Islamic Science Achievements during the Renaissance Period

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Abstract

In the era of the Golden Age Muslim scholars, artists, engineers, poets, philosophers and merchants contributed to the science, economics, literature, philosophy, marine, agriculture by means of both preserving the traditions of the past and using their own inventions. During the reign of the Umayyad and later Abbasid the scholars enjoyed great support from the rulers. The practical importance of medicine, military technology, mathematics helped developing the Arab Caliphate. The universal language of science was Arabic. Scientists from different countries from Cordoba to Baghdad and Samarkand were able to communicate using the same language. In the 9th century the rulers of Baghdad held meetings regularly (intellectual Majlises), during which the theologians, philosophers and astronomers gathered to discuss their ideas.

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Another author, George Saliba writes in his book 'Islamic science and the aging of the European Renaissance' (2011) about the fact that it was the Muslim civilization and its force that kept ancient knowledge for Europe, gave its own scientific and spiritual heritage and pushed to the Renaissance. His research has led to such a deep interest in Europe, that the author was invited to a series of lectures on the subject to numerous universities and research centers. Islamic scientists made outstanding achievements based on the works and treatises of the Ancient Greek and Roman heritage.

Islamic Constructor's Abbas Ibn Firnas Contribution to the Aviation

Abbas Ibn Firnas (810-887), Berber, was born in Spain. Like most other Islamic sages, he did not limit himself to one branch of knowledge. Abbas first studied mathematics and music (it was considered a branch of mathematics), designed the metronome for the musical needs, manufactured glass from sand (after that Spain ceased to buy glass in Egypt and began producing it), and also astonished people with the mechanical room of 'virtual reality', where the stars were shining on the ceiling, clouds sailing, thunder and lightning flashed.

However, he entered the history of the world with other achievements. In the year 852, Ibn Firnas pulled the cloth on a wooden frame and safely jumped from the minaret in Cordoba, received only minor injuries. By that time the city was called 'the ornament of the world', half a million people lived there, most of whom were literate (70 libraries serviced the population). Residents were particularly not impressed with this focus, so the scientist sat down to draft full of wings. It took him long years to create wings. At the age of 65 he made a suicidal show, he climbed the mountain near Cordoba, strapped himself to the airframe that

he had developed and jumped down. A crowd of thousands was watching him. To the surprise of those present, ‘artificial wings’ picked up an elderly scholar and carried him with decent speed. The flight was a success, but the landing was not thought through by Ibn Firnas. He climbed and tried to go back to the starting point, but his glider had no inhibitory mechanisms, so the inventor met the ground at a full speed and injured his back.

Abbas Ibn Firnas is the renowned naturalist, humanist, scientist and chemist. He drew the attention with his poetic talent and thanks to it he managed to enter the court of Abderrahman II (822-852). Due to his inventions he was able to appear at the court of Muhammad I (852-886), successor of Abderrahmane. He invented a water clock called Al-Magath Magath. He was the first to make glass from sand (before this secret known only to the Egyptians), developed the astrolabe, and built a planetarium, the first in the Iberian Peninsula. However, first of all, Abbas got famous for having invented the simplest parachute. He attached a piece of cloth to the wooden frame, and he jumped from the minaret of Cordoba with this device. When landing he received only minor damage. And Abbas Ibn Firnas did not stop there. He continued to develop artificial wings. His new flight took place from the mountains of Cordoba in the year 875 and lasted for a longer time and air flows picked up the scientist and carried him forward. That's only the touchdown was less than successful that time, the aged Abbas Ibn Firnas injured his back. Abbas Ibn Firnas died 12 years later in Cordoba in 887.

The scientist’s hometown Ronda has an astronomical center named after him, and in Cordoba, where famous flights were made, a bridge over the river Gvadalakir (río Guadalquivir) was designed, with a statue of the scientist in its center. The author of the project is Jose Luis Manzanares Hapon. Abbas Ibn Firnas is honored not only in his homeland: the airport in the north of Baghdad is named after him, and on the road to Baghdad

International Airport there is a statue of Abbas Ibn Firnas. In Libya a stamp with the image of the scientist was released, and the moon crater was named after him. Ibn Firnas feat was only repeated half a century later in England, and gave similar results. Monk Eilmer jumped off the roof of the abbey balancing on the artificial wings for over 200 meters and broke his leg at landing.

The first controlled flight with a safe landing also made Muslims. In the 1630s the inventor Ahmet Celebi Hezafren jumped from the Galata Tower in Istanbul (61 meters high) on leather wings and flew across the Bosphorus, actually having carried out the world's first flight from Europe to Asia. Impressed Sultan Murad IV awarded Ahmet with the golden embroidered robe and then banished him to a distant province, probably fearing he would start flying everywhere.

