

ALBIRUNI- A VERSATILE GENIUS

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ALBIRUNI

Abu Raihan Albiruni (973-1050) (Al Bīrūnī), a versatile genius and man of profound knowledge in all sciences, hailed from Birun, Kat, the capital of Khwarizm in Persia. He was a physician, mathematician, natural scientist, astronomist and historian. He was proficient in Persian, Arabic, Sanskrit, Greek, Hebrew and Syriac. He spent the first twenty-five years of his life in Khwarizm studying Islam and other sciences. In 995 he left his home town and became a court scholar at Bukhara in the court of Samanids (810-899), where famous physician Ibn Sina (Avicenna) was practicing. Then he moved to the court of the Ziyarid Amir of Tabaristan. From here he wrote his first major work, *Al Atharul Baqiyaan Qurunil Khalia*, on historical and scientific chronology. Later he served Khwarizm Shah Abul Abbas Ma'mun (Ma'munids/1009-1917) for seven years. Sultan Mahamud of Ghazna, being jealous of the splendor of Ma'mun, sent him an ultimatum demanding that all the leading scholars are to be send forthwith to Ghazna to adorn his own court. Ma'mun had no other option except to accept the demand, because Mahmud was a powerful and arrogant sultan. Many of the scholars were not willing to go to Ghazna and they escaped to some other places. Only Albiruni, Abu Nasr Jilani, the mathematician and Abul Khyr Khammar, the physician went to Ghazna. Albiruni remained at Ghazna for about thirty years till his death. He served as the court astrologer at Ghaznavi court. This time he imbibed information of India as a land of astronomy and abode of many scholars. He after spending about twelve years with Mahamud, moved to India in 1707 without any patronage from the Sultan. In India he studied the life and culture of the natives and the rich scholarship, they acquired in various sciences. He wrote the complete history of India, *Tarikh al Hind (Fi Tahqiq Ma lil Hind min Maqbula fil aql wa Mardula)*, finishing it around 1030 just after the death of the Sultan Mahamud. He died at an unknown date after 1050 (AH 442). However, the Tashkent scholars put the date of death as 2 Rajab 440/11 December 1048. He had at his credit some important scientific works like *Kitab al Tafhim li awail sana'at al Tanjim* on

Mathematics, *Qanun al Mas'udi fil Hay'a al Nujum*, on astronomy, *Kitab al Jamahir fi Ma'rifat al Jawahir* on mineralogy and *Kitab al Saydala fil Tibbi* on pharmacology.

Albiruni was obviously a prolific author, who preferred to use Arabic, the scientific language of the Muslim world, for most of his works, rather than Persian, in which the creation of a technical and scientific vocabulary was only just taking rough shape during his time. However, it was more common at this period to translate from Arabic into Persian than vice-versa, and the Persian version as a very early translation of an Arabic seems original. His total works amount to 180, ranging from large-scale treatises covering great expanses of knowledge to brief epistles on specific topics. Ninety-five of his works (about 65 percent), were devoted to astronomy, mathematics, and related subjects like mathematical geography. *George Sarton* considered him as one of the world's foremost scientists. His major contribution to astronomy is *al-Qanun al-Mas'udi fi'l-Hay'a wa'l-nujum* covering the same ground as Ptolemy's *Almagest*, but introducing new material. It thus differs from the works of most of his predecessors and contemporaries who were concerned only with constructing astronomical tables suitable for computation of planetary positions, usually without any discussion of the derivation of the parameters upon which the tables were based. He described the variation in the motion of the sun with respect to the earthly observer in mathematical language that modern historians of science have construed as among the earliest references to mathematical functional relationships. In trigonometry his major contributions are to be found in *Kitab maqalid al-hay'a* (compendium on astronomy), in which he concentrated mainly on the applications of spherical trigonometry in astronomy and provided a detailed classification of spherical triangles and their solutions. In *Kitab fi ifrad al-Maqal fi Amr al-zelal* (exhaustive treatise on shadows), he developed the familiar trigonometric definitions further and applied them to such religious practices as determining times of prayer and finding the direction of Makkah. In mathematical geography Albiruni developed a new technique for measuring the difference in longitude between two given cities. In the domain of numerical analysis and approximate techniques, Albiruni's ability to conceptualize in functional terms is equally clear. Albiruni's attempts to record and classify all previously known methods for astrolabe projections, as well as methods that he himself proposed, in his comprehensive book on the astrolabe (*Kitab fi Isti'ab al-wujuh al-mumkina fi sa'at al-aştorlab*) can perhaps also be included in the domain of applied mathematics.

