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Tree of Life Motifs in Seljuk Architecture

Abridged from a lecture by Gönül Öney

Anatolian Seljuk art in the 12th to the 13th centuries, is extremely innovative when considered in the context of early Islamic art. Indeed, the varied figural representations in stone, stucco, tile and wood decoration rank among the richest examples depicting symbolic backgrounds in the architecture of Islamic art.

As we know, the misnomer of Qur’anic prohibition of figural art, which prevented the existence of figures in the Islamic world, has been corrected by several art historians. The figural prohibition, as expressed in the “Haditha” (traditions) recorded centuries after the death of Prophet Muhammad, influenced orthodox Islam for 14 centuries. A unique synthesis is to be seen in Anatolian Seljuk figural representations and also in our main topic: the tree of life representations which combine the characteristics of Turkish Central Asian, Sasanian and Muslim arts in Iran with the legacies of Christian art in Anatolia.

To understand Seljuk figural art with its symbolic backgrounds, we must first consider various Central Asian traditions. The Seljuks appeared in the 10th century as an offshoot of the Central Asian Turkish Oguz tribes in West Turkestan. Before they accepted Islam in the second half of 10th century, most Seljuks were followers of shamanism and were a semi-urbanized society. The metal, wooden, bone and textile artefacts, richly decorated with stylized symbolic figures, foliate and life tree depictions, were the main source of inspiration for Seljukid figural representations.

With the expansion of the Seljuks in Persia during the 11th-12th centuries, they absorbed early Islamic and pre-Islamic Sasanian elements. When Seljuks reached Anatolia at the end of 12th and later, during the 13th century, they were stimulated by the cultural heritage of Armenian stone carvers. The masons’ signs, often found on profane and sacred Seljuk architecture, is a proof of this legacy. The rich figural program, which we encounter in early-Islamic minor arts, finds its reflection in Anatolian Seljuk architecture on stone reliefs.

Another important non-Islamic component in the Seljuk iconographic art programme, is the Chinese one. The import of artefacts via the Central Asian trade routes and intensive trade connections in the 12th-13th centuries by sea, introduced various Chinese elements such as the dragon motif.

On top of this rich heritage, the shaman Mongol raids in the middle of the 13th century, brought a fresh wave of Central Asian spirit and tradition to Anatolia. They doubtlessly played a role in regenerating some of the ancient customs and beliefs and incorporated them into the world of Islam. We can see, therefore, that the effects of Central Asian shaman cults persisted for a long time after the adoption of Islam by the Seljuks.

The Mongol invasion of Anatolia also made a great impact on the political, social and economic life of the Seljuks. The Turcoman masses from West Turkestan and Iran, escaping from the Mongols, passed through Khorasan and Iran and took refuge in Anatolia. The moral and economic collapse of the Anatolian people drew them to patronise sheiks and dervishes in search of salvation and security. Some heretical sects came into existence and many convents were built. Many sheiks and dervishes travelled from village to village and town to town to spread their own beliefs and ideas. From the middle of the 13th century on, many such beliefs and orders continued in Anatolia under the cover of Islam.

Seljuks mixed their own steppe traditions with all these urban Islamic and non-Islamic cultures and transformed them into a new form of art. Thus, the existence of far-reaching symbolism caused by this background, influenced the pictorial programme of Seljuk figural art and our main subject, the tree of life depictions. The rich programme of figural representations in general and the tree of life representations in particular, are seen on sacred architecture such as mosques, madrasas,
mausoleums and even on tombstones. Profane buildings, such as palaces, caravanserais and city walls are also often decorated with figural representations. As the material is very rich and diversified, the lecturer concentrated in their talk only on the tree of life depictions and on the accompanying imaginary symbolic figures. Lions, birds, double-headed eagles, sirens, dragons and also rosettes and pomegranate motifs.

Professor Öney introduces several different versions of the Seljuk tree of life depictions. The simplest version is in the form of a branch or a flower. The life-tree depictions in the north portal of the Ulu Camii Mosque in Divrigi (1226 AD), spring from small vases which most probably symbolise the cup containing the elixir of eternal life. The tree of life is topped by a big rosette resembling a sunflower; most probably as a symbol of the sun.

In the İnce Minareli Medrese in Konya (1258 AD) the tree of life symbols are depicted symmetrically on top of the portal niche, with big pomegranate motifs as the symbol of eternal life. A big luminary sign, the crescent, surrounds the stem of the life tree.

Another example can be seen at the portal of the Çifte Minareli Medrese in Erzurum (end of 13th century). Here, the tree of life is seen in the form of a stylised palm tree, with pomegranates in its branches. The tree springs from a rosette-like big vase, again a luminary sign. The
pomegranate is, as mentioned before, a symbol of eternal life and the fruit of heaven.

Tree of life motifs flanked with birds or stems is another version. These examples are especially prevalent on tombstones in Central Anatolia. On tombstones, depictions of the tree of life are again surrounded with rosettes, symbolising the celestial system. The tree of life surrounded by birds is also common on Seljukid palace tiles. The richest examples are seen on the tiles of Kubadabad Palace; Sultan 'Ala' al-Din Keykubad's summer Palace (1236 AD). Here we find various types of tree of life depictions, combined with double birds.

The tree of life flanked by sirens can be seen on the portal of the Karatay Han near Kayseri (1246-49 AD). Here a small mask-like human head hidden in arabesque, replaces the sun rosette. The tree is in the form of arabesque foliage.

Trees of life flanked by birds and topped by an eagle is a richer version. They are depicted on two sides of the Gök Medrese Portal at Sivas (1228 AD). The depiction of big pomegranates, small birds between the branches of the tree and a small crescent underneath the stems, are typical motifs of these life trees.

We can explain the tree of life and double bird, siren or double-headed eagle combination with Central Asian beliefs. The Turkish shamans believed that an iron-
either side of the wings. The dragons' heads at the wing-end, threaten the eagle with wide-open mouths. This representation reminds us of the dragon life-tree eagle combination at the Çitte Minareli Medrese in Erzurum. The dragon-monster is devouring the luminaries. Here, the sun, in the form of a double-headed eagle, and the moon in crescent form, are threatened by the dragon which represents darkness and enemies. In all of our tree of life representations, the victorious, powerful, protecting eagle is the symbol of the sultan, the universe or the shaman. He is guarded by lions or sirens when threatened by evil forces that are mainly represented by the dragon.

We encounter similar combinations on the wooden door-shutters of the Kileci Masjid in Aksehir (13th century) and on a piece of silk, dating to the reign of 'Ala' al-Din Keykubad (1220 AD), found in the Handicrafts Museum in Berlin. Another interesting example can be observed on a lacquer-painted Qur'an-stand in the Mevleva Museum in Konya (1270 AD). In these examples the life tree is replaced by an arabesque background, surrounding the double-headed eagle. On the wooden example from Kileci Masjid and the Konya silk, the dragons can be observed among the foliage. On the Qur'an-stand the double-headed eagle is surrounded by protecting lions. We encounter in these examples, summary form versions of the tree of life representations. The origin of this magical combination of different creatures and foliage, lies in the complex, widespread Euro-Asian animal style. The richest examples occur in Pazirik, Mongolia and date between the 5th-4th centuries B.C. On wooden horse-decorations in the Hermitage Museum in St. Petersburg, mask-like lion-heads are combined with griffon-heads and, in several other examples, magical creatures become a part of the foliate composition.

As we noticed, tree of life depictions are mostly situated on the portals and façades of buildings. According to shaman sources, the Turks have always considered that their tent, or house, is a symbol of cosmos or paradise. Some scholars think that the portals or iwans of sacred buildings were regarded as the entrance gate to the universe and paradise. If we accept this explanation, we can surmise that the tree of life depiction on buildings, stresses their importance in the city and testifies to the political and social power of their builder during his lifetime as well afterwards. It is as if their portals are conveying a message with these representations, indicating that these buildings have a place in the universe.

Interestingly, a very different version of the tree of life, accompanied by symbolic figures can be seen in the Hıdıvâvend Hatun Mausoleum in Nigde. In this building, all symbolic tree of life motifs are separately depicted on different façades. This time, instead of summary form presentation, a divided composition is preferred. The double-headed eagle with dragon-heads at wing ends and a mask-like human head as the sun rosette is depicted in one of the upper niches. On the left side, we notice a mask-like human head, hidden between arabesques. Near the portal, the capital is ornamented with three small, mask-like human heads. They might represent the deceased. On the south-east façade, we notice two symmetrically placed lions flanking three big rosettes (one of which is broken). Their heraldic character and upright posture emphasise their guarding and protective function. Their tails end in dragon-heads, as in the case of double-headed eagles. The dragons are threatening the sun, represented by the lions. Siren figures enrich the figural repertoire. On the left side of the portal, two sirens flank three big rosettes; their heads crowned in Central Asian style. Their wings terminate in dragon-heads with open mouths. They reveal the same hybrid nature as the lion and double-headed eagles. On the north side, on top of the window panel, two sirens, placed face to face, flank three large rosettes. In
summary: the tree of life, double-headed eagle, double lions, double sirens, all with dragon heads at wing ends, rosettes and human heads (as rosettes), are motifs which are already known to us from other examples. In this mausoleum, they are distributed throughout the building.

Tree of life motifs on mausolea and tombstones have, however, a different background. They are combined with the idea of the heavenly salvation of the deceased. According to shaman beliefs, the eagle or the birds help the shaman in his travels. For this reason, the shamans used to have wings on their robes to transform them into birds. The tree assists in the ascension of the spirit of the dead, which is also in bird form. The Orkhun inscription of the Gōktürks in Central Asia refers to the flight of the spirit to the other world. Even today in Anatolia, reference is made to the deceased by saying "he has flown like a bird."

The double-headed eagle is also represented as a purely heraldic emblem in Islamic, Christian and Byzantine art. In this case it functions as a royal emblem. Thus, we often encounter eagles in Seljuk palaces and on city walls. The double-heads of the eagle may point to a political constellation or they may express two power spheres as mentioned in Seljuk foundation inscriptions, for example "the Sultan of Arabs and Persians". The ferocious appearance of the double-headed eagle implies its protective meaning. On several tiles found in the summer palace Kubadabad, double-headed eagles are depicted. Some examples are distinguished by Arabic inscriptions on their bodies. The word "al-Sultan" demonstrates the role of the double-headed eagle as the Sultan’s emblem and power symbol. Although they are not related to our tree of life depictions, they are typical examples of the many-layered, intricate symbolic background of the Seljukid figural representations.

As we have demonstrated in the examples presented, the symbolic ‘tree of life’ background can be mainly attributed to shamanistic beliefs originating in Central Asia and the continuation of such beliefs in Islamic sects. In the 13th century, the Alevi, Bektashi, Mevlevi and several other Sufi dervishes, as well as Islamic mystics, adapted these beliefs into Islam. They used symbols to convey their feelings. Sufi stories tell of souls transformed into birds, flying to heaven. The dervishes of several orders had great tolerance on the rights of Islam. In conclusion we can say that both the shaman and Sufi beliefs gave rise to unique tree of life representations in Anatolian Seljuk art.
Central-Asian Elements in Early Islamic Art

Abridged from a lecture by Boris I. Marshak

It is well known that the early, courtly art of the Caliphate from the late seventh to the ninth century AD had two main sources of inspiration: Byzantium and Sasanian Persia. However, this lecture shows that several themes and motifs that were considered to be Sasanian Persian are in fact Central-Asian or contain combined Persian and Central-Asian elements. In this respect it is necessary to solve two problems. What historical situation determined the penetration of Central Asian elements into early Islamic art and why could art historians not separate them from the Persian influence?

