madrasah* and a standard public school is that the *madrasah* places academic subjects within a religious context. For example, while studying earth science students read Qur'anic chapters on mountains, oceans, the sky, and stars. Additionally, all *madrasahs* have a mosque at the school, serving as a reminder of the link between religion and all fields of study.

The oldest continuously functioning university in the world is a *madrasah* in Cairo, Egypt called al-Azhar University. This mosque and school complex was built during the reign of the Fatimid Dynasty, with the doors opening in 972 CE. For more than a thousand years students have traveled from around the world to study at this prestigious university. In recent decades many American scholars have studied the Qur'an and *Hadith* (the tradition and sayings of the Prophet Muhammad) at al-Azhar.

Although al-Azhar has served as a center of Arab philosophical, religious, and scientific learning, it has also served a political role, producing many patriotic leaders who actively fought European imperialism in the region. For this reason, graduates of this university are well-respected, and *fatwas* (religious edicts) issued by al-Azhar scholars often take precedence over declarations made by less qualified teachers.

In the 1960s al-Azhar University expanded its curriculum to include modern subjects such as applied sciences and engineering. A college of medicine is also part of the university. These departments continue the tradition of weaving religious thought into the curriculum so that this *madrasah* still holds a special position in the world of traditional and modern education.

For more information on al-Azhar and its class offerings, visit its web site at www.alazhar.org/english/profile.htm.

God, thereby quietly accepting it as punishment for one's sins. The Qur'an and *Hadith* strongly supported learning and studying, so the conflict between the two views did not create as much opposition to scientific exploration among the Muslims as it had in the Christian West before the Renaissance. This is one of the reasons why some Jewish and Christian scholars might have preferred to work under the patronage of a wealthy Muslim ruler rather than in medieval Europe. (It is worth noting that Galileo was imprisoned for presenting scientific ideas that were seen as a challenge to Church teachings. This was a very serious accusation.) Eventually western scholars who had traveled or studied in Muslim lands assumed the Islamic attitude toward scientific pursuit. This opened doors to debate and changes in attitudes that arrived when Europe was ripe for change: the Renaissance, a period usually dated from the 14th to the 16th centuries.

Certain *hakeems* made such important contributions to the sciences, and to geography in particular, that their names are known in the West (in their Latinized form) as some of the greatest scholars of history. Not all of the influential scholars were Arab—some came from Persia, India, Central Asia, and other areas—and not all were Muslims. Their work, however, was supported by Arab and Muslim patronage, which enabled them to devote their lives to the pursuit and dissemination of knowledge. Following is a list of some of the *hakeems* who had the strongest influence on Renaissance scholarship as their works traveled out of the Arab world and into the universities of Europe.

Muhammad Al-Khawarizmi

Al-Khawarizmi set the foundation for future geographic studies with brilliant work in mathematics. His calculation methods enabled geographers to measure distances accurately, determine the size and arc of the earth, and calculate measurements like the length of a geographic “degree.” Following the lead of Chinese scholars, he divided the earth into 360 degrees, which improved the ability of travelers and explorers to determine their location. Al-Khawarizmi was one of the early scholars who worked in 9th-century Baghdad. He further devel-

oped a system of numbering that had originated in India; this system replaced the awkward Roman numerals with symbols that represent quantities such as 1, 2, and 3. These symbols are called “Arabic numerals” in the West. Al-Khawarizmi revolutionized the field of mathematics by using these symbols and another Indian concept called *sifr*, or the zero. He shaped these new ideas into “algebra,” named after the title of his book, *Al-Jabr*. His own name was Latinized into “Algorism,” another mathematical term (algorithm) used in the West. Al-Khawarizmi also mapped the stars and revised many of Ptolemy's incorrect celestial charts. It is believed that his maps were used to create the famous map of the world that a group of scholars drew for al-Ma'moun, the caliph of Baghdad from 813 to 833 CE.

Al-Mas'udi

Born in Baghdad, al-Mas'udi is known as a famous traveler, historian, and geographer. He began to wander at a young age, visiting India, Ceylon, Zanzibar, Syria, Palestine, Egypt, and other places. He died in Egypt in 957 CE. His book, *Meadows of Gold and Mines of Precious Gems*, provides an extensive listing of his knowledge, travel observations, and experiences; in it he describes phenomena such as earthquakes, geological formations, and the nature of the Dead Sea. He also wrote about mechanical inventions such as the windmill, which he observed during his travels across the Middle East. Written in 947 CE, al-Mas'udi's book is still available today.

