Memoria technica

& *Hisab al-jummal* Under The Mughals

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Abstract: "The credit for advancement in arithmetic, algebra and geometry goes entirely to the Muslim intellectuals and mathematicians. Much before the breakthrough in which Muslims invented 'zero' every civilization was dependent on the use of alphabets. These alphabets had numerical values. The use of alphabets for writing sums remained in vogue for a very long time but this was a very cumbersome and tedious method and often caused confusion. With the invention of 'zero' revolution was brought about. Before this invention Muslims too depended on their alphabets i.e. *abjad* and they too had numerical values. Islamic architecture, almost throughout the Islamic world, never allowed the old system to die. Rather a new phase was initiated by which the dates of the construction of the monuments were concealed in pieces of poetry and were inscribed on the facades and salient places of the buildings. The system is known as *tarikh* or the chronograms. Not much research has been done on this very engrossing and interesting aspect of Islamic culture in general and of Islamic architecture in particular. This short article focuses on how the dates were construed for monuments, and how they were concealed in meaningful couplets or *ruba'is* which eulogized the monument as well as its builder."

The Arab historian Al-Baladhuri has not only furnished us with an account of the conquest of Sindh by the Arabs, but also describes the early Arab missions to India in detail.[1] Most of these missions were carried out during the period of the *Khulafa-i Rashidin*. There is a particular reference to the presence of Arab missionaries at the town of Thana near Bombay (now Mumbai). A place called Bharoach near Gujarat was also visited by the early Arabs. These places of great antiquity hold many interesting relics to this day.[2] Reference to the Arabs exist in many of the Devanagri inscriptions of this regions and the Arabs are termed as Tajikas.[3] Abu'l-Hasan al-Mas'udi who visited Western India in 303A.H./915A.D., saw various mosques on the western coast which were then well kept.[4]

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Al-Hajjaj, the Umayyad, Governor of Iraq, sent successive expeditions to the Indian frontiers. He especially appointed Muhammad ibn Qasim as commander of the successful expedition sent against Rajah Dahir of Daybul in Sindh.Daybul was thus the first city to have a mosque. From Daybul Muhammad ibn Qasim marched on to Brahmanabad and Mansurah and captured the city of Rur.[5] He built a mosque at. Rur which should be regarded as the second mosque on Indian soil[6]. This mosque serves the earliest example of inscriptions or epigraphy in Pakistan. After reaching Multan Muhammad ibn Qasim built a number of mosques there as well.

From this example of epigraphy we see a continuous effort by the builders of mosques to introduce inscriptions in them[7]. Beside Arabic and the Qur'anic texts Persian gradually became more important and prominent in epigraphy in the two centuries or so before the establishment of Mughal rule. The epigraphy of the Khaljis (1290-1320) Tughlaqs (1320-1413), Sayyids (1414-1457), and Lodhis (1457-1526) shows how steadily Persian gained ground for inscriptions on mosques and surfaces of other Muslim buildings. The Mughals provided a special boost to Persian and to *hasta'lique* script which was so suitable for writing non-Qur'anic Persian text. The Qur'anic epigraphy of the Mughals can be divided into five major categories:

1)   The use of complete *suras* or selected *ayat,*   2) The *bismillah,* 3)The Islamic confession of faith: the *Kalimah-e Tayyibah* and the *shahadah,* 4) The *Takbir,*   5) Various attributes of Allah.

Non Qur'anic inscriptions which generally appear in Persian in nasta'lique script can be classified into the following five major types:

1)   Name of the mosque, 2)Name of the patron and the date of erection
3)   Poetical eulogy in praise of Allah and the Prophet, 4) Names of the Prophet Muhammad, Caliphs and *imams,* 5) *Ahadith* concerning mosques, *salat* and other fundamentals of Islam.

Date of the construction of mosque was given in two forms. Either the date was given in words, sometime superimposed by numerical or the date was concealed in a chronogram. Mughals, no doubt, specialized in this art. Although a chronogram is technically a phrase or sentence in which certain letters express a date through their numerical value, in Mughal chronograms the sentence or the phrase itself alludes to or is descriptive of the event to which the date belongs.