The contacts began soon after the fall of Iran in AD 651 when a strong Arab army was quartered in Khorasan in order to conquer a large group of small principalities and rich city-states in Central Asia. Although local rulers gradually became the allies of the Arabs, being formally converted, there were frequent revolts and the war was to continue for more than a hundred years. The spoils of war and contributions were brought to Merv, the headquarters of the Khorasan army. One fifth of those were sent to the central government. Tributes and taxes from the vast territory of Khorasan itself, Sogdia, Khwarizm, Tokharistan and so on, also accumulated in Merv. Thus, Sogdian or Tokhar works of art reached the central parts of the Caliphate. It is worth mentioning al-Tabari’s account of how, in the 740s in Merv, many precious vessels in the form of different animals were prepared for despatch to the Caliph. In Khorasan, Arabs and their local allies interacted politically and culturally. In particular, some powerful Arabs had local retainers, the so-called [Persian for subordinate] under the Umayyads.

The role of the Khorasan army was so great that the Umayyad dynasty fell when Abu Muslim, the Abbasid emissary, took power in Merv. In the days of Abu Muslim the majority of Central Asian nobles were converted and closely collaborated with the Arabs. Meanwhile he executed several of those who were, or seemed to be, less loyal. In the early cAbbasid period the converts from Central Asia occasionally became influential not only in Khorasan but also in Baghdad, such were the Barmakids who arrived from Tokharistan.

Merv was so important that three Abbasid princes ruled there before their reign as Caliphs. The most famous of them was al-Ma’mun ibn Harun al-Rashid who spent from AD 808 to 817 in Merv as a governor, then as a rival to his reigning brother and finally as Caliph. He had many local noblemen among his most important supporters. After his victory some of them followed him to Baghdad.

All these facts are well known but historians usually do not see that those mean anything more than the gradual growth of the Iranian component in the Caliphate society. For them, the differences between the Persians (a people whose homeland was Fars, whose language belonged to the West-Iranian linguistic family and whose pre-Islamic kings were the Sasanians) and the Khwarizmians, Sogdians and Bactrians is not important. However, these Central-Asian peoples, during the long period before the Arab invasion, were independent from the Sasanians and their East-Iranian languages were different from Persian and (to a lesser extent) from each other.

Taking this into consideration, can one still bracket all of them, including the Persians, together? The two
alternative answers are both correct: “yes” from the point of view of an historian, “no” from the aspect of the art historian. The historian, whose field of investigation is written sources, may say that soon after the Arab invasion, those Sogdian and Bactrian minorities who were converted into Islam theoretically became the equal of the Arabs, but practically they were adopted by the Muslim Persian-speaking community because penetrating Arab society was much more difficult. In the eyes of their former compatriots such a convert was a Tajik, an Iranian (Parthian and Sogdian) word for ‘Arab’, though the Arabs themselves only considered the Tajiks as being equal to those Persian allies who had been conquered and converted much earlier. In the eighth century, Tajiks used Persian in the public sphere. Much later, whole peoples became Tajiks and eventually forgot their native East-Iranian tongues: both Tojiki (a language of modern Tajikistan) and Dari (in Afghanistan) are very close to Persian. Many Middle Persian Sasanian books were translated into Arabic but such translations from the eastern Iranian languages are unknown. The Sogdian and Bactrian literary traditions were interrupted. Thus the elites of the Eastern and Western Iranians lost many of their dissimilarities during the first centuries of Islam. For all of them, Sasanian Iran was a model for nostalgic Iranian patriotism and, in some respects, this also applied to the Arabian administration, especially in the Abbasid period. However, for the art historian it is not only the above-mentioned traditions of the elite that are important but also that of the artisans who made the objects d’art because their traditions were by no means identical to each other. The rich customers who commissioned luxurious works of art from gold, silver or silk, statues and figural murals, needed something to remind them of the glories of the Sasanian court. They already knew such Sasanian themes as the royal hunt and the royal banquet. The quality of execution was also appreciated while stylistic hues and compositional peculiarities were not as important to them. These things could only be fully appreciated by master-craftsmen who had either learned them by heart during their apprenticeship or may have created them themselves. When such a master tried to copy something made by a craftsman of a different school, he could reproduce its subject and often its composition but inevitably changed the style and many of the details that were alien to him and would not seem important to his customers. Therefore, an art historian, carefully comparing various objects, can recognize the features specific to certain centres of production; in particular, Sasanian Iran and Sogdia. Tokhar (Bactrian) art will be also involved in this discussion. Finally we will check Persian, Sogdian or Tokhar designs in early Islamic works of art.

The great collection of so-called “Oriental Silver” in the Hermitage Museum, St. Petersburg gives us a unique opportunity to distinguish different local and period styles in the study of one material. The Hermitage and several other museums have collected about a hundred Persian Sasanian silver vessels and tens of the Sogdian ones, without which it would be difficult to say whether it was the style or the material that determined the different features. It is much more correct to compare Iranian silver vessels with Sogdian silver vessels rather than with Sogdian murals, or Sogdian silver vessels with their Bactrian counterparts rather than the statues of Bamiyan. The silver vessels produced between the third and fourteenth centuries AD in many countries, from Mesoopotamia to Sogdia and from India to Siberia, came to the Hermitage Museum, not from the art market, but from the forests of the Arctic zone of Russia as Central-Asian merchants and others brought silver vessels there in order to barter them for furs. Later on, many vessels were hidden in the earth and, after many centuries, found one by one or in small groups. Some, however, are still in the possession of Siberian shamans. Unlike the civilized countries of Asia, medieval Siberia did not know silver currency. The vessels, therefore, were not recast in order to use the metal for coins. On the contrary, they were preserved as sacred objects or hidden in the forests.

As the lecturer has tried to illustrate in his books, (Софийское Серебро (Sogdian silver), Moscow 1971 and Silberschatze des Orients, Leipzig, 1986) the protocol of royal imagery prevailing in the production of the Sasanian silversmiths was alien to their Sogdian colleagues; the style of the Sasanian Empire was solemn
and rather static whereas the Sogdians preferred the compositions which were dynamic as a whole and detailed. For example, the shape of a wing drawn by a Sasanian artist is compact and robust, its outlines are even, whereas the Sogdians drew each of the long feathers separately and each feather ended with a small volute. Therefore in such a wing everything seems moving. Besides, the movement of any feather is similar but not identical to that of each other. The purely decorative motifs like the half-palmettes in Sasanian art are compactly inscribed into a simple geometric figure: a circle or a triangle. In the art of Sogdia the half-palmettes seem "dishevelled" because each of their lobes curves separately and their sharp ends usually bend in the direction opposite to that of the main part. Thus from the most important themes to the smallest details, works of art reflected the difference between the aesthetics of the order and discipline typical of the great Sasanian empire and the spirit of individual activity characteristic of the Sogdian town-folk.

Central-Asian motifs are rarely present in Umayyad art. However several crowns in the mosaics of Qubbat al-Sakhra in Jerusalem are similar to the Sogdian (or Tokhar) crown type. The mosaics were repaired many times and one cannot be sure that the Central Asian details were present in the original ones of 690s AD, but the floral ornaments on the copper plaques upon the beams, more vivid than the Sasanian ones, sometimes also resemble those from Sogdia. For 'Abd al-Malik who was a patron of the mosaic craftsmen and coppermiths, it does not matter whether the prototypes of their motifs were genuine Sasanian or Central Asian for by then the craftsmen had at their disposal many luxury goods from Central Asia as it became the main repository for the spoils of war after the fall of Iran in 651.

Later, but still in the Umayyad period, in a mural of Khirbat al-Mafjar the so-called Senmurv (in fact, the royal farr) has not Sasanian but almost Sogdian wings with separately drawn individual feathers. However this fantastic animal is not a Sogdian motif but a symbol of the divine Glory-and-Good-Fortune of the Sasanian kings. This mural demonstrates the mixture of the Sasanian, Sogdian and Roman/Syrian elements. The latter is represented by a "decorative motif of interlacing circles" (published by Oleg Grabar), large and small, whereas the farr (Senmurv) roundels are inscribed into the large ones. Among the eighth century silver vessels there is a group that stylistically is partly Sasanian and partly Sogdian. In considering the Sogdian and related schools of silversmiths, the lecturer called this group School 'A' in his classification. One of the vessels belonging to School 'A' is a magnificent Hermitage plate showing the same fantastic animal. In it, the contrast between Sasanian iconography and the Sogdian style is striking. It is worth mentioning that "non-Sasanian" detail, such as a sharp protruding tongue, is rendered in a similar manner both on the plate and on a mural in Khirbat al-Mafjar. Some motifs of the School 'A' production, for example, lotus buds and wreaths are neither Sasanian nor Sogdian but Tokhar, derived from Buddhist traditions (Buddhism was popular in Tokharistan but not in Sogdia). The most probable location of School 'A' is Merv, which, in the eighth century was the capital of Greater Khorasan. It included Khorasan proper, which formerly belonged to the Sasanians and the vassal dominions of Sogdia, Tokharistan (former Bactria) and other Central-Asian lands. The newly converted Sogdian and Tokhar artisans brought their own traditions of craftsmanship to Merv but their rich patrons were the Khorasanian Arabs and Persians who almost equally liked Sasanian imagery.

Two other peculiarities of School 'A' are of interest to us. Firstly, in the flat parts of the decoration of several vessels the background is not plain but ring-matted. Although this manner was widespread from Sogdia to
The symbol of Royal Glory, Central medallion of a silver plate, School ‘A’, Merv, 1st half of the eighth century, Hermitage Museum, St. Petersburg, Russia

China it was not prevalent in Sasanian Persia. Secondly, lines ending with a dot is one of the distinguishing features of this school but not the central Sogdian one. In later variants of the motif that date to about the mid-eighth century and a little later, there were more such dots than in earlier examples. Both these features are attested on the famous bronze ewer in the Tbilisi Museum that bears an early Arabic inscription on its rim:

يركة من صناعة أبي زيد - مما عمل بالبصرة سنة سبع (تسع) وستين

If the inscription is completely correct the vessel was produced in Basra by Abu Yazid, most probably an Arab, in AH 67 or 69. However, the lecturer thinks that there was not enough space for the last words on the rim because the writer did not precisely calculate the size of the letters. In this case, the words “and a hundred” or “and two hundreds” were missed out. The most probable date is AH 167 or 169. Another good example of such unfinished Arabic inscriptions is an eighth-century lustre glass bowl from the Corning Museum of Glass. There, the last word is also placed just before the first one. This last word means ‘year’ but the numbers of the date are totally absent. The lecturer defended the latter date of the ewer in an article in the two above-mentioned books. However, it is necessary to remember that the line-and-dot incised ornament reserved on the ring-matted background is much more formalized in the decoration of the ewer than it is on the eighth century early vessels of School ‘A’, and such deep formalization seems impossible for AH 67. Abu Yazid and other early Islamic metalworkers did not fear to combine several heterogeneous elements. On the Basra ewer alongside the Central-Asian decorative motifs we can see Byzantine motifs and Arabic but nothing Sasanian.