Al-Maqdisi

Al-Maqdisi was born in Jerusalem in 947 CE. He visited the entire Muslim world except India and Spain. One of the earliest scholars of “social geography,” he described not only the physical properties of the lands he visited, but took the time to write about the customs and manners of the people as well. He listed sources of trade commodities such as spices and medicines. Realizing the popularity and importance of geography, al-Maqdisi wrote:

I recognized that this subject is an all-important one for travelers and merchants. It is desired by princes and noble personages, sought for by judges and doctors of law, the delight

of commoners and men of rank. (Nafis Ahmad, *Muslim Contributions to Geography*, Ashraf Press, 1972, p. 34.)

Al-Biruni

Considered the greatest of all Muslim geographers, al-Biruni journeyed extensively throughout 11th-century Persia, Central Asia, and India. In 1017 the soldiers of Sultan Mahmud al-Ghazni captured al-Biruni. The ruler recognized that he had a brilliant scientist in his captivity and offered al-Biruni a high position in his court. Al-Biruni accepted and later accompanied the Sultan on several military campaigns to northwestern India, where he learned to read and write Sanskrit and devoted himself to the study of Hindu culture and science. These studies led to his famous *Book of India*, one of the earliest works to describe a nation in extensive detail. Writing continuously until his death, al-Biruni wrote over 180 books on such diverse topics as history, natural science, geology, astronomy, mathematics, and medicine.

Al-Tusi

Al-Tusi exerted one of the strongest influences on European medieval and Renaissance scholarship. His books focused on astronomy, mathematics, and geography—all closely related sciences. Like al-Biruni, al-Tusi was caught up in the violence and upheaval of warfare that was to affect much of the Middle East as warriors thundered out of Central Asia. When the Mongols, under the leader Hulagu, defeated Persia, al-Tusi offered his services as Court Astronomer. By holding this influential position he managed to save libraries and universities from certain destruction. Eventually he even convinced Hulagu to support construction of a school and observatory for the study of science and mathematics. The foundations of this building still exist today near Tabriz, Iran. Al-Tusi had perforations cut in the dome of the observatory so that sunlight would fall upon certain lines drawn on the floor as the days and seasons changed. These rays of light indicated the time of day as well as the altitude of the sun.

Al-Tusi found errors in Ptolemy's planetary model and wrote a new theory about the movement of the moon and the planets. Eventually his

works became prized possessions in the libraries of European astronomers. When, during the Renaissance, Copernicus presented his revolutionary ideas about lunar and planetary motions, he was essentially expanding on what al-Tusi had written two centuries earlier.

TRAVELERS AND EXPLORERS

As the Arab-Islamic world developed a more sophisticated understanding of astronomy, mathematics, and geography, a grand tradition of travel evolved in tandem. People traveled mainly to make a pilgrimage to holy cities such as Mecca or Jerusalem, to attain knowledge, or to engage in trade and commerce. The tales of some of these travelers have survived through oral tradition and written commentary, which are filled with stories of traveling scholars, merchants, and even emperors making the *hajj*.

Mansa Musa: The “Golden King” from Africa

At the center of the West African empire of Mali sat Timbuktu, a city that flourished in the arts, learning, and trade, especially of slaves, ivory, and gold. Timbuktu's wealth became so legendary that the Geographical Society of Paris offered a reward of 10,000 francs to the first European explorer to discover its whereabouts. Rene Caillie (1799–1838), who learned Arabic and funded his own expedition, won the prize.

Caillie found a sleepy village that bore little resemblance to the legendary 14th-century royal city ruled by Mali's emperor, Mansa Musa. This brilliant diplomat and trader expanded his influence through much of northwest Africa when he betrothed his daughter to the ruler of Morocco. Mansa Musa escorted his daughter to the wedding with a caravan of hundreds of camels, thousands of pounds of gold, and two hundred maidens to accompany her in her new home.

Mansa Musa was little known beyond the confines of Africa until his famous *hajj* to Mecca in 1324, which was as impressive as his trip to Morocco and is considered one of the most magnificent caravans in history. European merchants who were trading



Preserving and cataloguing a portion of Timbuktu's more than 10,000 surviving Arabic manuscripts is the job of Djibril Doucoure, director of Cedrab, the Ahmed Baba Center for Documentation and research, and researcher Sane Chirfi Alpha. (Stephenie Hollyman/Saudi Aramco World/PADIA)

along the North African coast at the time told many tales of Mansa Musa's caravan on its passage to Cairo and Mecca. Instead of riding at the head of the caravan, he opted to be preceded by 500 slaves, each of whom carried a golden staff. Hundreds of warriors held gold-tipped spears. Along the way to the *hajj*, Mansa Musa encountered villagers who had never witnessed such a grand spectacle. His slaves even wore fine fabrics

What impressed people even more was the piety and generosity of this emperor, who was previously unknown in the Arabian Peninsula. Legend has it that he gave away 100 camel-loads of gold, each weighing 300 pounds. He gave much of the gold to poor peasants. His enormous handouts devalued the local currencies of Egypt and other regions he passed through, causing the economies to take years to recuperate.