There is no certainty about where, when and hcw the art of composing chronograms originated. The earliest chronogram in Jewish literature is found in a Hebrew poem of Al-Harizi of 1205A.D.[8]. Chronograms are common in Latin literature of the Middle Ages. In Europe the word "chronogram" was apparently first used in some verses addressed to the King of Poland in 1575[9],

but by that time chronograms had long been used in the East. The Islamic, particularly the Persian, equivalent for chronogram is *"tarikh"*. In Latin the letters intended to give a date were written in larger format. Majuscules were used even in the middle of a word to make conspicuous those letters which bore a date. Sometimes these letters were emphasized by gilding, or by the use of a different colour, often red. A typical example of a Latin chronogram is given below:[10]

ChrIstVs DVX ergo trIVMphVs

C	=	100
I	=	1
V	=	5
D	=	500
V	=	5
X	=	10
I	=	1
V	=	5
M	=	1000
V	=	5

....

1632

Many Islamic books which today are considered undated bore a chronogram on the title page or within the colophon in place of figures to give the date of publication. Occasionally the title and date was jointly expressed in this manner. Thus Mir Aman, who translated a Persian romance of Amir Khusraw, called *Qissa-i-Chahar Darvish* ("The story of the four dervishes"), chose for his translation the name *Bagh u bahar* ("The garden and the spring"). According to the Arabic system of *abjad* these words give the date 1217A.H./802A.D. which was the date of the translation's publication.

Though the invention of chronograms cannot be traced back to any one source with certainty, and though their date of origin is equally uncertain, it has been suggested that the medieval monks were their originators as they used them as a sort of *memorial technical*[11]. Persian chronograms in the Arabic alphabet are, it seems, of greater antiquity than European examples. It is not improbable indeed, that chronograms originated in the East where poetic juggling of various kinds was common. Chronograms became extremely popular for books and epitaphs. Authors, *katibs*, and printers rivaled one another by hiding dates in intricate chronograms sometimes most difficult

to decipher[12]. In Persian versified chronograms dates are computed on the basis of *abjad*[13] or *hisab al-jummal.* The name *abjad* was the first of a series of mnemonics and incorporated the first four letters in this order, i.e. alif, *ba, jim,* and *dal.* But *abdjad* was only one of the eight mnemotechnical terms into which the twenty-eight consonants of the Arabic alphabet are divided. In the east the whole series of these *voces memorials* is vocalized in the following order[14] : *'abjad* (أبْجَد), *hawwaz*(هَوَّز), *huttiy* (حُطِّي), *kalaman*(كَلَمَن), *sa'fa*(سَعْفَص), *qarashat*(قَرَشَت), *thakhadh* (ثَخَذ) and *dazagh*(ضَظَغ). According to one version six Arabs arranged these letters after their own names[15]. According to another tradition the first six groups are the names of six demons[16]. The arrangement had a practical purpose in that each letter was assigned a numerical value. The twenty-eight characters are thus divided into three successive series of nine each: units, i.e. 1 to 9; tens, i.e. 10 to 90 and hundreds, i.e. 100 to 900. The arrangement is as follows:

Abjad

Alif	(ﺍ)	with the value of	1
Ba	(ﺏ)	with the value of	2
Jim	(ﺝ)	with the value of	3
Dal	(ﺩ)	with the value of	4

Hawwaz

Ha	(ﻩ)	with the value of	5
Waw	(ﻭ)	with the value of	6
Za	(ﺯ)	with the value of	7

Huttiy

Ha	(ﺡ)	with the values of	8
Ta	(ﻁ)	with the value of	9
Ya	(ﻱ)	with the value of	10

Kalaman

Kaf	(ﻙ)	with the value of	20
Lam	(ﻝ)	with the value of	30
Mim	(ﻡ)	with the value of	40
Nun	(ﻥ)	with the value of	50

