MUSLIM MASTERMINDS

VOLUME 01

In this volume we discover the inventions and works of some of the Muslim world's greatest inventors and intellectuals:

- Ibn Haytham
- Ibn Nadim
- Al-Idrissi
- Ibn Khaldun
- Al-Jazari
- Al-Khwarizmi
- Al-Zahrawi
- Ibn Firnas

Ibn al-Haytham: Discoveries in optics and the first Camera

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Muslim Masterminds

Verily in the creation of the heavens and the earth
and the alternation of the night and the day
are signs
for those of understanding.

Those who remember Allah while standing or sitting or lying on their sides
and give thought to the creation of the heavens and the earth
[saying], "*Our Lord, You did not create this aimlessly; exalted are You;*
then protect us from the punishment of the Fire".

Aal-'Imraan (The Family of Imraan)
Ayaat 190 - 191

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ABU'L-FARAJ MUHAMMAD BIN IS'HĀQ AL-NADIM

SCHOLAR, BIBLIOGRAPHER AND AUTHOR OF THE KITĀB AL-FIHRIST

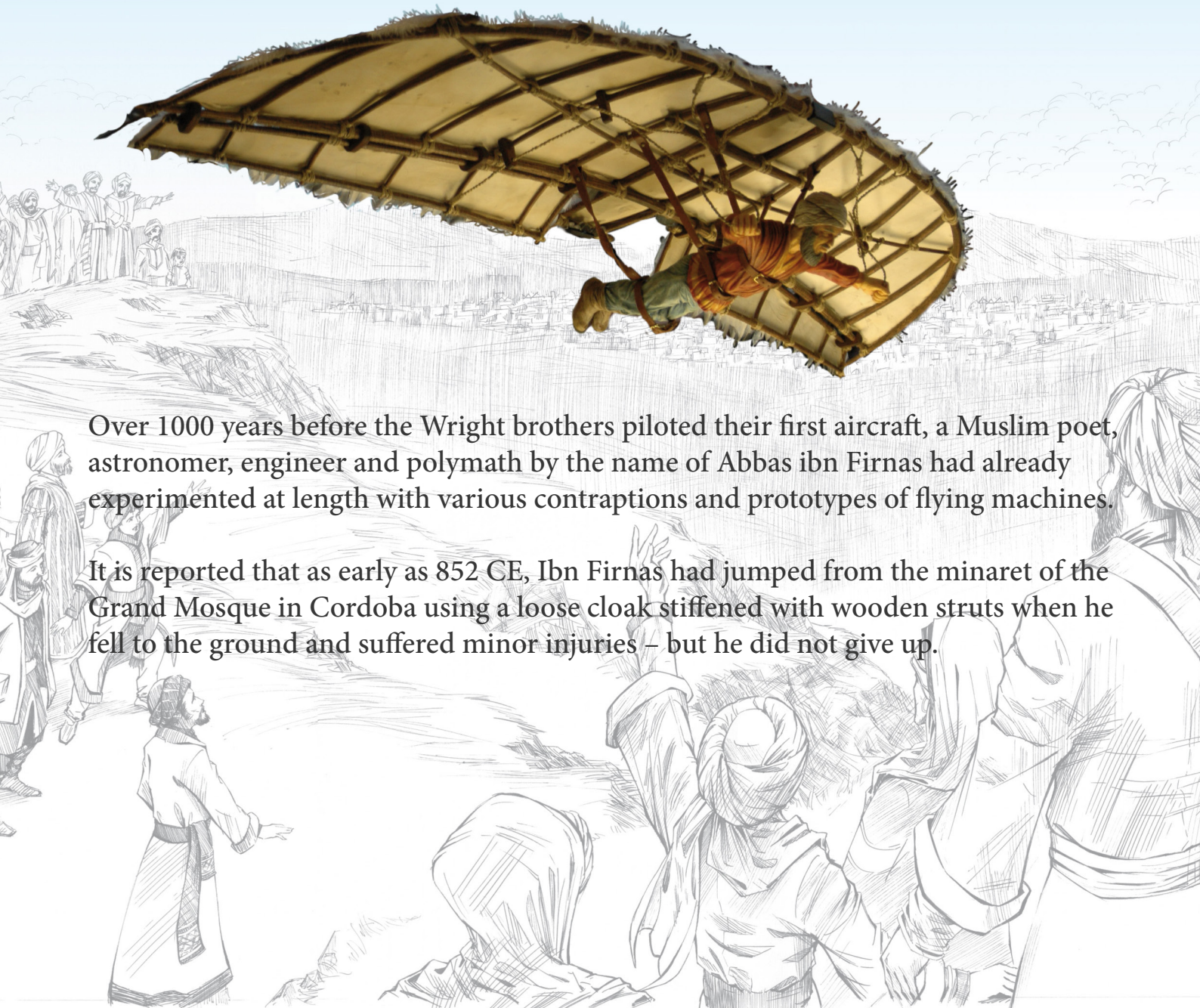
A bookseller and calligrapher by profession, Ibn Nadim compiled *Kitab al-Fihrist* which indexes all the books ever written and recorded in the Arabic language, in which he presents detail on each authors' genealogy, date of birth, time of death, country of residence, their merits and their faults –for all the books that had ever been written up to and including the year 377 A.H in the Islamic calendar.

