Abu Ali Ibn Sina (980 – 1037)

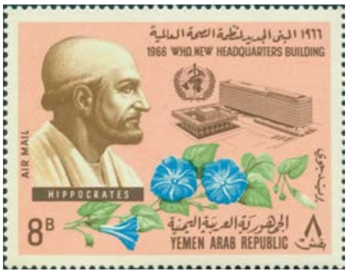
by Heinz Klaus Strick, Germany

Perhaps the most famous of the Islamic scientists, Abu Ali al-Husain ibn Abdallah ibn Sina, is known in the West as Avicenna.

His writings were translated into Latin as early as the 12th and 13th centuries and had a considerable influence on the development of science in Europe. Ibn Sina wrote about 450 works, of which 240 are still preserved - most of them on philosophy and medicine. However, the universal scholar was also a physicist, mathematician, poet, music theorist and alchemist.

The large number of stamps that have been published in particular in Islamic countries shows the esteem that he still enjoys today.

His encyclopedia *Qanum al-Tibb* (Canon of Medicine), which systematised and developed knowledge and traditions of the Greek, Roman and Persian sciences, had the greatest influence on posterity. The work contained a comprehensive description of the organs, their diseases, but also mental illnesses. It provided information about infectious diseases and sets hygienic rules on how to prevent their spread. The canon listed the effects and manufacture of 760 drugs. Avicenna even outlined criteria for how new medicines should be tested. His teachings were passed on to students at European universities until the 17th century. In some cases the book was used as the standard work on medicine even into the 19th century.

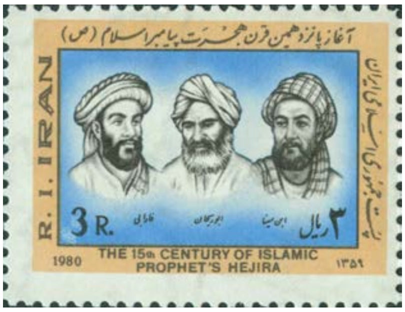


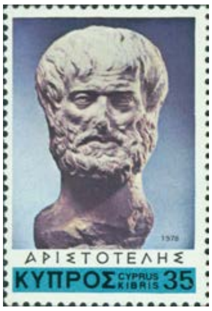
Ibn Sina's father was the administrator of the Sultan of Bukhara (today: Uzbekistan). He took care of the upbringing of his son himself and the young boy amazed visitors with his unusual perceptiveness.

Persian was spoken at home, but the boy quickly learnt Arabic, so that at the age of 10 he was not only able to read the Koran, but also to quote the Koran from memory.

At the age of 13 he started to deal with medical questions. At the age of 16 he treated his first patients. His reputation spread quickly - right up to the Sultan, whom he was able to cure of an illness. As a reward for this, the curious youngster received permission to use the Sultan's library. This enabled him to expand his knowledge in all areas. As he later noted in his autobiography, he found few teachers who could teach him anything; rather, he worked out most of it himself.

When the region was involved in wars between rival princes and his father died, Ibn Sina began a turbulent period of migration. He moved from place to place, but still wrote on different topics. Students quickly gathered around him, even if he was only temporarily in one place. He met ABU ARRAYHAN AL-BIRUNI, with whom he exchanged lively correspondence on philosophical questions, especially the teachings of ARISTOTLE.





The Iranian stamp on the left shows portraits of AL-FARABI, AL-BIRUNI und IBN SINA.

When he finally found a job as a doctor at the court of a Buyid prince in Hamadan (today: Iran), the troubled time was not yet over. The prince appointed him vizier, but after an intrigue at the court he was temporarily imprisoned. When the prince died, IBN SINA moved to Isfahan, where he spent his last years. He is buried in Hamadan.

The Iranian stamps from 1954 show the provincial capital Hamadan, the old and the new tomb of AVICENNA (mausoleum with tower).

IBN SINA also wrote a second encyclopedia, which is (misleadingly) entitled *Kitab al-Shifa* (Book of Healing).

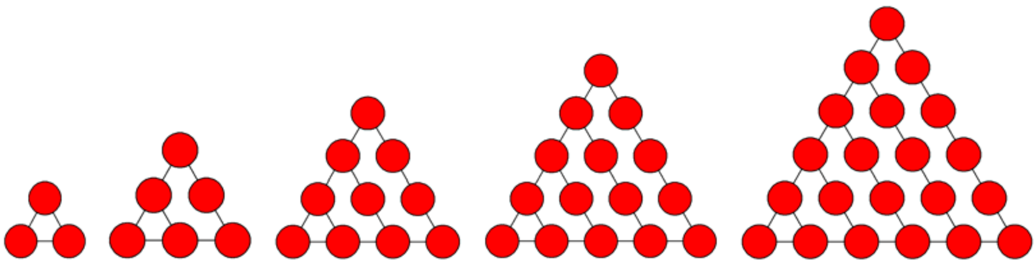
Of the four parts of this work, the first deals with mathematics, and shows that IBN SINA understood the fields of geometry, astronomy, arithmetic and music. Geometry also included surveying and the physical areas of statics, kinematics, hydrostatics and optics. Astronomy also included calendar questions and tables with geographic data. The arithmetic included a section on adding and subtracting with Indian numbers (which, as he wrote - was explained to him by a greengrocer).

