

Al-Bīrūnī

Abū Rayḥān Muḥammad ibn Aḥmad al-Bīrūnī
al-Khwārazmī

DATE OF BIRTH September 973
PLACE OF BIRTH Kāth, Khwārazm
DATE OF DEATH 1048
PLACE OF DEATH Ghazna

BIOGRAPHY

In the history of science, al-Bīrūnī is nowadays regarded as the most prolific and original Muslim mind of the Middle Ages. A fervent admirer of the Greeks, whose heritage came down to him via the late Antique Alexandrian school, and of the indefatigable activities of the Christian translators in Baghdad in the 9th century, he nevertheless enriched this heritage by new methods and original ideas in the fields of astronomy, mathematics and geodesy. Remarkable too is his broad interest in all subjects of learning, including his knowledge of non-Muslim religions, especially the various Christian denominations, about which he shows a great degree of impartiality and even sympathy, though without giving up his Muslim convictions. The relevant statements are scattered through many of his works, while one special tract about the Christian feasts and fasts is now lost. The chronology of his writings can be followed in the biography established by Pavel G. Bulgakov.

Al-Bīrūnī was born in Kāth, the capital of Khwārazm, on the banks of the Amū-Daryā River, south of the Aral Sea. Although of humble origin – he even claims ignorance of his father's identity – he was fortunate enough to find his first teacher in the eminent Khwārazmian mathematician and astronomer, Abū Naṣr Maṣṣūr ibn 'Alī ibn 'Irāq, who was a prince of the ruling family of the Khwārazm Shahs.

From 995 to 997, he was in Rayy, near present-day Tehran, where he took part in the observations carried out by the eminent astronomer Abū Maḥmūd al-Khujandī, using a huge sextant. Back in Kāth for two years, in 997 he calculated the distance between his town and Baghdad in collaboration with another older colleague, Abū l-Wafā'

Muḥammad ibn Muḥammad al-Buzjānī, by measuring in these two places the different times of the beginning of a lunar eclipse.

While still in his home town, he entered into correspondence with the young Ibn Sīnā, who even then was revered in Bukhārā as a great expert in all fields of learning. Al-Bīrūnī doubted some tenets of Aristotle's natural philosophy, which Ibn Sīnā felt obliged to defend, e.g. the absolute lightness of air and fire, the possibility of one element being transformed into another, the non-existence of a vacuum and of atoms, and the immutability of the heavenly spheres as an argument for the eternity of the world. Al-Bīrūnī even ventures the idea that our cosmos may not be the only one of its kind, and he accuses Ibn Sīnā, who denies this, of trying to limit God's omnipotence (one might compare this academic conflict with the case of Giordano Bruno). It is possibly this sceptical attitude towards the predominant Peripatetic and Neoplatonic mainstream in Islamic philosophy that earned him the nickname al-Bīrūnī, after the Bīrūniyyūn, the Arabic form of the philosophical sect of the Pyrrhonists. The dispute between the two young scholars also touches upon the Christian thinker John Philoponus, whom Ibn Sīnā regards as a hypocrite, while al-Bīrūnī defends his integrity and his belief in the biblical notion of creation.

In about 997 or 998, al-Bīrūnī went to Gurgān, the ancient Hyrcania, south-east of the Caspian Sea, to work at the court of the Sultan Qābūs ibn Wushmagīr, who was renowned as a Maecenas of poets and scholars. Here he stayed until 1003-4. It was to the sultan that he dedicated his first great work, *Al-āthār al-bāqiya 'an al-qurūn al-khāliya* ('Lasting vestiges of bygone generations', commonly known as 'The chronology of ancient nations'). It deals with the eras of various peoples and religions and their astronomical and mathematical foundations, among them the church year of the Nestorians and the Melkites. He gives the biblical background of the fasts and feasts with remarkable objectivity, though the date of the creation of the world he finds impossible to determine because of the differences between the three Old Testament versions: the Jewish, the Samaritan and the Septuagint (pp. 20-21). Against Buddhist contentions that the variations in human language and body shape exclude the existence of a common ancestor for the whole human race, he explains the varieties as being the result of differences in dwelling places and their air and water, a clear allusion to the Hippocratic work *De aere, aquis, locis* (Fück, p. 74).