Sa'fas

Sin	(س)	with the value of	50
'ayn	(ع)	with the value of	60
Fa'	(ف)	with the value of	70
Sad	(ص)	with the value of	80

Qarashat

Qaf	(ق)	with the value of	100
Ra'	(ر)	with the value of	200
Shin	(ش)	with the value of	300
Ta'	(ت)	with the value of	400

Thakhadh

Tha'	(ث)	with the value of	500
Kha'	(خ)	with the value of	600
Dhal	(ذ)	with the value of	700

Dazagh

Dad	(ض)	with the value of	800
Za'	(ظ)	with the value of	900
Ghayn	(غ)	with the value of	1000

The origin of *abjad* is somewhat obscure. Classical Arabic sources offer two different explanations of its origin. One source is that quoted by Ibn al-Nadim[17]. He states that the Arabic alphabet was constructed by six Arabs, and that these six persons later discovered six more letters which were not in their names, i.e. *tha', kha', dhal, za, shin* and *ghayn*[18]. These letters are known as rawadif.[19] The second explanation is that the whole system is of foreign origin as claimed by al-Mubrrad and al-Sirafi.[20] The first tow sets of letters exist in Hebrew and Syriac as well and the letters in both cases have the same numerical value as those of the letters in both cases have the same numerical value as those of the letters in present day Arabic, Persian or Urdu. In the case of other letters most of the letters in Syriac and Hebrew possess the same numerical value as those of the present Arabic[21], but they do not make sets similar to those I Arabic. The point of al-Mubarrad and al-Sirafi seems valid.

Lastly we are left with the problem of establishing the date of the first chronogram in the Islamic world. Hilton gives 1318 A.D. for the first Islamic chronogram. In Pakistani architecture the fashion of chronograms, particularly versified ones, gained increased popularity with coming of the Mughals. They brought this system of recording dates with them from the Iranian world. Prior

to Mughal rule versified dated were given but without chronograms as we see in the case of the mausoleum of La'l Shahabaz Qalandar at Sehwan. In two of these inscriptions the date is recorded as:

بروزِ ہفتم از ماہِ رجب بنی شد ایں روضہ

بسالِ ہفصد و پنجاہ وہفت ہجرت مہتر

(tr.):   *On the 7th of Rajab this mausoleum was completed*

In the yaer 757 after the glorious Hijrah.

i.e. the date 7th of Rajab, 757 A.H. is given in words and in the second instance:

ہفتم از ماہ صفر بنی شد ایں مرقد بسال

ہفصد و پنجاہ ہشت از ہجرتِ احمد شمار

(tr.):*On the 7th of Safar this mausoleum was completed*

In the year 758 from the date of Hijrah of Ahmad (Muhammad).

The date 7th Safar, 758 A.H. is given in words. Both these dates belong to the period of Firuz Shah Tughlaq. Another inscription in the same mausoleum has the date 1173 A.H. and this is arranged in a chronogram. The second hemistich of the last couplet reads:

قبولِ بادنشان درجنابِ شاہانی

(tr.): *(was) accepted by the honourable Emperor*

The computation of the above chronogram is as follows:

							Total
1. *Qabul*	=	qaf	ba	waw	lam		Total
		100	2	6	30		138
2. *Bad*	=	ba	alf	dal			
		2	1	4			7
3. *Nishan*	=	nun	shin	alif	nun		
		50	300	1	50		401
4. *Dar*	=	dal	ra				
		4	200				204
5. *Janab*	=	jim	nun	alif	ba		
		3	50	1	2		56
6. *Shahani*	=	skin	alif	ha	alif	nun	ya
		300	1	5	1	50	10	367

$$1 + \quad 2 + \quad 3 + \quad 4 + \quad 5 + \quad 6$$

$$138 + \quad 7 + \quad 401 + \quad 204 + \quad 56 + \quad 367 = 1173(A.H.)$$

Some more examples of chronograms on Mughal architecture found in Pakistan will now be examined.