Thus, in Islamic art of the eighth century AD outside Khorasan, only a few Central-Asian elements are traceable. Much more important are the contacts of the early ninth century, the period of Ma'mun when iconographic type was created. It later (in the tenth through thirteenth centuries) became very popular in the Islamic world. This is a banqueting scene with a crowned king seated cross-legged on the lion-throne, surrounded by his servants and musicians. In the ninth century this was a metaphorical image of a model Sasanian feast, not a group portrait of some Islamic ruler and his retainers because, at that time, Caliphs and Amirs did not wear crowns. What the customer wanted to see was the Sasanian analogue of al-Ma'mun's Arab-Iranian court. However the Khorasankan craftsman who fulfilled his commission was not an heir of the Sasanian artistic tradition. His thesaurus was more Central-Asian than Persian. Therefore many details of the early ninth century Hermitage silver plate showing the banquet find parallels in Tokharistan, Sogdia and even Syria and Iraq, but not Sasanian Persia. Two lions under the throne depicted on the plate, a lotus flower between them, the horizontal position of the king's foot, his heavy hair lying on his shoulders and a large halo are all Buddhist Tokhar elements. The king's crown and the throne carpet have Sogdian parallels while the lions are similar to a lion shown on a silver plate of School ‘A’. In addition, the faces of the servants and the musicians are not Central-Asian but resemble those in the Arab murals of Qasr al-Hayr al-Ghurbi in Syria and Samarra in Iraq.

The lecturer thinks that this type of royal imagery was composed so eclectically because it was created in Khorasan, the meeting place of the Persian, Arab, Sogdian and Tokhar cultures. The Khorasankan court of al-Ma'mun was the predecessor of his later court in Baghdad and Khorasankan courtly art moved to the central regions of the Caliphate as well. All of this made the newly created style widespread and long-lasting. The plate showing a royal feast is not alone. There are other representations of the same style, for instance, a plate showing a scene of the royal hunt, also in Hermitage, and a ewer in the Musée des Arts Décoratifs in Lyon, France. The shape of the ewer is almost certainly Sogdian, but in the composition of the hunt scene decorating the plate, one finds not only Central-Asian but also Sasanian analogies. In c. AD 836, a frieze showing running animals was painted on a wall of the Caliph's palace in Samarra. This motif could have come from Sogdia because a very similar frieze was revealed in Panjikent, a Sogdian town. The latter is datable to c. AD 740.

Between the tenth and eleventh centuries AD, this new royal imagery was still fashionable in the more or less autonomous Caliphates of Khorasan and Armenia. In both countries the Sogdian type of crown, the figure of the cross-legged king and the lion thrones are present. The Central-Asian motifs are also present in Western Iran from the Buyid period.

In conclusion, it is necessary to remember that only art objects themselves, as opposed to written sources, help us to recognize the third source of inspiration in early Islamic art after Iran and Byzantium.
The Greatest Muslim Philosopher:  
A New Light on Avicenna’s Life

Abridged from a lecture by Yahya Michot

This lecture is divided into four parts: a general introduction to the life of Ibn Sina (Avicenna); a look at the traditional approach to his life; a newly discovered text and finally, some conclusions about the impact of Ibn Sina on his contemporaries.

Ibn Sina died in Hamadan in 1037 AD. Also known as “al-Shiiti al-Ra’i”, or the prince of philosophers and physicians, he became famous for his work al-Qanun fi al-Tibb, which became a standard text in the world of medicine in Europe from the time it was first translated in the twelfth century until well into the nineteenth century. It was translated into various languages including Hebrew, Latin and Italian in which the first printed copy of this work appeared in the sixteenth century. His other book, the philosophical encyclopaedia Kitab al-Shifa’, was translated into Latin in Europe in the sixteenth century. As Ibn Taymiyyah has corroborated, his Kitab al-Isharat wa al-tamhadi was considered the Mushaf of philosophers.

Most of Ibn Sina’s works were studied in all the universities of Europe and the Islamic world. He is even supposed to have influenced Abu Hamid al-Ghazali in the thirteenth century, a whole generation later. It is said that when al-Ghazali was ill, his medicine was al-Shifa’, or ‘the book of Ibn Sina’. In his book Kitab al-Hudud, Ibn Ghaylani al-Balkhi – another prominent scholar – regards Ibn Sina as an intellectual phenomenon with great influence over many of the scientists of Central Asia in the twelfth century who sincerely believed that the truth was how Ibn Sina described it.

Who was Ibn Sina? What kind of thought did he actually develop that could be considered authentic? How can the same person be considered a hero in one culture, a magician in another and a philosopher in yet another? What sources do we have giving us information regarding the life and works of Ibn Sina?

Except for a tiny inscription in a manuscript dating 147 AH/1016/17 AD by Hunayn ibn Ishaq (now in the Bibliothèque National in Paris), no autograph or signature of his has been found. A manuscript such as the Miskawayh Chronicle renders only poor data, covering as it does events up to 980 AD, the year in which Ibn Sina was born. Al-Tawhidi, who covered the intellectual debates of the period, stopped in the year 922 AD and did not include any mention of Ibn Sina. However, some information, rich in detail, is to be found in Ibn Sina’s autobiography as well as in a biography written by his student al-Juzjani.

In his autobiography, Ibn Sina wrote only of his early years. A biography of Ibn Sina was completed by his student al-Juzjani as a philosophical programme through which he wanted to convince the reader that Ibn Sina was intelligent by nature and had the capacity of a human being to attain knowledge without much effort. This epistemological reality allowed Ibn Sina to feel superior as he personally admitted in his autobiography. Al-Juzjani did not mention any other disciples of Ibn Sina, particularly al-Bahramyar. This is the problem with this biography as the author’s aim seems to have been mainly to present Ibn Sina as a man with no faults, a sage and a genius, while hiding the less glorious aspects of his life.

For the known details about Ibn Sina’s life, we have to rely on later historians such as Ibn Kathir, al-Bayhaqi and Ibn Osabe’ah. Born in Bukhara of a bourgeoise family, Ibn Sina’s father held a high-ranking position at the Samanid court. This allowed Ibn Sina to receive a good education in the Samanid state. As his name suggests, his family may have had Buddhist origins. ‘Buddhasena’ is the Buddhist word for cleric, as is the case of al-Majusi. It is probable that Ibn Sina did not attend the al-Kuttab, the traditional religious school, because his family was well off enough to provide him with special teachers. He was able to practice medicine at the age of seventeen, just after his father’s death. Ibn Sina studied and later practiced all kinds of medicine. He claimed that he was exceptionally bright and that he did not learn anything more after the age of eighteen. He was also known, by later historians, as a ‘Hanafi faqih’ (legal Hanafi scholar), a profound ‘Qadari’ (futalist) and a Sufi.

The political situation, however, forced Ibn Sina to leave Bukhara in 999 AD, after which he ended up in the enemy court in Gorgan where he worked as a physician and a philosopher. From here he moved to Rayy (modern
Tehran) in the entourage of a Samanid Prince. In the court of the Buyid ruler in Rayy—the Shīite, Majd al-Dawla— he was obliged to work in his different capacities. He is known to have tried to heal Majd al-Dawla of his melancholy. He met many intellectuals in Rayy. These included al-Qadhi Abd al-Jabbar and other Mu’tazilites.

In AD 1015, Ibn Sina left Rayy for Hamadhān to work for Shams al-Dawla, the brother of Majd al-Dawla. Wherever he travelled he was always accompanied by his students. The most distinguished of these were al-Juzjani, who became his biographer, and al-Bahmanyar. The latter was the son of a noble family and Ibn Sina became his mentor. Ibn Sina lived off the family of al-Bahmanyar for some time.

There were many discussions between Ibn Sina and his students as well as with the other intellectuals who came to his majlis. He was appointed as a kind of a vizier to discuss various matters of thought, medicine and theology. He was, however, imprisoned twice in these two cities. He was freed by another Amir of the Buyids from Isfahān. He lived the last thirteen years of his life, from 1025-1037 AD in Isfahān. Al-Juzjani explains how much Ibn Sina was respected and esteemed by ‘Ala’ al-Dawla, the ruler of Isfahān. In Isfahān, Ibn Sina wrote most of his important books. Most of his works were,
however, lost during the two attacks of the Gznavids on Isfahan. He had to follow the Amir in his military campaigns during one of which he died in Hamadhān in 1037 AD. It is an irony of history that he had to die in the city he hated most: Hamadhān.

Thus, Ibn Sīna’s life passed through three distinct phases: the self-conscious prodigy in Central Asia; the professionally successful exile in Iran and the glorious servant of the enlightened Buḍīd ruler in Isfahan. The general impression conveyed by the known details of his life is that since he was born a al-Shaykh al-Raʾīs, he was always able to find a job. Soon people came to appreciate his genius and ability as a physician, as an advisor and as a philosopher. He had, however, to fight to impose himself and his views on his contemporaries and had to face many social and professional difficulties. He did not though always behave as an impassive detached sage, unconcerned about worldly affairs and full of contempt for material realities. In fact, his behaviour was often to the contrary.

It is in Bursa, one of the early capitals of Turkey, that a text by Ibn Sīna was found. Copied in 1273 AD by Abdullah ibn Muhammad ibn ‘Umar al-Khatib, this text, a letter he wrote to the vizier, Abu Sacad, has led to a new approach to the biography of Ibn Sīna. Since there is no mention of this text in Ibn Sīna’s biographies, it was deemed lost. This text was found within a group of thirty texts which the lecturer was able to identify because al-Bayhaqi, the twelfth century historian, mentioned this incident in his Tarikh al-Hukama.

In his Tātīmma, al-Bayhaqi described a discussion that took place between Ibn Sīna and Abu al-Qassim al-Kirmānī and referred to Abu al-Qassim as a sage who was engaged in a debate with Abu Ali (Ibn Sīna). This led to a quarrel between the two men that was accompanied by bad manners.

Abu Ali is supposed to have accused Abu al-Qassim of paying too little attention to the art of logic. In return, Abu al-Qassim accused Abu Ali of error and deceit. Abu Ali is known to have written about this debate to the vizier, Sheikh Abu Saʿād al-Hamadhānī. In his letter to Abu Saʿād, Ibn Sīna tried to make a case for himself as the master of philosophy by presenting obscure logic—such as questions of metaphysics—in order to impress the vizier and to convince him not to waste his time over the mediocrity of Abu al-Qassim. Needless to say, al-Juzjānī was more circumspect and did not mention this discussion in his biography.

Part of the Letter to Vizir Abu Saʿād from a copy made in 1275/7
ever disturb him, "although al-Kirmani had somewhat annoyed him."

In 1015 AD, ibn Sina migrated from Hamadan to Rayy where he was introduced to the court of Majd al-Dawliyah and his powerful mother al-Sayyidah. It was here—in the circles of the vizier Abu Sa’ad as well as, perhaps, Miskawayh, also a friend, that he met the old philosopher whom al-Tawhidī has described as Abu al-Qassim ‘al-Katib. A hostile relationship immediately developed between the two men. Ibn Sina had to take many initiatives against the old man: he complained about him to the scholars of Baghdad; he asked the vizier al-Hamadhānī to arbitrate between them; he got angry with his student and refused to permit his book al-Isharat to be read by Abu al-Qassim.