Ibn Nadim's index catalogues books of varying subjects ranging from explantions of the Glorious Quran, the Hadith, grammar and philology, history, biography, genealogy, poetry, theology, law, Philosophy, legends, fables and even alchemy.

He also provides the reader with precise information on the number of pages and chapters in each book while also citing the names of famous calligraphers, bibliographers and libraries. Ibn Nadim's *Al-Fihrist* is a monumental catalogue of literary brilliance and is hailed as a classic work of genius.

ABBAS ABU AL-QASIM IBN FIRNAS

FLYING MACHINES AND AVIATION PIONEER



Over 1000 years before the Wright brothers piloted their first aircraft, a Muslim poet, astronomer, engineer and polymath by the name of Abbas ibn Firnas had already experimented at length with various contraptions and prototypes of flying machines.

It is reported that as early as 852 CE, Ibn Firnas had jumped from the minaret of the Grand Mosque in Cordoba using a loose cloak stiffened with wooden struts when he fell to the ground and suffered minor injuries – but he did not give up.

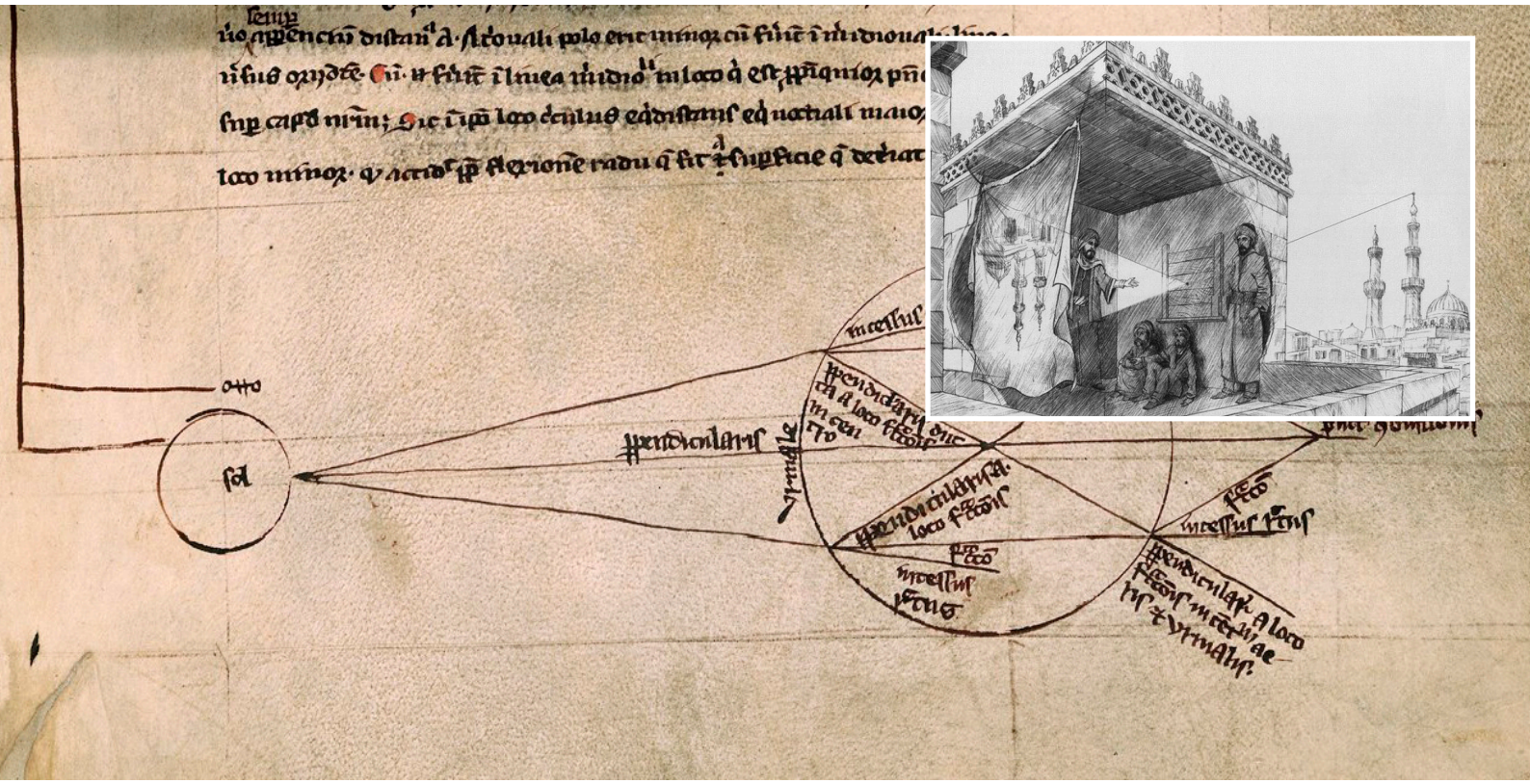
By the age of 70 years old, Ibn Firnas manufactured artificial wings from silk and eagles' feathers – which he used to jump off a mountain top. This time Ibn Firnas soared in the sky for ten minutes before touching the ground, he realised that his invention needed a tail wing to facilitate a smoother landing.

Today, Baghdad international airport and a moon crater are both named in honour of Abbas Ibn Firnas.

