Islamic Science 3

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Islamic Names

1. ism (personal name)

2. kunya (surname, agnomen) = Abu (Father) or Umm (Mother)

3. nasab (linage, patronymic, genealogy) = bin , (son of) bint (daughter of),
   b. (abbreviation); banu = "sons/children of" or tribe

4. nisba (ascription, connection) = tribal, geographic, or professional affiliation (ends with i(m) or iyya (f)

5. laqab (honorific, regnal title, throne name) = honorary title

Example: Muhammad might include:

Muhammad (ism), Abu al-Qasim (kunya), Ibn Abdullah (nasab), al-Qurayshi (nisba), al-Nabi (prophet) or Rasul Allah (apostle/messenger of God) (laqab)

An ism (pronounced IZM), a personal, proper name given shortly after birth, usually on the third day, but sometimes on day of birth and sometimes on the seventh day after birth. Examples of such names are Muhammad [Mohammed], Musa [Moses], Ibrahim [Abraham], Ahmad.

A kunya (pronounced COON-yah); e.g., abu Da'ud [the father of David], umm Salim [the mother of Salim]. It is meant as a prefix of respect or reverence. Married persons (especially women) are, as a general rule, simply called by their kunya (abu or umm + the name of their first son). When using a person's full name, the kunya precedes the personal name: Abu Yusuf Hasan [the father of Joseph, Hasan], Umm Ja'far Aminah [the mother of Ja'far, Aminah].

Nasab (pronounced NAH-sahb), ; e.g., ibn 'Umar [the son of Omar], bint `Abbas [the daughter of Abbas]). The nasab follows the ism in usage: Hasan ibn Faraj [Hasan the son of Faraj], Sumayya bint Khubbat [Sumayya the daughter of Khubbat]. Many historical personages are more familiar to us by their nasab than by their ism: e.g., the historian ibn Khaldun, the traveler ibn Battuta, and the philosopher ibn Sina [Avicenna].

When the parent in a nasab is referred to by his kunya, the word abu becomes abi, e.g., Muhammad's son-in-law was 'Ali ibn Abi Talib, 'Ali the son of Abu Talib, or 'Ali, the son of the father of Talib.

Laqab (pronounced LAH-kahb), a combination of words into a byname or epithet, usually religious, relating to nature, a descriptive, or of some admirable quality the person had (or would like to have); e.g., al-Rashid [the Rightly-guided], al-Fadl [the Prominent]. Laqabs follow the ism: Harun al-Rashid

One particular form of laqab is formed on the pattern of `Abd [servant of] plus one of the 99 names of Allah; e.g., ‘Abd Allah (`Abdullah) [the servant of God], `Abd al-Aziz [servant of the Almighty], These laqabs are used as, and in the place of, an ism: ‘Abd al-Mun’im ibn Idris ibn Sinan. The feminine form of this type of laqab is Amat al-X, for example, Amat Allah (Amatullah), (female) servant of Allah.

Nisba (pronounced NISS-bah)
Nisbas follow the ism or, if the name contains a nasab (of however many generations), generally follow the nasab. The three primary types of nisba are:

Occupational, e.g., Muhammad al-Hallaj [Muhammad, the dresser of cotton].

Of descent, derived from the name of a person's tribe of birth or family lineage: Mughirah al-Ju'fi [Mughirah of the tribe of Ju'fi]; Yusuf al-Ayyubi [Joseph the Ayyubid, Joseph of the family line of Ayyub].

Geographical, derived from the place of residence or birth: Yaqub al-Dimashqi [Jacob of Damascus].

Yusuf ibn Ayyub
ism son of ism [one generation nasab]

Yazid ibn Abi Hakim
ism son of the father of Hakim [one generation nasab where the father's name is a kunya]

Ayyub al-Sakhtiyani [masculine]
Mariyah al-Qibtiyah [feminine]
ism + nisba

Abu Muhammad Wahb
kunya [the father of Muhammad] + ism

Ahmad ibn Abi Fanan al-Katib
ism son of the "father of Fanan" [one generation nasab, where name of father is a kunya] + occupational nisba

Umamah bint Hamdun ibn Isma'il
ism + two generation nasab

Layla bint Zuhayr ibn Yazid al-Nahdiyah
ism + two generation nasab + [feminine form of] nisba

Abu Bishr al-Yaman ibn Abi al-Yaman al-Bandaniji
kunya + laqab/ism + one generation nasab [where name of father is a kunya] + nisba

Abu al-Tayyib 'Abd al-Rahim ibn Ahmad al-Harrani
kunya [where name of son is laqab/ism] + laqab/ism + one generation nasab + geographic nisba

T. E. Lawrence in response to is publisher for Revolt in the Desert:

"Arabic names won't go into English, exactly, for their consonants are not the same as ours, and their words, like ours, vary from district to district. There are some 'scientific systems' of transliteration, helpful to people who know enough Arabic not to need helping, but a wash-out for the world. I spell my names anyhow, to show what rot the systems are."

