

the eye as a piece of machinery.” And had a camera obscura, a dark-room. Al-Biruni defined the nature of finite matter 700 years before Lavoisier. The encyclopedic physician Ibn Sina astoundingly determined that light “originates from the dissemination of particles from a light source,” concluding that the speed of light was finite.

We know that Al-Battani’s changing orbit calculations anticipated Kepler’s planetary motions; that Islamic astrolabes guiding by stellar position revolutionized navigation. That Omar Khayyam’s Persian calendar calculations still permit us today to compute to the second the end of the earth’s revolution around the sun each year.

In mathematics, the Islamic legacy is nothing short of momentous. Founders of arithmetic, trigonometry, even the beginnings of the non-Euclidian geometry which Einstein used for the Theory of Relativity. Where would the world be without Al-Uqlidisi’s & Abul Hasan’s decimal point? What would the world be without Al-Jabr Wal Mukabala, the textbook creation of algebra by al-Khwarizmi? The most accomplished mathematician of the Middle Ages, whom the West called Algorismus, is not a household name, though his invention is, especially when homework time rolls around.

Islam’s followers gave the world the first road maps, atlases (Ibn Khirdazbah), almanacs (al-manaq), encyclopedias. The Moroccan Ibn Battuta (1304-1374), who claimed never to have travelled the same road twice, outdistanced & outdescribed Marco Polo by leaps & bounds. The Amir-al-Bahr (Chief of the Waters: Admiral) of the Ocean Sea, Columbus himself, confessed learning from Ibn Rushd (Averroes) to believe Rushd’s “New World beyond the Sea of Darkness.” Vasco de Gama’s pilot to India was the Arab Ahmad Ibn Majid, “the Lion of the Sea in Fury.” It is ironic that this navigator who wrote the 1490 Nautical Directory (Kitab al-Fawaid) of the Red Sea & the Indian Ocean guided the ships that would lead to the demise of Arab control over those shores. “The inventors of the globe, the encyclopedia, the almanac are indisputably & solely the founders of modern geography.

Muslims were the originators of toxicology, cardiology, parasitology, dermatology, trauma or emergency medicine (Egyptian Ibn Al-Quff, 13th century). Also embryology, ophthalmology, orthopedics, obstetrics (and emergency caesarean sections), urology, public health, preventive medicine, medical ethics. They

single-handedly jump-started surgery and anesthesiology. Abul Qasim as-Zahrawi of Spain ligated blood vessels 5 centuries before Ambroise Pare. Muslim surgeons perfected narcosaturated sponges. Al-Nafis of Egypt described blood circulation 400 years before Harvey.

The next time anyone mentions Leonardo da Vinci & the first flying machine, you can cite Ibn Firnas, the master tinkerer: his flying device dates from the 800s.

Sociology was a revolutionary & original Muslim field, and ever more pertinent to the modern world and all our futures. It is known that Ibn Khaldun, Tamerlane’s North African “consultant on the Muslim World,” provided a “classic statement of a destiny unfolding not only in time but in space.” Ibn Khaldun “proved to be the Herodotus & the Thucydides of Muslim historiography.”

There are those who believe that science is like a wind of thought that blows through the human collectivity in simultaneous waves, and that the determination of intellectual primacy is futile, or irrelevant. But this is not the issue. At issue are the forgotten Muslim scientists who must be forgotten no longer, in the interest of truth and history. The rise of Muslim science was indeed “a miracle, indubitably,” as George Sarton has said. Without Islamic science, the intellectual fate of the world might have remained a barely unsealed cipher. Cipher. Sifr, empty; passing into Italian as “Zephyro”; passing into a scribe’s shorthand as “Zero.” Zero, born Sifr, concept and non-number invented by Muslim geniuses. Geniuses whose ideas flourished because of the Quran. And to the Prophet’s (peace) words: “**Knowledge is beneficial to its seeker in this world and in the Hereafter as well.**”

The achievements of these luminaries have faded into oblivion due to our indifference & apathy. There is an urgent need to reclaim these achievements and, as their heirs, it is our duty to hold aloft the torch of knowledge lighted by these illustrious personalities. We must, therefore, bring their works into the limelight once again. Let’s not forget two of the world’s oldest existing universities, Al-Zaytunah in Tunis & Al-Azhar in Cairo go back more than 1,000 years. Before any European uni.

