

The Magic of Science

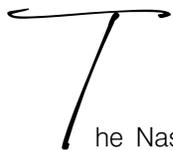
The Arts of Islam: Treasures from the Nasser D Khalili Collection



Science in Islam was at its high peak between the ninth and 13th centuries. Charlotte Schriwer of the Nasser D Khalili Collection of Islamic art examines the achievements of the early Islamic scientists; skilled physicians, mathematicians and astronomers who seamlessly combined religion and science.

Facing page: Celestial globe. Dated AH 684 (AD 1285-6). Iran. Brass, sheet metal, with silver-inlaid dots. 13.4 cm (diameter). © Nour Foundation.

TEXT BY CHARLOTTE SCHRIWER
 PHOTOGRAPHY BY CHRISTOPHER PHILLIPS
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The Nasser D Khalili Collection of Islamic Art holds a uniquely diverse collection of objects related to science, tools and magic; ranging from basic utilitarian objects, such as glass cupping devices dating from as early as the seventh century, to the more complex and intricately detailed tools of the 19th and 20th centuries, such as astrolabes, quadrants and *qiblah* compasses. Detailed scientific manuals and handbooks, elaborately decorated magic medicine bowls, talismans and amulets, and rare alchemical equipment, as well as delicately produced globes mapping stars and constellations across the skies, add to this incomparable collection of scientific instruments and tools. Many of these have not been studied in great detail, and although their function and purpose may still remain an enigma to scholars of Islamic art and history today, there is no doubt that these objects were essential and reflect the necessity of science and magic in everyday life for any individual, regardless of their status in society. Furthermore, although not all objects may display great beauty in the historical sense, their interest lies in their purpose; if not in the aesthetic, at least in the functional.

Medieval Islamic scholars were renowned for their scientific knowledge and were often far ahead of their European counterparts.

Medieval Islamic scholars were renowned for their scientific knowledge and were often far ahead of their European counterparts. *'Ilm* was the word used for science; a term incorporating the learning and understanding that came from studying the forces that controlled human existence. It referred to any investigation, not only by scientific methods but also by other means, such as magic, which sought to find possible answers to the seemingly inexplicable. Therefore magic was deemed to be a perfectly acceptable form of scholarly investigation and interpretation, just in the same way as mathematics, astrology and alchemy.

Faith and the Physical

In Islam, science and religion are often closely related. Medicine was one of the sciences for which medieval Islamic scholars were most famous. For example, in 16th-century Padua the '*Qanun fil-Tibb* (Medical Encyclopaedia)' of Ibn Sina (Avicenna) was still referred to as long as 600 years after it had first been written. Studies of the human anatomy, as well as medical and pharmaceutical compendia, all drew on the traditional medical



کلیه دولت و ملک این شهر که در سواحل این دریا
وقایع آن در زمان ما و در زمان پیشین
فرمان آن زیاد است و اخبار درود

مناسط کوی

برای و مشیرون کن شمس
انلی برنده با بود

صهار قور و افسا این شهر
کلیسا بود

سنانه

صهار قومین رانی

مانا ران ساری

لوزانده

برقازده اولان کور

نسل

اطلا قنسی

شهر و بند بکلیه یونان
اولان قلیه البرید

مناسط



Although unconventional in modern practice, the use of magic in medicine and divination as well as for physical and spiritual protection was common in medieval Islam.

practices established by the Prophet Mohammed (PBUH). A superbly decorated example of this work entitled '*Al-Tibb Al-Nabawi* (Medicine of the Prophet)' by Ibn Qayyim Al-Jawziyyah includes a finely illuminated *tughra* of Ottoman Sultan Suleyman the Magnificent (reigned 1520-1566), which was produced in Ottoman Turkey during the 16th century.

Following on the esteemed traditions of the Prophet (PBUH), medical and scientific manuals began to include more detail over the centuries, as knowledge expanded through

investigation and research. Manuals in human anatomy, for example, began to show detailed colour drawings of organs, the circulatory system, bones and muscles, while the medicinal properties of plants were studied in ever greater depth.

In addition to the various reference books, scientific tools were also produced. Another specialty of medieval Islamic scholars was their knowledge of alchemy (the mixing of metals; first to attempt to create gold), which became the forerunner of modern chemistry, the two often being interchangeable in medieval Islamic science. The equipment used for alchemical experiments was frequently made of glass. The process of distillation, in particular, involved a condensing vessel (alembic or *Ar'abiq*) and a receiving vessel (cucurbit or *Arqar*). Distillation was commonly used for pharmaceutical, medicinal and industrial purposes, such as the production of perfumes.

Previous pages: *Kitab-i Bahriye* (The Book of the Sea) of Piri Reis. Circa 1670. Ottoman Turkey. Ink, gouache and watercolour on paper. 24 x 34 cm. © Nour Foundation.

