

***Chapter: I***

***Mughal Gardens, Monuments and Hydraulic System***

The initiator of the Mughal gardens in India was Zaheeruddin Babur who had witnessed the beauty of Timurid gardens in Central Asia during his early days.<sup>1</sup> Furthermore, he was much influenced by the picturesque description of gardens in Persian poetry of Firdausi, Sa'adi, Hafiz, Khayyam and Nizami.<sup>2</sup> In India, Babur laid out the gardens more systematically. Fundamentally, the Mughal gardens have had edifices in a symmetrical arrangement within enclosed towns with provisions for water channels, cascades, water tanks and fountains etc. Thus, the Mughals maintained the tradition of building fourfold (*chaharbagh*)-symmetrical garden. Babur, however, applied the term *chaharbagh* in its widest sense which includes terraced gardens on mountain slopes and his extravagant rock cut garden, the *Bagh-i Nilufar* at Dholpur.<sup>3</sup> After Babur, the tradition of building *chaharbagh* touched its zenith during the time of Shah Jahan. Unlike Timurid gardens, the *chaharbagh* element was not always followed with rigid cross intersected by the pathways but was made in less sharply built plots and beds in the area between the axial channel and surrounding walls.<sup>4</sup> However, modern scholars are now increasingly questioning the excessive use of the term *chaharbagh* in the interpretation of Mughal gardens, since it was not always symmetrical. This view finds archaeological support also. The excavated Mughal garden at Wah (12 kms west of Taxila), near Hasan Abdal, associated with Mughal emperors Akbar, Jahangir and Shahjahan reveals that the pattern and overall design has not been symmetrical on the first and second terraces.<sup>5</sup> A miniature painting made by Farrukh Chela, on the margin of *Diwan-i Hafiz*, depicts the irregular arrangement of a walled garden (**Plate: I**). However, the excavated Wah garden displayed other features of the structure, such as the platforms, water channels and terracotta pipes to supply water, *baradari*, decorations of cascades and channels in a

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<sup>1</sup> For Persian and Central Asian garden tradition and their influence on Mughal gardens, see Mehdi, M. R. Moghtadar et.al., *The Persian Garden- Echoes of Paradise*, (Washington, 2004); E. B. MacDougall and Richard Ettinghausen (eds.), *The Islamic Garden: Dumbarton Oaks Colloquium on the History of Landscape Architecture*, (Washington, 1976), IV; Moynihan, *Paradise as a Garden*; Sylvia Crowe, et.al., *The Gardens of Mughal India*.

<sup>2</sup> R. Nath, 'Bagh-i Gul Afshan of Babur at Agra', in *Indo Iranica*, (1970), 23 (iii), pp. 20-21.

<sup>3</sup> Ebba Koch, 'My Garden is Hindustan, The Mughal Padshah's Realization of a Political Metaphor', in Michel Conan, ed., *Middle East Garden Traditions: Unity and Diversity: Questions, Methods and Resources in a Multicultural Perspective*, (Washington, 2007), p. 159.

<sup>4</sup> Ebba Koch, 'The Mughal Waterfront gardens', in Attilio Petruccioli, ed., *Gardens in the Time of the Great Muslim Empires: Theory and Design*, in *Muqarnas Supplements*, (Leiden, 1997), vol. 7, p. 142.

<sup>5</sup> Makin Khan, 'An Introduction to the Historical, Architectural and Hydraulic Studies of the Mughal Garden at Wah, Pakistan', *East and West*, (December, 1996), Vol. 46, No. 3/4, p. 463.

chevron pattern, flower vases, floral motifs, creeper designs and geometrical patterns which represent some of the element depicted in Mughal Architecture.<sup>6</sup> The distinctive architectural feature of *baradari* in the Wah garden is flat and domed roofs were noticed on the alternative bays.<sup>7</sup> The Shalamar gardens of Kashmir and Lahore display some buildings, especially edifices made for ladies (*zanana*) on the highest terraces.<sup>8</sup> However, it is rightly observed that all gardens of Mughal India were not fulfilling the characteristic features of Mughal gardens. Besides, there were ordinary groves and orchards or flower and fruit gardens also.<sup>9</sup>

As for location, the Mughal emperors were much particular in selecting places of great natural beauty. Often they selected mountain slopes with gushing water to layout gardens, the finest example being *Bagh-i Shalamar* and *Bagh-i Nishat* in Kashmir, Shalamar garden at Lahore and Mughal garden at Wah (Hasan Abdal) etc.

### **Mughal gardens and monuments**

Almost all the Mughal gardens contained some very important buildings like residential palaces, forts, mausoleums, mosques etc. The gardens became an essential feature of almost each kind of Mughal monuments and were inter related to these monuments which can be categorized as: (i) Gardens attached with Imperial palaces, forts and gardens which beautified private residential buildings of the nobles (ii) Religious and sacred structures i.e., tombs and mosques erected in the gardens, and (iii) Resort and public building in the pleasure gardens. The Imperial palaces of Mughals at Agra, Delhi and Lahore were built around the 'gardens'.<sup>10</sup> The first Mughal emperor Babur made his gardens outside the fortress palaces of pre-Mughal rulers just as a symbol of appropriation of land because they had been the seat of power, as agreed by both

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<sup>6</sup> Ibid.