Sifr. Definitely not the word to define Islamic science. Or Islamic civilization.

In Islam, nature is not seen as something separate but as an integral part of a holistic outlook on God, humanity, the world & the cosmos. These links imply a sacred aspect to Muslims' pursuit of scientific knowledge, as nature itself is viewed in the Quran as a compilation of signs pointing to the Divine

Incredible SCIENTISTS

CORDOBA, CAIRO & BAGHDAD
WERE CONSIDERED

“THE INTELLECTUAL CENTRES OF THE WORLD”

**Millions upon millions
around the world
speak Arabic every day
without realizing it,
in words used without pausing.
Without Islamic Science,
there may have been
a **delayed**
industrial revolution...**

The physicist Abdus Salam believed there is no contradiction between Islam & the discoveries that science allows humanity to make about nature & the universe; and that the Quran & the Islamic spirit of study & rational reflection was the source of extraordinary civilizational development. He highlights, in particular, the work of Ibn al-Haytham & Al-Biruni as the pioneers of empiricism who introduced the experimental approach, breaking way from Aristotle's influence, and thus giving birth to modern science. If you want the truth about Islamic civilization, turn off the TV, put the phone aside, and **read** this.: Muslims gave the world **dazzling enlightenment...** And in this contemporary world Muslims by the millions are contributing to the advancement of civilization.

SCIENTIFIC OBSERVATION, EXPERIMENTAL KNOWLEDGE & RATIONALITY ARE THE PRIMARY TOOLS WITH WHICH HUMANITY CAN ACHIEVE THE GOALS LAID OUT FOR IT IN THE QURAN

There was once a civilization that was the greatest in the world. It was able to create a continental super-state that stretched from ocean to ocean, and from northern climes to tropics and deserts. Within its dominion lived hundreds of millions of people, of different creeds and ethnic origins. And this civilization was driven more than anything, by invention. When other nations were afraid of ideas, this civilization thrived on them, and kept them alive. Its architects designed buildings that defied gravity. Its mathematicians created the algebra and algorithms that would enable the building of computers, and the creation of encryption. Its doctors examined the human body, and found new cures for disease. Its astronomers looked into the heavens, named the stars, and paved the way for space travel and exploration.

Look up at the sky tonight. See Altair, (from the Arabic *altair*, the bird), star of the first magnitude in the constellation of Aquila. Or Aldebaran, the orange one, in Taurus (al dabaran: follower (of the Pleiades); naranj: orange). And Betelgeuse, the red giant (bait al jauza: shoulder of the giant (Orion). No ghouls to fear (al ghul: those who seize, vanish) in Algol (same origin), the first known eclipsing binary star, in the constellation of Perseus. Millions upon millions around the world speak Arabic every day without realizing it, in words used without pausing.

If you reached for your eyeglasses to contemplate the starry night, you may also thank two Islamic scientists: Ibn Firnas, who invented them in 9th century Spain, where they were manufactured & marketed from then on & Ibn al-Haytham (Alhazen), the 11th century originator of the science of optics. An entire civilization, the West, is taught that the English scientist Roger Bacon (d. 1292 CE) is owed this credit. The history books, the science books do not say that Ibn Firnas' invention of the magnifying glass stimulated the work of Kepler & Galileo; that al-Haytham's treatise on

optics preceded Newton's by 600 years in the exact study of lenses, prisms & light. That refraction, and the famous 17th century Newtonian experiment which proved that white light consisted of the commingling colour bands of the spectrum, had been demonstrated by Kamal ad-Din, in the 14th century. The eminent Danial J. Boorstin, in "The Discoverers," grants at best that "Arab scientists were in the mainstream of optical science." In the book "The Miracle of Islamic Science," Dr. K. Ajram sets out to set the record straight. He gives 45 entries of What is Taught/What Should be Taught." And these are not esoteric, scholarly, dusty & dry items. They constitute the utterly basic ingredients that have shaped our modern life.