His conceptions of the spherical shape of the earth and of the distribution of geographical features on its surface proves his excellence in geography. He has much to say about changes in climate and of terrain that is based on a close examination of fossils, seashells, and stratigraphy. He also studies the Indian works of astronomy and incorporates them to his further studies. Albiruni also devised his own method of determining the radius of the earth by means of the observation of the height of a mountain and carried it out in India. His work on Geography includes *Kitab al Tahdid Nihayat al Amakin li tashih al masafatil masakin*, *Kitab al Taqasim al al Aqaleem*, *Maqala fi Tassteeh al suwar wa tabteeh al Kuwar* and *Kitab Abi Rayhan Ila Abi Said*.

Albiruni, a traveler proficient in several Asian languages and an inquisitive and attentive observer, was interested all his life in gathering precise information on plants and their medicinal uses. He arranged them alphabetically in a treatise entitled *Kitab al-Saydana*. Altogether 1,197 drugs are mentioned in the work, however, some drugs are cited under several synonyms. In his

eighties Albiruni devoted a book entitled *Kitab al-jamahir fi ma'rafat al-jawahir* (The sum of knowledge about precious stones) to mineralogy. It is the most comprehensive book on this subject in medieval Arabic literature. He accepts the vapor theory, more specifically Jabir b. Ḥayyān's sulphur-mercury theory, of the origins of the minerals and metals. He rejects the notion of transmutation, though he admits the growth and gradual transformation of metals into gold in nature. Besides *Kitab al Hind*, Al Biruni had written various books on history such as *Kitab al Musamara fi Akhbar al Khwarism* and *Athar al Baqia, an al qurun al khalia*. He tries to write a factual history avoiding the myths and fabricated genealogies.

Albiruni had deep knowledge in religion. He always took a tolerant position towards other religions though criticized many of their beliefs and customs. Regarding Christians he writes : "May God protect us from slandering anyone, whether friend or foe, and especially the sect of the Christians. For, although their doctrines are bad, their way of life is the highest pinnacle of chastity and integrity and kindness toward everyone" (*Kitab al-tafhim li-awa'el shena'at al-tanijim*, ed. R. R. Wright, London, 1934,179). He explains elaborately the customs and traditions of Zoroastrians, Christian sects, Manicheans, Jews and Hindus. In his *Tarikh al Hind*, he makes a number of excursions into the field of comparative religion. In several passages, the author compares the beliefs of the Hindus with those of the Greek philosophers and the Muslim Sufis. In another passage he compares the Indian holy syllable *ōm* with the Muslim *basmala* and the ineffable name of god in Judaism. He observes that the word *dev/deva* is used by Hindus to designate the angels (as a monotheist he is reluctant to speak of "gods") but by the Persians to refer to demons.

Albirūni's fame as an Indologist rests primarily on two texts. One is a translation from Sanskrit into Arabic of the *Yogasutras* of Patañjali, entitled *Kitab Batanjali* (The book of Patanjali). The other, Albiruni's magnum opus, is *Tarikh al Hind* (*Kitāb taḥqīq ma lil-Hind min maqula maqbula fil-aql aw marḍula* (The book confirming what pertains to India, whether rational or despicable). This is a wide-ranging examination of Sanskrit scientific sources, supplemented by conversations with Hindu pundits whom Albiruni met while accompanying his patron, Sultan Maḥmud of Gazna, on military campaigns in northern India. In the West the book is most often referred to as *India*, after E. C. Sachau's translation (*Albiruni's India*, 2 vols., London, 1888, 1910). There are also some references to Indian data in Biruni's *al-Athar al-baqia*. After translating the Book of Patanjali (*Kitab Batanjali*) he describes the Hindu methods of Yoga meditation very elaborately and this later enabled the spread of Yoga in Arab lands. Many Sufis encouraged yoga meditation to their disciples. He portrays idol worship as class-specific, being the indulgence of uneducated, superstitious masses, rather than the preference of those literate Brahmins with whom he himself was in frequent contact.