Mosque of Shahjahan, Thatta

Inside the eastern gateway of the mosque there are two inscriptions, one on the southern flank of the gateway and the other on the northern. Both consist of one couplet each. The later gives the date. The couplet is as follows:

<div dir="rtl">
هاتفم گفت سال اتمامش

گشت زیبا چو مسجد اقصیٰ
</div>

(tr.): *The angel asked the year of its completion*

It became elegant like the Masjid-i Aqsa.

The translation of the couplet is equally relevant to the date: 'When asked the angel the year of the completion of the mosque. He said: "The mosque became beautiful as Masjid-I Aqsa". Obviously that is not the right reply: The right reply is hidden in the chronogram:

		Gaf	shin	ta			Total
1.	Gasht =	20	300	400		=	720
2.	Ziba =	za	ya	ba	alif		
		7	10	2	1	=	20
3.	Chu =	cha	waw				
		3	6				
4.	Masjid =	mim	sin	jim	dal		
		40	60	3	4		107
5.	Aqsa =	alif	qaf	sad	ya		
		1	100	90	10		201

1	+	2	+	3	+	4	+	5	=	Date
720	+	20	+	9	+	107	+	201	=	1057 (A.H.)

Inscription from Margalla

The inscription of the Margalla Pass comprises four couplets of verse and four lines of prose. The last hemistich of the fourth couplet is made of three words which give the date. The numerical value of the hemistich can be calculated as follows:

<div dir="rtl">
ناصیه مہوش ہندوستان
</div>

(tr.): *Like the beautiful Hindustan.*

			nun	alif	sad	ya	ha		Total
1. Nasia	=		50	1	90	10	5	=	156
2. Mihwish	=	mim	ha	waw	shin				
		40	5	6	300			=	351

3. *Hindustan* = ha   un   da waw   sin ta alif   nun

              5   50   4   6   60 400 1   50   =   576

             1   **+**   **2**   **+**   **3**   **=**

             156   **+**   **351**   **+**   **576**   **=**   **1083   (A.H.)**

Mosque of Wazir Khan, Lahore

Mosque of Wazir Khan contains a number of inscriptions including the chronograms on the left of the main portals as 'one approaches the mosque from the outside:

سالِ تاریخ بنائی مسجدِ عالی مقام

ازخرد جستم بگفتا سجده گاهِ اہلِ فضل

(tr.): *When I asked the reason the date of the foundation of*

This magnificent mosque

It answered," This is the place of worship of the pious".

The words *sajdahgah ahl-i fadl* give the date. The following is the explanation of the chronogram:

1.*Sajdahgah* = sin   jim   dal ha gaf alif   ha   Total

               60   3   4   5   20   1   5 =   98

2. *Ahl*   = alif   ha   lam

               1   5   30   =   36

3. *Fadl*   = *fa*   *dad*   *lam*

               80   800   30   =   910

               1+   2+   3

               98+   **36+**   **910**   = **1044 (A.H.)**

Below this couplet there is another couplet and that also gives the date. The couplet reads:

تاریخ ایں بنائی چو پرسیدم اہل خرد

گفتا بگو کہ بانی مسجدِ وزیرِ خاں

(tr.):*When I asked the wise the date of its foundation*

He said," Say the founder of this mosque is Wazir Khan".

In this couplet the words *bani masjid Wazir Khan* give the date. They can be computed as follows:

1. *Bani*   =   ba   alif   nun   ya   Total

                   2   1   50   10   =   63

2. *Masjid* =   mim   sin   jim   dal

                   40   60   3   4   =   107

3.	*Wazir*	=	*waw*	*za*	*ya*	*ra*			
			6	7	10	200	=	223	
4.	*Khan*	=	*kha'*	*alif*	*nun*				
			600	1	50		=	651	
			1+	2+	3+	4			
			63+	107+	223+	651	=	1044	(A.H.)

