

Mechanics: Clockwork, Watermills and Windmills

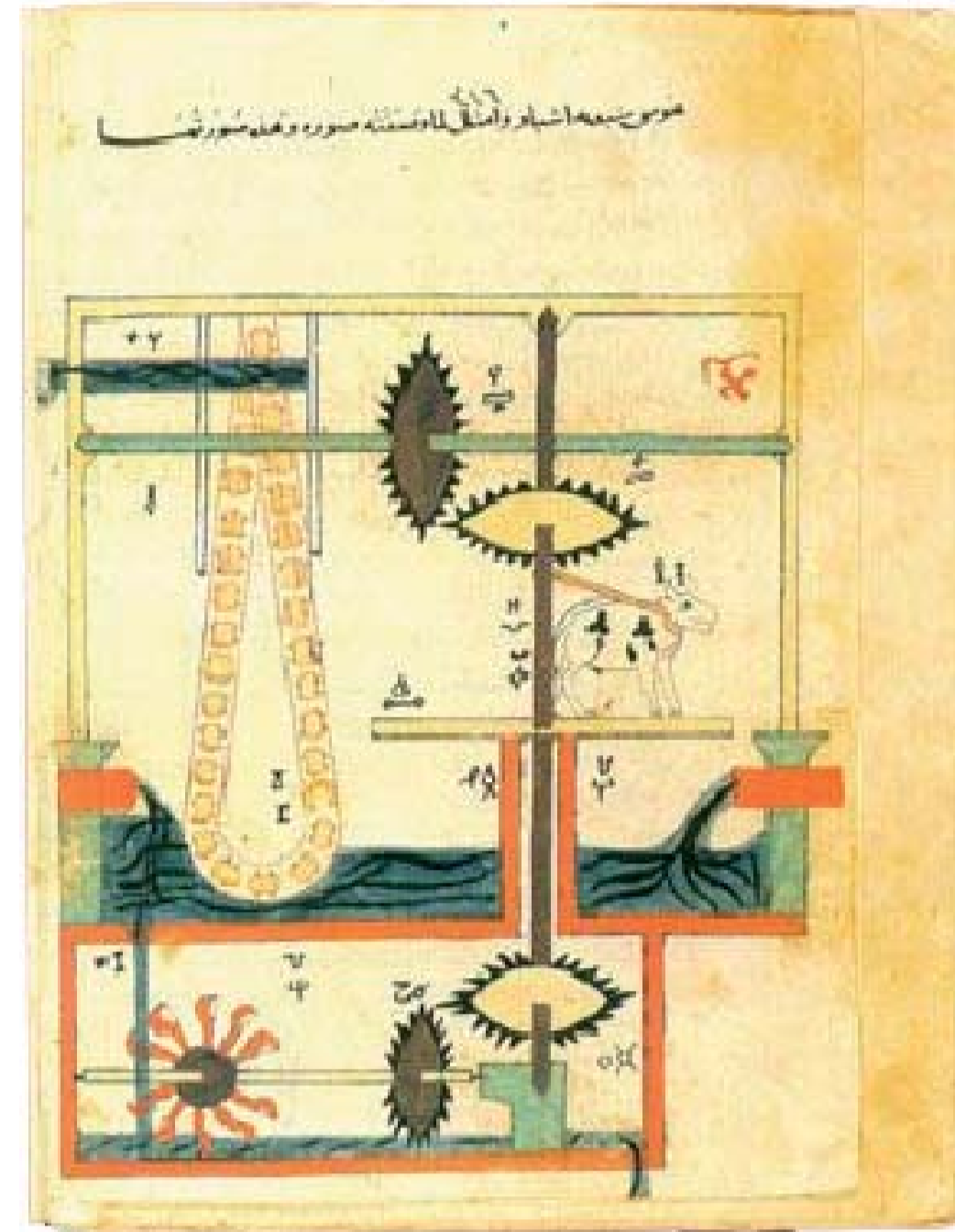
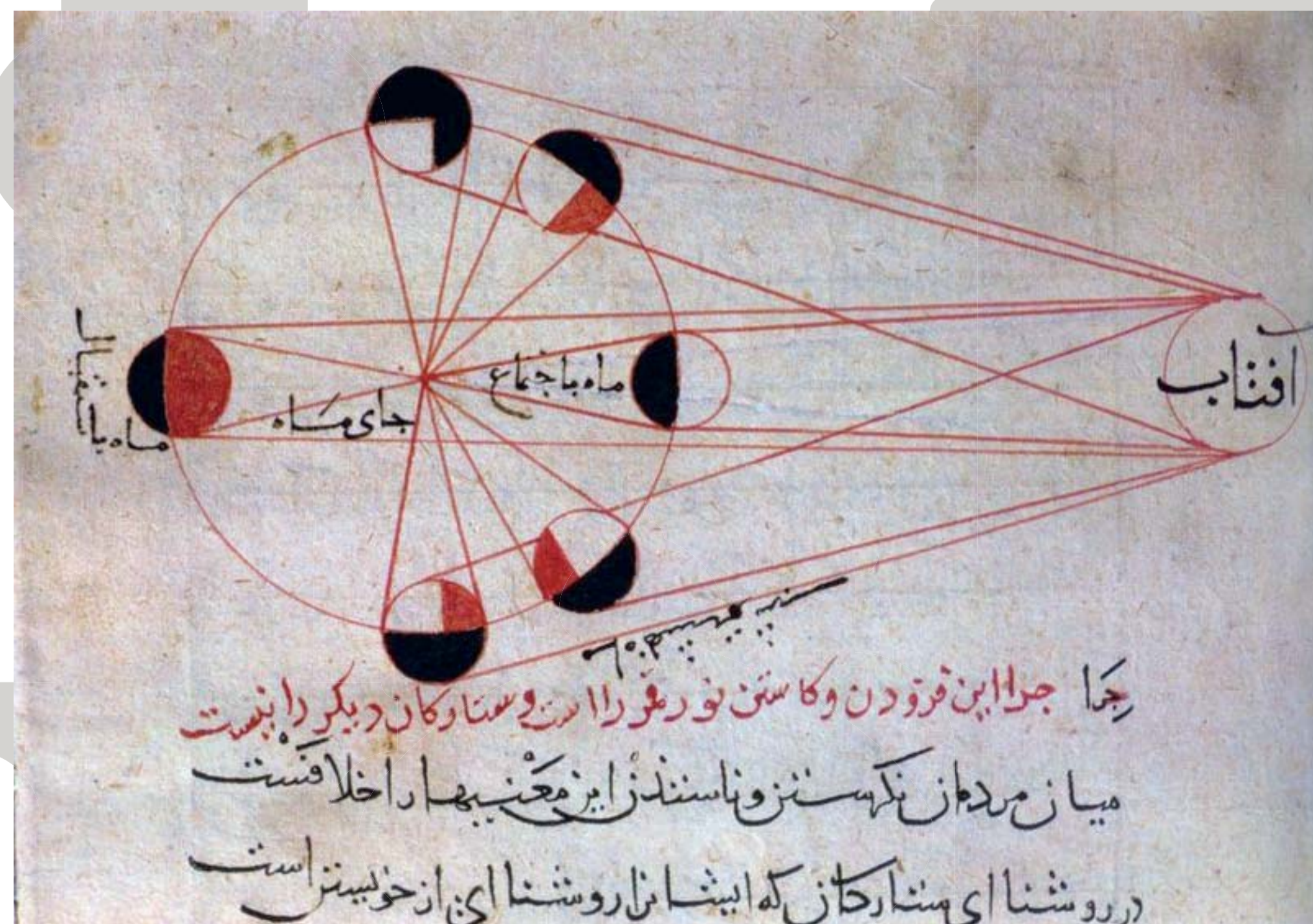