Albiruni was satisfied with what he got from the treasury of knowledge in India. In the conclusion to *Tarikh al Hind* he says: "I place my gratitude to Allah who bestowed his benevolence upon me. This much is enough to reach my goal". (Albiruni's India, Vol.1, 24). *Tarikh al Hind* was first published by Edward Sachau in 1837 at London. In 1887 he himself translated the book to English. In 1910 and 1914 the second and third editions of the book were released. All aspects of ancient Indian civilization are being dealt with in the work. Religion, philosophy, literature, history, astronomy, ritual, laws; all these are included. *Tarikh al Hind* is unique in its style, presentation and contents. It is an encyclopedia of Ancient Indian civilization.

It is useful to rulers and travelers alike. It became useful in dividing the empire into provinces and selecting strategic locations for warfare. The book includes a small preface and eighty long chapters. It gives a clear picture on Hindu outlook on God and the universe. India's geology, history, fables, Hindu customs, festivals, Hindu codes, Hindu society, Indian mathematics; all find a place in the work.

As Indian historian K.M.Panikkar observed, most of the medieval historians were bards of the Kings. They praised even the most inferior kings just to show gratitude to the favours received from them. But Albiruni fostered an entirely different attitude, because he resided in India as a freelancer and was free to formulate his own opinions. His comments on his master Mahmud Ghazni alone may be sufficient to prove this: "He (Mahamud) destroyed all progress of India. Due to his fanatic exploitations Hindu society became dust like and was blown out in all four directions".(*Albiruni's India* by Edward Sachau, London 1940, Vol:1,p24). Albiruni emphatically condemned his master's lootings of temples and attacks on Indian people. Albiruni showed complete justice to historical principles. He did not believe, what all others said. He maintained equanimity in unearthing facts. He admitted mistakes himself and openly wrote the truth. In the preface of *Tarikh al Hind* he emphasized: "One who keeps away from liars and stuck with truth and in that way maintain pride even among liars is liable to be praised. The liar will not protect justice. He will move with atrocities. He will destroy faith. He will steal other's wealth. He will support all bad activities." (*Albiruni Commemoration Volume*, Calcutta-Iran Society, 1951,60) Dr.A.Jefry praises the middle path followed by him while evaluating non Muslim religions: "It is difficult to see people like Albiruni even in the modern ages who wrote in a commendable style without prejudices to other religions" (Ibid.,60). For the first time he met Brahmins at the court of Mahamud Gazni. It may be from here he got touch with Sanskrit and Indian sciences. Albiruni left India in 1030. The difficulties encountered by him to get accustomed with Indians were too many. The first was language issue. There was no connection between Sanskrit and his tongue Arabic. The languages of the priest and the ordinary person differed very much. Also there were no books available for studying Sanskrit. On the other hand, most of the Indian books were in the form of Sanskrit verses.

Another issue was the presence of so many religious beliefs in the country. Hindu customs and rituals varied from place and they were entirely different from those of Muslims. The basis of the Hindu religion was the teachings by Brahmins, who had the prerogative of learning and others were generally denied it. People of other religions and the lower caste people were not allowed even to touch the books. As per the Hindu laws, foreigners were impure (*mlecha*) people. The wounds inflicted by Mahamud Ghazni on Brahmin community brought animosity between Islam and upper caste Hindus. Islam was totally misunderstood by the atrocious misdeeds of Mahamud. Hindus took Islam as a religion of war and injustice. They were not aware that Ghazni's attacks did not have even distant relations with Islam. He attacked Muslim monarchs in central Asia as he did the same in India. Also, Muslims never accepted the caste supremacy of the Brahmins and their religion was antithetical to Islam, that Brahmanism asserted the caste hierarchy and Brahmins being the superior caste. Moreover, Muslims being a folk belonged to a foreign land; they were treated as impure (*Mlecha*) by the Brahmins. This situation negatively affected the visit of Albiruni also. Apart from this he could not get enough cooperation from Mahamud or the Hindu Kings. But all these did not hinder his quest for knowledge. Albiruni reached nooks and corners of India traversing forests and hillocks. When the study of Sanskrit

was denied to him due to his impurity, he is said to have studied it, by hiding behind the trees in the forest where the *gurukula* teaching of the Brahmins were going on.