<sup>7</sup> Ibid.

<sup>8</sup> Sylvia Crowe, et.al., pp. 102, 150; Moynihan, *Paradise as a Garden*, p. 142.

<sup>9</sup> Irfan Habib, 'Notes on the Economic and Social Aspect of Mughal Gardens', in James L. Wescoat, *Mughal Gardens: Sources places*, p. 127.

<sup>10</sup> Klaus Rotzer and Khandu Deokar 'Mughal Gardens in Benaras and its Neighbourhood in the Eighteenth and Nineteenth Century', in Francoise Nalini Delvoy, ed., *Confluence of Culture: French Contribution to Indo Persian Studies*, (New Delhi, 1995), p. 135.

Catherine and Wescoat.<sup>11</sup> But later palaces were built in the garden as a metaphor of Paradise on earth, the example of which may be found in the fusion of palace and gardens in Shah Jahan's fortress palace at Delhi.<sup>12</sup> The court poet and historian Salih Kambuh in his verses proclaims Shah Jahan's palace as terrestrial image of paradise with its *Hayat Bakhsh* (life bestower) garden like a new *Iram*<sup>13</sup> (the fabulous garden) with its natural plants and beautiful water decorations.<sup>14</sup> Basically, the Persians in Iran and Central Asia, and the Mughals in India borrowed the concept of building monuments in the gardens from the *Quran*. The *Quranic* verses variously mention the presence of beautiful mansions (*masakin*) in the Gardens of Eternity (*Jannat-i Adnin*).<sup>15</sup>

Besides religiosity, observes Ebba Koch, these paradisiacal palace gardens has also some political meaning since 'they were intended as an image of his reign and empire as garden, paradise of the ideal king whose good government had brought about a new golden age of an unending spring.'<sup>16</sup> Not only Red Fort palace, but all other Mughal palaces situated at Agra, Lahore, Delhi and Kashmir etc. were intersected with beautiful gardens.<sup>17</sup> Manucci gives the vivid picture of the Mughal Empire that all the three principal imperial seats, Delhi, Agra and Lahore, had been beautified by the gardens with running water.<sup>18</sup> However, evidence suggests that not only the above mentioned palaces, but almost every Mughal palace was adorned with gardens. The garden of Rafiz Rakhna at Sirhind, known as Aam Khas Bagh, displays the meaning of its nomenclature, since this walled garden had a palace and a *sarai*.<sup>19</sup> Sultan Hafiz Rakhna of Herat, the *shiqdar* (superintendent) at Sirhind, laid out this garden during the reign of Akbar with some

<sup>11</sup> Catherine B. Asher, 'Babur and the Timurid *Char Bagh*: Use and Meaning', in *Environmental Design*, (1991), no.1-2, pp. 37, 47; James Wescoat, 'Picturing an Early Mughal Garden', *Asian Art*, 2 (1989), pp. 75, 77. Babur's first garden at Agra was named *Hasht Bahisht Bagh*.

<sup>12</sup> Ebba Koch, 'Mughal Palace Garden from Babur to Shahjahan (1526-1648)', in *Muqarnas*, (1997), vol. 14, p. 143.

<sup>13</sup> The fabulous garden *iram* (Arabic), is said to have been devised by Shaddad bin 'Ad in emulation of the gardens of paradise. Cf. F. Steingass, *Comprehensive Persian English Dictionary*, (N. Delhi, 2007), p. 39.

<sup>14</sup> Salih Kambuh, *Amal-i- Salih*, (Calcutta, 1912-46), III, pp. 28-29.

<sup>15</sup> *Quran*, 9:72; 39:20; 61:12.

<sup>16</sup> Ebba Koch, 'Mughal Palace Garden from Babur', op. cit., p. 159.

<sup>17</sup> For detailed description of Anguri Bagh in Agra fort palace, Hayat Bakhsh and Red Fort Palace, Lahore Fort and gardens etc. see *Ibid.*, pp. 143-165.

<sup>18</sup> Manucci, Nicolao, *Mogul India (1653-1708) or Storia do Mogor*, Eng. tr. W. Irvine, 4 vols. (Calcutta, 1965-67), II, p. 463.

<sup>19</sup> Subhash Parihar, *Mughal Monuments in the Punjab and Haryana*, (New Delhi, 1985), p. 10.

buildings within the premises which had, in words of Badauni, no parallel in Hind.<sup>20</sup> Shah Jahan took keen interest in the development of gardens and made six visits to Sirhind garden. Abdul Hamid Lahori informs us that Shah Jahan celebrated the *nauroz* festival in the garden in 1634 AD and ordered Dayanat Khan, the *diwan* of *Sarkar* Sirhind, to build few more buildings of the palace including *daulat khana-i khas* (personal palace), *jharokha mubarak* (lattice window), *khavgah* (sleeping apartment), and a *mahal-i muqaddas* (exalted palace) near the tank.<sup>21</sup> However, Lahori was contradicted by the European traveler William Finch who mentions the presence of *daulat khana-i khas* in 1611 AD. According to him the palace structure of the garden had an eight square *mahal* with eight chambers for women. There was a tank in the middle over which there were eight rooms with galleries round about.<sup>22</sup> Finch places the palace in the crossing of two causeways whereas another traveler Manrique (visited India in 1641 AD) locates it in the last section and describes it as a ‘grand royal palace’.<sup>23</sup> Most probably it was built by Sultan Hafiz Rakhna himself, as the plan of the garden shows the period of the reign of Akbar.<sup>24</sup> A picturesque description of the palace situated in the so called *Zahra Bagh*, erroneously called after the name of Zahra, the daughter of Babur,<sup>25</sup> has been given by Shah Jahan’s poet laureate Abu Talib Kalim who named the garden as *Bagh-i Jahanara*, in which a palace (*qasr*) was surrounded by flowerbeds with a tank and situated on the bank of the river.<sup>26</sup>

