Great Muslim Scientists and their Contributions to the fields of Science

AL-RAZI (RHAZES)
(864-930 C.E.)

Abu Bakr Muhammad Ibn Zakariya al-Razi (864-930 C.E.) was born at Ray, Iran. Initially he was interested in music but later on he learnt Medicine, Mathematics, Astronomy, Chemistry and Philosophy. In medicine his contribution was so significant that it can only be compared to that of Ibn Sina. Some of his works in Medicine e.g. Kitab al-Mansoori, Al-Hawi, Kitab al-Mulooki, and Kitab al-Judari everlasting fame. Kitab al-Mansoori which was translated into Latin in the 15th century, comprised ten volumes and dealt exhaustively with Greco-Arab medicine. He became the first to draw clear comparison between smallpox and chicken-pox. Al-Hawi was the largest medical encyclopedia composed by then. He greatly favored cure through correct and regulated food and psychological treatment. He was also an expert surgeon and was the first to use opium for anesthesia.

He compounded medicines and designed several instruments used in chemical investigations. One of his books called Kitab al-Asrar deals with the preparation of chemical materials and their utilization. He paved way for organic and inorganic Chemistry. He was the first to produce sulphuric acid and prepared alcohol by fermenting sweet products. His contribution as a philosopher is also well known.

He has more than 200 outstanding scientific contributions to his credit, out of which about half deal with Medicine and 21 concern alchemy.

ABU'L WALEED MUHAMMAD IBN RUSHD (AVERROES)
(1128-1198 C.E.)

Abu'l Waleed Muhammad Ibn Rushd, known as Averroes in the West, was born in 1128 C.E. in Cordova.

Ibn Rushd made remarkable contributions in Philosophy, Logic, Medicine, and Jurisprudence. In Medicine his well-known book Kitab al-Kulyat fi al-Tibb was written before 1162 C.E. Its Latin translation was known as 'Colliget'. In it, Ibn Rushd had thrown light on various aspects of Medicine including the diagnoses, cure and prevention of diseases. In Philosophy Tuhafut al-Tuhafut was written in response to Ghazali's work. In Astronomy he wrote a treatise on the motion of the sphere, Kitab fi-Harakat al-Falak.

Ibn Rushd's writings spread over 20,000 pages, the most famous of which deal with Philosophy, Medicine and Jurisprudence. On Medicine alone he wrote 20 books. Regarding Jurisprudence, his book Hidayat-al-Mujtahid wa-Nihayat-al-Muqtasid has been held by Ibn Jafar Thahabi as possibly the best book on the Maliki School of Fiqah. Ibn Rushd's writings were translated into various languages. Aristotle was recognized in Europe because of Ibn Rushd's deliberations on his work.

ABU ALI HASAN IBN AL-HAITHAM (ALHAZEN)
(965-1040 C.E.)

The father of modern optics, Abu Ali Hasan Ibn al-Haitham was one of the most eminent physicists, whose contributions to optics and the scientific methods are outstanding. His scientific pursuits, included Optics, Mathematics, Physics, Medicine and development of scientific methods on each of which he has several outstanding books.

He discovered the laws of refraction and carried out the first experiments on the dispersion of light into its constituent colors. His book Kitab al-Manazir was translated into Latin in the middle Ages. In this work, he rejected the popular idea that eyes give out light rays. Instead, he correctly deduced that eyes work when light rays enter the eye from outside.

He dealt at length with the theory of various physical phenomenon's like shadows, eclipses, and the rainbow and speculated on the physical nature of light. He is the first to describe accurately the various parts of the eye and give the scientific explanation of the process of vision. He also attempted to explain binocular vision and gave the correct explanation of apparent increase in the size of sun and moon when near the horizon.

He is known for the earliest use of camera obscura. His research on catoptrics centered on spherical and parabolic mirrors and spherical aberration. He made the important observation that the ratio between the angle of incidence and refraction does not remain constant and investigated the magnifying power of a lens.

In his book Mizan al-Hikmah, Ibn al-Haitham has discussed the density of the atmosphere and studied atmospheric refraction. He discovered the twilight only ceases and begins when the sun is 19° below the horizon. In Mathematics, he developed analytical geometry by establishing linkage between algebra and geometry. The list of his books runs to 200 or so.

ABU RAIHAN AL-BIRUNI
(973-1048 C.E.)

Al-Biruni was a versatile scholar and scientist who had equal facility in Physics, Metaphysics, Mathematics, Geography, Sociology, Astrology, Archeology and History.