From the now extinct sect of the pagan Sabians in Ḥarrān, the biblical Haran, he quotes a legend about Abraham, in which the patriarch appears in an unfavorable light. Al-Bīrūnī sees this as the malevolent invention of a Christian polemicist. In this context, he mentions the Christian apologist ‘Abd al-Masiḥ ibn Ishāq al-Kindī, who accuses the Sabians of carrying out human sacrifices in the past (pp. 204-5). From the New Testament, he quotes the two different genealogies of Jesus in Matthew and Luke, and the attempts to harmonize them (pp. 22-23). The Nestorians put the Annunciation to Mary on 1 December, and must therefore claim that her pregnancy miraculously lasted only 25 days (pp. 309-10). Christ’s baptism gives him the opportunity to describe at length the contemporary rite in Byzantium (p. 293). In the reports on the Passion, he notes the differing times in the day of the crucifixion, according to John and the Synoptic Gospels. Despite his Muslim convictions, he abstains from adducing the denial of Christ’s crucifixion in Q 4:157-58. But, oddly enough, he remains silent about the role of the Romans: Pilate appears as the leader (*qā’id*) of the Jews (Fück, pp. 93-94). Al-Bīrūnī further censures superstitious excesses in the Christians’ veneration of the cross, when they claim to find a cross-shaped figure in the constellation of the Dolphin or in the wood of the Paeonia tree, which, when it is cut, reveals markings that resemble a cross (pp. 296-97). In connection with Easter, he mentions the Holy Fire in the Church of the Holy Sepulcher and, making use of a number of reports, describes what used to happen before the church was destroyed on the orders of the Fatimid Caliph al-Ḥākim, and how the Muslim population of Jerusalem took part in the ceremony as well as the Christians. He does not dismiss it as a fraud, but tries to find equally wondrous phenomena elsewhere (Fück, pp. 94-95).

Al-Bīrūnī knows of three Christian denominations (p. 288). The Nestorians acknowledged as their authority Nestorius, who urged his followers to think rationally about their creed (p. 309). The Melkites were present even in Khwārazm (p. 288), but at the time when he wrote the ‘Chronology’ he had not managed to meet any of the Jacobites in order to gather information about their beliefs (p. 315). He also mentions the Arians, and finds that they were nearer to Islam (p. 288).

In 1008, al-Bīrūnī returned to his own country, where the residence of the Khwārazm Shahs had been transferred to the new capital Jurjāniyya. Here he met his old teacher, Abū Naṣr Maṣṣūr ibn ‘Alī ibn

ʿIrāq, and also Ibn Sīnā, who had fled from Bukhārā after the downfall of the Sāmānid dynasty there. He also formed close friendships with two Nestorian colleagues. Abū Sahl ʿĪsā ibn Yaḥyā al-Masiḥī, who came from Gurgān and had studied in Baghdad, was a physician and polymath. One of his writings bears the title *Kitāb izhār ḥikmat Allāh taʿālā fī khalq al-insān* ('Demonstration of God's wisdom in the physique of man'), this in full congruence with Muslim belief. He dedicated 12 of his other tracts to al-Bīrūnī. The other Christian friend was the physician and philosopher Abū l-Khayr al-Ḥasan ibn Suwār al-Khammār, who was born in Baghdad, and was active as a translator from Syriac into Arabic. Al-Bīrūnī quotes him often. One story told by his pupil, Ibn Hindū, in his *Miftāḥ al-ṭibb wa-minḥāj al-tullāb* ('The key to medicine and the course of students') illustrates the self-confident behavior of Christian intellectuals at this time. One pious Muslim incited the people against Abū l-Khayr and even wrote a book about the futility of Galenic medicine, but when this man fell ill with a severe headache and asked Abū l-Khayr for a remedy, he advised him to put the book under his head and trust to a cure from God (p. 16).