<sup>20</sup> Abdul Qadir Badauni, *Muntakhab-ut Tawarikh*, Eng. tr., George Ranking, Reprint. (New Delhi, 1990), II, pp. 393-94.

<sup>21</sup> Abdul Hamid Lahori, *Padshahnama*, ed., Kabir Al-Din Ahmad, Abd Al-Rahman and W.N. Lees, (Calcutta, 1866-72), II (i), pp. 115-16.

<sup>22</sup> W. Finch, *Early Travels in India*, ed., W. Foster, reprint, (New Delhi, 1968), p. 158.

<sup>23</sup> Manrique, *Travels of F.S. Manrique, 1629-1643*, Eng. tr., Luard and Hosten, (Oxford, 1927), II, p. 184.

<sup>24</sup> Subhash Parihar, *History and Architecture Remains of Sirhind: The Greatest Mughal City on Delhi Lahore Highway*, (N. Delhi, 2006), p. 190.

<sup>25</sup> It was widely believed that Zahra Bagh received its name from Babur’s daughter Zahra or Zehra but Ebba Koch, on the basis of sources and features of the surviving architectural remains, came to the conclusion that this garden was commissioned by Nur Jahan, the wife of Jahangir and was completed in 1621 AD. Cf. Ebba Koch, ‘the Zahara Bagh: (*Bagh-i-Jahanara*) at Agra’, *Environmental Design*, (1986), I, pp. 30-37.

<sup>26</sup> Abu Talib Kalim, *Diwan*, as cited by Ebba Koch, ‘The Zahara Bagh’, op. cit., p. 34. The verses of Talibas follows:

‘A boat trip will remove the sorrow from your heart,  
Pass by the garden of Jahanara!  
In this paradise is such a heart attracting palace (*qasr*)  
That the eyes get anxious to behold it.

Mughal garden means the aesthetic water features and plantation with rich ‘architectural structures’. However, Rotzer says that Mughal garden was entirely a ‘habitable’ space comparable to the English Bungalow.<sup>27</sup> Imitating the Mughal life style, the Jat rajas of Deeg and maharajas of Banaras, constructed the residential palaces in the gardens with Mughal architectural features. The buildings were at the southernmost part of the gardens on a raised platform, facing towards North to avoid the sun rays and, at the same time, to have the panoramic view of the gardens.<sup>28</sup> An early eighteenth century painting explicitly shows the relationship and interlocking function of the palace and garden (**Plate: II**). Conclusively, during the time of Mughals, even if each garden had not a palace yet almost each palace had a garden. This was not the case with the Imperial palaces only; the palaces of the nobles were also interlocked by the gardens.

The gardens attached to the private residence of a noble were known either as the *khanabagh*<sup>29</sup> or *sarai bustan*.<sup>30</sup> The Mughal nobles followed the Timurid tradition of Central Asia in making their residences within gardens. Clavijo, a Spanish ambassador to Timur’s court (1404 AD), gives an eye-witness account that at Samarqand, the capital, Timur had built sacred places in the gardens.<sup>31</sup> Likewise, in India, several *khanabaghs* (residences of the nobles), dated from the time of Akbar, have been excavated at Fatehpur Sikri. In construction, they were quite small as compared to the *khanabagh* or *pa-in bagh* (garden outside the main structure but in its shadow) of Shah Jahan’s *daulatkhana*. The residential place of Abdur Rahim Khan-i Khanan, the Iranian nobles’ house, the *yatishkhana* of the animal superintendent, the *yatishkhana* of the superintendent of Hathipol Sarai, the *fardkhana* (guest house) near *diwan-i Am*, and the main *daulatkhana*

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On three (of its) sides are flower gardens and in front of it is the river,  
 And each of its waves a curling lock brings about joy.  
 Its (the palace) doors and walls through paintings (have become) flowerbeds,  
 And one should sit inside facing the wall!  
 In that (palace) is a tank, full of the water of life,  
 And its waves do not know its shore.  
 The flower garden and this sublime palace were founded.’

<sup>27</sup> Rotzer and Deokar, ‘Mughal Gardens’, op.cit., p. 138.

<sup>28</sup> Ibid., pp. 137,138, 140, 143.

<sup>29</sup> Lahori, *Padshahnama*, I, (i), p. 243.

<sup>30</sup> Salih Kambuh, *Amal-i Salih*, III, p. 46.