AL-HASAN IBN AL-HAYTHAM (ALHACEN)

FATHER OF OPTICS AND INVENTOR OF THE CAMERA OBSCURA

While the ancient Greek philosophers believed that the eyes emitted rays of light enabling man to see objects, this false belief was debunked by a 10th century Muslim mathematician, astronomer and physicist by the name of Al Hasan Ibn al Haitham – also known in the West as *Alhazen*. He became the first person to document the fact that light enters the eye, rather than leaving it.



Through his book of optics - *Kitab al-Manazir* - his ideas and discoveries influenced many European scholars including those of the *European Renaissance*. Today, many still consider him a pivotal figure in the history of optics and the *Father of modern optics*.

He invented the first pin-hole camera after noticing the way light came through his window. The word camera originates from the Arab word Qamara, referring to a dark solitary room. Alhazen is also credited with having revolutionised physics from being a discipline based purely on philosophical meditation to one that is today predicated on scientific proof and the empirical method.

MUHAMMAD AL-IDRISI AL-QURTUBI AL-SABTI

GEOGRAPHER, CARTOGRAPHER AND AUTHOR OF EARLY MAP OF THE WORLD

The Entertainment for he who longs to travel the world was an Arabic geographical book written in Sicily in the year 1154 by the Muslim scholar Muhammad al-Idrisi Qurtubi al-Hasani al-Sabti also known to the Western world as *Dreses*.