A few more examples (they are irresistible): Looking at yourself in the mirror? No, it is not from Venice in 1291, as is held, but Syria 9th-10th centuries. Consulting the town clock, jogging with your chronometer? Ibn Firnas, again, for the chronometer, and Muslim mechanical engineers, whose weight-driven clocks ushered in modern time, not the 1335 Milan clocktower. And the pendulum too was not Galileo's brainstorm but the Egyptian Ibn Yunus al-Masri's. The stern rudder, the compass, Islamic mechanical wizards and experimenters gave them to us. The Chinese found the magnetic needle. It was Muslims who applied it, who "invented" its practical use in navigation.

Substances & Devices: These were introduced by Muslims to the West. Guitars and cotton (*qutn*), street lamps and pianos, tongue depressors and artificial teeth, paper money and postage stamps, soap, plaster casts, gauze (*kazz*) dressings. Moveable type (Gutenberg notwithstanding, Islamic Spain had brass type 100 years before his). Paper: The first industrial paper-mill operated in Baghdad in the early 8th century. Paper was used in Makkah in 707 CE. It appeared in England in 1309. You are beginning to get the picture. It's being painted squarely, fairly, in non-polemic terms. Without Islamic science, there may have been a delayed industrial revolution, another astrophysical picture. No trips to the moon and beyond. A different world.

Muslim scientists were the real founders of science. They were not only brilliant theoreticians, they were the first historians & philosophers & methodologists of science, the first experimenters. We have been given a history of the world **clouded by misinformation**.

Let's examine the rise of science in Islam and

Islam's role in rising science. The Chief Chemist is the One Who is Creator of the elements. The most Insightful Astronomer is the One Who created the laws of celestial motion & matter. The most learned Biologist is the One Who built the human biological system, the structure and function of which intrigues the mind of the philosopher and earns the admiration of the physiologist. The early Muslim scientists had the Quran as the fountain head of their inspiration & their secondary spring of knowledge was the Prophet of God. Two potent fountain heads. Two powerful stimuli.

When the first millennium dawned, the Persian genius Al-Biruni and his prodigious contributions: 400 years before Leonardo da Vinci. He is called the Leonardo of Islam by Harvard historian George Sarton. But it would be more correct to say that Leonardo was the Al-Biruni of Christianity. Abu al-Rayhan Muhammad ibn Ahmad al-Biruni created the scientific method backed by the rigour of experimentation, a physicist and an astronomer who identified gravity, motion and momentum, a botanist and a geologist who, knowing the aquatic origin of the earth from the Quran, postulated the primordial sea that once covered the Indus Valley system; a mathematician who computed the earth's solar orbit. Al-Biruni seems to have combined the genius of da Vinci, Galileo, Newton and Copernicus together.

Modern chemistry begins with Boyle & Lavoisier in the 17th/18th centuries, we are commonly told. **Not so**. Al-Kimiya for Islamic scholars was not alchemy, the cult of transmutation. In the Islamic era, al-Kimiya was precisely what it is today: the study of chemicals. The discipline is still saturated with Arabic terms from the instruments of research to the substances & chemical processes themselves. Al-Jabr (9th century) is considered the father of chemistry. The al-kili alkali acid base principle identified by Muslim scholars is the direct forerunner of the crucial pH scale. Sulfuric acid, often called the single most important industrial chemical in use today was first described in 1200 CE in Arabic writings. Muslim chemists discovered & isolated 20 of the basic elements of the Element Table.

In the darkest of occidental dark ages, Ibn al-Haytham dissected vision and seeing, "recognized the persistence of images on the retina" and "began treating

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& IN THE HEREAFTER AS WELL
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