<sup>31</sup> Clavijo, Ruy Gonzalez, *Embassy to Tamerlane 1403-1406*, Eng. tr., Guy le Strange. (London,1928), p. 144.

of Shah Jahan contained house gardens, situated inside the palace in small *chaharbagh* style.<sup>32</sup> In Delhi, the residences of the nobles were surrounded by gardens and were mostly situated outside the wall in the suburb where water was available in plenty for larger gardens. The evidence of *Khulasat-ut Tawarikh* suggests that in every house there were fresh gardens provided with tanks and reservoirs.<sup>33</sup> Salih Kambuh, in his picturesque language, describes the beauty of these gardens and narrates that even the buildings and gardens of Baghdad, in front of Dajla River, felt ashamed before these gardens (*bagh*) and orchards (*bustan*).<sup>34</sup> A modern scholar Stephen P. Blake in his survey to Shahjahanabad (Delhi) came to the conclusion that in the city, every elite mansion had its *Khana Bagh* (House Gardens).<sup>35</sup> These gardens were extremely pleasant places to stay during the hot weather especially for the Begums who being forbidden to go into public spaces, used to amuse themselves in the secluded portions where they feel like ‘paradise’.<sup>36</sup> Bernier found gardens in every good house and said ‘they consider that a house to be greatly admired ought to be situated in the middle of a large flower garden...’<sup>37</sup> Chandra Bhan Brahman, a native of Lahore, and *munshi* under Shah Jahan, while describing the beauty of the fort of Shahjahanabad and its gardens, writes that there were so many enchanting (*dilkash*) and eternal gardens which reminds one of Paradise (*bahisht*).<sup>38</sup> Chandra Bhan, in his *Chaharchaman*, eulogizes *khanabagh* and the gardens in these words:<sup>39</sup>

‘Every house (*makan*) is like a sublime heaven (*firdaus-i barin*),  
And every building has a paradisiacal garden (*bustan*);  
Its avenues (*khiyaban*) are so utterly delightful (*ishrat sirisht*),  
You might say they are the lanes of the road to Paradise (*rah-i bahisht*)’.

<sup>32</sup> Syed Ali Nadeem Rizavi, ‘Exploring the Mughal Gardens at Fatehpur Sikri’, *PIHC*, (New Delhi, 1998), p. 900.

<sup>33</sup> Jadunath Sarkar, *The India of Aurangzeb (Topography, Statistics and Roads) Compared with India of Akbar, with Extracts from the Khulasat-ut-Tawarikh and Chahar Gulshan*, (Calcutta, 1901), p. 4.

<sup>34</sup> Salih Kambuh, *Amal-i Salih*, III, p. 46.

<sup>35</sup> Stephen P. Blake, *Shahjahanabad the Sovereign city of Mughal India: 1639-1739*, (Cambridge, 1991), p. 49.

<sup>36</sup> Rotzer and Deokar, ‘Mughal Gardens’, op.cit., pp.138; For details of the *khanabagh* of Delhi see Stephen Blake, *Shahjahanabad*, pp. 62-64. Idem, ‘The *Khana Bagh* in Mughal India: House Gardens in the Palaces and Mansions of the Great Men of Shahjahanabad’, in James L. Wescoat, *Mughal Gardens: Sources places*, pp. 171-88.

<sup>37</sup> Francoise Bernier, *Travels in the Mughal Empire, 1656-1668*, Eng. tr., Archibold Constable, Reprint, (New Delhi, 1983), p. 247.

<sup>38</sup> Chandra Bhan, *Chaharchaman*, p. 124.

<sup>39</sup> *Ibid.*, p. 125.

In fact, in almost every Mughal town there were suburbs comprising of Mughal gardens. In Rajasthan, these types of gardens were known as *haveli* gardens.<sup>40</sup> Both banks of Jamuna river in Agra, especially the right bank had dotted by the *havelis* and gardens of nobles and dignitaries.<sup>41</sup>

Besides the Imperial and nobles' residential gardens, which were centered with palaces, mansions and *havelis*, there were funerary gardens too. It became almost customary that after the death of the owners, their pleasure gardens were generally converted into funerary gardens by constructing sepulcher at the center where once the *baradari* or open pavilion stood.<sup>42</sup> The sixteenth century traveler Edward Terry informs us that every affluent Muslim used to build his sepulcher in his life time, maintaining all the features of Mughal gardens.<sup>43</sup> The building was generally situated on square platform with four canals ornamented with fountain and trees like cypresses and fruit to make the funerary gardens beautiful and evergreen.<sup>44</sup> Generally the funeral gardens of the Emperors or nobles had been handed over to the priests and *faqirs* who used to live and look after the garden by receiving their subsistence from the sale of the fruits and from the alms given by the visitors who came to visit the resting place of their relative or friend or master.<sup>45</sup> A mosque attached to it was an essential architectural feature of the funerary gardens. In the light of the Islamic notion of a garden in the Paradise, James Dickie tried to explain that 'burial in a garden amounts to a material anticipation of immaterial bliss and the garden approximate the *Quranic* model the more effective is the analogy'.<sup>46</sup>

However, the funerary garden was the answer of Islam to the grim realities of death and to prepare the owner for death even in his lifetime, and also with the intention of receiving prayer (*fatiha*) by the descendants after the death. The tomb of Humayun

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<sup>40</sup> Ajay Khare, 'Ghat ki Guni: The Gateway to Dhoondhar Empire', in Shikha Jain, ed., *Princely Terrain: Ambar, Jaipur and Shekhawati*, (Delhi, 2005), pp. 18-29.