Diagram of a chain mill powered by water and oxen.

Because Muslims pray 5 times a day, keeping time is very important for them. Al-Jazari (1136-1206 CE), is one of the renowned Muslim inventors and responsible for dozens of inventions. The elephant-clock, water and windmills are some of these. Windmills already existed during the second Caliph, Hazrat Umar (r.a.). These were small unproductive inventions. Al-Jazari's inventions were larger, more complex and more solid. His ingenuity resulted in a small industrial revolution. Previously, everything was based on man and horsepower. The water and windmills helped with irrigation and food processing. Over a period of 500 years the Islamic Empire expanded through it's Ummah to the outside world: to China and India in the East and Netherlands and England in the West. Al-Jazari is also the inventor of the crank shaft, cylinders/pistons and different metallurgist and mechanical techniques. Each machine in the world has some parts thanks to Al-Jazari, the father of mechanics.

Astronomy

In view of the region (Mediterranean, Middle East, Persia and India) and the rich history of many civilizations in that area, Muslims were also pioneers in the field of astronomy. It was Muslims who closely studied optics and who invented the telescope. Thanks to the scientific foundations of the Muslims we have a better picture of what the entire universe looks like. There are 164 stars with Arabic names. That the moon moves around the earth and the earth around the Sun was already known in the 10th century CE. The circumference of the earth was calculated to be 40,253.4 km. The modern circumference calculation is 40,075.16 km. A marginal error of only 0.4%. Sun and moon eclipses could be calculated in advance and were no longer associated with superstition or religion. The name of our planet is also named after the Arabic word "ardun" which is derived from an ancient Egyptian word.