He was a geographer, cartographer and Egyptologist who lived in Sicily during the reign of King Roger II of Sicily. In the year 1139 Al-Idrisi took a globe depicting the world to the court of King Roger. Al-Idrisi's book contained seventy regional maps including his renowned circular world map.

500 years before that realisation dawned on Galileo, Muslim scholars took it for granted that the Earth was spherical, Ibn Hazm's famously noted;

"that the Sun is always vertical to a particular spot on Earth"

The work of Muslim astronomers were so accurate that by the 9th century they calculated the Earth's circumference to be less than 200km from what scientists declare it to be today.

WALĪ AL-DĪN ‘ABD AL-RAHMĀN IBN KHALDUN

HISTORIOGRAPHER AND FATHER OF SOCIOLOGY. AUTHOR OF AL-MUQADDIMAH

Abd al-Rahman ibn Khaldun, the 14th century social theorist from North Africa is considered a pioneer and forerunner in the social sciences, historical philosophy and early economic theory.

Ibn Khaldūn’s golden legacy *Al-Muqaddima* -(The Prelude) has influenced many scholars including 17th-century Ottoman historians who used his theories to analyse the growth and decline of the Ottoman Empire, while in 19th century Europe scholars acknowledged the significance of the his works and considered Ibn Khaldun as one of the greatest philosophers of the Middle Ages.

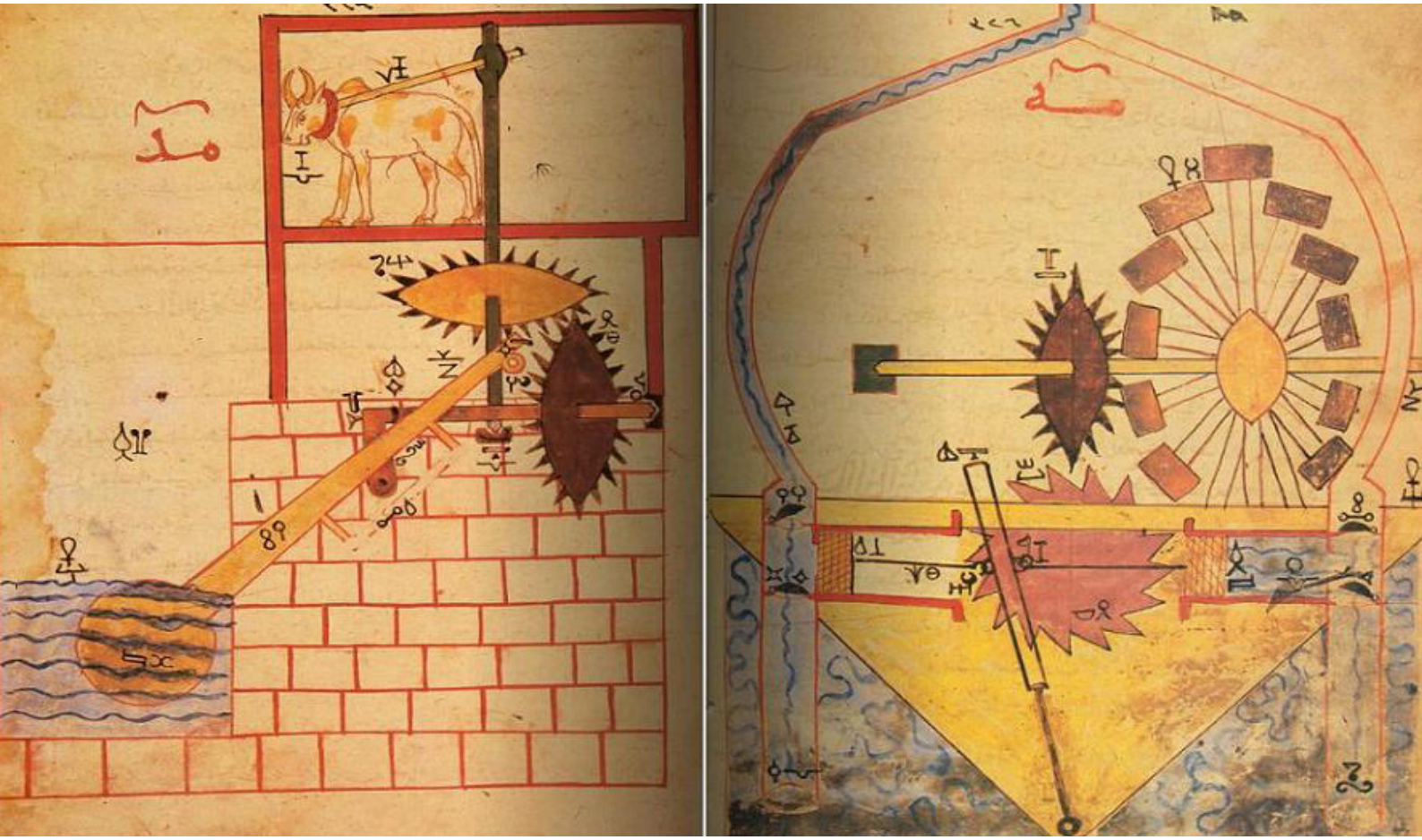
In the *Muqaddimah*, Ibn Khaldun declares a new science, *ilm al-Umran* – the science of social organization - in which he dissects the interdependence of the religious, political, economic, military, and cultural spheres of life thereafter demonstrating the need for effective management of social dynamics. His ideas later served the likes of Machiavelli, Vico, Comte, Durkheim, Spengler and Wirth to name but a few.