<sup>41</sup> Ebba Koch, *The Complete Taj Mahal and the Riverfront gardens of Agra*, (New Delhi, 2006-7), pp. 30-31, 37-79.

<sup>42</sup> Nadeem Rizavi, 'Exploring the Mughal', op.cit., p. 859.

<sup>43</sup> Terry, *Early Travels*, pp. 315-16.

<sup>44</sup> James Fergusson, *History of Oriental Architecture*, (London, 1910), II, pp. 289-90.

<sup>45</sup> Terry, *Early Travels*, pp.315-16; James Dickie, 'The Mughal Garden: Gateway to paradise', *Muqarnas*, (1985), vol. III, p. 132.

<sup>46</sup> *Ibid.*, p. 131.



became the favorite destination of his descendants. Whenever they used to visit Delhi, it was obligatory for them to make prayers.<sup>47</sup> Irfan Habib further generalized Richard's view of Imperial to ordinary people, and elaborates that these tomb gardens were generally accessible to the common people so that they could come to visit the gardens and pray for the salvation of the entombed.<sup>48</sup> An inscription of Gulabi Bagh at Lahore makes it clear that Sultan Beg constructed a garden like that of paradise so that 'the pious prayed to God for his eternal life!'<sup>49</sup>

It is generally believed that the tradition of constructing tomb in the enclosed gardens began in India during the time of Khaljis when the complex of Mandu was built in which there stands a tomb of Hoshung Shah with a congregational mosque (Friday masjid) and a *madrasa*.<sup>50</sup> Although it is not certain that whether the tomb garden was in vogue during the time of Timur or not, since the Timurid tombs are located in the cemeteries,<sup>51</sup> yet according to Babur's own testimony, he buried his mother in the garden in Kabul (1506 AD).<sup>52</sup> Consequently, these types of gardens proliferated in almost in every city; especially in Agra, Delhi and Lahore which was imitated exhaustively by the Mughal officials in all the *Subas* of the empire. Thus, Humayun's tomb at Delhi, Akbar's tomb at Sikandara (Agra), Itmad-ad Daula's tomb at Agra and finally Taj Mahal (Agra) exhibit the best and fabulous specimens of imperial and noble's tomb gardens. The author of *Khulasat-ut Tawarikh* comments upon the tomb gardens of Delhi that the tombs of the nobles, ministers, scholars and other accomplished persons, amid gardens and orchards, were too many to be enumerated.<sup>53</sup>

The evidence frequently refers the *zanana* tomb gardens for the royal women, such as Shah Begum's tomb, Jahangir's first wife and Man Singh's sister, known as

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<sup>47</sup> J. F. Richards, 'The Historiography of Mughal Gardens', in Wescoat, ed., *Sources, Palaces*, pp. 263-64.

<sup>48</sup> Irfan Habib, 'Notes on the Economic', op.cit., p. 137.

<sup>49</sup> Syed Muhammad Latif, *Lahore: Its History Architectural Remains and Antiquities*, (Lahore, 1892), p. 134.

<sup>50</sup> Fairchild Ruggles, *Islamic Gardens*, p. 108.

<sup>51</sup> Catherine, 'Babur and the Timurid *Char Bagh*', op. cit., pp. 49-50.

<sup>52</sup> Zahiruddin Muhammad Babur, *Baburnama*, Eng. tr., A. S. Beveridge, Reprint, (New Delhi, 1979), p. 246.

<sup>53</sup> Sujjan Rai Bhandari, *Khulasat-ut Tawarikh*, op.cit., p. 11.

Khusrau Bagh;<sup>54</sup> garden of Raushanara, half a mile from Delhi;<sup>55</sup> Rabia Durrani's tomb, situated in the middle of a *chaharbagh* garden, a typical of most imperial Mughal tomb at Aurangabad;<sup>56</sup> Qudsia Bagh on the north of the walled city of Delhi which forms a turning point in the history of the late Mughal architecture.<sup>57</sup> Tomb of Bahu Begum, wife of Shujaudaula, at Faizabad was also inspired by the Mughals and was built on *chaharbagh* pattern in 1806 AD.<sup>58</sup> Bibi Pari's tomb was built in the complex of Lalbagh at Dhaka, on the same pattern of *Aam Khas Bagh* (strictly with Mughal features) at Sirhind, albeit not terraced.<sup>59</sup> However commenting upon the tomb gardens, the European travelers aptly described that the gardens served their owners as place of enjoyment in their life and continued to serve even after death as the choicest place for their tombs and mausoleums.<sup>60</sup> Recently modern scholars have extended another plausible reason for such a wide availability of tomb gardens in economic perspective since the tomb gardens were exempted from the garden tax (*sar-i darakhti*).<sup>61</sup>

Besides the tomb gardens of rulers, nobles and royal ladies, there were tomb gardens of holy men also, as the Sufis loved nature and usually lived outside the quarters of the city. The grave of the famous saint of Gujarat, Shah Alam was outside the city of

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<sup>54</sup> Catherine, *Architecture of Mughal India, The New Cambridge History of India*, (Cambridge, 1992), 1:4, pp.104-05, 146. When Shah Begum, Jahangir's first wife and Man Singh's sister, poisoned herself in 1604 AD, she was buried in a garden at Allahabad, which came to be called Khusrau Bagh after Khusrau was buried there in 1622 AD and even today is known with the same name. In 1611 AD Finch found it as a sumptuous tomb.

