

The Golden Age of Islamic Invention

The Dark Ages, we are told, was a time of economic and cultural collapse in Europe. This period, between the end of the Classical Age¹ (900 BCE to 600 CE²) and the beginning of the Renaissance³ (1300–1600 CE), may have been dark in most of Europe. However, to the east, across the Islamic world, this period was anything but dark. To the contrary, from

¹ *Classical Age*: a period of history in which Greece and Rome held enormous political power and cultural influence

² *CE*: abbreviation for *Common Era*. It indicates the number of years after year 1 of the calendar used in Europe and the Americas. (For BCE, see footnote on page 39.)

³ *Renaissance*: a period in European history in which there were many artistic, cultural, and scientific developments

the 7th century to the time of the European Renaissance, Islamic civilization experienced an explosion of culture and scientific thought and discovery. For more than six hundred years, it was the world's center of learning. Scientists, philosophers, artists, and engineers sustained and extended the knowledge of the classical world, and laid the foundation for the European Renaissance. Consider some essential objects of our daily lives, among them gasoline, plastic, cars, cameras, and soap. Many of them have their origins in inventions of this Golden Age of Islam.

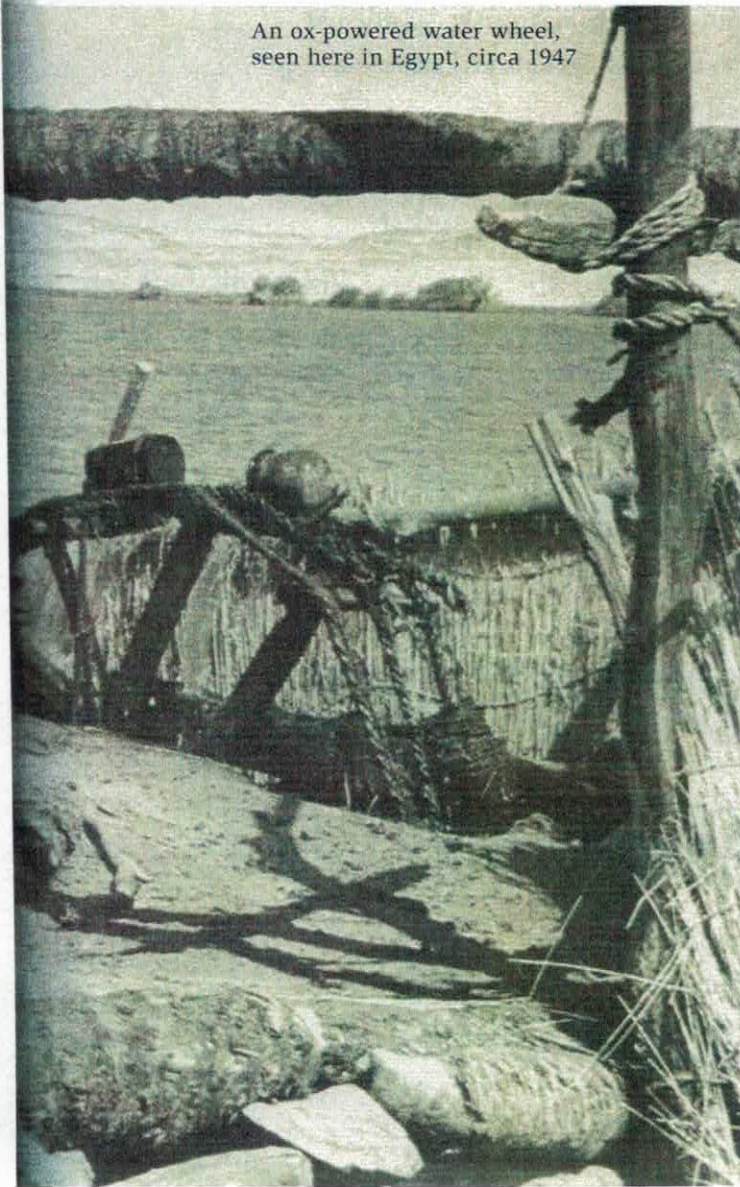
In the 12th century, the Islamic world was enormous. It stretched from Spain, across North Africa, all the way east to present-day Pakistan.



Within its borders were many languages, cultures, and traditions. At the height of its power, it also was home to a massive, vibrant economy, which fueled exploration and the growth of knowledge. Scholars from far and wide converged on Baghdad, Cairo, Tripoli, and Cordoba, which were centers of learning and scientific research and discovery. News of the ideas and inventions of the Islamic world found its way through Europe over trade routes. It also traveled back from the east with the soldiers returning from the Crusades.⁴ The following are three of the hundreds of inventions that have made their mark on the world.

⁴ *Crusades*: a series of wars from the 11th through 13th centuries led by Christians against Muslims

An ox-powered water wheel, seen here in Egypt, circa 1947



From Irrigation⁵ to Engines

In many parts of the world, irrigation is at the heart of successful agriculture. Various methods of irrigation had been developed all over the world. However, no one had found a way to raise water from below ground without great effort. A brilliant engineer in Turkey at the beginning of the 13th century, Al-Jazari, decided to tackle the problem. He used existing technology to create the crank-connecting rod system. A crank is a long bar that is attached at a right angle to a rotating rod. One end of the rod moves in a circle. The other end slides up and down. This system was an important advance because it converts circular motion into linear motion. With this device, an ox walking in a circle could raise water to the surface. The same system is used today in a wide range of machines, including bicycles and car engines.

From Perfume to Gasoline

Some of the most significant scientific advances during this period were in chemistry. As early as the 9th century, chemists in Iraq and Iran were developing basic equipment and chemical techniques. Many are still in use today. One of the most important of these techniques was distillation. This is a method of separating out different components of a liquid mixture. It uses the differences in the boiling point of each component in the mixture. When each component boils, it changes into a gas. Each gas is then collected in a separate container. When the gases cool, they turn back into liquid, but in the separate containers. This technique was used to create perfumes, vinegar, and alcohol, which was used as a disinfectant.⁶ Today, distillation is an essential step in the production of gasoline, plastic, and many medicines.

Hygiene: From the Mosque to the Home

For Muslims, hygiene is a religious matter. They must wash before they enter the mosque for prayers. It comes as no surprise that Arab chemists were busy finding the best way to wash.

⁵ *irrigation*: a system of providing water so that plants will grow

⁶ *disinfectant*: a chemical that destroys bacteria and that can prevent diseases from spreading

Why is this a job for a chemist? In the ancient world, people used oils to clean their bodies. However, because oil and water do not blend, this was not a very effective method. Oil can help remove the dirt, but water cannot rinse away the dirty oil. Arab chemists were the first to create a water-soluble⁷ compound, which was very effective for cleaning. Today, we call that compound soap. Chemists also created shampoo as well as

⁷ *water-soluble*: able to become liquid when mixed with water

cosmetics, mouthwash, and deodorant. In contrast, soap, and personal hygiene in general, did not become an accepted part of European culture until well into the 18th century.

There were hundreds of other discoveries and inventions that were influential in the fields of astronomy, engineering, mathematics, medicine, and optics, as well as architecture and music. It is thought that later, many western scholars, including Roger Bacon, Nicolaus Copernicus, Leonardo da Vinci, and Isaac Newton, all drew on the work of the scholars of the Golden Age of Islam.

Text Sources

The following sources were consulted when writing the readings for *Reading and Vocabulary Focus 3*.

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