When he arrived at Hamadan as an immigrant, ibn Sina was probably poor and very much in need of asserting himself intellectually. He used all above-mentioned strategies to attain his ends. It was only later, in Isfahan, that he would be recognized, achieve glory and as a consequence, begin to behave in a different way. As ibn Sina writes in Daneshnāmeh, "With ‘Ala’ al-Dawīla... I realised all my wishes: security (imān), dignity (buzurg), glory (shukuh), prestige (kīyāyā) and veneration for knowledge". The lack of all these were probably responsible for the more problematic side of his personality in those early years spent in Rayy and Hamadan where he had to fight for himself. It was only later that he could forget about them. However, there was a direct consequence of this difficult life when ibn Sina came to be considered a pandect and an esoteric. When people looked at some of his work as being gnostic and reserved for the elite of the time, it is probable that those books had nothing to do with any deep belief in spiritual gnosticism on his part. It was, perhaps, merely a policy of copyright to protect intellectual production against the conclusions or arguments of bad philosophers.

There is, no doubt, a difference between refusing to lower oneself to a level of degradation and wanting to ascend to a higher level of spiritual development. It seems clear that Ibn Sina refused to go down to the level of anyone. He wanted to be pure himself and became so in Isfahan. He was a humanist and as he introduced himself in his text, he was "a man from Bukhara". Undoubtedly proud of his Bukhara origin, Ibn Sina was a Moslem "faqih", a man genuinely self-conscious of his greatness and, most of all, a "Cadarī".

Ibn Sina can thus be considered the last of the "Ancients" and the first of the "Moderns". To understand ibn Sina, one has to compare him to Hegel and not to Aristotle. Ibn Sina was the first in the history of Mediterranean thought to offer a complete philosophical system. Its systematic character suggests an all-encompassing view of reality based on very economical conceptual tools which include the few crucial basic ideas on the basis of which everything—metaphysics, religion, medicine and all aspects of reality—are accounted for. This makes him very similar to Hegel who offered a similar philosophical model in the nineteenth century.
The Arab school of Cryptology: The Discovery of Fifteen Ancient Manuscripts

Abridged from a lecture by Mohamad Mrayati

Cryptology was born among the Arabs. They were the first to discover and write down the methods of cryptanalysis. At the beginning of the eighth century, Baghdad, the largest Islamic city and the capital of the Abbasid Caliphate, was the site of the birth of cryptology. Lately, the discovery of several manuscripts confirmed the above-mentioned fact.

Cryptology consists of three main branches: cryptography (called in Arabic al-ta'nih), cryptanalysis or code breaking (called in Arabic Istikhraj al-Mu'amma) and steganography (called in Arabic al-Ikhla'). At the beginning of the eighth century, an Arab school of cryptology was started by al-Kindi (around 801-873 AD) and continued to develop until the 15th century when al-Qalqashandi wrote his encyclopedia Suhh al-A'sha (on The Industry of Writing). A recent study of this school proved that it had developed analytical studies in cryptography and invented the science of cryptanalysis or code breaking.

Eleven manuscripts, written by the scholars of this school, have already been studied, edited and published in Arabic while four others have yet to be published. Specific reasons led to the invention of cryptology as a science. One of these reasons was the advancement in linguistics, arithmetic, and algorithms made by the Arabs.

Further research is still needed to study the archives of Arabic and Islamic historic documents in order to analyze certain events showing the use of cryptography and cryptanalysis.

Cryptology: Principles mentioned In Arabic Manuscripts

Cryptology is, on the one hand, a science that studies measures to hide information called cryptography or steganography while, on the other hand, the science that studies anti-measures to discover the hidden information, is called cryptanalysis or code breaking.

Cryptography deals with transferring a plain text with clear information into a ciphered text or cryptogram, which cannot be understood. This is achieved by using certain character processing methods by means of a 'key'. The objective of this operation is to transmit information between two parties that know the 'key' while preventing anybody who does not have the 'key' from understanding the ciphered text.

In his manuscript Risala li Istikhraj al-Mu'amma (Treatise in cryptanalysis) al-Kindi distinguished between the following principles of cryptography and mentioned a number of methods based on each principle:

A. Simple encipherment
   - transposition
   - substitution
   - adding nulls or omitting letters

B. Compound encipherment: realized by adding two or more simple methods that are compatible.

A simple example used in several Arab manuscripts to show the implementation of these methods is the following:

The plain text is: Muhammad and Ali

The ciphered text using transposition of letters, and the key is to reverse the order of letters within each word, will be: dammahum dha lla.

The ciphered text using compound encipherment and applying substitution, with the key being that each letter should be substituted by the shape of that letter following it in the alphabet, therefore 'd' becomes 'e', 'a' becomes 'b', 'm' becomes 'n', 'h' becomes 'i', 'u' becomes 'r' and so on, hence the ciphered phrase becomes: 'ebnbnbpm esob sjmbb'.

Finally, if we add nulls, for example a 'S' after each three letters, considering the space between words as a letter, the compound ciphered text will be: 'ebnbnbpm esob sjmbb'. Summarizing the three steps explained above one can write:

Plain text: Muhammad and Ali
Ciphered text (transposition): dammahum dha lla
Ciphered text (substitution): ebnnbpm esob sjmbb
Ciphered text, (adding nulls): ebnsbjnpsn esob sjmbb

The receiver of this message, knowing the three keys, will process the text by inverting the three steps, i.e. starting from the last step and ending at the first.

Using code is a method in cryptography by which a word or a phrase is substituted by a word, a number, or a symbol. The list, which gives all such equivalencies, forms a sort of dictionary or codebook. The Arabs used
code to cipher information. Two examples of such uses are writings of alchemists and Sufis.

Cryptanalysis is the science of finding the plain text from the cryptogram without knowing the key or keys. It is sometimes called code breaking. Al-Kindi is the founder of this science. He classified the algorithms, used to decipher a ciphered text (by substitution), in the following three types:

1. The quantitative method, which consist of processing the ciphered text using letter frequency analysis. Al-Kindi calculated the frequency of occurrence of Arabic characters and explained the reasons behind those phenomena. The code breaker would count the frequency of occurrences of the symbols in the ciphered text, and then compare the order of the highest frequency symbols with the order of the highest frequency letters in the alphabet. Then, he repeatedly tries to match letters between his list and the specific list for the used language until he succeeds in deciphering the text. One very important remark here is that al-Kindi emphasises that this statistical analysis does not apply unless the length of the ciphered text is long enough for the statistical law to hold. This is probably the first time in history that the law of large numbers in statistics is mentioned. He states that if this is not the case, qualitative methods should be applied.

2. Qualitative methods are those based on linguistic theories and knowledge. At that time, this knowledge had reached a high level in Islamic cities. Cryptology as a science could not have been developed without such advances in linguistics. This is a clear example of how progress in social sciences played a role in stimulating the development of exact sciences. Al-Khalli ibn Ahmad al-Farahidi (718-786 AD) had established his well-known dictionary: al-‘Ayn, ibn Ginni (d.1002) had put down his works on phonetics and phonology such as al-Khasa‘is and Sibawayh (755-796 AD) had written extensively on syntax in his well known book: al-Kitab. In his treatise on cryptanalysis, al-Kindi explained how the possible combination and non-combination of consonants can be used to break a ciphered text. He established tables of all Arabic consonants with an exact account of their impossible combinations with other consonants. He also used the close affiliation between certain letters such as the ‘a’ and the ‘i’ in ‘al’ in Arabic, which is the most frequent two-letter combination or bigram, ‘af’ in Arabic corresponds to ‘the’ in English, which is also a very frequent combination. In addition to that, al-Kindi referred to the importance of using two-letter and three-letter words which have high frequency of occurrence such as ‘in, on, at, to, for and the.”

### Table 1.

<table>
<thead>
<tr>
<th>Author</th>
<th>Dates (AD)</th>
<th>Manuscript</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yaqub al-Kindi</td>
<td>801 - 873</td>
<td>Risalah fi ‘ikhtiyar al-Musawma (An essay on cryptography)</td>
</tr>
<tr>
<td>Ibn Tabataba</td>
<td>272 - 624</td>
<td>Risalah fi ‘ikhtiyar al-Musawma (An essay on cryptography)</td>
</tr>
<tr>
<td>Ibn Wahab al-Kabib</td>
<td>10th century</td>
<td>al-Budan fi uslah al-Bayan (Proof on Elegant Writings)</td>
</tr>
<tr>
<td>Salih al-Maqalatay</td>
<td>?</td>
<td>al-Maqalatay (The two articles or papers)</td>
</tr>
<tr>
<td>Salih Adab al-Shuara</td>
<td>?</td>
<td>Adab al-Shuara (Skills of Poems)</td>
</tr>
<tr>
<td>Ibn al-Dinawir</td>
<td>1187 - 1229</td>
<td>Maqal al-faadul al-Mansijah fi khl al-trjnhah (Simplifying the Goals of Chapters on Cryptanalysis)</td>
</tr>
<tr>
<td>Ibn al-Qalashandi</td>
<td></td>
<td>Sakh al-Din al-Siba‘i al-Inshah (The Dowry of the Blind in the Writing Enshiyah)</td>
</tr>
</tbody>
</table>
3. The third principle of cryptanalysis mentioned by al-Kindi is the use of the probable word, especially at the start and end of messages where traditional and protocol words are usually employed.

Steganography is hiding or concealing information, a military message for example, within another support which could be, for example, an ordinary love letter. This is done by means of different methods. Arab scholars mention several ways of doing this, such as ciphering a message as a set of numbers which are embedded in a sheet of accounts, or in a mathematical problem. Another method was to conceal a message as the first character of nouns in an ordinary letter. They also explained more sophisticated systems of concealment.

Factors stimulated the birth of cryptology among the Arabs

The following is a brief survey of the most important factors that gave rise to the birth and advancement of cryptology among the Arabs.
5. The proliferation of reading and writing in the Arab and Islamic world and their close association with Arabic culture, the Holy Qur'an and Qur'anic sciences were also among the important factors in the progress of cryptography. Many historians of cryptology confirm this fact when they consider that one of the prominent factors which prevented the rise of cryptography and cryptanalysis in the ancient Egyptian, Chinese, Indian and Babylonian civilizations was the limited spread of reading and writing.

Arab Scholars in Cryptology
and their Achievements

Cryptography was considered one of the secret sciences (al-'ulum al-khafiyyah). Manuscripts in this field, consequently, are very rare and because of the need for secrecy, many of these manuscripts are still missing. Table 1 shows the manuscripts that have been discovered and the names of their authors. These scholars form the Arab School on Cryptology. They refer to each other in their writings and participated in the development of this science over seven centuries. Table 2 shows the implicit and explicit references practiced between these scholars as deduced from their manuscripts. In what follows, the originality of each one of the members of this school is summarized.