<sup>55</sup> This garden was built by princess Raushanara, daughter of Emperor Shah Jahan in 1650. She is buried in the middle of an open pavilion which was in the center of the garden. Fanshawe, *Delhi Past and Present*, (London, 1902), p. 61.

<sup>56</sup> Catherine, *Architecture of Mughal*, pp. 264-65.

<sup>57</sup> *Ibid.*, pp. 302-03; Fanshawe, p. 54. The tomb of Udham Bai (known as Qudsia Begum, wife of Muhammad Shah) was built in a *chaharbagh* palace complex in 1748 AD and a mosque is also attached to it. She was a dancing girl who was later given the title 'Nawab Qudsia Sahib-uz Zamani' by her son Ahmad Shah. Cf. Herman Goetz, 'The Qudsia Bagh at Delhi: Key to Late Mughal Architecture', in Monica Juneja (ed.), *Architecture in Medieval India: Forms, Context, Histories*, (New Delhi, 2008), pp. 220-31; R Nath, *Monuments of Delhi: Historical Study*, (New Delhi, 1979), p. 69.

<sup>58</sup> Catherine, *Architecture of Mughal*, p. 319. I visited the said tomb and found it a replica of Humayun's tomb with underground grave and stairs on all the four sides to go to the elevated tomb.

<sup>59</sup> Bibi Pari was the favourite daughter of Shaista Khan, governor of Bengal, during the reign of Shah Jahan. Her tomb was built in Lal Bagh Fort at Dhaka which became the premier city after shifting the capital here during the time of Shah Jahan. Though it is known as Lal Bagh Fort, it more closely resembles an elaborate walled garden which adheres to the imperial Mughal idiom. Cf. Catherine, *Architecture of Mughal*, pp. 284-85.

<sup>60</sup> Pelsaert, *Jahangir's India of Francisco Pelsaert*, Eng. tr., W. H. Moreland & P. Geyl, (Delhi, 1925), p. 5; Terry, *Early Travels*, p. 315-16.

<sup>61</sup> *Mirat*, I, pp. 263-64; Irfan Habib, 'Notes on Economic', op.cit, p. 135 n.

Ahmadabad in a verdant garden which was plundered at the time of the invasion of the Marathas.<sup>62</sup> References reveal that the rulers often used to grant lands to saints who, later on, were buried in those lands, which were often encircled by gardens.<sup>63</sup> Besides lands, evidences suggest that the emperors used to donate gardens also to the tombs of Sufi saints.<sup>64</sup> Havel writes that Mughals had the custom of building tombs for themselves and for their saints or heroes, which also finds support from Terry's descriptions that many tombs in the gardens were built in the memory of esteemed saints.<sup>65</sup> It is found that they loved to be in the company of saints and to take blessings from them. Dara Shikoh had spiritual relationship with several Sufis, especially with Mian Mir of Lahore. His work *Sakinat-ul Aulia* refers to his several meetings with Mian Mir in the garden.<sup>66</sup> The Mughal painter Bichitr has portrayed perhaps the same prince along with sages and learned men in the garden (**Plate: III**). Like Sufis, Hindu Yogis also had their attachment with gardens. *Archaeological Survey of India* Report makes it clear that to the West of Shahganj at Agra, there was a walled garden enclosure, known as Udinath Bagh, named after a Jogi or Hindu devotee who lived there during the time of Akbar. The survey report further showed that the garden had octagonal towers on each of the four corners with, on the east end of the enclosure, a fine old red sand stone building and many full bellied pillars which were decidedly Hindu in character.<sup>67</sup>

The Mughal gardens were not only intermingled with the sacred structure like tomb but they were dotted with mosques also. Mosques in the gardens symbolize spirituality. One of the earliest depictions of such types came from the great Umayyad mosques in Damascus which possessed a splendid mosaic garden.<sup>68</sup> In India, Babur for the first time built a mosque in a large *chaharbagh*, Bagh-i-Nilofar at Panipat, on the

<sup>62</sup> *Mirat*, Eng. tr., M. F. Lokhandwala, (Baroda, 1965), pp. 506-07.

<sup>63</sup> Abdul Rehman, 'Garden Types in Mughal Lahore According to Early Seventeenth Century Written and Visual Sources', in Petruccioli, ed., *Gardens in the Great Muslim Empires*, p. 163.

<sup>64</sup> Khwaja Mohd Azam Kashmiri, *Waqiat-i Kashmir*, Urdu tr., Dr. Shamsuddin, (Srinagar, 2001), p. 229; Itmad Ali Khan *Mirat-ul Haqiq*, Fraser Collection, 124, Bodleian Library, transcript of the manuscript (T. No. 92), written in the early eighteenth century, is preserved at the CAS, Department of History, AMU, Aligarh, f. 191b.

<sup>65</sup> E. B. Havel, *Indian Architecture: Its Psychology Structure and History*, (London, 1913), p. 62; Terry, *Early Travels*, p. 316.

