Jabir ibn Hayyan

Abū Mūsā Jābir ibn Hayyān (Arabic/Persian جابر بن حيان, often given the nisbas, al-Azdi, al-Kufi, al-Tusi or al-Sufi; fl. c. 721 – c. 815),[3] is the supposed[4] author of an enormous number and variety of works in Arabic often called the Jabirian corpus.[5] The scope of the corpus is vast and diverse covering a wide range of topics, including alchemy, cosmology, numerology, astrology, medicine, magic, mysticism and philosophy.[6]

Popularly known as the father of chemistry, Jabir's works contain the oldest known systematic classification of chemical substances, and the oldest known instructions for deriving an inorganic compound (Sal ammoniac or Ammonium chloride) from organic substances (such as plants, blood, and hair) by chemical means

Some Arabic Jabirian works (e.g., the “Book of Mercy”, and the “Book of Seventy”) were translated into Latin under the Latinized name "Geber."

After the Abbasids took power, Jabir went back to Kufa. He began his career practicing medicine, under the patronage of a Vizir (from the noble Persian family Barmakids) of Caliph Harun al-Rashid. His connections to the Barmakid cost him dearly in the end. When that family fell from grace in 803, Jabir was placed under house arrest in Kufa, where he remained until his death.

It has been asserted that Jabir was a student of the sixth Imam Ja'far al-Sadiq and Harbi al-Himyari

In total, nearly 3,000 treatises and articles are credited to Jabir ibn Hayyan.

The scope of the corpus is vast: cosmology, music, medicine, magic, biology, chemical technology, geometry, grammar, metaphysics, logic, artificial generation of living beings, along with astrological predictions, and symbolic Imâmî myths.[6]:5

- The 112 Books dedicated to the Barmakids, viziers of Caliph Harun al-Rashid. This group includes the Arabic version of the Emerald Tablet, an ancient work that proved a recurring foundation of and source for alchemical operations. In the Middle Ages it was

translated into Latin (Tabula Smaragdina) and widely diffused among European alchemists.

- The Seventy Books, most of which were translated into Latin during the Middle Ages. This group includes the Kitab al-Zuhra ("Book of Venus") and the Kitab Al-Ahjar ("Book of Stones").
- The Ten Books on Rectification, containing descriptions of alchemists such as Pythagoras, Socrates, Plato and Aristotle.
- The Books on Balance; this group includes his most famous 'Theory of the balance in Nature'.

Jabir professed to have drawn his alchemical inspiration from earlier writers, both legendary and historic, on the subject.[32] In his writings, Jabir pays tribute to Egyptian and Greek alchemists Zosimos, Democritus, Hermes Trismegistus, Agathodaemon, but also Plato, Aristotle, Galen, Pythagoras, and Socrates, as well as the commentators Alexander of Aphrodisias, Simplicius, Porphyry and others.

Jabir's alchemical investigations ostensibly revolved around the ultimate goal of takwin, the artificial creation of life. The Book of Assemblage "Kitāb Al-Tajmi' "[35] includes several recipes for creating creatures such as scorpions, snakes, and even humans in a laboratory environment, which are subject to the control of their creator.

The Jabirian corpus is renowned for its contributions to alchemy. It shows a clear recognition of the importance of experimentation, "The first

essential in chemistry is that thou shouldest perform practical work and conduct experiments, for he who performs not practical work nor makes experiments will never attain to the least degree of mastery."[40] He is credited with the use of over twenty types of now-basic chemical laboratory equipment,[41] such as the alembic[42] and retort, and with the description of many now-commonplace chemical processes – such as crystallisation, various forms of alchemical "distillation", and substances citric acid (the sour component of lemons and other unripe fruits), acetic acid (from vinegar) and tartaric acid (from wine-making residues), arsenic, antimony and bismuth, sulfur, and mercury[40][41] that have become the foundation of today's chemistry.[43]

According to Ismail al-Faruqi and Lois Lamya al-Faruqi, "In response to Jafar al-Sadiq's wishes, [Jabir ibn Hayyan] invented a kind of paper that resisted fire, and an ink that could be read at night. He invented an additive which, when applied to an iron surface, inhibited rust and when applied to a textile, would make it water repellent."

Muhammad Ibn Zakariyya Al-Razi

Abū Bakr Muhammad ibn Zakariyyā al-Rāzī (Persian: ابوبکر محمّد زکریای رازی *Abūbakr Mohammad-e Zakariyā-ye Rāzī*, also known by his Latinized name **Rhazes** (/ˈrɑːziːz/)[3] or **Rasis**; 854–925 CE), was a Persian[4][5][6] polymath, physician, alchemist, philosopher, and

important figure in the history of medicine. He also wrote on logic, astronomy and grammar.