Al-Kindi

Al-Kindi was the first scientist to write the first manuscript on cryptography in the ninth century AD, i.e., seven centuries before Leon Battista Alberti. He classified cipher systems into different categories and distinguished between transposition and substitution seven centuries before Giovanni Battista Porta and introduced the concept of composite encipherment incorporating of two or several simple methods. Also, al-Kindi discovered and expounded the use of the frequency of occurrences of letters in cryptanalysis and verified that vowels have the highest frequency in all languages and calculated the frequency of bigrams or contact count in cryptanalysis. He introduced the use of the principle of "the probable word" seven centuries before Porta and calculated the frequency of occurrence of each letter in an Arabic text, classifying the Arabic alphabet according to a descending frequency of occurrence.

Ali ibn 'Adlan

Ali ibn 'Adlan was the first scientist to write a book in the form of a manual for cryptanalysis and to publish a detailed description of how to solve a mono-alphabetical cipher with no space or word divisions four centuries before G. B. Porta. He also was the first to use word length and letter frequencies in the first and last positions of words for cryptanalysis plus using bigrams of repetitive letters. Ibn Adlan wrote the first practical examples on cryptanalysis in which he stated that to use frequency analysis, the ciphered text should be at least 90 characters long.

Ibn al-Durayyhim

Ibn al-Durayyhim analysed the various capabilities of substitution cipher, and to present what is called "Vigenère Table" two centuries before Blaise de Vigenère and introduced the concept of the grille cipher two centuries before Girolamo Cardano.

Sahib al-Maqalatayn

Sahib al-Maqalatayn's work contained some original and important ideas that were not covered by al-Kindi.
For example, the use of several symbols to cipher each of the higher frequency letters, that is, the invention of "frequency reversal" well before its use in the West by more than three centuries. He explained the fact that if the ciphering method is too complicated, it would pose problems to the users, and may be dangerous to use in wartime.

Ibn Wahab al-Katib

Ibn Wahab al-Katib introduced and explained some composite encipherment techniques using transposition and substitution together, or using substitution and nulfs. He produced a list of bi-letter words in Arabic presented in decreasing order of frequency or occurrence. He also invented the idea of enciphering two-letter words by a special symbol for each one, and not as two characters.

The treatise of Ibn Wahab is very rich in phonetic and phonologic theory explaining the reasons behind the 'order of letter frequency' and the 'contact count' of letters. In his treatise he speaks of the "least effort principle" or "assimilation," and "place of articulation" and its effect on "contact count."

Ibn Dunaynir

The manuscript of Ibn Dunaynir is the most voluminous of all the manuscripts to be found so far on cryptography. Ibn Dunaynir tried to include all previous knowledge on the subject and quotes explicitly al-Kindi, ibn Tabataba, Sahib al-Maqalatain, and Sahib Adab al-Shu'ara'. He also mentions that certain ideas in his book are original, namely the use of numbers to encipher text, the use of more than one number to encipher the same character and to achieve frequency reversal (homophonic substitution cipher); the invention of some special composite encipherment methods, employing substitution and transposition; the presentation of several concealment encipherment methods such as concealing the cryptogram as a commercial document, or a story, or an astronomical document etc.; the use of certain devices to encipher messages such as coloured rosary, a wooden board with holes and a thread, folded sheet of paper, etc. He also mentions practicing the encipherment of speech by using hand signs or, for example, when playing chess.

Table 3

<table>
<thead>
<tr>
<th>Date</th>
<th>Major Ciphertext Principles</th>
<th>Deciphering Breakthrough</th>
</tr>
</thead>
<tbody>
<tr>
<td>9th/10th</td>
<td>Linear substitution, Mono-alphabetic</td>
<td></td>
</tr>
<tr>
<td>9th/10th</td>
<td>al-Kindi writes the first known manuscript on cryptography classification of all known methods. He is followed by the Arab school.</td>
<td></td>
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<td>11th/12th</td>
<td>Vigenere introduces the poly-alphabetic cipher.</td>
<td>Habbaghe 1834, and Kazuki 1865 break the poly-alphabetic cipher.</td>
</tr>
<tr>
<td>1917</td>
<td>Vernam 1917 and Mauchley 1918 introduce the One Time Pad cipher.</td>
<td>Theoretically impossible to break.</td>
</tr>
<tr>
<td>1984</td>
<td>Bennett and Brassard invent quantum cryptography.</td>
<td></td>
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</tbody>
</table>

Ibn Tabataba

He is one of the early scholars who wrote on the encipherment of poetry. Poetry at that time was an important medium and may be among the most important media for spreading information. In the Islamic state, at that time present over extensive areas, from Spain to China including North Africa, Arabic was the official language, and poetry was a very important means of "broadcasting" information. Ibn Tabataba was the foremost reference for the cryptanalysis of enciphered poetry and was quoted by many other scholars. In his manuscript, he expressed very clearly fifteen principles of cryptanalysis of enciphered ordinary text.

al-Jurhumi

He dates of birth and death are as yet unknown. He produced two manuscripts that are mainly concerned with the cryptanalysis of poetry encipherment. It is clear from the titles of the two manuscripts and from the text itself that they are parts of larger manuscripts by him, which treated the whole subject. The originality of al-Jurhumi is manifest in his analysis of the idea of "evenness of distribution" or "frequency reversal." He stated that it is importance of reducing the use of high frequency characters in the text and increasing that of the low frequency ones as much as possible. He also gave an extensive analysis of bigrams and trigrams in Arabic, their frequencies of occurrence, and their use in cryptanalysis. He proved, giving several examples, that when the cryptogram is not long enough, and symbols are not repeated sufficiently, it is impossible to decipher, since one can have many corresponding clear texts.

Sahib Adab al-Shu'ara'

The author of Adab al-Shu'ara's (Skills of Poets or Literature of Poets) extracted and summarised it in a treatise called Risalah fi Istikhraj al-Mu'tama min al-Shi'r (An essay on deciphering encrypted poetry). The author repeats some of the principles mentioned already by ibn Tabataba, but his originality lies in elaborating the use of the morphological patterns in cryptanalysis. He also presented an important number of examples of decipherment.

The Role of the Arab School in the History of Cryptology

The history of cryptography is marked by important, distinguishing events in cryptography and in cryptanalysis. The Arab school prevailed for over more than six centuries in cryptography and more than nine centuries in cryptanalysis.

<table>
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<tr>
<th>Date</th>
<th>Major Ciphertext Principles</th>
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<tr>
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While in cryptanalysis the real breakthrough outside the Arab school was by Babage and Kasiski in 1863 AD (see Table 3).

**Cryptology in Relation to other Sciences and Technologies**

The development of cryptology has always been related to the advancement of certain sciences and technologies. The Arab breakthrough in cryptanalysis could not have happened had al-Kindi not had the decimal system at his disposal as well as the knowledge of calculating permutations mentioned already in al-Qalqashandī's and the Algebra laid down by his contemporary, Mohamad Al-Khawanizmi (750-847 AD).

The statistics of characters of the Qur'an were also quite developed. On the other hand, linguistic sciences such as morphology, syntax, and semantics were flourishing strongly during that period while the technologies of paper and ink fabrication were witnessing an extraordinary growth. The third science that contributed to the stimulation of cryptology was Management Sciences which had also been witnessing a huge development due to the creativity of al-Dawawin in Baghdad.

In recent times, several new sciences are being used in cryptology particularly: probability and statistics signal processing, natural language processing, numerical analysis, complexity theory, etc. On the other hand, new technologies are becoming essential in cryptology such as electronics, telecommunication, and information technology.

The al-Kindi classification of the methods of cryptography

poly-alphabetic cipher, which was a new principle. In cryptanalysis, al-Kindi's principles were not extended until 1863 AD when Babage broke the poly-alphabetic cipher followed by Kasiski. Again, the situation did not change much until the introduction by Vernam 1917 AD and Mauborgue 1918 AD of the one-time-pad (or the use of a random key as long as the message itself). This last method is proven unbreakable.

Two new important events happened in the 20th century. First, was the introduction of the concept of a public key cipher by Diffie, Hellman and Merkele in 1976 and its realization by Rivest, Shamir and Adlman (RSA) in 1977. The particularity of this type of cipher is that it does not need the previous exchange of keys between communicating parties. Secondly, was the invention of quantum cryptology by Bennett and Brassard in 1984, which is proven to be unbreakable and which does not need previous exchange of keys either (Singh, 1999, p.317).

In conclusion, the real and important breakthroughs in cryptography since the Arab School were by Vigenère in 1586 AD and in the 20th century, by the introduction of the one-time-pad, the RSA, and Quantum cryptography.
Monuments of Afghanistan

A Lecture by Géza Fehérvári

Afghanistan is a large country with a territory of over 600,000 square kilometres. The exact number of its population is not known for the simple reason that there are many nomads. However, it is estimated to be about twenty million. Fortunately, I had the opportunity to visit the country over thirty years ago, well before the troubles started. There were only two major roads in that vast country, built by American, Russian and German engineers. One of these roads runs west of Kabul to Kandahar, turning up north to Herat. The other road leads north to Mazar-e-Sharif and up to the then Soviet frontier.

When I went there in 1971, I was the guest of the German Development Fund and was staying at their headquarters in Kabul. Two colleagues and I decided to rent a car and travel around the entire country. The first destination was Bamiyan and the beautiful Bamiyan Valley. The party decided to take the shorter, but perhaps tougher road through the mountains. The mountain pass we had to go through lay at an altitude of over 2,000 metres. Although it was extremely hot that August in Kabul, there was still snow on the mountains. The first thing that surprised and attracted us was that whenever a cemetery or lonely grave was passed there were coloured flags flying around the graves. This is not a Muslim custom, but is quite clearly Buddhist— one of the Buddhist traditions that has survived in the country for over fourteen centuries. Of course we should remember that Afghanistan was one of the bulwarks of Buddhism until the advent of Islam in the seventh century AD. It was also the birthplace of Hellenism and home of beautiful Buddhist Gandharan art.

After crossing the mountains, we saw the beautiful green Bamiyan valley opening up in front of us. To the right were the remains of the once large and famous city of Shahr-e Golgola. It was destroyed, just like the entire Bamiyan valley, by the Mongols during their invasion in 1220 AD. Opposite, across the valley, we could see the shining rock face of the Hindu Kush. Into its side, hundreds of caves had been carved by the Buddhist monks, who arrived there during the Kushan period around the second century BC. We could also see the two huge carved statues of Buddha, one being fifty-three metres, the other thirty-three metres high. These were the statues which were destroyed by the Taleban in early 2001. Islam had tolerated them for 1400 years, just like the paintings and carvings we were able to see in the Buddhist caves. Some of these cave carvings present three-pointed arches and squinches, two features that play an important role in later Islamic architecture.

We went around the ruins of Shahr-e Golgola which had such a tragic end during the early thirteenth century. Historians recorded that when the Mongols besieged the city, Genghis Khan’s grandson was killed there. Genghis promised revenge. Apparently, he said that everything, whether human, animal or bird, should be killed in the
Bamiyan valley. He must have carried out his revenge since not much has survived. While Bamiyan revived, Shahr-e Golgola was never rebuilt.