Inscription from a bridge, Peshawar

This inscription consists of four couplets in four lines and two lines of prose. The date of construction of the bridge is contained in the last four words of the second hemistich of the last couplet. The last couplet runs as follows:

<div dir="rtl">

پی   تاریخ   اتمام   مهندس

بگفتا   خیرباد   جاری   آباد
</div>

(tr.): *About the date of its completion the engineer(builder)*

Said,"The welfare exists and will continue to flourish".

The words from the last couplet may be computed as follows:

1.	*Khair*	=	*kha'*	*ya*	*ra'*			Total	
			600	10	200		=	810	
2.	*Jari*	=	*jim*	*alif*	*ra'*	*ya'*			
			3	1	200	10	=	214	
3.	*Bad*	=	*ba'*	*alif*	*dal*				
			2	1	4		=	7	
4.	*Abad*	=	*alif*	*ba'*	*alif*	*dal*			
			1	2	1	4	=	8	
			1+	2+	3+	4			
			810+	214	7+	8	=	1039	(A.H.)

Several other buildings of the Mughals also display this interesting jugglery of words. For example in Lahore the Mausoleum of Mian Mir had a chronogram. It was made of three couplets and the last line gives the date of his death 1045. A.H. (1635 A.D). The tomb of Hadrat 'Ali Hajveri has a chronogram comprising three couplets and the last word alone of the last line gives the date 845 A.H. (1072 A.D.). This can be considered as the oldest extant chronogram in Lahore. In the tomb of Nawab Imam al-Din the sarcophagus has the chronogram giving the date of his death. Even Zeb al-Nisa' composed several chronograms and when she died a poet of the *darbar* versified a chronogram of three couplets which gave the date of her death 1080 A.H. (1699 A.D.). 'Ali Mardan Khan's tomb has a chronogram

which gives the date of his death as 1141 A.H. (A.D.). And when the Shalamar Bagh was completed, one of the royal poets composed a chronogram too. This chrongogram gives the date 1047 A.H. as the year of completion of the garden. The *Hijra* date corresponds to 1637 A.D. Close to the Shalamar Bagh there was another garden by the name of Gulabi Bagh. The garen does not exist today but its gateway still stands with a chronogram giving the date 1066 A.H.(1655 A.D.). With the departure of the Mughals and the decline of Persian language, the art of composing chronograms died. Though Sikhs during their never touched the standards which Mughals had maintained. The art of versifying chronograms thus died and has never been revived.

Wazir Khan Mosque, Lahore
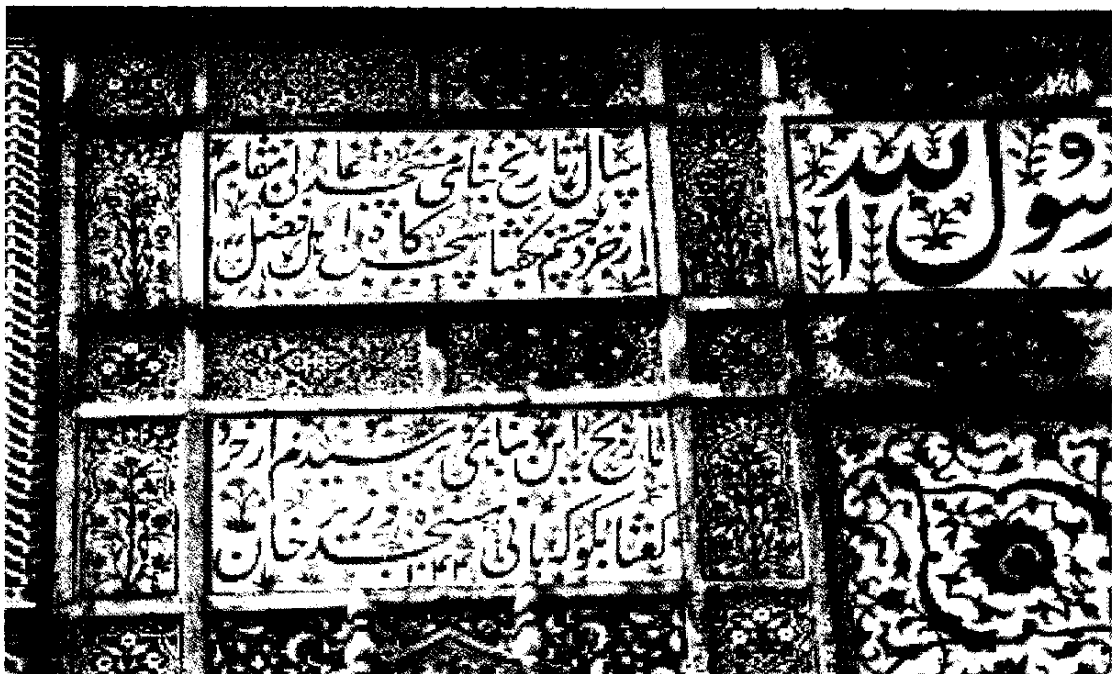
Choronograms on the facade of Wazir Khan Mosque