His well known book Kitab al-Hind gives a graphic account of the historical and social conditions of the sub-continent. His famous book Qanoon-i Masoodi discusses several theories of Astronomy, Trigonometry, solar, lunar and planetary motions and relative topics. In al-Athar al-Baqia, he has attempted a connected account of ancient history of nations and the related geographical knowledge, discussed the rotation of the earth and has given correct values of longitudes and latitudes of various places. His Kitab al-Saidana, combines the Arabic and Indian knowledge on Medicine. Kitab al-Jawahar deals with the properties of various stones. The formula attributed to Newton was actually discovered by him seven centuries before. He developed a new mathematical formula to add geometrical progressions.

He was the first to take experiments related to astronomical phenomenon. He ascertained that as compared with the speed of sound, the speed of light is immense. He was authentic astrologer.

IBN CINA (AVECENNA)
(980-1037 C.E.)

Abu Ali al-Hussain Ibn Abdullah Ibn Sina was born in 980 C.E. at Afshana, near Bukhara. He was the most famous physician, philosopher, encyclopedist, mathematician and astronomer of his time. His major contribution to medical science was his famous book Al-Qanoon, known as the "Canon" in the West. The Qanun fi al-Tibb is an immense encyclopedia of Medicine extending over a million words. His important original contribution includes such advances as recognition of the contagious nature of phthisis and tuberculosis; distribution of diseases by water and soil and interaction between psychology and health. In addition to describing pharmacological methods the book described 760 drugs and became the most authentic materia medica of the era. He was also the first to describe meningitis and made rich contributions to Anatomy, Gynecology and child health. His philosophical encyclopedia Kitab al-Shifa was a monumental work, embodying a vast field of knowledge from philosophy to science.

Ibn Sina also contributed to Mathematics, Physics and other fields. In Physics his contribution comprised the study of different forms of energy, heat, light and mechanical and such concepts as force, vacuum and infinity, specific gravity and use of air thermo-meter.

IBN ABBAS ZAHRAWI
(936-1013 C.E.)

Abul Qasim Khalaf ibn al-Abbas al-Zahrawi was born in 936 C.E. in Zahra in the neighborhood of Cordova. He became one of the most renowned surgeons and physicians of the Muslim era. He is best known for his early and original breakthroughs in surgery as well as for his famous medical encyclopedia called Al-Tasrif, which is composed of thirty volumes. Three volumes on surgery specially focus on cauterization, removal of stone from the bladder, dissection of animals, midwifery, styptics and surgery of eye, ear and throat. He perfected several delicate operations, including the removal of dead fetus and amputation.

Al Zahrawi was the inventor of several surgical instruments and specialized in curing disease by cauterization. Al Zahrawi was also an expert in dentistry, and his book contains sketches of various instruments used thereof. He discussed the problem of deformed teeth and developed the technique of preparing artificial teeth and of replacement of defective teeth by these. In Medicine, he was the first to describe in detail the unusual disease, hemophilia.

ABU AL-NASR AL-FARABI
(870-950 C.E.)

Abu Nasr Muhammad Ibn al-Farakh al-Farabi was born in a small village Wasij, near Farab in Turkistan in 259 A.H.(870 C.E.). As a philosopher and scientist, he acquired great proficiency in various branches of learning and is reported to have been expert in different languages.
Farabi contributed considerably to Science, Philosophy, Logic, Sociology, Psychology, Medicine, Mathematics and Music. He was also an encyclopedist. Author of large number of books on several subjects embodying his original contribution; he came to be known as the "Second Teacher" (al-Muallam al-Sani), Aristotle being the first. One of the important contributions of the Farabi was to make the study of logic easier by dividing it into two categories viz., Takhayyul (idea) and Sabut (proof).

In Sociology he wrote several books out of which Ara Ahl al-Madina al-Fadila became famous.

IBN AL-BAITAR
(DIED 1248 A.D.)

Abu Muhammad Abdullah Ibn Ahmad Ibn al-Baitar Dhiya al-Din al-Malaqi was one of the greatest scientists of Muslim Spain and was the greatest botanist and pharmacist of the Middle Ages. He learned Botany from Abu al-Abbas al-Nabati,with whom he started collecting plants in and around Spain on a plant collecting expedition and traveled along the northern coast of Africa as far as Asia Minor. The major stations he visited include Bugia, Constantinople, Tunis, Tripoli, Barqa, Adalia and Syria. Ibn Baitar's major contribution, Kitab al-Jami fi al-Adwiya al-Mufrada, is one of the greatest botanical compilations dealing with medicinal plants in Arabic. The encyclopedia comprises some 1,400 different items, largely medicinal plants and vegetables, of which about 200 plants were not known earlier.

His second monumental treatise Kitab al-Mughni fi al-Adwiya al-Mufrada is an encyclopedia of Medicine. The drugs are listed in accordance with their therapeutical value. Thus, its twenty different chapters deal with the plants bearing significance to disease of head, ear, eye etc.