While in Mecca Mansa Musa befriended al-Sahili, an Andalusian (Spanish-Arab) poet and architect who accompanied him back to Africa. Following the Islamic directive to strive for knowledge, Mansa Musa employed al-Sahili's skills to transform Timbuktu into a city of magnificent mosques, universities, and markets. Legends of Mali's glories spread rapidly and had an important influence on the work of famous cartographers and geographers of Europe. The Catalan Atlas, a famous map produced in 1375, depicts an enthroned Mansa Musa extending a gold nugget to an Arab trader approaching on camel back. This map increased Europe's curiosity about Africa.

Leo Africanus: Kidnapped Scholar

Hasan al-Wazzan, a brilliant young Arab scholar who was born in Granada, Spain, was kidnapped and given away as a gift in 1518. He was traveling on a ship captured by Christian pirates along the coast of Tunisia. When they discovered that al-Wazzan had a draft of a book about his travels through Africa, they decided not to sell him at the slave markets of Pisa and Genoa; instead they presented him as a gift to Pope Leo X, who was known for his love of art and learning. Pope Leo realized that al-Wazzan had a sophisticated education and could serve Europe, which at that time had very little knowledge of Africa except along the coastlines, beyond which European traders feared to go. The Pope invited al-Wazzan to become a member of the Papal Court, where he would receive support to complete his book, *The History and Description of Africa and Notable Things Therein Contained*. Al-Wazzan had to convert to Christianity, at which time the Pope renamed him Leo Africanus. John Pory, who translated al-Wazzan's work into English (after it had been first translated into Latin and French), wrote:

Moreover as touching his exceeding great Travels.... I much marvel how ever he should have escaped so manie thousand of imminent dangers.... How often was he in hazard to have bene captive, or to have had his throte cut by the prouling Arabians, and wilde Mores [Moors]. And how hardly manie

High Tech Advancements and World Exploration

How were Arab explorers able to travel from the Arabian Peninsula to China, and all along the east coast of Africa, by the 8th century? Sailing in the unknown seas was a challenging prospect, and many ships that left for exploration were never seen again. What inventions gave explorers and traders the confidence to sail the open seas instead of remaining close to the coastlines?

New shipbuilding methods produced stronger, sturdier vessels, a famous example of which is the Arab *dhow*. This wooden boat with one or two sails was stitched together with cords made of coconut husk, and not with wooden pegs or nails, as were European ships. Arab shipbuilders then covered the entire dhow with a coating of oil that kept the vessel watertight. A new sail, the *lateen*, made ships more maneuverable in the open seas, which was especially important during a violent storm. These delicate, triangular sails enabled ships to make full use of monsoon winds, which propelled ships between the Arabian Peninsula and the coast of India.



A traditional Arab pearling dhow anchored off Bahrain. (Victor Lambourne/Saudi Aramco World/PADIA)

Guiding these sailors were complex star charts called *zij*. Many of these maps of the heavens were developed under the patronage of the great Mongol warrior-kings of Central Asia. They were often scholars themselves, and their astrological observatories in cities such as Samarkand and Bukhara still stand today. These charts often meant the difference between life and death for explorers. The Gregorian calendar that we use today is based on the *Zij Tables* of Ulugh Beg, 15th-century ruler of Samarkand and grandson of the most notorious Mongol leader, Ghenghis Khan.

Navigational instruments such as the compass (originally a Chinese invention), the quadrant, and astrolabe revolutionized sea travel. By more accurately measuring latitude and longitude, sailors were able to calculate their location and find their way home. Sailing the open seas before these instruments were invented would have been harrowing indeed.

*times escaped he the lyon's greedie mouth, and the devouring
jawses of the Crocodile?*

(Bovill, p. 142)

Besides describing the physical features of Africa—rivers, deserts, and mountain ranges—al-Wazzan's book is a treasure trove of information on social customs, such as how to approach royalty by crawling on the ground and sprinkling dirt on one's head as an expression of humility. Al-Wazzan also details items that were traded between Africa, Asia, and Europe. He speaks of the value of salt,

sugar, brass vessels, fabrics, gold, slaves, horses, and civet, the musk of a catlike mammal of the same name that is used in some perfumes. Books were also in great demand. Commenting on the royal courts of Timbuktu, al-Wazzan states:

Here are great stores of doctors, judges, priests and other learned men, that are bountifully maintained at the king's cost and charges. And hither are brought diverse manuscripts or written books out of Barbarie, which are sold for more money than any other merchandise.