Islamic Achievements in Medicine during the Golden Age

The highest achievements of Muslim scholars can be also noted in medicine. It was the Arab Caliphate that built Hospitals for first time, the first medical institutes appeared. For many centuries Muslim doctors have been at the forefront of scientific research in the field of ophthalmology. The first hospital in the Caliphate was established in 707 during the reign of the Umayyad caliph al-Walid ibn Abdul-Malik. The famous scientist Ibn Sina (980-1037), known in the West as Avicenna, is credited for the discovery of infectious diseases, anesthesia, communication of psychological and physical states, and many other areas of medicine. His book, ‘The Canon of Medicine’, was used as a textbook in the best medical institutions of Europe from the 12th to the 17th century.

The ‘Canon of Medicine’ is an extensive work consisting of 5 books. The book first describes the theoretical medicine. This is sort of a textbook on anatomy and physiology with

propedeutics of internal diseases. The second book describes simple drug substances, presents the teachings of Ibn Sina on drugs, their nature and their trial. It describes 785 simple vegetable, animal, mineral drugs with their action, the methods of application, rules for their picking, mixing and storage. 165 from the mentioned in the book 396 plants are used in the modern medicine. The third book is the most extensive; it is devoted to pathology and therapy, description of individual diseases and their treatment. The 4th book consists of 7 parts and is dedicated to surgery, treatment of fractures and dislocations, the general doctrine of fever (the crisis in diseases). It talks about tumors, purulent inflammation of the subcutaneous tissue, as well as infectious diseases. The main issues of the doctrine on poisons are also highlighted. Book 5th contains the description of 'complex' drugs and poisons and antidotes. The fifth book is in fact a comprehensive pharmacopoeia for its time. It describes in detail the preparation of complex drugs and their application.

The causes of diseases in the 'Canon of Medicine' by Ibn Sina bind to endogenous and exogenous factors. He clearly defines a relationship between the inhaled air and the spread of infectious diseases. According to his writings, 'the pox and measles are among the carryover diseases and are more frequent after southerly winds, when they often blow'. Thus, more than eight centuries before the discovery of Antonie van Leeuwenhoek, the author of the microscope and the first discoverer of invisible to the naked eye 'beautiful animals', i.e., microorganisms, Ibn Sina suggested the possibility of the existence of the hidden reasons for human diseases. 'The Canon ...' contains a sufficiently detailed description of the clinical picture of meningitis, pleurisy, pneumonia, peritonitis, gout, ulcers, malaria, cholera, smallpox, measles, rabies, schizophrenia, kidney stones and gallstones, helminthiasis, discusses the various fevers, treatment wounds and abscesses, skin care and hair care, and much more. Description of the physical properties and macroscopic characteristics of sputum,

saliva, sweat, urine and feces contained Ibn Sina, can be called, in fact, the first and original laboratory research.

Ibn Sina gives much attention to physical exercise, heavy and light, recommends not limiting to one kind of sport, but engage into several ones and different in nature, according to the state of physical health. In the ‘Canon of Medicine’ Ibn Sina describes 6 degrees of health and disease (modern scientists introduced the concept of ‘amount of health’). Rather often the pages of ‘Canon ...’ (almost every three pages) mention ‘medicinal food’ and ‘nutritional medicine’. Obviously, this is due to the fact the traditional medicine in the South-East Asia has very little toxic drugs, and among them there are many plants used for food. From the Chinese medicine Ibn Sina borrowed the concept of ‘quality’ food or medicine (in Chinese medicine they are called ‘four properties’ or ‘four Qi’). They are taken into account in the treatment of diseases and are determined based on the mouthfeel and sensations in the body. Regularity and consistency as the great virtues of ‘Canon of Medicine’ were noted even by those who had been inclined to underestimate the importance of Ibn Sina in the history of medicine. The success of ‘Canon ...’ was caused by the clarity, persuasiveness, simple description of the clinical picture of the disease, the accuracy of therapeutic and dietary requirements. These features quickly brought enormous popularity to the book, and provided its author with the ‘autocratic power for five centuries throughout the medical world of the Middle Ages’.

Conclusions

Muslim scholars have maintained and strengthened the knowledge of ancient Greece, laid the foundations of modern science, medicine, astronomy and navigation, inspired other countries and nations to their cultural achievements. This duty to the Muslim world will hardly ever be possible to completely compensate. Like in many areas of science, technology

and art, a list of individuals who dedicated themselves to geographical science is enormous. Most of them went on a journey around the world in order to gather first-hand information to quench their thirst for knowledge and practical experience, to sate the curiosity and leave the information behind that would help other people. Today we are able to explore the world through magazines and satellite TV channels. Modern people acquire knowledge and skills through the 'professionals', without leaving their chair that does not look like for those who lived in the past millennium, driven by curiosity and a belief in the possibility to give meaning to the world around them.

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