This fruitful academic life was terminated in 1018, when Sultan Maḥmūd of Ghazna occupied Jurjāniyya, and the leading intelligentsia, among them al-Bīrūnī and Abū l-Khayr ibn al-Khammār (q.v.), were summoned or even deported to his residence in Afghanistan, if they were not among those who managed to flee beforehand, like Ibn Sīnā and Abū Sahl ʿĪsā ibn Yaḥyā. Al-Bīrūnī was able to continue his activities, and between 1018 and 1025 he wrote his 'Geodesy', with the Arabic title *Kitāb taḥdīd nihāyāt al-amākin li-taṣḥīḥ masāfāt al-masākin* ('On establishing the boundaries of places to confirm distances between settlements'). In order to determine the *qibla* correctly, it was necessary to have a clear idea of the spherical shape of the earth, something that not all theologians were inclined to accept. Al-Bīrūnī reports in this book an incident that had occurred about a century earlier in Baghdad, when the Muʿtazilī Abū Hāshim al-Jubbāʿī (q.v.) boasted before a learned assembly that he had torn out pages from a book of Aristotle where this was to be read, whereupon the Syrian Aristotelian philosopher and translator, Abū Bishr Mattā ibn Yūnus, ridiculed him openly before the assembly. The way in which the story came down to al-Bīrūnī is easy to reconstruct, because Abū l-Khayr ibn al-Khammār had been a pupil of the Baghdad Jacobite philosopher Yaḥyā ibn ʿAdī (q.v.), who in turn had studied with Abū Bishr.

Maḥmūd of Ghazna led several military excursions into the Punjab, where he plundered the Hindu temples, and brought back much gold and slaves. Al-Bīrūnī, who had to accompany him, took the opportunity to study the creeds and customs of the Hindus, and even tried to learn Sanskrit and to meet Indian astronomers. He wrote his observations down in a magnificent work entitled *Kitāb fi taḥqīq mā li-l-Hind min maqūla maqbūla min al-‘aql aw mardhūla* ('Verification of what from the Indians is acceptable to the mind and what is not'), commonly called simply 'India'. His attempt to penetrate mentally into a totally foreign culture is unique in all the literature of the Middle Ages, though it was also carried on in close parallel with the imperialist undertakings of a Muslim power to subjugate the country. Al-Bīrūnī complains about the idolatry and superstition of the Hindu masses and the narrow-mindedness of the intellectuals who shun dispute about their religion. He sees no other salvation for 'the innate perversity of their nature' than conversion to Islam (p. 91). In order to understand the foreign culture, he compares it with phenomena he knows better. Thus, he compares Hindu religion and mythology with the state of the Greeks before the introduction of Christianity (pp. 12-13), though with the difference that the latter had true philosophers, which the Indians do not. Reminiscences of the Bible are also present. He detects traces of polytheism in the Old Testament (p. 18), and he finds the ethics incumbent on the caste of the Brahmans similar to those of the Christians, 'but the people of this world are not all philosophers. Most of them are ignorant and erring, who cannot be kept on the straight road save by the sword and the whip. And, indeed, ever since Constantine the victorious became a Christian, both sword and whip have ever been employed, for without them it would be impossible to rule' (p. 280). In this book he also quotes John Philoponus' *Refutation of Proclus* (pp. 17, 111, 114).