A comprehensive thinker, Razi made fundamental and enduring contributions to various fields, which he recorded in over 200 manuscripts, and is particularly remembered for numerous advances in medicine through his observations and discoveries.[8] An early proponent of experimental medicine, he became a successful doctor, and served as chief physician of Baghdad and Ray hospitals.[9][10] As a teacher of medicine, he attracted students of all backgrounds and interests and was said to be compassionate and devoted to the service of his patients, whether rich or poor.

According to the *Encyclopædia Britannica* (1911),[*better source needed*] he was among the first to use humoral theory to distinguish one contagious disease from another, and wrote a pioneering book about smallpox and measles providing clinical characterization of the diseases.[12] He also discovered numerous compounds and chemicals including alcohol and sulfuric acid.

Through translation, his medical works and ideas became known among medieval European practitioners and profoundly influenced medical education in the Latin West.[9] Some volumes of his work *Al-Mansuri*, namely "On Surgery" and "A General Book on Therapy", became part of the medical curriculum in Western universities.[9] Edward Granville Browne considers him as "probably the greatest and most original of all the

Muslim physicians, and one of the most prolific as an author".[15] Additionally, he has been described as a doctor's doctor,[16] the father of pediatrics,[17][18] and a pioneer of obstetrics and ophthalmology.[19] For example, he was the first to recognize the reaction of the eye's pupil to light.

Razi was born in the city of Ray (modern Rey) situated on the Great Silk Road. In his youth, Razi moved to Baghdad where he studied and practiced at the local bimaristan (hospital). Later, he was invited back to Rey by Mansur ibn Ishaq, then the governor of Rey, and became a bimaristan's head.[2] He dedicated two books on medicine to Mansur ibn Ishaq, *The Spiritual Physic* and *Al-Mansūrī on Medicine*.[2][22][23][24] Because of his newly acquired popularity as physician, Razi was invited to Baghdad where he assumed the responsibilities of a director in a new hospital named after its founder al-Muʿtaḍid (d. 902 CE).[2] Under the reign of Al-Mutadid's son, Al-Muktafi (r. 902-908) Razi was commissioned to build a new hospital, which should be the largest of the Abbasid Caliphate. To pick the future hospital's location, Razi adopted what is nowadays known as an evidence-based approach suggesting having fresh meat hung in various places throughout the city and to build the hospital where meat took longest to rot.

He spent the last years of his life in his native Rey suffering from glaucoma. The lectures of Razi attracted many students. As Ibn al-Nadim relates in *Fihrist*, Razi was considered a *shaikh*, an honorary title given to

one entitled to teach and surrounded by several circles of students. Razi was a generous person by nature, with a considerate attitude towards his patients. He was charitable to the poor, treated them without payment in any form, and wrote for them a treatise *Man La Yaḥḍuruhu al-Ṭabīb*, or *Who Has No Physician to Attend Him*, with medical advice.[31] Ibn al-Nadim recorded an account by Razi of a Chinese student who copied down all of Galen's works in Chinese as Razi read them to him out loud after the student learned fluent Arabic in 5 months and attended Razi's lectures. After his death, his fame spread beyond the Middle East to Medieval Europe, and lived on. In an undated catalog of the library at Peterborough Abbey, most likely from the 14th century, Razi is listed as a part author of ten books on medicine. Al-Razi was one of the world's first great medical experts. He is considered the father of psychology and psychotherapy. Razi's book *al-Judari wa al-Hasbah* (*On Smallpox and Measles*) was the first book describing smallpox and measles as distinct diseases.[41] It was translated more than a dozen times into Latin and other European languages.

Razi's interest in alchemy and his strong belief in the possibility of transmutation of lesser metals to silver and gold was attested half a century after his death by Ibn an-Nadim's book (*The Philosophers Stone*-Lapis Philosophorum in Latin). Nadim attributed a series of twelve books to Razi, plus an additional seven, including his refutation to al-Kindi's denial of the validity of alchemy.

Al-Kindi (801–873 CE) had been appointed by the Abbasid Caliph Ma'mum founder of Baghdad, to 'the House of Wisdom' in that city, he was a philosopher and an opponent of alchemy. Razi's two best-known alchemical texts, which largely superseded his earlier ones: *al-Asrar* (الاسرار "The Secrets"), and *Sirr al-Asrar* (سر الاسرار "The Secret of Secrets"), which incorporates much of the previous work.

Apparently Razi's contemporaries believed that he had obtained the secret of turning iron and copper into gold.

Razi developed several chemical instruments that remain in use to this day. He is known to have perfected methods of distillation to gain alcohol[54] and extraction. ar-Razi dismissed the idea of potions and dispensed with magic, meaning the reliance on symbols as causes.

Razi's works present the first systematic classification of carefully observed and verified facts regarding chemical substances, reactions and apparatus, described in a language almost entirely free from mysticism and ambiguity.

Al-Biruni

Abu Rayhan al-Biruni /ælbɪˈruːni/ (973 – after 1050)[3] was an Iranian[4][5][6][7] scholar and polymath during the Islamic Golden Age. He has been variously called as the "founder of Indology", "Father of Comparative Religion",[8][6][9][10] "Father of modern geodesy", and the first anthropologist.