(Bovill, p. 148)

Al-Wazzan's book also details the use of cowry shells as a medium of exchange and currency; he writes about their influx from Persia and their use in place of gold coins for inexpensive purchases.

Zheng He: Chinese Muslim, and Admiral of the Seas

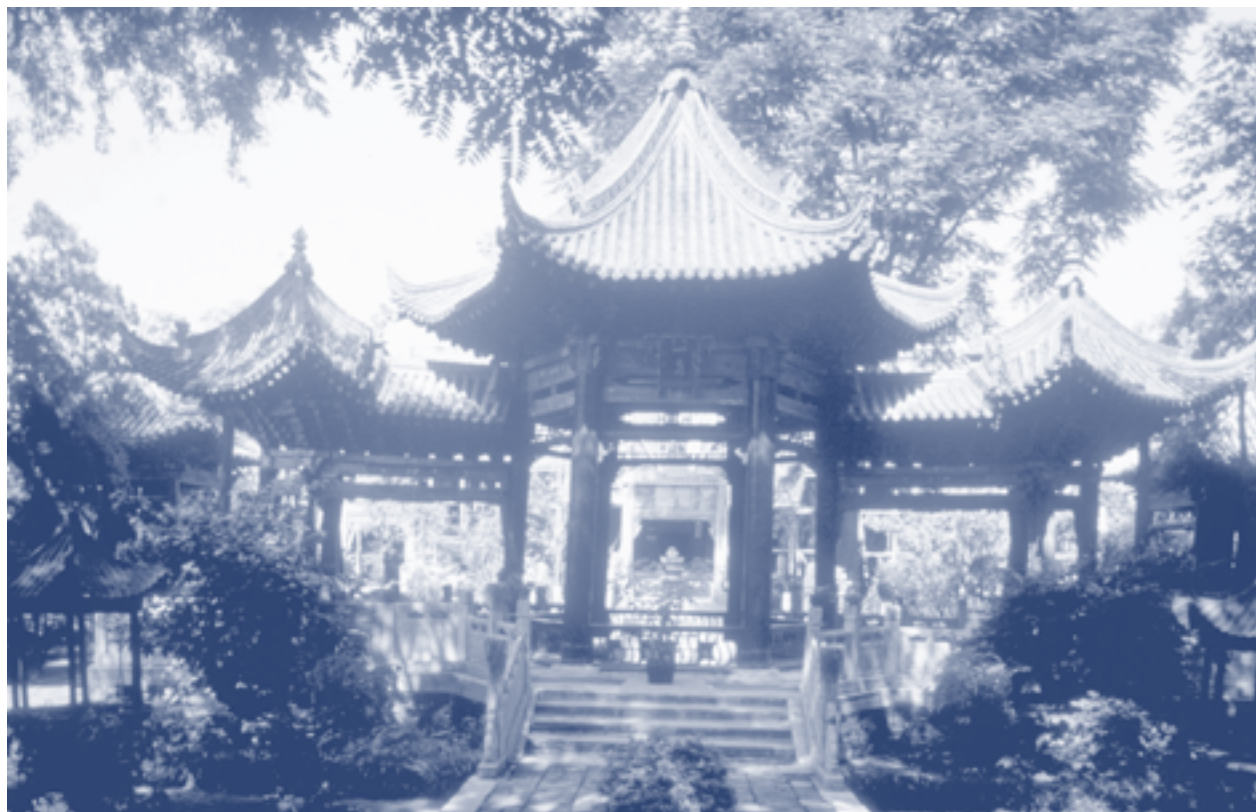
When European merchants and missionaries arrived in China in the 14th century, they were surprised to discover well-established communities of Arabs living there. As early as 850 CE Arab merchants made the arduous voyage eastward to China to participate in a flourishing trade. By the end of the 9th century there were so many Muslims in Canton (Guangzhou) that the emperor had appointed a Muslim official to govern the area and to lead the Friday prayers at the local mosque.