In about 1030, al-Bīrūnī wrote for a woman named Rayḥāna, who like him came from Khwārazm, the *Kitāb al-tafhīm li-awā'il ṣinā'at al-tanjīm* ('Instruction in the elements of the art of astrology'). Here he deals again with the Nestorian church year, but more succinctly than in the 'Chronology'. To his mention of a feast called *Māshūsh* he adds the remark: 'This is one of the impudent statements made by people ignorant about the Christians to the effect that *Māshūsh* is a night when men and women meet together to seek Jesus, when promiscuous intercourse takes place as chance determines in the dark. We take refuge in God from offending the sect of the Christians,

whose disposition, in spite of their false doctrine, is eminently distinguished by modesty, uprightness and kindness to all' (§ 300).

To Maḥmūd's son and successor Mas'ūd (r. 1030-40) he dedicated the so-called *Mas'ūdic Canon*, a voluminous handbook of astronomy. Here he deals again with the fasts and feasts of the Christians and the death of Jesus at the hands of the Jews, and reveals a knowledge of Christian historians such as Eusebius of Caesarea, Theophilus of Edessa, and others who still await identification (pp. 169-71 and 227-53).

Although al-Bīrūnī was no physician, in his last great work he dealt with *materia medica*, but in a strictly philological manner. The strange title of the *Kitāb al-ṣaydana fī l-ṭibb* ('The pharmacy for medicine') probably means that medicine itself needs a remedy, namely against the chaos of the many names of the substances used in therapy and diet. In 1,116 articles he equates about 4,500 names in 27 languages. Among the few marginal remarks on Christian matters appears one report about the relaxed small talk between a Byzantine emperor and an ambassador sent by the Caliph al-Manṣūr. It shows that the Muslims at this time were able to relish a good joke even when it was made at their expense, otherwise it would not have been written down.

MAIN SOURCES OF INFORMATION

Primary

- Al-Bīrūnī, *Al-āthār al-bāqiya 'an al-qurūn al-khāliya*, ed. E. Sachau, Leipzig 1878; J. Fück, 'Sechs Ergänzungen zu Sachaus Ausgabe von al-Bīrūnīs "Chronologie Orientalischer Völker"', in J. Fück (ed.), *Documenta Islamica inedita*, Berlin, 1952, 69-98 (trans. E. Sachau, *The chronology of ancient nations*, London, 1879 [page nos of the Arabic ed. in the margin]; trans. [Russian] M.A. Saḷe, *Pamyatniki minuvšikh pokoleniy*, Tashkent, 1957 [*Izbrannyye proizvedeniya* i; page nos of the Arabic ed. in the margin; contains the text of Sachau's lacunas])
- Al-Bīrūnī, *Fī taḥqīq mā li-l-Hind*, ed. E. Sachau, London, 1887 (trans. E. Sachau, *Alberuni's India*, 2 vols, London, 1888 (page nos of the Arabic ed. in the margin); trans. (Russian) A.B. Khalidov, Yu.N. Zavadovskiy and V.G. Ērman, *Indiya*, Tashkent, 1963 [*Izbrannyye proizvedeniya* ii; page nos of the Arabic ed. in the margin])
- Al-Bīrūnī, *Al-qānūn al-Mas'ūdi*, 3 vols, Hyderabad/Deccan, 1954-56 (trans. [Russian] P.G. Bulgakov and B.A. Rozenfeld, *Kanon Mas'ūda*, 2 vols, Tashkent, 1973-76 [*Izbrannyye proizvedeniya* v, 1 and 2; page nos of the Arabic ed. in the margin])