<sup>66</sup> Dara Shikoh, *Sakinat-ul Aulia*, (Tehran, 1965), pp. 22-24.

<sup>67</sup> *Archaeological Survey of India (ASI), 1871-72*, (Varanasi, 1960), IV, p. 203.

<sup>68</sup> Osamah El Gohary, 'Symbolic Meaning of Gardens in Mosque Architecture', in *Environmental Design*, (1986), p. 32; Godfrey Goodwin, 'Gardens of the Dead in Ottomans Times', *Muqarnas*, (1988), V, p. 62.

pattern of the congregational mosque used by the Timurids.<sup>69</sup> Thus, like *chaharbagh* concept, Babur introduced the concept of building mosque in the garden. This legacy was carried on by the later Mughals too. The Badshahi mosque of Aurangzeb at Lahore with a garden courtyard without tomb is a live example. Likewise the region of Golkunda, in the sixteenth and seventeenth century, provides ample examples of mosque gardens.<sup>70</sup> Thus, a mosque attached with tomb in a garden became more prevalent. The regional kingdoms also followed the Mughal way and built mosques in the splendid gardens, often attached to mausoleums.<sup>71</sup> In the beautiful *chaharbagh* gardens of Mian Mir Nawab, son of Nawab Sadullah Khan, who was the Prime Minister of Jahangir at Lahore, there were two mosques, opposite to each other, most probably one for the ladies in the East and another for the nobles in the West.<sup>72</sup> Epigraphs of the period also authenticate the building activity of the gardens, sometimes attached to mosque and sometimes even far from mosque, given in *waqf* to the mosque.<sup>73</sup> Like mosques, temples were also built amid gardens on the pattern of Mughals by the regional rulers. Most of the temples of newly built Jaipur city by Sawai Raja Jai Singh had gardens.<sup>74</sup>

The pleasure gardens and their monuments were the most important feature of Mughal gardens. Inspired by nature, it was first developed by Babur in Farghana Valley on the line of the Iranian tradition. These gardens were actually meant for the sloping sites to create terraced gardens with flowing water but Mughals started to build these types of gardens even in the plains of Agra by developing the suitable hydraulic system. The courtiers and other elites followed the same traditions and the city like Lahore ultimately became the ‘city of gardens’.<sup>75</sup> There were innumerable pleasure gardens at the time of Mughals. After the annexation of Kashmir, it became a hub for such type of

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<sup>69</sup> Catherine, ‘Babur and the Timurid *Char Bagh*’, op.cit., p. 51; Idem, *Architecture of Mughal*, pp. 24-25, 27-28. The literary sources have not mentioned this mosque since Babur’s memoir has lacunae of this period and Zain Khan’s work ends with the early events of 1527 AD. However, an inscription, found in the mosque mentions that the mosque was under construction in 1527 AD and its gate, well and garden were finished by 1528 AD. (Ibid., p. 25).

<sup>70</sup> Ali Akbar Hussain, *Scent in The Islamic Garden*, p. 32.

<sup>71</sup> Havel, *Indian Architecture*, pp. 189-90.

<sup>72</sup> Latif, *Lahore*, p. 148.

<sup>73</sup> *Epigraphia Indica* (Arabic and Persian Supplement), 1933-34, p. 11; 1939-40, p. 30; 1955-56, pp. 83-84; Muhammad Qāsim Hindū Shāh Firishta, *Tarikh-i Firishta*, (Lucknow, 1874), II, p. 143.

<sup>74</sup> Ajay Khare, ‘Ghat ki Guni: The Gateway’, op.cit., pp. 28-29.

<sup>75</sup> Abdul Rehman, ‘Garden Types in Mughal Lahore’, op.cit., p. 164.

gardens and the tradition of this type of garden design reached its zenith with the construction of the Shalamar Garden at Lahore. Finally the Mughal pleasure gardens became an extension of the Royal Palace. A large number of buildings were built, for instance, in the Shalamar garden of Kashmir and Lahore which include *diwan-i- aam*, - *diwan-i-khas*, *baradari*, *hammam*, *zanana* and many more.<sup>76</sup> Generally, the lower terrace was reserved for the use of general public; upper for royalty and nobility; and the uppermost for *hammam* and *zanana*. Important administrative, socio-cultural, political and military activities were performed there. Thus, the pleasure gardens served heterogeneous purposes.

### Waterworks in Mughal Gardens

Like Persian and Central Asian gardens, water became the central and connecting theme of the Mughal gardens. Earlier, Hindus were also interested in water and water sites but with the religious significance only. Water played an effective role in the Mughal gardens right from the time of Babur. He was more interested in ‘beauty’ than ‘ecclesiastical prescription’. However, in India, the Mughals also assimilated certain typical Indian features in their water works of the gardens on the line of the Hindu romantic tradition of enjoying *varsha ritu*.<sup>77</sup> The two pavilions of Hayat Bakhsh garden in Red Fort, Delhi and Shalamar garden in Lahore are named after the monsoon months, *sawan* and *bhadon* with the characteristic to create the rain scene. The beauty of Babur’s classic *chaharbagh* was the central watercourse and its flowing water. Most of these gardens were divided into four quadrants by two axis comprised with water channels and pathways to carry the water under gravitational pressure<sup>78</sup> (**Plates: IV, V, VI, VII, VIII, IX; Plan: I**). At every intersecting point, there used to be a tank. In India, the early gardens were irrigated from the wells or tanks, but under the Mughals the construction of

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<sup>76</sup> Ibid., p. 165.