Khaddafi, Gadhafi, Qadafi

Da'ud, Daud, Dawud, Daoud,
Dawood, Daood and Da'oud

The Time of Al-Khwarizmi

First Half of Ninth Century

Cultural Background

The seventh Abbasid caliph, al-Ma'mun (813-833) founded a scientific academy in Bagdad, tried to collect as many Greek manuscripts as possible, and ordered their translation; he encouraged scholars from all kinds, and an enormous amount of scientific work was done under his patronage.

Al-Kindi

Abu Ysuf Ya'qub ibn Ishaq ibn al-Sabbah al-Kindi (i. e., of the tribe of Kinda) Latin name, Alkindus. Born in Basra at the beginning of the ninth century, flourished in Bagdad under al-Ma' mun and al-Mu'tasim (813 to 849), persecuted during the orthodox reaction led by al-Mutawakkil (841 to 861); died c. 873. "The philosopher of the Arabs;" so-called probably because he was the first and only great philosopher of the Arab race. His knowledge of Greek science and philosophy was considerable.

One of his writings was especially important: "De aspectibus," a treatise on geometrical and physiological optics (largely based on Euclid, Heron, Ptolemy) , which influenced Roger Bacon.

Mathematics and Astronomy

A large amount of mathematical and astronomical work was done during this period. It is practically impossible to separate mathematics from astronomy, for almost every mathematician was an astronomer or an astrologer, or both. Some of the most important steps forward were made in trigonometry in the course of computing astronomical tables.

Geometers:
Al-Hajjaj ibn Yusuf was the first translator of Euclid's Elements into Arabic. Al-'Abbas wrote commentaries upon them. Abu Sa'id al-Darir wrote a treatise on geometrical problems.

Arithmeticians and Algebraists:
The (Jewish) astrologer Sahl ibn Bishr wrote a treatise on algebra. The greatest mathematician of the time, was al-Khwarazmi. He combined the results obtained by the Greeks and the Hindus and thus transmitted a body of arithmetical and algebraic knowledge which exerted a deep influence upon medieval mathematics. His works were perhaps the main channel through which the Hindu numerals became known in the west. The Arabic transmission eclipsed the Hindu origin, and these numerals are known in the West as Arabic numerals.

Al.-Khwarizmi

Abu 'Abdallah Muhammad ibn Musa al-Khwarizmi. born: Khwarizm, modern Khiva, south of the Aral Sea.

Best known as Khwarizm, as evidenced by the words algorism and augrim (Chaucer) derived from it. Flourished under al-Ma'mun, caliph from 813 to 833, died c. 850. Mathematician, astronomer, geographer. He combined Greek and Hindu knowledge. He influenced mathematical thought to a greater extent than any other medieval writer. His arithmetic (lost in Arabic; Latin translation of the twelfth century extant) made known to the Arabs and Europeans the Hindu system of numeration. His algebra, Hisab al-jabr wal-muqabala, is equally important. It contains analytical solutions of linear and quadratic equations and its author may be called one of the founders of analysis or algebra. His astronomical and trigonometric tables, revised by Maslama al-Majrti (Second half of tenth century), were translated into Latin as early as 1126 by Adelard of Bath. They were the first Muslim tables and contained not simply the sine function but also the tangent . Al-Khwarizmui probably collaborated in the degree measurements ordered by al-Ma'nun. He improved Ptolemy's geography, both the text and the maps (Surat al-ard, "The Face of the Earth").

Sahl Al-Tabari
Also called Rabban al-Tabari, meaning the Rabbi of Tabaristan. Flourished about the beginning of the ninth century. Jewish astronomer and physician. The first translator of the Almagest into Arabic.

Habash Al-Hasib
Ahmad ibn 'Abdallah al-Marwazi Habash al-Hasib (the calculator). Flourished in Baghdad; died a centenarian between 864 and 874. Astronomer under al-Ma'mun and al-Mu'tasim. (He observed from 825 to 835) He compiled three astronomical tables: the first were still in the Hindu manner; the second, called the 'tested" tables, were the most important; they are likely identical with the "Ma'munic" or "Arabic" tables and may be a collective work of al-Ma'mun's astronomers; the third, called tables of the Shah, were smaller. For the solar eclipse of 829, Habash gives us the first instance of a determination of time by an altitude (in this case, of the sun); a method which was generally adopted by Muslim astronomers. He seems to have introduced the notion of "shadow," umbra (versa), equivalent to our tangent, and he compiled a table of such shadows which seems to be the earliest of its kind.