- Al-Bīrūnī, *Kitāb al-ṣaydana fī l-ṭibb*, ed. and trans. H. Mohammed Said, Karachi, 1973 (trans. [Russian] U.I. Karimov, *Farmakognoziya v medicine*, Tashkent, 1973 [*Izbrannye proizvedeniya* iv; more useful than the Karachi edition])
- Al-Bīrūnī, *Kitāb al-taḥḥīm li-awā'il ṣinā'at al-tanjīm*, ed. and trans. R.R. Wright, London, 1934
- Al-Bīrūnī, *Kitāb taḥdīd nihāyāt al-amākin li-taḥḥīm masāfāt al-masākin*, ed. P.G. Bulgakov, in *Revue de l'Institut des Manuscrits Arabes* 8 (1962) 3-328 (trans. [Russian] P.G. Bulgakov, *Opredelenie granic mest dlya utočneniya rasstoyaniy meždu naseleennymi punktami (Geodeziya)*, Tashkent, 1966 [*Izbrannye proizvedeniya* iii; page nos of the Arabic ed. in the margin])
- Al-Bīrūnī and Ibn Sīnā, *Al-as'ila wa-l-ajwiba*, ed. S.H. Nasr and M. Mohaghegh, Tehran, 1972
- Ibn Hindū, *Miftāḥ al-ṭibb wa-minhāj al-ṭullāb*, ed. M. Mohaghegh and M.T. Daneshpajuh, Tehran, 1989

Secondary

- G. Strohmaier, 'The picture of the world in al-Bīrūnī's "Pharmacognosy"', *European Review* 16 (2008) 241-48
- Sezgin, *GAS* v (1974) 375-83; vi (1978) 261-76; vii (1979) 188-92, 288-92; x (2000) 150-61; xiii (2007) 279-99
- G. Strohmaier, *Al-Bīrūnī. In den Gärten der Wissenschaft. Ausgewählte Texte*, Leipzig, 2002³
- G. Strohmaier, 'Al-Bīrūnīs Bericht über das Osterfeuer und den Grabfelsen in Jerusalem', *Graeco-Arabica* 7-8 (1999-2000) 519-21 (repr. in Strohmaier, *Hellas im Islam. Interdisziplinäre Studien zur Ikonographie, Wissenschaft und Religionsgeschichte*, Wiesbaden, 2003, 186-87)
- G. Strohmaier, 'Avicenna und al-Bīrūnī im Dialog über aristotelische Naturphilosophie', *Antike Naturwissenschaft und ihre Rezeption* 1 and 2 (1992) 115-30 (repr. in Strohmaier, *Von Demokrit bis Dante. Die Bewahrung antiken Erbes in der arabischen Kultur*, Hildesheim, 1996, 342-57)
- G. Strohmaier, 'Eine sabische Abrahamlegende und Sure 37,83-93', in P. Nagel (ed.), *Studien zum Menschenbild in Gnosis und Manichäismus*, Halle, 1979, 223-27 (repr. in Strohmaier, *Von Demokrit bis Dante*, 125-29)
- P.G. Bulgakov, *Žizn' i trudy Beruni*, Tashkent, 1972
- E.S. Kennedy, 'Al-Bīrūnī', *Dictionary of Scientific Biography*, ed. C.C. Gillispie, vol. 2, New York, 1970, 147-58
- A. Jeffery, 'Al-Bīrūnī's contribution to comparative religion', *Al-Bīrūnī commemoration volume A.H. 362-A.H. 1362*, Calcutta, 1951, 125-60

WORKS ON CHRISTIAN-MUSLIM RELATIONS

*Tadhkira fī l-irshād ilā ṣawm al-Naṣārā
wa-l-a'yād*, 'Note of guidance about the fasts and
feasts of the Christians'

DATE Unknown; before 1048

ORIGINAL LANGUAGE Arabic

DESCRIPTION

The work has not survived, and the title is only known from al-Bīrūnī's own bibliography, which he attached to the list of the works of al-Rāzī; see al-Bīrūnī, *Risāla fī fihrist kutub Muḥammad ibn Zakariyā' al-Rāzī*, ed. M. Mohaghegh, Tehran, 1985, p. 32, no. 53.

SIGNIFICANCE

It can be assumed that the contents did not significantly add to the information contained in the *Chronology* and the *Mas'ūdī Canon*.

MANUSCRIPTS —

EDITIONS & TRANSLATIONS —

STUDIES —

Gotthard Strohmaier