In the Geometry chapter, IBN SINA was based on the elements of EUCLID , but without emphasizing the deductive system of the sentences; It dealt with the traditional topics of straight lines, angles, planes, parallels, triangles, circles, proportions, area determination with parallelograms and with triangles, with regular polygons and with circles, volume determination with regular polyhedra and with spheres as well as construction with compasses and rulers (straight-edges). In another part he went into the parallel axiom of EUCLID and tried to prove it.

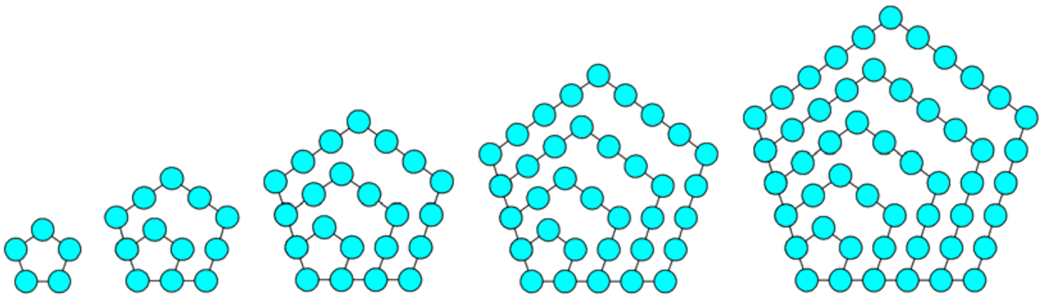
In the section on arithmetic, he dealt with the test for divisibility by 9 and explains how it works when calculating square and cubic numbers.

It also reflected the current state of number theory research; he explained in particular the properties of figurate, perfect and friendly numbers:

– Figurate numbers are numbers that result from growing regular n-cornered figures, such as the *triangular numbers* 1, 3, 6, 10, 15, 21, ...



  or the *pentagonal numbers* 1, 5, 12, 22, 35, 51, ...



– A natural number is *perfect* if it is the sum of its real divisors (examples: 6 = 1 + 2 + 3, 28 = 1 + 2 + 4 + 7 + 14).
  Perfect numbers are also triangular numbers, i.e. they can be noted as the sum of natural numbers. Example: 1 + 2 + 3 + 4 + 5 + 6 + 7 = 28.
  The sum of the reciprocal values of all divisors of a perfect number always results in two:
  $\frac{1}{1}+\frac{1}{2}+\frac{1}{3}+\frac{1}{6}=2$, $\frac{1}{1}+\frac{1}{2}+\frac{1}{4}+\frac{1}{7}+\frac{1}{14}+\frac{1}{28}=2$

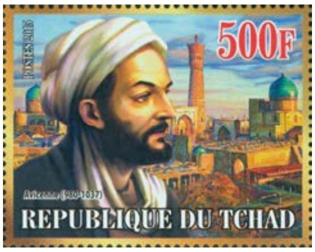
– Natural numbers where the sum of the real divisors is smaller than the number itself are called *deficient* ; if the sum is greater than the number, it is called *abundant* .

– Two natural numbers are called *friends* if the sum of the real divisors of one number is equal to the other number.
  Example: 220 and 284 (the smaller partner is abundant and the larger one deficient); the following applies: 220 = 1 + 2 + 4 + 71 + 142 and
  284 = 1 + 2 + 4 + 5 + 10 + 11 + 20 + 22 + 44 + 55 + 110.

In order to carry out astronomical measurements, he built his own instruments that enable more precise reading. Although he also represented the geocentric world view of PTOLEMY, he concluded from his own observations that Venus moved between the sun and the earth. He is convinced that light spread through certain particles and that therefore the speed of light was finite.

He rejected astrology because, in his opinion, it was incompatible with Islamic teaching. In his explanations of simple machines (roller, lever, pulley and so on) he did not go beyond ancient models, but knew how to explain how they worked.

IBN SINA dedicated large parts of his encyclopedia to philosophy, critically examined ARISTOTLE's teachings (which he says he only understood through the books of AL-FARABI), but also tries to reconcile them with the statements of the Koran bring to. Even if the statements of religion always took precedence for him, his philosophical writings influenced the Christian scholasticists THOMAS AQUINAS (1225 – 1274) and ALBERTUS MAGNUS (1200 – 1280).



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