From Bamiyan we turned towards the north to visit two major towns and archaeological sites: Mazar-e Sharif and Balkh. The city of Balkh, which was known to the Arabs as “Mother of the World”, being such a beautiful city, was also destroyed by the Mongols. In fact it has never recovered from the Mongol destruction. In spite of that there are two outstanding monuments there. One is a small and beautiful mosque, known as the Haji Piyade. Although it is next to the main road, nobody had mentioned or reported it until the late 1950s. It is a remarkable building because of its plan and decoration. When we look at its ground plan we notice that it has nine domed squares, which is rather unusual in mosque architecture. Conventionally, a mosque has a central open courtyard, surrounded by porticos and a covered sanctuary that faces Mekka. In the Haji Piyade there are no courtyards or porticos. The entire building being covered by nine domes. Two similar buildings are known with such plans in early Islamic architecture. One of them is the Mausoleum of Saba' Baniat outside Cairo. It dates back to the Fatimid period, probably to the late tenth or early eleventh century. The other one is the Mosque of Bab Mardum in Toledo, built in 1001 AD.

The other significance of the Haji Piyade lies in its beautiful stucco decoration (Fig. 1). The type of stucco which covers its walls, arcades and arches is known from Samarra, which was the second capital of the Abbasid Empire between 836 AD and 883 AD. The mosques, palaces and houses of Samarra were decorated with similar stucco work, in what we call styles A, B and C. The stuccoes in the Haji Piyade present styles A and B. Thus, they provide us with some evidence for dating this building. Samarra had a tremendous impact and influence on Islamic architecture in East and West. The Haji Piyade has now been published by several scholars who dated it to the late ninth or early tenth century. Just before the Soviet invasion of Afghanistan in 1979, Russian colleagues put up a metal frame around this building to preserve it from the harsh weather. However, at present we have no information as to what has happened to this important monument since the invasion and the war in 2001. Certainly, this mosque is one of the most outstanding buildings of early Islamic architecture, not only in Afghanistan but in general.

The second important and beautiful building in Balkh is the Mausoleum of Khwaja Abu Nasr Parsa, built in 1460 AD (Fig. 2). It has a large, melon-shaped dome, covered with beautiful glazed tiles, just like its façade and portico. The melon-shaped dome is very similar to that of
the Gur-e Mir in Samarkand, which is Timur's mausoleum and where such a dome was erected for the first time. During the early fifteenth century there was a famous Iranian architect, Qawam al-Din Shirazi, who must have been familiar with Timur's mausoleum, since he erected a similar dome over the Gavhar Shad Mosque at Mashhad, which was built for Imam 'Ali Fida, the Shi'as eighth Imam. Although Qawam al-Din was dead by the time the Mausoleum at Balkh was built, it was designed and erected by one of his eminent pupils.

Mazar-e Sharif can be proud of its beautiful Friday Mosque which, it is claimed, was most probably designed by Qawam al-Din Shirazi. Its walls are coated with colourful glazed tiles, although one should add, nevertheless, that those are due to later restoration.

After spending a fortnight in the northern part of Afghanistan, we returned to Kabul. While staying there we took the opportunity to visit another major Buddhist site in the country: Gulda, which is about thirty kilometres outside Kabul. There is a Buddhist monastery there and a large stupa (Fig. 3). I should probably say a few words here about a stupa. A stupa is a memorial monument. They are solid structures, built of stones or bricks. They can be hemispherical or square, but they are always capped by a huge dome. On top of the dome is a small rectangular element, known as a harmika which holds the reliquary of Buddha or a Bodhisattva. That is crowned by a lotus umbrella, called the chatri. The stupa of Gulda is a large square structure. Its dome partly survived, but the harmika and the chatri are now missing. It is not known when this stupa and the monastery, which is situated around the stupa, were built, but it is considered to be between the first century BC and second century AD.

The second part of our stay in Afghanistan was devoted to a long journey to the west and northwestern part of the country. About two hundred kilometres west from Kabul is the city of Ghazni which was the capital of the Ghaznavid Empire. Although the town was destroyed by the Ghurids in the mid-twelfth century AD, its major monuments survived. Among them is the palace of the Ghaznavid Masoud. It has a huge courtyard and four iwans. The walls were covered with beautifully carved stone and marble panels, while the courtyard itself was paved with moulded glazed tiles. The palace was excavated by an Italian team under the directorship of Professor Umberto Scarampi during the fifties and early sixties. Numerous items of glazed pottery, including lustre painted wares and metal objects were recovered from there.

Outside Ghazni are two tall towers. Their original function is not known. They could have been minarets or perhaps watchtowers. Both of them were erected during the eleventh century. One of them was built by the Ghaznavid Masoud III and the other one by Bahram Shah. Unfortunately, only the lower parts of both towers survived, the upper parts having been destroyed by a violent earthquake during the late nineteenth century.

Here, perhaps, I should refer to another tall and beautiful minaret which is in the central part of the country. It is known as the minaret of Jam. Although it is huge, sixty-seven metres high, it was reported only in 1957. This minaret is divided into three parts by two balconies which have since been destroyed. On the walls of the minaret there is a complete sura of the Holy Qur'an, the Surat al-Maryam, executed in brickwork, while between and around there are glazed tiles. This minaret was built by the Ghurid Mahmud in 1201AD.

Travelling from Ghazni towards the southwestern part of the country one reaches the Helmand river which is close to the Iranian border. There is a vast archaeological site in the area, known as Lashkari Bazaar. In Ghaznavid and Ghurid times it was a major city, the ruins of which extend several kilometres. The site was excavated by French archaeologists under the direction of Daniel Schlumberger. However, the site is so large that they were able to investigate only one mosque and a few palaces. The palaces which were excavated date back to the Ghaznavid period, to the eleventh and first half of the twelfth century. Below the Citadel of Lashkari Bazaar there is an arch, known as the "Arch of Bust" (Fig. 4). It was also constructed during the Ghaznavid period. There are the remains of a date: 400. Nearby is a building unparalleled anywhere in the world, an underground palace, called Chah-e Bust, "the Fountain of Bust". The palace comprises four underground floors. It was built brilliantly in such a way that, as the day progresses, there is always light in one part of the palace, even at its lowest.
level. This palace was surveyed and published by one of my former students, Dr. Mehrdad Shokohy.

Some 120 km. from Lashkar Bazaar are the ruins of a building known as the Medrese Shah-e-Mashhad. Built in 1174 AD and has four iwans that have extensive stucco decoration.

The last place we visited was Herat in the north eastern part of the country. Shah Rukh, Timur’s son and successor, made it the capital of the Empire. He was a great patron of the arts. Thus, Herat became the place where the most beautiful manuscripts were written or copied during the fifteenth century. He erected several monuments which, due to the fact that Herat, was so close to Iran, reveal strong Iranian influence. The Friday Mosque, which was probably the first that was built in the country, is vast and is beautifully decorated.

Unfortunately the original building was destroyed in a major fire during the twelfth century. The Ghurids rebuilt it and it was further enlarged and decorated in Timurid times. On one side of the building, there is a door, known as the “Ghurid door”, built in 1187 AD. A beautiful inscription executed in glazed tiles runs around the doorway, which gives us the date. The façade of the mosque was covered with faience mosaic during the Timurid period. In the courtyard there is a large bronze cauldron, dated 1363 AD. It is remarkable that this object has survived until the present day.

Shah Rukh’s most important building was a large Medrese that was completed in 1437 AD. Today, unfortunately, only its six minarets survive. The minarets, like many of the other buildings, were decorated with mosaic faience. It was most likely in Kirman, in Iran, that the technique of covering large wall surfaces was invented and introduced during the fourteenth century AD. It was achieved not simply by coating the walls with glazed tiles, but with an elaborate mosaic faience. This technique soon reached Herat and its Friday Mosque was one of the earliest buildings where it was applied. The architect, Qawam al-Din Shirezi built a smaller, but equally beautiful building in Herat: the Mausoleum of Gawhar Shad in memory of his deceased wife. It has a beautifully designed and mosaic faience-decorated mihrab and a similarly decorated, melon-shaped dome. Outside Herat there is a small, but well-known pilgrimage place, Gazur Gah, where Qawam al-Din also built a large mausoleum known as hazire, i.e. a closed burial place, which was completed in 1425 AD.

The walls of the Citadel of Herat, which dominate the city, were also decorated with mosaic tiles. It was there that the great artists of the period were working, writing, copying and illustrating the famous manuscripts of the period.

Afghanistan and its people have suffered a great deal ever since the Soviet troops invaded the country in 1979. Some two million people died and more than three million took refuge either in neighbouring countries or further east or west. Several of its monuments were destroyed and some, like the two huge statues of Buddha in Bamiyan, can never be rebuilt or reconstructed. However, we should pray and hope that peace will soon return to this beautiful country and that the people can enjoy the benefits of a modern world that was, for such a long time, denied to them.
Hindu-Arabic Numerals in the Arabic World and in Europe

Abridged from a lecture by Paul Kunitzsch

To write down numbers is an easy procedure in our times. We use two well-known types of notation, so-called “Arabic” numerals and, less frequently, “Roman numerals”. The Roman numerals being used for more than two thousand years, has symbols for “one”, “ten”, “hundred” and “thousand”, i.e. I, X, C and M, respectively (the latter two being the initial letters of the Latin words centum and mille). In addition, the Romans used a symbol for every five of the units, tens and hundreds, i.e. V, L and D. The ancient Greeks found other ways. They either wrote numbers in full words, or – as a shorter form of notation – they used an “alpha-numeric” system where the letters of the alphabet symbolised numerals with the 24 letters of their alphabet plus three obsolete letters they marked the nine units, 1-9 (alpha α - theta θ), the nine tens, 10-90 (iota ι - koppa θ) and the nine hundreds, 100-900 (rho ρ - sampi ρ). The same ways of notation were also employed in Semitic idioms, such as in Aramaic and Hebrew; but with their alphabet of 22 letters they reach to 400 (Taw Т). When the Arabs became acquainted with Greek science in the eighth century and translated Greek writings into Arabic in quantity, they followed the Greek methods, writing numbers either in words or in alpha-numeric notation. With the 28 letters of their alphabet, they then had symbols for 1-9, 10-90 and 100-1000. This system is still being used in the Arabic world today, similar to our use of the Roman numerals. It is called abjad (from the first four letters in the series, a-b-c-d) or hisab al-jumal.

All these systems were rather cumbersome, especially when calculations had to be made. It was in India that a much better system of notation was invented, in an unknown time before the seventh century AD, an ingenious system which in the course of centuries conquered the world and is now being used in most countries on earth. The Indians found that nine symbols, arranged in a strict decimal place system, were sufficient to express all numbers however great they may be.

Knowledge of this Indian system had reached the Near East by 622 AD. In that year the learned bishop of Ginnasrin (south of Aleppo, Syria), wrote in one of his treatises that not all the great inventions of the world were due to the Greeks. Other nations contributed to the human progress, such as the Indians, who devised a system, marvellous beyond praise, to write down all kinds of numbers with only nine symbols.

About a hundred years later the Arabs became acquainted with Indian numerals. They either learnt them through unknown channels, or from Persia in the course of the eighth century, or in connection with an Indian embassy to the caliph’s court in Baghdad in 770 or 772 AD. Among the presents brought along by the embassy there was an astronomical handbook that the Caliph soon ordered to be translated into Arabic. Such astronomical handbooks often contained chapters on the methods of calculation and in this way the Indian system of writing numbers with nine symbols and the methods of calculation in the system may have become known to Arabic scholars.