Above: Two fragmentary folios from a herbal compendium. 13th century. Probably Iraq. Ink and watercolour on paper. 14.2 x 16.9 cm and 16 x 16.5cm. © Nour Foundation.

Facing Page: *Tibb Al-Nabawi* of Ibn Qayyim Al-Jawziyyah. Dated 21 Shawwal 926 (4 October 1520). Probably Damascus, Syria. Ink, gold and opaque watercolour on paper. Folio size 17.5 x 12.1 cm. © Nour Foundation.



The Supernatural

Although unconventional in modern practice, the use of magic in medicine and divination as well as for physical and spiritual protection was common in medieval Islam. Deeply rooted in the belief in God, Islamic magic differed in practice from other cultures because it reflected devotion to Him, and piety, unlike the traditions of other ancient cultures that practiced magic. Magic squares, containing numbers believed to have magical or protective properties, certain chapters from the Qur'an, as well as '*Asma' Al-Husna*' (The 99 Beautiful Names of God) often adorned objects such as metal medicinal bowls. Curiously, the names of famous rulers associated with magical and protective properties, such as Salah Al-Din, were sometimes also inscribed on these bowls. Magic medicine bowls are believed to have been popular in 11th and 12th-century Syria, where the

first recorded example was discovered, as well as Egypt. The practice also existed in other areas of the Islamic world, such as 16th-century India, from which the Khalili Collection holds a superb example.

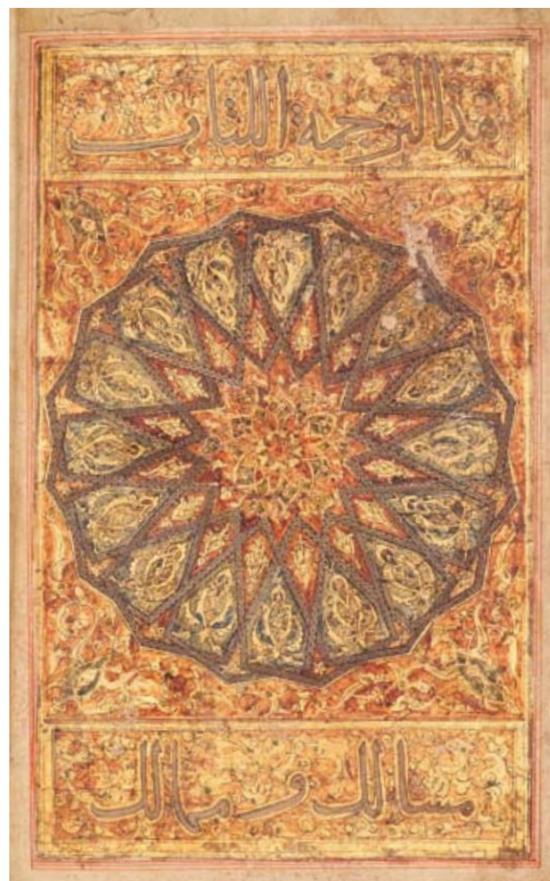
Amulets, plaques, talismanic charts and shirts, as well as treatises on magic are also featured in the Khalili Collection. One work in particular stands out; that of the 13th-century author Abu'l-Abbas Ahmad Ibn 'Ali Ibn Yusuf Al-Buni who wrote '*Al-Shams Al-Ma'arif* (The Illumination of Knowledge)', a popular treatise on talismans, magic squares and common occult practices. The superbly illuminated example in the Khalili Collection was produced in 19th-century Marrakesh and consists of 40 chapters discussing topics such as the use of numbers and squares, the magical properties of certain Qur'anic verses and the '*Asma' Al-Husna*'. Al-Buni draws on

the pre-Islamic Hellenistic and Jewish traditions, as well as other cultures assimilated into Islamic culture, and maintains his faith by including the essentials of Islamic magical practice of prayers and readings from the Qur'an.

Calculating Discoveries

In the science of mathematics, particularly in geometry and algebra, Muslim scholars were exceptionally skilful. Both were studied in great depth by Islamic scientists, and the instruments were crafted with precision and accuracy according to indepth scientific studies. Perhaps foremost in importance to medieval Islamic scientists was simplifying the process of finding the direction of Mecca in order to facilitate prayer for Muslims. This was achieved by means of astrological and mapping devices. Instruments such as astrolabes, *qiblah* compasses and celestial globes were thus welcome and commonly used inventions.

The Khalili Collection holds one of the largest and most diverse private collections of celestial globes, constructed using different techniques and designs, either with constellations, with stars only, without stars; or with astrological imagery. The tradition of celestial mapping can be traced back to Greece in the sixth century BC, and as a science was designed to solve timekeeping issues and other astronomical and astrological problems. The celestial globe, like the astrolabe, could not be used as a direct reading instrument;



the data had to be extracted, calculated and manipulated to arrive at a satisfactory solution. For a globe to function properly, it normally came with a stand containing meridian and horizon rings from which readings could be taken through their proper alignment. In many cases, these rings have disappeared and been replaced by later, non-functioning stands, but the Khalili Collection holds two splendid, intact examples.