Goods from as far away as Africa were usually off-loaded in the Persian Gulf and transported to Baghdad first. Baghdad, the famous "City of Peace," was then the seat of the Abbasid Dynasty and served as the hub of world trade. All the trade routes between Asia, the Middle East, India, Africa, and Europe had

to traverse Mesopotamia (modern-day Iraq). This international trade flourished to such an extent that by the 8th century Baghdad and Canton were the two largest cities in the world. At the far end of this thread of commerce, which eventually developed into the famous Silk Route, were the great port cities of China. The 10th-century historian al-Mas'udi wrote about China in *Meadows of Gold and Mines of Precious Gems*. This book provided invaluable information for Arabs who traveled to China. Today the ethnic Hui Chinese are descendants of the Arabs who braved such a journey.

Travelers and explorers went in the other direction as well. Zheng He, the legendary Chinese naval hero, served the 15th-century Ming dynasty emperor as Admiral of the Seas. Some of his expeditions contained as many as 300 "treasure ships" carrying 500 men. His navy numbered 37,000 sailors, the largest in the world at that time. Under his command, Chinese ships visited Siam (Thailand), Indonesia, Ceylon (Sri Lanka), the Arabian Peninsula, and Mogadishu, Mombasa, and Zanzibar along the east coast of Africa. In fact, Chinese merchants first saw

The Chinese-style pavilions of the Great Mosque in Xian. (Nik Wheeler/Saudi Aramco World/PADIA)



a giraffe in Africa, and upon his return to China, Zheng He presented one as a gift to the emperor. This presentation is the subject of many legends, paintings, and poems because the arrival of this formerly unknown creature was seen as a sign of good fortune for China and its ruler.

Because Zheng He was a Muslim, it is believed that he also made the *hajj*. The sight of the first group of Chinese Muslims at the great mosque in Mecca in 1433 must have surprised the Arab locals. During his lifetime, Zheng He directed the construction of the Great Mosque of Xian, with a complex of courtyards, gateways, pavilions, a pagoda, and a large prayer hall. This mosque, which is the oldest in all of China, is still standing and has recently been renovated.

THE CHRISTIAN EUROPEAN WORLD OPENS UP TO ARAB/ISLAMIC LEARNING

Christian Scholar-Monarchs: The First Step on the Road to Shared Knowledge

Arab rulers supported and encouraged scholars of many faiths. As Islam spread out of the Arabian Peninsula, philosophers, scientists, and writers thrived in the courts of Muslim rulers in different parts of the world. Eventually this wealth of knowledge spread to Europe as Arabic works were translated into Latin, and eventually into French and English. This phenomenon took place under the patronage of brilliant rulers, some of them Muslim, and some of them Christian.

With the 13th-century fall of Baghdad to the Mongols, the axis of learning shifted to Spain, where scholarly centers were built in cities such as Toledo, Granada, Cordoba, and Seville. Because these cities were under Muslim rule, they attracted people who fled the ravages of war in Central Asia and Baghdad. Christians, Muslims, Jews, and Zoroastrians were welcomed to Spain, where kings often competed to attract poets, artists, and scientists. As these centers of Islamic scholarship in Spain fell to the Christian *Reconquista*, Greek, Sanskrit, and Arabic texts began to trickle into Europe. Although the armies of Spain's Queen Isabella and King Ferdinand burned many manuscripts, many others were saved. European scholars appreciated the

astounding wealth of scholarship that was at their avail. Two European Christian rulers were particularly instrumental in facilitating the movement of Arab-Islamic scholarship to Europe: King Roger II of Sicily, and Alfonso the Wise, King of Castille, Spain.

King Roger II of Sicily

In 1138 King Roger invited al-Idrisi, a famous Arab geographer, to Sicily's royal court. A scholar in his own right, King Roger had created a wealthy and powerful kingdom that was the envy of all Europe. Educated by Greek and Arab tutors, this monarch attracted scholars from the Middle East and Asia to his palace. While most Christian rulers focused on the Crusades and their efforts to wipe out what they considered the "heathen" Muslims, King Roger used his knowledge of Greek and Arabic to study the wealth of scholarship that Arabs brought to his opulent court. He planned to use al-Idrisi's skills to create the first *scientific* map of the world. To complete this mammoth task, King Roger created the Academy of Geographers and drew together the best scientists of his time. The scholars evaluated all the geographic knowledge available, weeded out what they saw as fantastic tales or unscientific writings, and summed up all the contemporary knowledge of the physical world. They studied the works of 12 historical geographers, 10 of whom were from the Muslim world including an 8th-century Persian director of the postal service, the 9th-century Armenian author of *The Book of Countries*, and a 10th-century tax collector from Baghdad. They also turned to Paulus Orosius, a 5th-century Spanish scholar, and to Ptolemy, the 2nd-century Greek scholar whose manuscripts the Arabs had studied and revised extensively. After 15 years of work, the Academy presented its royal patron with al-Idrisi's famous *planesphere*, a 300-pound disk of silver carved with a map of the entire known world. This map was accompanied by the *Book of Roger*, a magnificent text with maps that consolidated all the geographic knowledge of the time. These works were given to the ecstatic King Roger shortly before he died. Soon thereafter Sicilian barons rebelled against Roger's successor, burned the Latin translation of the *Book of Roger*, and melted the silver map while looting the palace. Although the planesphere was lost, al-Idrisi