Arabic Medicine

Practically all the medical work of this period was due either to Japanese or to Arabic-speaking physicians. Of the eight physicians whom G. Sarton mentioned as the most important, six were Christians, one was an Arab, the other a Persian. A great part of the activity of these men was devoted to translating Greek medical texts, especially those of Hippocrates and Galen, into Syriac and into Arabic. All of the translators were Christians, the most prominent being Ya'hya ibn Batriq, Ibn Sahda, Salmawaih ibn Bunan, Ibn Masawaih, and Ayyub al-Ruhawi.

Jibril ibn Bakhtyashu' collected Greek manuscripts and patronized the translators, but he also wrote some medical works. Salmawaih ibn Bunan showed that the use of aphrodisiacs, always popular in the East, was dangerous. The greatest of all the physicians was Ibn Masawaih (Mesue Major). He dissected apes and composed various anatomical and medical writings, notably the earliest ophthalmological treatise extant in Arabic and a collection of aphorisms.

Ibn Masawaih

Latin name: Mesue, or, more specifically, Mesue Major; Mesue the Elder. Abu Zakariya Yuhanna ibn Masawaih (or Msuya). Son of a pharmacist in Jundishapur; came to Baghdad and studied under Jibrll ibn Bakhtyashu'; died in Samarra in 857. Christian physician writing in Syriac and Arabic. His own medical writings were in Arabic, but he translated various Greek medical works into Syriac. Apes were supplied to him for dissection by the caliph al-Mu'tasim c. 836. Many anatomical and medical writings are credited to him, notably the "Disorder of the Eye" ("Daghal al-ain"), which is the earliest Systematic treatise on ophthalmology extant in Arabic and the Aphorisms, the Latin translation of which was very popular in the Middle Ages.

The Time of Al-Razi Second Half of Ninth Century

Cultural Background

Abbasid Caliph Al-Mutawakkil (847-861) continued to protect men of science, chiefly the physicians, and he encouraged the school of translators headed by Hunain ibn Ishaq.

The Egyptian Dhul-Nun is generally considered the founder of Sufism, that is, of Muslim mysticism.

Geometers: Al-Mahani wrote commentaries on Euclid and Archimedes, and tried to vain and divide a sphere into two segments, in a given ratio. Al-Nairizi wrote commentaries on Ptolemy and Euclid. Thabit ibn Qurra made very remarkable measurements of parabolas and paraboids, but is best known as the leader of a school of translators which produced Arabic versions of some of the mathematical classics: Euclid, Archimedes, Apollonios, Theodosios, Ptolemy.

Astronomers and Trigonometricians: Al-Mahani made a series of astronomical observations from 855 to 866. Al-Nairizi compiled astronomical tables and wrote an elaborate treatise on the spherical astrolabe. Hamid ibn Ali became famous as a constructor of astrolabes. Thabit ibn Qurra published solar observations; he tried to improve the Ptolematic theory in planetary motions by the addition of a ninth sphere to account for the (imaginary) trepidation of the equinoxes. Qusta ibn Luqa wrote a treatise on the spherical astrolabes. Jabir ibn Sinan, who may have been al-Battani's father, constructed astronomical instruments, notably a spherical astrolabe.

The greatest astronomer of the age was al-Battani (Albategnius). He made a number of observations from 877, on, compiled a catalogue of stars for the year 880, determined various astronomical coefficients with great accuracy, and made an elaborate astronomical treatise which remained authoritative until the Sixteen Century. That treatise included a trigonometical summary where sines, tangents and cotangents, are regularly used. It contains a table of cotangents by degrees and theorems for spherical triangles.

AL-RAZI

In Latin: Rhazes. Abu Bakr Mohammed ibn Zakaria al Razi. Born in Ray, near Tehran, Persia, about the middle of the ninth century. Flourished in Ray and in Bagdad. died 923-24. Physician, physicist, alchemist. The greatest clinician of Islam and middle ages. His chemical knowledge was applied by him to medicine.

Of his many writings, the most important are the "Kitab al Hawi" (Continens), an enormous encyclopaedia containing many extracts from Greek and Hindu authors and also observations of his own; the "Kitab al Mansuri" (Liber Almansoris), a smaller compilation in ten books based largely on Greek science, and finally his famous monograph on smallpox and measles "Kitab al-jadari wal-hasba" (De variolis et morbiliis; de peste, de pestilentia), the oldest description of variola and the masterpiece of Muslim medicine.

