

The Forgotten History of Muslim Scientists

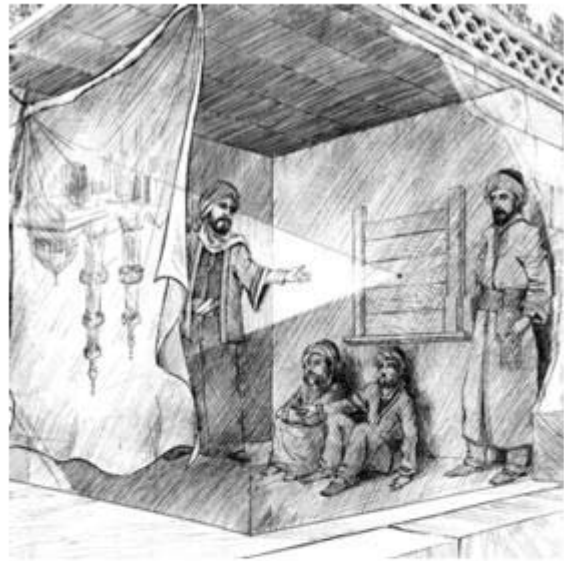
Without the flourishing of science in Muslim lands in the past, the modern world might not have algorithms or algebra

By David Biello | March 2, 2011 | 22

A millennium ago a physicist under house arrest rewrote the scientific understanding of [optics](#)—the study of the behavior and properties of light. In a book that has been compared in its revolutionary effect with Newton's *Principia* more than 700 years later, a Muslim scientist in Cairo—Abu Ali al-Hasan ibn al-Hasan ibn al-Haytham (or as he is known in the West, Alhazen)—proved that light traveled in straight lines via various experiments that employed mirrors and refraction. In a stroke, Alhazen pioneered the modern scientific method (hypothesis rejected or not rejected by experimentation) as well as experimental physics.

He also was the first to describe the camera obscura—a box with a hole in it that captures an image for the purpose of drawing it precisely, a precursor to the modern camera—as well as examining optical illusions in-depth and the thought processes behind human visual perception. His contributions also include the first explanation of dawn and twilight as effects of atmospheric refraction. All in an era when the Normans had yet to invade the Anglo-Saxon kingdom of England and Viking raiders burned the Greek and Roman scientific legacy in the transcribed books of Irish monks.

Alhazen is just one of a multitude of scientists working in the Muslim world in centuries past who made significant contributions to the advancement of science. In fact, the golden age of Muslim science lasted nearly a millennium, as depicted in a traveling exhibition, "1001 Inventions," now showing at the New York Hall of Science.



CAMERA OBSCURA: A Muslim physicist born in A.D. 965, Alhazen pioneered experimental physics, founded the modern scientific understanding of optics, and invented the camera obscura—a device for projecting images—as shown in this illustration.

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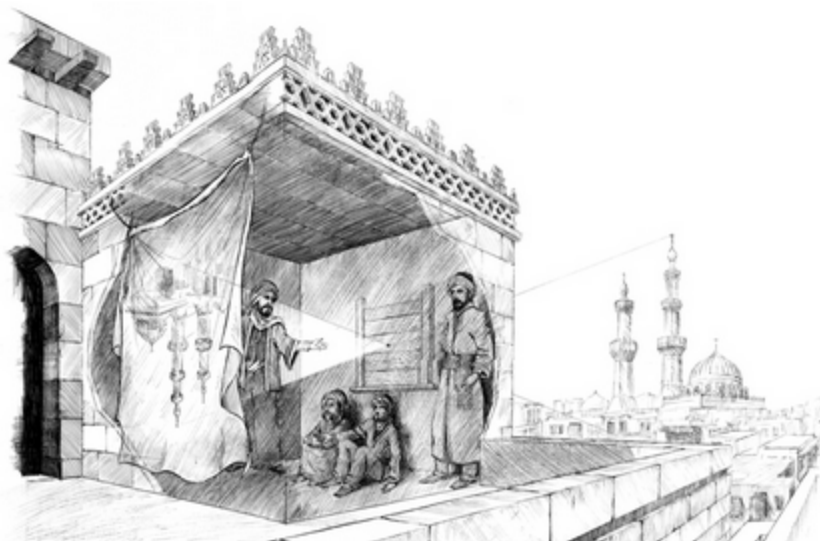


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Alhazen:

An Arab or Persian physicist born in A.D. 965 in what is now the port city of Basra in modern-day Iraq, Alhazen pioneered experimental physics and founded the modern scientific understanding of optics—the study of the behavior and properties of light. When he failed to regulate the floods of the River Nile in Egypt, he was placed under house arrest by his employer, the caliph, which allowed him to devote his life to scientific pursuits, such as his magisterial seven-volume *Book of Optics* that directly influenced Western scientists such as Johannes Kepler and Roger Bacon centuries later. The book also contained his description of the camera obscura—a device for projecting images—as shown in this illustration.



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[Image Link](#)

1001 Inventions Ltd., 2010

Abbas ibn-Firnas:

Born in the Al-Andalus region of medieval Muslim Spain in A.D. 810, ibn Firnas may have been the first inventor to attempt flight using a glider, as pictured here. The flight may be apocryphal, however, as its primary historical reference is from a court poem—although it appears in a wide variety of Arabic histories.

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Courtesy of The Yorck Project

Al-Jahiz:

An early proponent of evolutionary biology, Abu Uthman Amr ibn Bahr al-Kinani al-Fuqaimi al-Basri, wrote of food chains and environmental determinism in his seven-volume *Book of Animals* in the ninth century. This illustration from the book depicts an Arabian ostrich, which is now extinct. The grandson of an African slave, the Baghdad-based scientist nicknamed al-Jahiz also shared a fascination with the social organization of ants, like modern-day heirs such as E. O. Wilson.

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Al-Jazari:

An Iraqi genius—Abu al-Iz Ibn Ismail ibn al-Razaz al-Jazari, or al-Jazari—laid out construction plans in A.D. 1206 for some 50 mechanical devices, such as the "Elephant Clock" recreated here in this computer-rendered image. He was the first engineer to introduce the crankshaft, camshaft, locks with four bolts, and even segmental gears for communicating motion between pieces, much of which he employed in ingenious water-raising machines. He also used water to drive automata like moving peacocks, a serving girl who poured drinks and even a band in a boat in northern Mesopotamia.



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Fatima al-Fihri:

It wasn't just Muslim men. The oldest continuously operating university in the world—Al-Qarawiyyin founded in Fès, Morocco, in 859—was founded by a merchant's daughter: Fatima al-Fihri. The university, on the grounds of a grand mosque built by al-Fihri, subsequently produced a slew of leading Muslim thinkers.