escaped to Morocco with an Arabic copy of the manuscript hidden in his baggage. His book served as a model for Arab geographers, but it wasn't translated into Latin again until the 17th century, at which time it became one of the most influential geographic texts in European universities.

King Alfonso the Wise

King Alfonso X of Castille, the 13th-century Spanish monarch known as Alfonso the Wise, was a renowned scholar. A Christian, Alfonso filled his court with Muslim and Jewish translators, philosophers, and scientists who worked alongside Christian scholars to translate Arabic scientific manuscripts into Latin. Their translations and commentaries were instrumental in transferring Arab knowledge to Europe.

In 1254 Alfonso X founded the University of Seville, which housed Europe's first Arabic Studies department. This university produced the Alfonsine Star Tables, a study of the movement of heavenly bodies based on Greek and Arab astronomical knowledge that became a standard text for European astronomers. Alfonso X also gathered historians to his court to compile, under his direction, the first complete history of Spain and a vast history of the world. Alfonso X studied Arabic manuscripts and wrote several books on geology, navigation, alchemy, and philosophy.

Pictures from the manuscript of a book on chess, dice, and other board games, with their explanation ordered by King Alfonso the Wise. (Tor Eigeland/Saudi Aramco World/PADIA)



Alfonso was so skilled in the arts of music and poetry that his works are still popular today. His collection of musical canticles illustrates people in Arab dress performing on Arab instruments. Many of these songs were patterned on Arab rhythms and poetry. Arab music passed from southern Spain into France, influencing a new musical form called the Troubadour Songs.

Alfonso's glorious reign ended when he attempted to expand his power and take the throne of the Holy Roman Empire. He spent so much of his kingdom's money on this effort that his own son dethroned him, and he died in sorrow two years later. Yet Alfonso's intellectual pursuits and support for Arab/Muslim scholarship continue to bring him praise.

Scholars of Christian Europe: Creating a Bridge Between Two Worlds

As the centers of scholarship in Muslim Spain developed, the elites of northern Europe began to send their sons to study at the great universities of Toledo, Cordoba, Seville, and Granada. It may seem odd that this would happen at a time when the Christian and Islamic worlds seemed to be on a collision course, but even during the Crusades there was a thriving exchange of commercial goods and intellectual ideas.

The European scholars who took part in this exchange extended the thread of learning that began in China, India, and Mesopotamia, and then traveled through the Islamic East, Byzantium, and Greece, and finally entered Muslim Spain. Christian scholars who were associated either with fledgling universities or with the Roman Catholic Church passed this wisdom on to Europe.

One of the earliest of these scholars was Anselm, who was born in Italy in 1033. After living as a monk in Normandy, Anselm rose to the position of Archbishop of Canterbury. He was banished from the Church, however, because of his involvement in the power dispute between

the Church and the ruling monarchs, William II and Henry I. His writings on the relationship between rational thought and religious faith set the stage for further debate on the subject, a debate that Islamic philosophers had also been contemplating for centuries.

As early as 1060, the riches of Islamic thought were pouring into the West through the translations of Jews and Christians who worked under royal or church patronage. In the 11th century, Constantine the African translated Arabic, Greek, and Hebrew medical manuscripts into Latin. In 1085 CE, the Spanish Muslim city of Toledo fell to Christian conquerors. Upon recognizing the wealth of knowledge housed in Toledo's libraries, the enlightened Archbishop Raymundo brought together a corps of translators who worked under Dominico Gundisalvi. Their efforts transferred Arabic scientific and philosophical works to Europe.

Adelard of Bath deeply respected his Muslim tutors after he traveled to Antioch, Tarsus, and Toledo in search of knowledge. Greek and Arabic mathematics entered Europe through his translations of Euclid and al-Khwarizmi. Others followed suit and translated more books to satisfy Europe's intellectual curiosity of the time.

Peter the Venerable, with the aid of three Christian scholars and a Muslim, made the Qur'an available in Latin for the first time in 1143. Around the same time, Muslim alchemy and chemistry entered the Latin world through Robert of Chester's translations.