In addition, the Khalili Collection is fortunate to have one of the oldest surviving celestial globes, it dates from 13th-century Iran, and is the earliest known globe to employ the specific details concerning the constellation provided in a treatise on astronomy by 'Abd Al-Rahman Al-Sufi, the 10th-century astronomer to the royal court of Isfahan.

Star Searching

While its use in Europe had almost ceased entirely by the 17th century, the astrolabe was in use in the Islamic world until the 20th century. One can trace the history of science in Islam back to its Hellenistic and pre-Islamic Indian traditions, which subsequently travelled westward to Al-Andalus and on to medieval Europe. As an instrument, the astrolabe is beautiful as well as practical. It solved the main concerns of Islamic astronomy, such as astrology, finding the direction of the *qiblah*, and determining prayer times through the position of the stars. Among the extraordinary collection of astrolabes in the Khalili Collection is a precisely executed and wonderfully detailed example dating from ninth-century North Africa. The

Mapping was not limited to the heavens. Islamic science enjoys a long history of cartography from as far back as the 11th century, with works such as the famous '*Kitab Al-Mamalik wa-l Masalik* (Book of Postal Routes and Kingdoms)' by the medieval geographer Al-Istakhri.

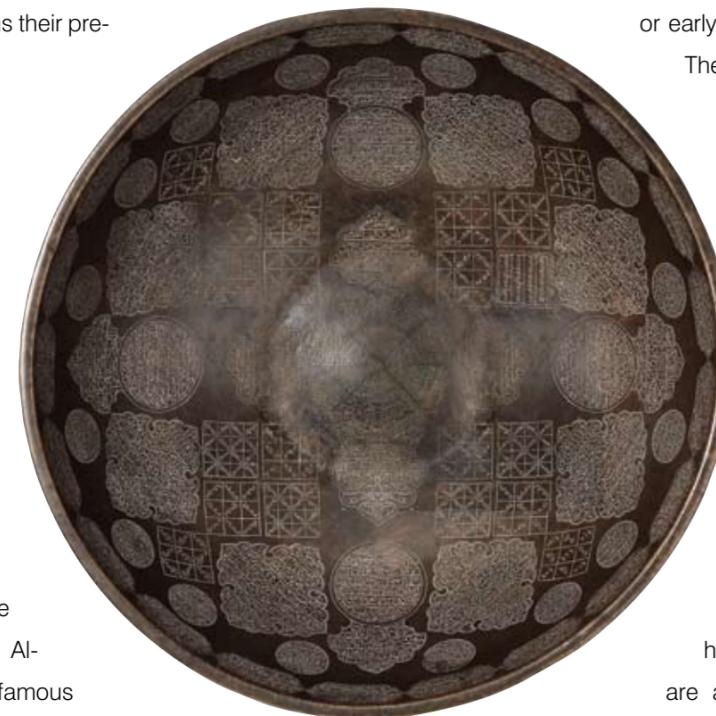
star pointers of this astrolabe not only listed stars (commonly found in Hellenistic and Babylonian heritage, from which traditional European astronomy was born) but unusually also mentions their pre-Islamic Bedouin names.

Charting Territories

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trend of the Age of Discovery that occurred in 15th-century Europe and the Americas by preparing a map of the New World, an area virtually uncharted by medieval or early modern Islamic cartographers.

The '*Kitab-i Bahriye*' offers detailed charts and town views of places such as Venice and Genoa, Alexandria and Cairo, as well as listing towns and villages dotted along the Nile River. The specific details, executed in a range of colours and stylistic drawings, include shoals, sandbanks and marshes. The 63 illustrated folios remaining in the Khalili Collection, which unfortunately have no supplementary text, are an exemplary reflection of the navigational skill and knowledge Muslim scholars acquired over centuries of scientific research, study and practice. 📖



Facing Page: '*Kitab Al-Masalik wa-l-Mamalik* (the Book of Postal Routes and Kingdoms)' by Al-Istakhri. 706 AH (1306-07 AD). Iran, perhaps Isfahan. Ink, gold, silver and opaque watercolour on paper. 25 x 15 cm. © Nour Foundation.

Above: Magic-medical bowl. 16th century. India, probably the Deccan. Brass alloy, cast and turned. 8.5 cm (height), 22.8 cm (maximum diameter). © Nour Foundation.

'The Arts of Islam: Treasures from the Nasser D Khalili Collection' is at Emirates Palace, Abu Dhabi, until 22 April. For information on the collection, visit www.khalili.org