Soon afterwards books began to be written in Arabic on “Hindu reckoning” in which Indian numerals and the methods of calculation with them were explained. The oldest and most famous of these books was written by al-Kwarizmi (c. 820 AD); its Arabic text is now lost; in the twelfth century, in Spain, it was translated into Latin; this text is also lost, but we know of the book from a number of successive Latin recensions. In Arabic, several similar texts exist and have been edited; e.g. by al-Illidisi (written 952-53 AD), Kushyar ibn Labben (second half 10th century AD) and Abd al-Qahir al-Baghdaadi (died 1037 AD). All these books follow the same structure. At the beginning they describe the nine symbols and the way of writing numbers with them. Then follow demonstrations of the mathematical operations. These numerals were completely new and strange, so their use had to be explained in detail. They must be written in

1. Numerals in an Eastern Arabic manuscript, presumably written by al-Sijzi, c. 970 AD, in Shiraz
2. Western Arabic numerals in a 'magic square'. added at an unknown time to a manuscript dated 1248 AD. The numbers are given both in Hindu-Arabic numerals and in the abjad letter system in decimal order, beginning on the right with the units, "after them" (in the Arabic sense of writing), i.e. to their left the tens, then to their left the hundreds, etc. A special problem is posed by "empty" decimal places. If, for example two hundred and four is to be written, the four must be put in the place of the units and the two in the place of the hundreds; in the place of the tens, in this case, there is nothing. In order to mark the empty decimal place, the Indians had devised an extra symbol called sunya, "nothing, empty". This was also taken over by the Arabs, in the form of a small circle called sifr (with the same meaning), whence our "cipher" and other derivations.

The forms of some of the nine symbols seem to have been varying for some centuries. In a manuscript presumably written 969-972 AD in Shiraz by the mathematician and astronomer al-Sijzi different forms appear especially for 2, 3 and 5 (fig. 1). The famous al-Biruni (died 1048 AD) and al-Nasawi (first half 11th century AD) mention in some of their works that still then there was no unanimity among scholars as to the forms of some of these numerals. (In modern Arabic, the four, five, and zero are written differently to the old forms.)

Together with all other knowledge, "Hindu reckoning" and Hindu-Arabic numerals reached the Arabic West, North Africa and Muslim Spain. In 955-56 AD Dunnas ibn Tamim in Qayrawan mentions that he composed a special book on that subject. Texts of Western Arabic mathematicians have until now been found only from the twelfth century on. Abu Bakr al-Hassar (active before 1200 AD) and Ibn al-Yasamín (died 1204 AD); and written specimens of Western Arabic numerals can only be traced in manuscripts from the end of the fourteenth century and later. It remains a desideratum to discover older Maghrebi manuscripts showing these numerals. The most important thing about Hindu-Arabic numerals in the Arabic West is that there they developed forms remarkably different from Eastern Arabic forms (fig. 2). However, in detailed comparison most of the nine symbols of the West can be recognized as being developed out of the Eastern forms except the symbols of 6 and 8; for the Western forms of these two, no explanation is as yet at hand.

However, the Western Arabic forms of the numerals are of special historical prominence: it is from these forms that the Europeans, in Spain, learnt Hindu-Arabic numerals. Since Europe received these forms from the Arabs in Al-Andalus, it is the reason these numerals are generally called "Arabic numerals", though, basically, their origin was Indian. The oldest Latin document showing the nine numerals (in Western Arabic form) is the "Codex Vigilanus", dated 976 AD (now in the Escorial library), in an inscription in the Etymologies of Isidore of Seville where, similar to Severus Sebokht's words of 662, the genius of the Indians is greatly praised (fig. 3).

In the first period, for about one and a half centuries, Arabic numerals were employed in Latin Europe to mark the counters of the abacus, the calculating board, which since Carolingian time had been marked with the Greek letters a (alpha) to q (theta) symbolising 1 to 9. Here the numerals still show strange, clumsy forms. A second inversion of the numerals came in the twelfth century when Arabic texts were translated into Latin in Spain with more sophistication. Now the numerals begin to show smoother forms (fig. 4). Eastern Arabic forms are also, occasionally displayed in Latin manuscripts (fig. 5), but the forms derived from Western Arabic figures prevailed until around 1500 AD when they were written and printed in the form known and used today.

3. The oldest occurrence of Hindu-Arabic numerals in a Latin manuscript, 976 AD.

4. Numerals as found in the oldest Latin recension of al-Khwārizmī's work on Hindu reckoning, 12th century AD.

5. Numerals on the title page of a Latin manuscript, 13th c. First line: 'Toledan' numerals (Western Arabic); second line: 'Indian' numerals (Eastern Arabic); third line: the numerals used in the manuscript itself. Below: cifre, i.e. two forms of zero.

In conclusion, we must admit that the Hindu numerals were an extraneous element both to the Arabs in the Orient and to the Europeans in the West. It took several centuries in both areas before they gained wider acceptance and began to be used on a wider level, beyond the scientific writings of arithmetic.
Qaiyrawan Mosque
An investigation into its origin

Abridged from a lecture by Ibrahim Shabouh

Contemporary historical reports about early Islamic conquests in the Arab world do not give us a complete picture of events. Not until the 3rd Century AH, known as the age of documentation, did reports start to be written down. These accounts and their authors’ names are still extant, and are also to be found quoted by contemporary historians such as ibn Abd al-Hakam and Abu al-Arab al-Tamimi. Later in the 4th and 5th centuries AH, historians such as al-Khashni, al-Ruqayq al-Maliki, al-Tajibi and ibn al-Dabbagh elaborated on these original accounts. From all these sources we can gather a general picture of the political history of the time, including an idea of the development of early Islamic architecture.

The site of Qaiyrawan city was chosen by ‘Uqba ibn Nafe’, after he had crossed a high plateau in order to avoid the coastal route which was full of Byzantine villages and cities. Following a marked pathway, he marched from the Jabal ‘Arabta to Qalasa, then to al-Qasrayn before reaching Subaytla. From there he traveled East towards Qilahana (Hajib al-Uyun) until he reached the eastern entrance to the valley.

According to the historian ibn Abd al-Hakam in his book Futuh Misr (The Conquest of Egypt), ‘Uqba started the construction of Qaiyrawan in 51 AH. The first building to be laid out was Dar al-Hamra. He then laid the foundations for the Mosque and used to pray on the land before the actual building was erected. People from the Fathari and from Quraysh tribes, were attracted to the spot and they started marking out their own plots. The same tribal scheme that was used to divide land in Kufa, Baara and Fustat, was also used in Qaiyrawan.

Early historical sources speak of the challenge ‘Uqba faced when trying to find the right qibla orientation, and how he finally came to know it through a vision, something that was well remembered by subsequent generations.

However, this early mosque did not last long as it was more of an open-air prayer area than a building. ‘Uqba’s successor, governor Abu al-Muhajir Ibn Dinar, abandoned the area and the place was deserted for seven years, while people turned their attention to the Takrawan of Abu-Muhajir. In his first four years governorship ‘Uqba had always looked to marsh a farther west, but was unable to complete his plan. However, ‘Uqba resumed a second governorship on the command of Yazid ibn Mu’awiya at the year 61 AH. Once more he attracted people to his Qaiyrawan, and rebuilt the city. But unlike his previous governorship he was impetuous, rushing to attack the West with insufficient planning, and was killed in Tahoudah around 64 AH.

In the following years, several rebellions and clashes took place, such as the confrontation between the State army and the sect of Sufi Kharjite who came from the East with the aim of establishing new bases among the Berbers, who were in fact quite responsive to the Kharjite approach. After half a century of conflict, there followed the rule of Yazid ibn Hatem al-Muhallabli, a distinctive governor who had subdued the Mahgreb, as described by al-Tabari. He was instructed by Abu Ja’far al-Mansur to secure the distant fortified city of Qaiyrawan where anti-caliphate factions were rallying, including the Kharajites, Aqids, and Umayyads. Al-Muhallabli fought hard to suppress the rebels as well as to restore the city, rearranging its markets and assigning a special location for each industry. In the year 157 AH he started the construction of the congregation Mosque. He had already knocked down the previous building with the exception of the mihrab and portions of carved stone built by Bishr ibn Salwan, including the minaret. He worked hard to give the city a metropolitan character. All that it gained in beauty and rank as a capital is attributed to him as noted by the chronicler al-Ruqayq.

Half a century later, a new dynasty began to assume power, namely the Aghlabids, founded by Al-Aghlab ibn Salem al-Tamimi, an Arab from Bani Sa’d bin Zaid Meneh. He was brought up in Marw al-Rawdah and became one of the generals of Abu Ja’far al-Mansur. Coming with al-Musawwade, his name was given to one of the roads leading to al-Mahdi river when the plan of Baghdad city was being laid down; it was called al-Aghlab road as noted by al-Khathab al-Baghdadi in his History of Baghdad. The rule of the Aghlabid dynasty lasted for nearly one century in Ifriqiya (North Africa), during which time, many great achievements were accomplished. After conquering Sicily, fortifying their cities and erecting a remarkable architectural monument, the 3rd Emir of the dynasty, Ziyadatullah ibn Ibrahim (201-223 AH /816-837 AD), finally suppressed the many uprisings against him and his regime. He was then able to review the plan of Qaiyrawan, and built the bridge of Bab Abi al-Rabi‘, which connected the city with the road to the East across the wadi of the river Zarud. He also re-built the congregation.
mosque after knocking down the existing building while preserving the mihrab and the solid stone parts built by
the Umayyad governor Bishr in Salwan. Within a quarter of a century major renovation to the mosque had been
completed thanks to Abu Ibrahim ibn al-Aghlab (242-249 AH /856-863 AD). He extended the prayer hall
northwards, adding two prayer areas and a dome on the foyr overlooking the courtyard. He also renovated the
mihrab with marble specially commissioned from the city of al-Mansur, and ceramic tiles, originally meant to cover
a seat which was left unfinished. Eventually these were placed in the face of mihrab. A minbar made of teak wood
was also commissioned for the mosque as noted by ibn Naji in Malim al-Iman quoting al-Ifikhariby al-Tejibi, and
in Silat al-Samit.

The renovation of the mosque doors and the construction of the ruler’s compartment (maqura) were
completed in the rule of al-Mu’iz ibn Badis in the early 5th century AH. External supports were added to the walls
and more arcades were built in the courtyard to enhance the support. The registration of the manuscripts in the
mosque library was completed by the Hafsi Emir al-Mustansir b’Illah Abu Hafs in the year 693 AH.

The following are some major discoveries of the archaeological digs.

First: How to explain the recurring historical references to
the knocking down and rebuilding of the mosque by three
governors, namely: Hassan ibn al-N’umman, Yazid ibn
Hatem and Ziadatullah. The lecturer has made
excavations at the site of Dar al-Imara that was deserted
by rulers in the year 185 AH in favour of al-Abbasia.
Excavations have shown that the mosque was originally
built in a pit (depression) which made it vulnerable to
floods from rain. Therefore, all subsequent restorations
focused on elevating the mosque to stabilize it.