Michael Scot left his homeland of Scotland to study in Sicily, Toledo, Bologna, and Rome. Although his interest in astrology led to accusations that he was a magician, his scholarly works were respected in Europe. He translated Arabic commentaries on Ptolemy's *Geography* and Arabic texts on zoology, physics, and philosophy. His translations reached such great European scholars as Albertus Magnus and Roger Bacon, who frequently cited the writings of Ibn Rushd (Averroes) and Ibn Sina (Avicenna), two giants of Islamic intellectual history.

Among the European transmitters of ancient knowledge, Gerard of Cremona stands out. Upon his arrival in Muslim Toledo in 1165, Gerard dedicated the rest of his life to the transmission of Greek and Arabic learning to the universities of Europe. One of his greatest feats was the translation of Ibn Sina's



Ibn Rushd, or Averroes, one of the great intellects of the 12th century, is honored by a statue in his hometown, Cordoba. (Tor Eigeland/Saudi Aramco World/PADIA)

Canon of Medicine into Latin, which revolutionized European medicine. Gerard learned Arabic, and with the aid of a Christian Arab and a Jew he translated 70 books. These included works on astronomy, mathematics, physics, and medicine.

The works of these eager Europeans influenced the later efforts of such intellectuals as Edmund Halley (of Halley's comet), Copernicus, and Chaucer, who wrote *A Treatise on the Astrolabe*, thereby introducing the details of this instrument to European navigators. These translations had a revolutionary effect on Europe, which was just beginning to develop its own university system and to refine its philosophy on the relationship between scientific reason and religious faith. With the introduction of Greek and Arabic learning, the flames of European intellectual growth were fanned as never before, and many of the most brilliant minds of the Christian world delighted in the opportunity to take part in this great synthesis of ideas. ■

SUGGESTED RESOURCES

General

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Durant, Will. *The Age of Faith*. New York: Simon and Schuster, 1950.

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Menocal, Maria Rosa. *Ornament of the World: How Muslims, Jews, and Christians Created a Culture of Tolerance in Medieval Spain*. New York: Little, Brown and Co, 2002.

Nasr, Sayyed Hossein. *Science and Civilization in Islam*. Cambridge, MA: Harvard University Press, 1968.

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Biographies

Dunn, Ross. *The Adventures of Ibn Battuta, a Muslim Traveler of the 14th Century*. Berkeley, CA: University of California Press, 1986.

Gilson-Miller, Susan, translator. *Disorienting Encounters: Travels of a Moroccan Scholar in France in 1845–1846, The Voyage of Muhammad As-Saffar*. Berkeley, CA: University of California Press, 1992.

Maalouf, Amin. *Leo Africanus*. Chicago, IL: New Amsterdam Books, 1990.

SUGGESTIONS FOR TEACHERS

Classroom Activities

1) Create two newspapers: the *Battuta Bugler* and *Leo’s Timbuktu Times*. Each student will select one of these papers and write an article for it. These are to be “news articles,” based on a combination of historical fact as well as the imagination of the student. For example:

- Ibn Battuta was in Cairo when the bubonic plague struck. A student could write an article “through the eyes of Ibn Battuta” about events in that city when the disease arrived. Who was blamed for the disaster? How was it explained? Did people turn to their faith or science or a combination of the two as they tried to escape the disaster?
- Leo Africanus was kidnapped and taken away on a pirate ship. What was it like? What was his impression of the people who had stolen him from his journey and his studies? What kind of weather did the ship encounter on the way to Europe? How did the people of Europe react to the arrival of an African scholar of his stature?

2) Journal writing exercise: Have students write their own imaginary *Rihla*, or travel journal, that describes either a religious pilgrimage or the travels and adventures of a merchant. Describe different things including:

- the areas traversed
- dangers encountered
- religious faiths and practices of the people they met along the way

- technology of travel (did they use ships, animals, a combination of the two?)
- natural barriers they had to cross to reach their destination

3) **Map exercise:** Using a large map of the world, map out the route taken in the journeys of Marco Polo and Ibn Battuta. Mark them in two different colors for clarity.

- What travel sites did they have in common?
- Which places did Polo visit but Ibn Battuta did not?
- Which places did Ibn Battuta visit that Polo never saw?
- Compare the total number of miles traveled by each (Ibn Battuta—75,000, Polo—25,000).
- Discuss the different methods of travel used by both.
- Discuss inventions that made their travel possible.