Al-Biruni was well versed in physics, mathematics, astronomy, and natural sciences, and also distinguished himself as a historian, chronologist and linguist.[6] He studied almost all fields of science and was compensated for his research and strenuous work.[13] Royalty and powerful members of society sought out Al-Biruni to conduct research and study to uncover certain findings. In addition to this type of influence, Al-Biruni was also influenced by other nations, such as the Greeks, who he took inspiration from when he turned to studies of philosophy.[14] He was conversant in Khwarezmian, Persian, Arabic, Sanskrit, and also knew Greek, Hebrew and Syriac. He spent much of his life in Ghazni, then capital of the Ghaznavid dynasty, in modern-day central-eastern Afghanistan. In 1017 he travelled to the Indian subcontinent and authored a study of Indian culture *Tārīkh al-Hind* (History of India) after exploring the Hindu faith practiced in India.[a] He was an impartial writer on customs and creeds of various nations, and was given the title *al-Ustadh* ("The Master") for his remarkable description of early 11th-century India.

He was born in the outer district (Bīrūn) of Kath, the capital of the Afrighid dynasty of Khwarezm in Central Asia[19][6] (or Chorasmia).[20][19] To conduct research, Al-Biruni used different methods to tackle the various fields he studied. He lived during the Islamic Golden Age, when the Abbasid Caliphs promoted the research of astronomy.[19] Al-Biruni spent the first twenty-five years of his life in

Khwarezm where he studied Islamic jurisprudence, theology, grammar, mathematics, astronomy, medicine, philosophy and also dabbled in the field of physics and most other sciences as well.[20] The Iranian Khwarezmian language, which was the language of Biruni,[21][22] survived for several centuries after Islam until the Turkification of the region, and so must some at least of the culture and lore of ancient Khwarezm, for it is hard to see the commanding figure of Biruni, a repository of so much knowledge, appearing in a cultural vacuum.[23] He was sympathetic to the Afrighids, who were overthrown by the rival dynasty of Ma'munids in 995. He left his homeland for Bukhara, then under the Samanid ruler Mansur II the son of Nuh. There he corresponded with Avicenna[24] and there are extant exchanges of views between these two scholars.

In 1017, Mahmud of Ghazni took Rey. Most scholars, including al-Biruni, were taken to Ghazni, the capital of the Ghaznavid dynasty.[1] Biruni was made court astrologer[25] and accompanied Mahmud on his invasions into India, living there for a few years. He was forty-four years old when he went on the journeys with Mahmud of Ghazni.[19] Biruni became acquainted with all things related to India. During this time he wrote his study of India, finishing it around 1030.[26] Along with his writing, Al-Biruni also made sure to extend his study to science while on the expeditions. He sought to find a method to measure the height of the sun,

and created a makeshift quadrant for that purpose.[19] Al-Biruni was able to make much progress in his study over the frequent travels that he went on throughout the lands of India.

Ninety-five of 146 books known to have been written by Bīrūnī were devoted to astronomy, mathematics, and related subjects like mathematical geography.[28] His religion contributed to his research of astronomy, as in Islam, worship and prayer require knowing the precise directions of sacred locations, which can only be accurately found using astronomical data.

He wrote an extensive commentary on Indian astronomy in the *Taḥqīq mā li-l-Hind* mostly translation of Aryabhatta's work, in which he claims to have resolved the matter of Earth's rotation in a work on astronomy that is no longer extant, his Miftah-ilm-alhai'a (Key to Astronomy).

Bīrūnī is one of the most important Muslim authorities on the history of religion.[50] Al-Biruni was a pioneer in the study of comparative religion. He studied Zoroastrianism, Judaism, Hinduism, Christianity, Buddhism, Islam, and other religions.

His underlying concept was that all cultures are at least distant relatives of all other cultures because they are all human constructs. "Rather, what Al-Biruni seems to be arguing is that there is a common human element in every culture that makes all cultures distant relatives, however foreign they might seem to one another."

Al-Biruni's fame as an Indologist rests primarily on two texts.[56] Al-Biruni wrote an encyclopedic work on India called *Taḥqīq mā li-l-Hind*

min maqūlah maqbūlah fī al-ʿaql aw mardhūlah (variously translated as "Verifying All That the Indians Recount, the Reasonable and the Unreasonable"[57] or "The book confirming what pertains to India, whether rational or despicable"[56]) in which he explored nearly every aspect of Indian life, including religion, history, geography, geology, science, and mathematics. During his journey through India, military and political histories were not of Al-Biruni's main focus. Instead, he decided to document the more civilian and scholarly areas of Hindu life such as culture, science, and religion.[58] He explores religion within a rich cultural context.[59] He expresses his objective with simple eloquence: He also translated the works of Indian sage Patanjali with the title *Tarjamat ketāb Bātanjalī fi'l-k̲alāṣ men al-ertebāk*.