

Astronomy in the Baghdad of the Caliphs

Summary: From the 8th to the 12th century Baghdad was the most civilized city in the world, scene of a vigorous cultural and intellectual life. One of the many interests of the scholars of that milieu was astronomy, not least because the wonders of God's universe were repeatedly mentioned in the Quran and because certain religious rituals were bound to the cycles of the sun and moon.

The speaker presented examples of the remarkable achievements of the Muslim astronomers of this early period: extracts from astronomical manuscripts in the form of diagrams or tables, and astronomical instruments of one sort or another, such as astrolabes, quadrants, sundials, calculating devices, etc. Both in theoretical and practical astronomy astounding advances were made, and some of these sources bear witness to the development of what may well be called "astronomy in the service of Islam".

What was eventually transmitted to eager Europeans in the Middle Ages was just a fraction of this early material, already long outdated in the Islamic world, and for the rest we are forced to turn to the 10,000 surviving manuscripts and several hundred surviving instruments. Studies of the history of Islamic science still suffer from the fact that most scholars are interested only in the phenomenon of transmission, either from Antiquity or on to Europe. Many people think that "the Arabs gave us (the) zero". It is more appropriate to look at the phenomenon of Islamic science within its own cultural context. Then, if we want to compare, we discover that actually, as far as astronomy is concerned, little was achieved in Europe until ca. 1550 that had not been achieved previously by Muslim scholars at some time between the 9th and the 15th century.

The speaker also discussed the devastation of Baghdad by the Mongols in the 13th century, and its devastation once again in the 21st century. It appears that many if not all of the medieval manuscripts were destroyed on both occasions. Fortunately for the history of astronomy in 9th-century Baghdad, plenty of other relevant manuscripts are scattered in libraries around the world. Much of the research on these manuscripts over the past 20 years has been conducted in Frankfurt; some of the results are already published, others are in press.

Some of the following topics that were discussed in the lecture:

- The new Islamic sacred cosmology, from 9th-C Baghdad
- The new Islamic sacred folk geography, from 9th-C Baghdad
- The new Islamic folk astronomy, documented in 9th-C Baghdad
- The first encounters with mathematical astronomy in 8th-C Baghdad: al-Fazârî and Ya'qûb ibn Târiq
- The translations of Greek astronomical works, late-8th- & 9th-C Baghdad
- The earliest known astrolabe, from 8th-C Baghdad (perhaps recently "liberated" from the Archaeological Museum in Baghdad)
- Arabic as the new language of science, from the 8th century onwards
- The earliest trigonometric tables in Arabic, from 9th-C Baghdad
- The earliest surviving Arabic astronomical handbooks with tables, from early-9th-C Baghdad
- Some of the first scientific personalities writing in Arabic: al-Khwârizmî, Habash al-Hâsib, Thâbit ibn Qurra
- The first tables for regulating the times of Muslim prayer (defined by shadow-lengths and twilight phenomena), from 9th-C Baghdad
- The first tables for reckoning time of day by the sun and time of night by the stars, from 9th- and 10th-C Baghdad
- The first tables displaying the direction of Mecca for all longitudes and latitudes, from 9th-C Baghdad
- The first tables for regulating the Islamic lunar calendar, 9th-C Baghdad
- The first tables of geographical longitudes and latitudes, 9th-C Baghdad
- The first Arabic world-map, from 9th-C Baghdad
- The first Muslim geodetic measurements, commissioned in 9th-C Baghdad
- The first astrological histories in Arabic, from 9th-C Baghdad

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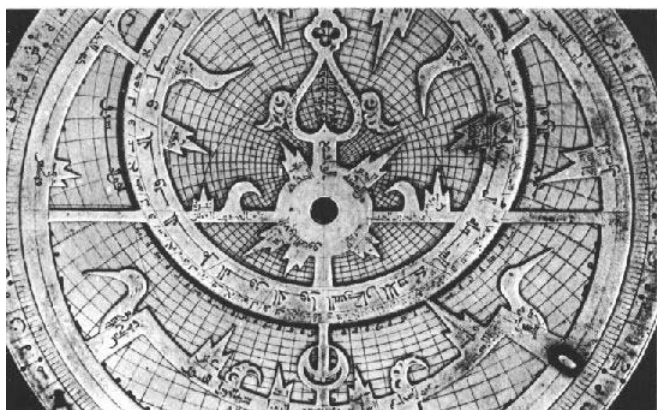
- Astrological themes: the founding of Baghdad, the computation of the length of human life, etc.
- A spectacular astrolabe with zoomorphic decoration, a veritable "scientific work of art", from 10th-C Baghdad
- The earliest known Islamic planetary equatorium, on an astrolabe from 10th-C Baghdad

And, last but not least:

- The "Uhrtäfelchen" of Regiomontanus in 9th-C Baghdad (?)
- A world-map preserving direction and distance to Mecca at the centre, conceived in 9th-C Baghdad (?)
- An iterative solution to "Kepler's equation", from 9th-C Baghdad (!)

There is, of course, enough material here for a substantial book.

For a bibliography of publications on these topics, see www.unifrFrankfurt.de/fb13/ign/astronomy_in_baghdad/bibliography.html.



A "weapon of mass calculation" from 10th century Baghdad

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David King, an "old European"-type but U.S.-trained orientalist, has been Professor of the History of Science at Frankfurt since 1985. Born in England, he was educated at Cambridge (Mathematics), Oxford (Education), and Yale (Near Eastern Studies), and he has worked on the primary sources for the history of Islamic astronomy in libraries and museums all over the world.

During 1972-79 he directed a Smithsonian Institution project at the American Research Center in Cairo researching the history of Islamic astronomy, and during 1979-85 he was Professor of Near Eastern Languages & Literatures and History of Science at New York University.

His publications include A Catalogue of the Scientific Manuscripts in the Egyptian National Library (1980-86), and three volumes of collected studies: Islamic Mathematical Astronomy (1986/93), Islamic Astronomical Instruments (1987/95), and Astronomy in the Service of Islam (1993), and also, on a medieval European topic, The Ciphers of the Monks: A Forgotten Number-Notation of the Middle Ages (2001).

His World-Maps for Finding the Direction and Distance to Mecca (Leiden: E. J. Brill, 1999) was awarded the International Book Prize of the Islamic Republic of Iran for the year 2000. The first part of his Studies in Astronomical Timekeeping in Medieval Islamic Civilisation, based on over 500 previously-unstudied manuscripts, is to appear later this year under the title The Call of the Muezzin (Leiden: E. J. Brill).

Over the last 15 years he has been awarded several DFG grants for research with colleagues in Frankfurt on astronomical tables, astronomical instruments and two-way scientific transmission between Europe and the Near East in the 16th and 17th centuries.

In Frankfurt in November, 2001, he delivered a lecture entitled: "When the night-sky over Qandahar was lit only by stars", presenting some remarkable tables for time-keeping at night, computed a thousand year ago for the latitude of Qandahar. Most of his attitudes are of the kind that Donald Rumsfeld would call "unhelpful".

This lecture was sponsored by the Frankfurt-Mainz-Nancy History of Mathematics Seminars, organized by the Institute for the Didactics of Mathematics, Goethe University, Frankfurt; the History of Mathematics work-group, Gutenberg University, Mainz; and the Poincaré Institute at the University of Nancy.

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