4) **Guest Speaker Series:** Have each student select a historical figure who would have traveled through the Arab world during the 7th through 15th centuries. Students will create a poster that gives a visual representation of this person's life. It can have pictures of a church, synagogue, or mosque if their character was a religious figure. It can have ships and maps if their character was an explorer, or trade items if their character was a merchant. Try to represent the arts, as well, so your "guests" include poets, painters, jewelers, and dancers. Renaissance scholars who participated in the exchange of knowledge would also be interesting figures to research.

Each student is to visit the class as a "special guest speaker" whom you introduce. They then discuss their life, their accomplishments, their times, and the place in which they live. After the formal presentation is finished, the other students can then ask the guests questions about their lives. If the students don't know the true answer, let them use their imagination to answer the queries. The room can be decorated with the posters after the Guest Speaker Series is over.

Note: If students would prefer to research the history of a **city** instead, they could be introduced as a visitor from the city they selected. There were many great centers of scholarship that would be fascinating

places to research. Some suggestions would be Chang'an, Baghdad, Toledo, Timbuktu, Constantinople, Alexandria, Samarkand, and Nishapur. Students could also find other cities to study. Their posters could depict what the city would have looked like at the time when their "character" lived there.

5) **Critical thinking exercise:** Have students re-read the remarks that the Englishman John Pory wrote about Leo Africanus. (See below.) Students should search for some ironies in the comments made by Pory about this African scholar for whom he seems to have much respect. Discussion could be started by asking the following questions:

- Which cultural group does Pory fear the most?
- What is Hasan al-Wazzan's ethnic background?
- Who captured al-Wazzan in the first place?
- What are some of the reasons for Pory's admiration for al-Wazzan?
- How do you think Europeans felt about Africa and the African people as they entered the Age of Exploration and began traveling to different continents for geographic and sociological research?
- Can you find other references by Europeans to those people whose areas were eventually colonized by the West?
- What kind of attitude is expressed about the people of these colonized regions?

There is, of course, a certain irony that Pory, a Christian, is marveling at the ability of al-Wazzan, a Moorish Muslim, to escape the grasp of what he perceived were the dreadful Moors. Also, keep in mind that Christian pirates had captured the scholar in the first place. Until then, he had traveled in relative safety through much of Africa. This piece is indicative of the prejudices of Europeans, who failed to credit al-Wazzan's brilliance as that of an Arab, a Muslim, and a Moor. Instead, he had become "Europeanized" in their eyes, and in the process, they literally forgot that this man was a Moor. As "one of them" he then received admiration for his knowledge, his writing, and his adventurous spirit.

Moreover as touching his exceeding great Travels... I much marvel how ever he should have escaped so manie thousand of imminent dangers.... How often was he in hazard to have

beene captive, or to have had his throte cut by the prouling Arabians, and wilde Mores [Moors]. And how hardly manie times escaped he the lyon's greedie mouth, and the devouring jawes of the Crocodile?

—John Pory, English translator of the book of travels by Leo Africanus, as cited in Bovill, p. 142.

6) Sharing Many Languages: While Arab travelers, explorers, and merchants traversed the Old World trade routes and set out on religious pilgrimages, they often participated in the transfer of words as well as ideas and trade items. There are many words in the English language which reflect the Arabic heritage of travel and trade. While many words in this list are of Arabic origin, they all came to the English language through the exchanges that took place between Arabs and Europeans. Try to see which words have to do specifically with **travel and exploration**, which have to do with **commerce**, and which words are **names of commodities** that would have traveled along the great trade routes of history.

Typhoon	Sugar
Monsoon	Sloop
Orange	Magazine (warehouse)

Cotton	Almanac
Jasmine	Indigo
Risk	Lemon
Pepper	Admiral
Tariff	Algebra
Average	Caliber
Artichokes	Cipher
Sandal	Gibraltar
Sofa	Check
Traffic (distribution)	

Geographers, merchants, nomads, and religious pilgrims all learned to use the stars as a map and a guide through unknown territory. There are several star constellations that still bear the name that was given to them by Arab or Muslim astronomers. Among those are:

Acrab	from <i>'aqrab</i>	(Scorpion)
Altair	from <i>al-ta'ir</i>	(The Flyer)
Deneb	from <i>dhanb</i>	(Tail)

Perhaps the one that is best known in the West is the name of the bright red star in the shoulder of the constellation of Orion. This star was named “Bayt al-Jizya”; the Europeans changed it to the Latinized “Betelgeuse.” Most westerners are now familiar with this famous star as “Beetlejuice.” ■

Karima Alavi is the Director of the Dar al Islam Teachers' Institute in Abiquiu, New Mexico. She taught history at the high school level for over twenty years and is active with the World History Association.

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