BADĪ'UZ-ZAMAN ABŪ L-'IZZ ISMĀ'ĪL AL JAZARI

POLYMATH, AND MECHANICAL ENGINEER. INVENTOR OF CRANK-CONNECTING ROD

Before Leonardo Da Vinci there was Badī'uz-Zaman Abū l-'Izz Ismā'īl ibn ar-Razāz al-Jazarī. The engineering genius who among his many famous inventions designed and built a programmable humanoid, but perhaps his most significant invention was the revolutionary crank-connecting rod.

By converting rotary motion to linear motion, the crank enables the lifting of heavy objects with relative ease. This powerful technology, pioneered by Al-Jazari in the 12th century was soon adopted globally, resulting in everything from the modern bicycle to the internal combustion engine.

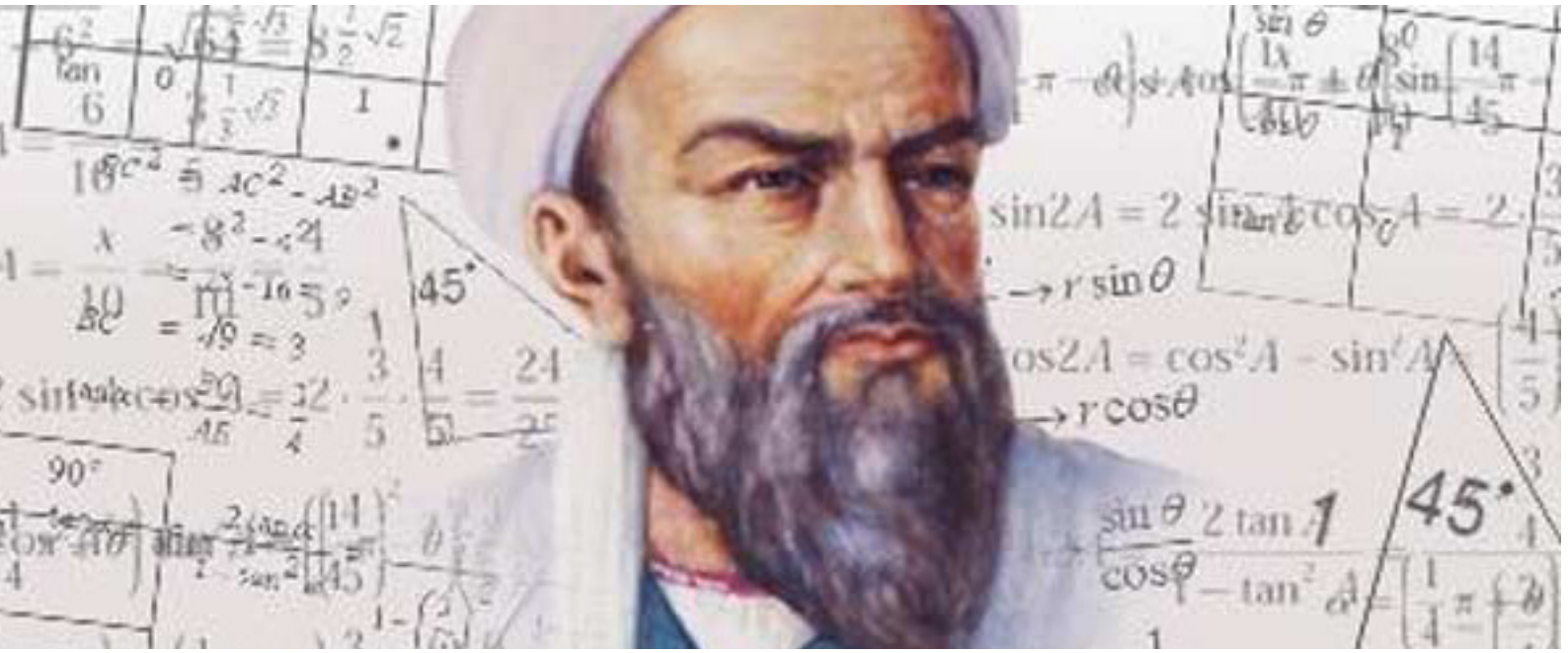


Notwithstanding his amazing inventions and literary achievements, Al-Jazari also developed the earliest water supply system powered by gears and hydropower. He was a polymath, a scholar, an inventor, a mechanical engineer, an artist and mathematician – best remembered for his *Book of Knowledge of Ingenious Mechanical Devices* in which he provides details of 100 mechanical devices.

MUHAMMAD IBN MUSA AL-KHWARIZMI

FOUNDER OF SEVERAL BRANCHES AND CONCEPTS IN MATHEMATICS

Muhammad ibn Mūsā al-Khwārizmī's *Al-Kitāb al-mukhtasar fīl hisāb al-jabr wal-muqābala* is a compendium on advanced calculations that serves as the foundation of modern Algebra. It was translated into Latin in the 12th century. Al-Khawarizmi's writings introduced Hindu-Arabic numerals and the concepts of algebra into European mathematics.




كتاب الخوارزمي