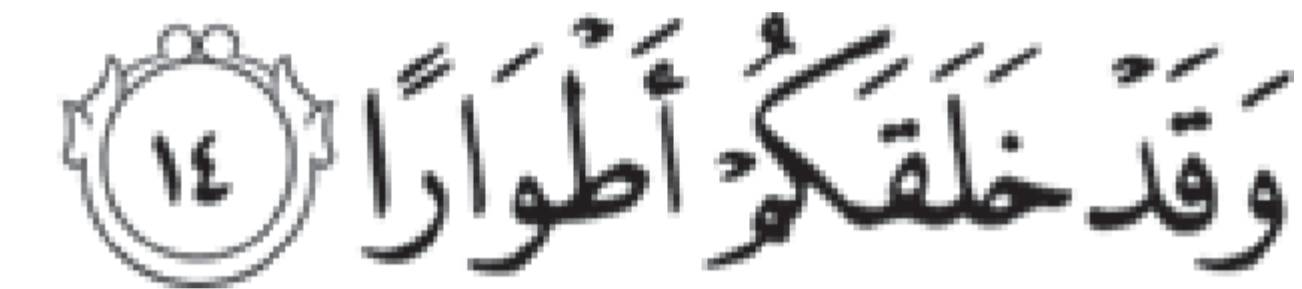
Lunar calculations by Al-Biruni(973-1043 CE)

Evolution and Biology

Modern biology concludes that all life on Earth has developed in increments (phases or steps) over long periods of time. This is the theory of evolution. One of the greatest discoveries of science. Al-Jahiz (781-868 CE) a nature enthusiast and biologist has described in detail that his observations indicate that humans and animals had developed in different phases based on natural changing conditions like the climate and environment. For instance cattle in the North(cold regions) were fatter and more hairy, and in the South thinner and almost hairless which was essential for their survival in the heat. A camel had water stored in its back because it lived in a dry area. Al-Jahiz also made a clear statement that humans could have evolved from ape species. Except for their appearance and physiology, he also made the link to certain human behaviors. He also described in detail the foodchain containing dozens of organisms which depend on each other, including plants. This is now called ecology and is an important knowledge area to protect biodiversity in the world.

Muslims of the 8th century and beyond were not surprised or shocked by this theory. It was literally written in the Quran, Surah Nuh, 71:14.

"Allah has created you in successive stages"



There are 31 verses in the Quran which describe or support evolution and other biological principles. The theory of evolution was taught until the 19th century CE at schools in the Ottoman Empire. 1000 years after Al-Jahiz, the European "scientist" Charles Darwin, stole or had taken his ideas and kept the scientific honor for himself.

Al-Jahiz also made a scientific study explaining the different ethnicities. He had attributed skin color to the same natural conditions that affect animals. "The closer you are to the sun and the more often you're in the sun the darker your skin will be. What you eat and drink, also effects your appearance and posterity ". He also made a link between the physical power of the Zanj people, a tribe and heredity of dark skinned people. Dark skin was a sign of certain superior characteristics such as resistance to the bright sun. Allah, as he stated, does not curse or bless people on the basis of their appearance. We are all equal in Allah's eyes. Because of his research, he was appointed as an Advisor to the Caliph. He himself was half Arab and half Abassid, a lifelong prankster and openly criticized the rich and powerful people of his time.



Book of Life. Al-Jahiz. Page about ostriches.

Vaccination

A method for humans and animals to protect against certain diseases by infecting them with a weaker variant of that disease. We all get vaccinations when we are babies. There are an estimated 2.5 billion more people in the world thanks to vaccinations. Western literature gives all the credit for vaccination to Edward Jenner, who got popular by finding a cure (in 1792 CE) against "smallpox". In 1724, 68 years before Jenner came with the invention, the English Ambassador's wife, Mrs. Montegue, already had her children vaccinated in Istanbul. Something that was standard for centuries in the Ottoman Empire. All schoolchildren received the vaccination. Mrs. Montegue was a big fan of vaccination and began a campaign to introduce it in Europe. Most English scholars ignored her because it came from a woman. Edward Jenner had also heard and read about this story. Furthermore he heard of this from the Royal Collage of Science in England. After successfully experimenting with the vaccines, he promoted this as his own unique invention. Unfortunately for him, Mrs. Montegue loved writing letters and the Ottomans carefully archived her letters which they used as proof of their claim. However, the Europeans and other Westerners have not yet fully accepted this as a fact. Vaccination is taught as an Islamic invention at the high schools and even elementary schools throughout the Islamic world.



Postage Stamp from 1967, Turkey. 250 years national vaccination campaign.