Second: The excavations carried out inside the prayer hall
and the outer arcade revealed the technique that was
used to join the supports that hold the massive roof of
nearly 3500 m square: Ditches were dug 5 to 7 metres
depth and one metre wide, running criss-cross through
the whole space. They were filled with pieces of stone
and lime before being leveled off. At each crossing of two
ditches a column was erected to bear the roof. The same
technique was referred to and illustrated by ibn al-Azraq
in his book on Makka, where he described the additions to
the Holy Sanctuary attributed to al-Mahdi. Most of the
columns are made of marble or granite, re-used from
older buildings. To ensure the symmetry of the arches, the
architect adjusted the column bases, raising or lowering
them to ensure that the height of the capitals, from which
the arches sprung, were equal. The capitals were
surmounted by solid wooden beams painted red, which
were adjusted accordingly to provide the necessary
additional support for the construction of the arches.

Third: The roofs of the mosque though frequently
renovated, provide a unique example of early Islamic art
both in terms of their quality and quantity. It is thanks to
the moderate climate of the city that the mosque roofs
have been preserved. The roofs are made of wood,
painted red, over which decoration and inscriptions are
painted in blue, white and yellow. Some fragments have
carved Kufic calligraphy dating to the 3rd century AH. In
subsequent generations, carving was replaced with
painting whereby the letters were outlined in different
colours which allowed for greater legibility. Various
techniques were used in the woodwork and the
supporting corbels from the time of Ziyadatulllah in 221 AH
until the time of al-Mu’iz ibn Badis.

Fourth: The mihrab and its associated sections raise
some of the most complex questions. This is often an area
for debate since it concerns one of the fundamental
elements in mosque architecture and the al-Qayrawan
mihrab is used as a reference for the mihrabs of other
mosques, because it was left largely untouched and so
serves as an example of the original ‘first’ form.

Fifth: Abu Ibrahim Ahmed ibn al-Aghlab’s renovation of the
mihrab and its associated area, originally built by
Zyadatulla, is considered to be one of the masterpieces of Islamic architecture. The semi-circular horizontal axis is flanked on both sides by two red columns which are surmounted by Byzantine capitals with open work, and crowned by two slabs of marble inscribed in Kufic in basmalla and tasliya. They are carrying a broken arch, the soffit of which, like the façade, is decorated in tiles, as mentioned by al-Tajibi. The internal surface of the mihrab is covered in marble slabs decorated with open-work; some are carved with vegetal and geometrical designs and layered vertically to serve as dividers for the various decorative groups. Here the carver’s work seems to comply with two contradictory extremes, namely freedom versus conformity. As rectangular panels are distributed along the mihrab, smaller mihrabs are arranged in a horizontal axis, which exhibit a variation in their design. Their panels convert the semi-circular cavity into a seven-sided form. Leaves and scrolling branches form a recurring decorative motif in these carved pieces, and display a harmony in the craftsmanship, as they interlace, affront and bend inside the circles or split freely. On the top of this marble overlay is seated the mihrab’s cap, considered the only surviving piece of its kind in Islamic decorative arts.

Sixth: The issue of glazed tiles has been always disputed since the 19th and early 20th centuries, and still remains so today. Archaeologists tend to follow the example of al-Tajibi who assumes no connection between Qairawan and the archeological finds there, rather attributing them to Mesopotamian origin. Major scholars of this school are Sarre, Herzfeld, Butler and Marciles, who wrote on this topic in the 1920s. From its origin, luster-ware has been difficult to identify and study since it appeared simultaneously in three centers, namely Qairawan, Egypt and Mesopotamia. The Qairawan find has been used to date other finds since it was comprehensive and conclusively dated. Subsequent investigation has proved it to be a local product.

Seventh: The minbar is one of the most discussed architectural features in Islamic art history. It is the oldest complete example of its kind dated 248 AH. It still survives intact, having been partly restored during the reign of the Hafsid. In the beginning of the 20th Century the Endowment Society took an interest in its complete restoration. The lecturer has photographically documented the minbar’s condition before and after restoration. It is made up of 200 separate carved and pierced panels laid asymmetrically. Seen together; however, they display a great deal of harmony in their vegetal and geometrical elements, combining aesthetic perfection with historical specificity. If the issue of the mihrab’s tiles and marble is debatable, the lecturer is quite certain that the minbar’s teak wood was imported but locally manufactured in Qairawan. Here elements of Byzantine, Roman and Berber art were intermingled, something that holds for the decoration of the minbar as well. There is no trace of contemporary Eastern styles of wood and stone carving.

Since the beginning of the 5th Century AH, the minbar was placed on the left of the imam and not on his right as it is today. This was confirmed by the discovery of a closed door on the side of the maqsura. The imam would come out of this door for prayer and to deliver his sermon. Later, another door on the northern side was used.

The maqsura is a distinctive masterpiece of woodwork, being the oldest among its parallel pieces. Built by al-Muriz bin Badis in 410 AH, this piece, along with other woodwork attributed to al-Muriz proves that the Samarra style in wood carving didn’t appear in North Africa before early 5th century AH as confirmed by its decoration. Especially remarkable is the inscriptive band running along its upper side that displays exquisite calligraphy unparalleled except in the inscriptive band of the great iwan in the Sultan Hassan Mosque in Cairo. Each letter stands in harmony with a background of elegant plaited forms interlaced with floral scrolls.

Eighth: Like all other Tunisian mosques in particular the ones in Zaytuna and Madhiyya, the three courtyard arcades, Eastern, Western and Northern are not original;
they were added later as is confirmed by architectural evidence. The dating of such additions to 403 AH was given by Marcias according to one of the columns overlooking the courtyard that carries this date. However, it has been subsequently proved that these additions were made at the time of the restoration work attributed to al-Mustansir al-Hafsi. The external walls of the mosque were threatened with collapse because of the general neglect of the city, including the mosque, during the Hilali tribes migration. The government was unable to deal with the necessary work needed and so al-Mustansir built huge salients to support the walls from the outside. Raising the level of the internal floor, he then added the arcades. The ruins of Sabra, the Fatimid city was the main source for the building material and the columns, among them the one inscribed with the date referred to by Marcias. This restoration work unquestionably took place in 693 AH as inscribed on the entrance to the Western arcade.

Ninth: Something unique about this mosque is the large number of manuscripts preserved in its library, including famous rare Qur'ans, treatises on Malikite jurisprudence and various documents on the history of the city. It also has the oldest Qur'an manuscript known as the Mushaf Fadl copied in 240 AH, although some of its folios are written in 1st century script. There are also some manuscripts written on parchment and dated to 235 AH and 290 AH as well as some documents dated to the 4th Century AH.

Most remarkable of all is the famous Mushaf commissioned for the nursemaid of the Emir Badis ibn al-Mansur in 410 AH, copied, gilded and bound by the exquisite calligrapher 'Ali ibn Ahmed al-Warraq, an extremely talented if infamous artist. It is mentioned in the Collection register that the script used in this manuscript is of the Rihani type. It originally contained approximately 4500 folios of large white parchment, of which only 2600 have survived. The waqf (endowment) document and the wooden box preserving the manuscript are still in the Qayrawan mosque. The calligrapher's artistic talent is displayed in the balance and proportion of the work and in his distinctive ability to handle problems of letter distribution, by successfully avoiding areas of overcrowding or emptiness. Unfortunately, this valuable manuscript did not bring the same acclaim to its master as that given to a master such as ibn al-Bawwab, who didn't even attain such a high level of craftsmanship.

The mosque of 'Uqba ibn Nafi' is the only surviving monument of religious architecture which has preserved the overall original structure as well as original features such as the the marble and tile decoration of the mihrab, the roofs, the unique dome, the minbar, the call, and the maqrura. The mosque also provides us with evidence of many concerns missing in parallel mosques, which makes it an important reference point for many scholars.
Library Gifts

Dar al-Athar al-Islamiyyah has benefited from a seasonal deluge of gifts - in the form of books for the library. Our many friends across the world have made these thoughtful gestures, which are truly appreciated. Their kind consideration for the restoration and improvement of the library will be of benefit to many scholars, now and in the years to come.

From Dr Petra Martin al-Awadhi, Researcher

From Mr. Beder A. Al-Bajian, President of the Steering Committee of the Friends of DAI

From Mr. M. H. Buxtorf, DAI Rehabilitation Coordinator

From Mr. Edmund Capon, Director, Art Gallery of New South Wales- Australia

From Mr. Talib al-Baghi, Kuwait Mission office at UNESCO in Paris

From Mr. Ali al-Bidah-Calligrapher

From Ms. Claire Bersani, Jewellery Designer

From HE Mr. Wojciech Bozek, (Former) Ambassador of Poland, Kuwait

From Ms. Joanna Capon

From Mr. Manuel Gomez Anurabe, Landscape Architect Specialist / A prolific writer

From Dr. Werner Daum, German Embassy in London
winged eagle left her eggs on the tree of life and that shamans were born out of these eggs. According to this belief, the life tree is also accepted as a totem tree, or the symbol of creation and the universe.

In the Çifte Minareli Medrese in Erzurum (second half of 13th century) the tree of life depictions on both sides of the façade, represent a more elaborate version. The trees of life spring from crescents, under which are pairs of open-mouthed dragons and on top of the tree sits a big double-headed eagle. The pomegranates (symbol of eternal life and heaven) and the small birds in between the tree branches are, as seen before, typical of the Seljuk tree of life depictions. The dragon pair is a new addition to the tree of life composition in the Çifte Minareli Medrese. It is generally accepted that the early prototypes of the dragons are found in Chinese art. Although they are often used as protective figures in mausoleums, they are sometimes depicted as ferocious monsters attacking luminary signs. The threatened crescent (moon) motifs makes this relationship evident.

The dragons of Çifte Minareli Medrese might well be protective symbols of the life tree; attacking darkness and evil forces. The big rosettes and crescents on top and underneath the tree must also be related to Central Asian beliefs. Sun, moon and planet cults played an important role in the lives of the Turkic people in Central Asia. The close relationship of the eagle with the tree of life is based on the identification of the eagle with the highest heavenly deity. The eagle is also accepted as the ancestor of shamans. Often, it is envisioned as a double-headed eagle, placed on the cosmic tree, as the guide to Heaven. Tree of life, bird, eagle, protective creatures and planets are also encountered on Central Asian tents, drums and dresses of the shamans, verifying their identification with these symbols.

The tree of life motif can also be found on the Yakutiye Medrese in Erzurum (1310) which was constructed during the Mongolian invasion. The tree of life lies on both sides of the portal. The tree again rises from a large rosette. Two lions flank the tree with a double-headed eagle and on top there is a large rosette. Again, we can explain the tree of life and the double-lion combination with shamanistic beliefs. In Central Asian shamanism, the tree of life is considered to be the center of the universe, as well as a pathway, or staircase, conveying the shaman either underground or skyward to paradise on his journeys. Powerful talismanic creatures such as lions, sires and dragons are the protectors of the shamanistic tree and of the shaman from evil spirits during his travels. The rosettes, or in some examples, human heads above, or at the side of the tree, symbolise the planets, the universe or paradise, where the shaman arrives at the end of his celestial voyage. Central Asian beliefs consider the universe as being represented by planets.

We encounter several other examples where the tree of life, in foliate arabesque form, serves as the background for double-headed eagles whose wings or tails end in dragon heads. This is a summarised form of tree of life depictions. The double-headed eagle at the western portal of Divrği Ulu Camii Mosque (1228 AD), is repeated twice in a mirror-like image and is rendered in a powerful heraldic pose. The fan-shaped tail overlaps a small crescent, the crescent being repeated twice on