Notes and References

1)   Al-Balaldhuri, *Futuh al-Buldan,* (Cair, 1319 A.H.), 438-51.

2)   A. Chughtai, *Mosques in Indo-Pakistan sub-continent,* (Lahore, 1962), 42.

3)   *Ibid*

4)   Abu al-Hasan 'Ali ibn Husain al-Mas'udi, *Muruj al-Dhahab wa Ma'adin al-Jawahir,* (Cairo, n.d.), 382-3

5)   This name is found in various forms. Al-Mas'udi calls it al-Rur; Ibn Khurdabih writes it al-Daur; Al-Istakhri has al-Ruz and ibn Hauqal has Ruz, while al-Biruni and al-Idrisi have Ruz and al-Ruz Respectively. Its present name is Alor or Rohri. See Appendix to *The History of India as told by its own Historians.* (ed.) J. Dowson, (tr.) H.M. Elliot, I (London, 1857), 635.

6)   Chaghatai, *Mosques in Indo-Pakistan,* 43.

7)   Towards the end of 1850s, the Pakistan Archaeological Department discovered a mosque at Banbhore. The mosque in question is supposed to have been built on the site of a demolished Hindu temple. Later Excavations at the same site have led to more discoveries including stone slabs bearing Qur'anic inscriptions. This example can be considered as a prototype on inscriptions in Pakistani mosques or for that matter, whole of the subcontinent.

8)   *The Jewish Encyclopaedia,* IV (London, 1903), 63.

9)   *The Oxford English Dictionary,* (repr. Oxford, 1961), 395.

10)   J. Hilton, *Chronograms* (London, 1882), vii.

11)   *Ibid, op.cit.,* ix

12)   *Ibid.* The author does not say when and where.

13)   Also called *abajad* or *Abu Djad.* See Ibn al-Nadim, The *Fihrist of* al-Nadim, ed. & tr. B. Hodge, 2 vol. (New York, 1970), 7.

14)   In the West group 5, 6, and 8 were differently arranged as: *sa'fad, qurishat,* respectively *zaghsh.*

15)   G. Weil, "Abdjad", *Encyclopaedia of Islam,* vol.I, 97-98; he does not identify the first six groups to which this applies, i.e. those of West or East.

16)   *Ibid.*

17)   Ibn al-Nadim only gives various sets of words on which *abdjad* system was based. He does not say anything about how the numerical value was assigned to each letter.

18)   D. B. McDonald, "Allah", *Encyclopedia of Islam.* I, 302-11.

19)   A sort of afterthought.

20)   Al-Mubarrad and al-Sirafi consider the system wholly of foreign origin. See Weil, op.cit.,97-8.

21)   See F. Ballhorn, *Grammatography,* (London, 1861), 20; cf. ibid., 14, 16-9.

22)   *Gaf* does not occur in the Arabic alphabet but its numerical value remains that of *kaf.* There are several such additions in Persian and Urdu whose value is the same as that of the nearest letter in Arabic alphabet.

23)   *Cha* is also a Persian (and Urdu) addition.