According to Albiruni, Hindus believed that India is the greatest country and Hinduism is the loftiest religion. They judged that foreigners follow blind faith and are ignorant. This was the reason for Hindu theology becoming inactive. Otherwise, Hindu science might have reached greater heights. Even transoceanic travels were forbidden to the followers of Hindu religion. "What else is there to say about this society?" After arriving in India, he developed his Sanskrit that he acquired from Ghazna. Within no time he was able to handle that language fluently. He translated the Sanskrit books written by Kapila, Pathanjali, Brahma Gupta and Varaha Mihira into Arabic. He also translated the books by Greek scientists Euclid and Ptolemy into Sanskrit language. In the matter of scholarship of Sanskrit he left behind even Brahman pundits. When there were no apt words in Arabic for Sanskrit words he wrote Sanskrit words as such in Arabic. In *Tarikh al Hind* there are at least 2500 words of this type. On the coins of Mahmud Ghazni there were inscriptions both in Arabic and Sanskrit. On the one side beside the value of the coin the sacred kalmia of Islam (*La Ilaha Illallah Muhammadun Rasulullah*) was inscribed along with Hijrah year. On the other side the translation of the same in Sanskrit language was inscribed. For the *kalmia* the Sanskrit translation was "Avyaktham Eka; Muhammada Avatara." Some scholars objected to giving *avatara* for the prophet. Albiruni gave *Janayana Samavathi* for Hijrah year and *Avyaktayenamah* for *bismillah*.

Albiruni thinks that prophets have been sent to India also. He observes that the Hindus basically believe in one God and the Hindu Saints are most respectable. He blames Muslim scholars for their ignorance in Indian sciences and philosophy.

Some books written by Albiruni on Indian sciences:

- *Jawamiul Mawjud li Khawathiril Hunud* (The review of *Brahmasidhanatha* by *Brahmaguptan*)
- *Thahdeeb Seejul Arkand* (The translation of *Khandakadayaka* by *Brahmagupta*)
- *Khayal al Kusufain 'indal Hind* (The Indian view on Eclipses)
- *Tadkira fil Hisab wal Adabi Argam al Sindh wal Hind* (A study on Indian Mathematical science)
- *Kaifiyath Rusum al Hind fi T'aallum al Hisab*. (The Indian ways to study Mathematical science)
- *Fee Ra'yul Arab fee Marathib al 'Adad al Asvab min ra'yul Hind* (The order of numbers in vogue with Indians and Arabs)
- *Fi Rasikath al Hind* (About the Indian Trinity)
- *Fee Sankalbal 'Adad* (The assumption in Indian numbers)
- *Tharjumat ma fee Brahmasidhanath min Tharakkul Hisab* (The Indian calculation method as per Brahma siddhanatha)
- *Fee Tahseel 'an Azzaman indal Hind* (the Hindu Time calculation)
- *Al Jawabat 'an almasaqilalvaridath min munajjmil Hind* (Replies to Indian astronomical scientists)
- *Aljawabat 'anal mas'ailil 'ashr al Kashmiriyat* (Replies to 10 questions by Kashmiris)
- *Maqalat fee Hikayath Tarikh al Hind fee Istikhraj al umru* (The Indian horoscope)
- *Tarjumat Kitab al Maqavid al Sagheer Barahamihir* (Translation of Varahamihira's light horoscope)
- *Hadith 'an Asnam al Bamiyan* (Story of two *Bamiyan* idols)

- *Hadith Tilufar fee Qissathi dweebasathy wa Brabakar* (The Story of the lotus described in *Deavasathiya* and *Prabhakara*)
 - *Tharjumah Khalbayara* (The translation of medical pamphlet *Kalpara*)
 - *Fee Thahqiq ma lil Hindi min Ma'qulat minMaqbula fil aql wa Mardula* (The complete book on India with short name “*Tarikh al Hind*”)
 - *Maqalah fee Basdiv inta gees al adna* (Translation of brochure on ascendance of *Vasudevan*)
 - *Tarjumah Kitab al sank fil mawjudat al mahasunat wal makwulath* (Translation of book on *Sankhay*)
 - *Tarjumah kitab al Patanjali fil Kalas min al Irtibaad* (Translation of book by *Pathanjali*)
 - *Tarjuma Pulsa sidhanth* (Arabic translation of Sanskrit version of Greek astronomical scientist *Poulas*' book)
 - *Tarjumat Brahmasidhant* (Translation of *Brahmasidhantha*)
 - *Maqalath fi tahwil manasilu Qamar* (Indian science of lunar movements)
 - *Kandakatal Arabi* (Translation of *Kantakatakya*)
 - *Miftah al Ilm al Hayat* (Indian view on movements of Sun and Earth)
-