He made investigations on specific gravity by means of a hydrostatic balance. Various chemical treatises are ascribed to him, and one of them (Arcandorum liber, apocryphal?) contains a list of 25 pieces of chemical apparatus.

The al-Hawi has not been published, and there is not even a single complete manuscript in existence. A latin translation, Liber dictus Elhavi, appeared in Brescia (1486), followed by various Ventian editions. The liber ad Almansurem, in ten books was first published in Milan (1481) and was frequently republished.

AL-BATTANI

In Latin: Albategnius, Albatenius - Abu Abdallah Mohammed ibn Jabir ibn Sinan al-Battani, al-Harrani, al-Sabi, born before 858 in or near Harran. Flourished at al-Raqqa, in the Euphrates, died in 929 near Samarra. Great astronomer. Various astrological writings, including a commentary on Ptolemy's "Tetrabiblon" are ascribed to him, but his main work is an astronomical treatise with tables ("De scientia stellarum," " De numeris stellarum et motibus") which was extremely influential until the Renaissance.

He made astronomical observations of remarkable range and accuracy from 877 on. His tables contain a catalogue of fixed stars for the years 880-81 He found that the longitude of the sun's apogee had increased by 16o47` increase since Ptolemy, that implied the discovery the motion of the solar apsides and of a slow variation in the equation of time. He determined many astronomical coefficients with great accuracy: precession 54.5`` a year; inclination of the ecliptic, 23o35`.

The third chapter of his astronomy is devoted to trigonometry. He used sines regularly with a clear consciousness of their superiority over the Greek chords. He completed the introduction of the functions umbra extensa and umbera versa (hence our contangents and tangents) and gave a table of contangents by degrees. He knew the relation between the sides and angles of a spherical triangle.

Biology and Medicine

First Half of Tenth Century

Mathematics and Astronomy

Abu Kamil perfected al-Khwarizmi's algebra; he made a special study of the pentagon and decagon and of the addition and subtraction of radicals; he could determine and construct the two (real) roots of a quadratic equation.

Abu Othman translated Book X of Euclid, together with Pappos's commentary upon it.

Al-Balkhi and the physician Sinan ibn Thabit wrote various treatises on mathematical, astronomical, and astrological subjects.

Al-Hamdani compiled astronomical tables for Yemen, and his work on archaeology of that country contains much information on the scientific views of the early Arabs.

Ibrahim ibn Sinan was primarily a geometer; he wrote commentaries on Apollonios and on the Almagest - his determination of the area of a parabola was one of the greatest achievements of Muslim mathematics.

Medicine

Most new ideas were published in arabic.
The greatest physician of the age was Jewish, Ishaq al-Isra'ili (Isaac Judaeus). He wrote the main mediaeval treatise on urine.

Abu Othman and Sinan ibn Thabit, became famous as organizers of hospitals. Sinan raised the scientific standards of the medical profession. Abu Othman translated Galenic writings into Arabic.

IBRAHIM IBN SINAN

Abu Ishaq Ibrahim ibn Sinan ibn Thabit ibn Qurra. Born in 908-9, died in 946. Grandson of Thabit ibn Qurra (q. v. second half of ninth century. Mathematician and astronomer. He wrote commentaries on the first book of "Conics" and on the "Almagest", and many papers on geometrical and astronomical subjects (for example, on sundials). His quadrature of the parabola was much simpler than that of Archimedes, (in fact the simplest made before the invention of the integral calculus)

ISHAQ AL-ISRA'ILI

Isaac Judaeus. Isaac Israeli the elder.
Born in Egypt; flourished in Qairawan, Tunis, where he died, a centenarian, about the middle of the tenth century (c. 932?). Jewish physician and philosopher.

One of the first to direct the attention of the Jews to Greek science and philosophy. Physician to the Fatimid caliph "Ubaid Allah al-Mahdi" (909 to 934), he wrote many medical treatises in Arabic. Translated into Latin in 1087 by Constantine the African.

The main medical writings are: on fevers, the book of simple drugs and nutriments, on urine (by far the most elaborate mediaeval treatise on the subject); the "Guide of the physician" (lost in Arabic, extant in Hebrew under the title of Manhag.) He wrote also a medico-philosophical treatise on the elements, and another on definitions. Isaac was the earliest jewish philosopher (at least one of the earliest) to publish a classification of the sciences. This was essentially the Aristotelian one.