His compendium also contains sections on calculating areas and volumes of geometric figures and the use of algebra to solve inheritance problems according to proportions prescribed by Islamic law.

Al-Khwārizmī lived in Baghdad, where he worked at the *Dār al-Hikma* the famed House of Wisdom patronised by the Caliph al-Ma'mūn – where he revised and corrected Ptolemy's view of the world and produced one of the first maps of the known world in 830 CE.

He also worked on measuring the volume and circumference of the earth and contributed to work related to clocks, sundials and astrolabes.

ABŪ AL-QĀSIM KHALAF IBN AL-'ABBĀS AZ-ZAHRĀWĪ

MUSLIM PHYSICIAN AND SURGEON

Abu al-Qasim al-Zahrawi (Latinised *Albucasis*) is celebrated as one of the greatest surgeons in history. His outstanding contribution to medicine was his encyclopaedic work *Al-Tasrif li-man 'ajaza 'an al-ta'lif*, a long and detailed medical guide book that has been used as a standard manual in European universities for over five hundred years.

Al-Tasrif is a 1,500 page long illustrated encyclopaedia that was translated into Latin in the late 12th century, by Gerard of Cremona. The oldest medical manuscript written in England is dated around 1250 CE according to The British Medical Journal and it has startling similarities with Al-Zahrawi's book, which is comprised of 30 chapters resulting from his 50 years of medical practice and experience.

Many modern surgical instruments are of exactly the same design as those designed and illustrated by al-Zahrawi. His scalpels, bone saws, forceps, fine scissors for eye surgery and many of the 200 instruments he devised are still recognisable to a modern surgeon.

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