<sup>77</sup> For the details of the Hindu influence on Mughal gardens see Villiers Stuart, *Gardens of the Great Mughals*; Rotzer and Deokar ‘Mughal Gardens’, op.cit., pp. 131-169; G.H.R. Tilloston, *The Rajput Palaces: The Development of an Architectural Style, 1450-1750*, (N.Delhi, 1987), pp. 190-196; M.C. Joshi, *Dig, ASI*, (N.Delhi, 1982), pp. 1-35; Monica Juneja (ed.), *Architecture in Medieval India*, pp.549-559; Fairchild Ruggles, *Islamic Gardens*, p. 135-38.

<sup>78</sup> Irfan Habib, ‘Notes on the Economic’, op.cit., p.127; Sylvia Crow et.al, pp.16-17; James Dickie, ‘The Mughal Garden’, op.cit., p. 128; Syed Ali Nadeem Rizavi, ‘Iranian Influence on Medieval Architecture’ in Irfan Habib, ed., *A Shared Heritage, the Growth of civilization in India and Iran*, (AHS, 2002), p. 129.

canals or the use of existing canals for the gardens provided more adequate and dependable water supply.<sup>79</sup> Thus, the most important aspect of the waterworks of gardens was the permanent source of water supply. The hydraulic system needs enquiry about the ‘outside water source’ as well as ‘inside distribution of water’ in the paradisiacal Mughal gardens.

The principal source of water to the Mughal gardens were: (i) lakes or tanks (ii) wells or step-wells (iii) canals, harnessed from the rivers, and (iv) natural springs.<sup>80</sup>

Tanks or lake have been used as a main source of water in Northern India since long.<sup>81</sup> After the battle of Panipat the first site visited by Babur was *hauz-i shamsi* (Iltutmish) and *hauze-i khas* (Khalji).<sup>82</sup> Babur’s description that Hindustan lacks ‘running water’<sup>83</sup> is not tenable because evidence of the presence of tanks and canals speak otherwise. Thus, Babur’s observation may be gauged from the garden point of view. The hydraulic projects, in India, were meant to provide water for cultivation of crops while Mughals eulogized gardens with free flowing water.<sup>84</sup> Secondly, his description was centered around Agra region which was deeply dissected terrain with restricted canal development. Babur himself mentions the existing reservoir and tank, on which he constructed garden at Dholpur and Fatehpur Sikri, for that water was lifted through Persian Wheel.<sup>85</sup>

In Deccan plateau of India, the use of lake and dam, existed from the ancient time and technologically to feed the gardens, was understood by the Kakatiya’s time. This

<sup>79</sup> Moynihan, *Paradise as a Garden*, p. 100.

<sup>80</sup> Cf. Iqtidar Hussain Siddiqui, ‘Water-works and Irrigation System in India during Pre-Mughal Times’, *Journal of the Economic and Social History of the Orient*, (Feb., 1986), Vol. 29, No. 1, pp. 52-77; Irfan Habib, *Agrarian System of Mughal India (1556-177)*, second edition, (New Delhi, 1999), pp. 24-36; See also, Sadaf Fatma, ‘Waterworks in Mughal Gardens’, *PIHC*, (New Delhi, 2013), pp. 1268-78.

<sup>81</sup> C.f. Irfan Habib, *Agrarian*, p.30. He has cited the example of Sudarshan lake at Girnar built under Chandragupta Maurya used for irrigation under Ashoka.

<sup>82</sup> *Baburnama*, p. 176. Anthony Welch, ‘Gardens that Babur did not like’, op.cit., p.61. Ibn Batuta informs that *Hauz-i Shamsi* served for irrigation and its source of water was not only rains but the river Jamuna also (Ibn Batuta, *The Travels of Ibn Battuta*, Eng. tr. Sir Hamilton Gibb, (Cambridge 1971), vol. 3, p. 624). Evidence shows the presence of tanks, lakes and cisterns in the regional kingdom of Delhi Sultanat like Kankariya tank in Ahmadabad around which a number of villas and pleasure gardens were constructed (*Mirat* (Suppl) pp. 18-19).

<sup>83</sup> *Baburnama*, p.191, Eng. tr., pp. 486-87.

<sup>84</sup> Anthony Welch, ‘Gardens that Babur did not like’, op.cit., p. 89.

<sup>85</sup> *Baburnama*, pp. 216-18, 223, 225-6, 244; Sylvia Crow et. al, pp. 35, 74.

ancient system was prevalent during the Bahmani period also.<sup>86</sup> Likewise the main source of water in Golkunda fort, which was inherited by the Qutubshahi rulers from the Rajas of Warangal (1512AD), and its garden was Durgam Cheruvu Lake, located in the hillocks of Jubilee Hills. As the lake was on 552 mt. height, around 20 kms distant and had to travel to the main tank of the fort which was again on 525mt. height; so the technology used for that was not only the principle of siphoning based on gravitational force but the application of Boyle's law according to which gradual decrees in the diameter of pipelines led to the increase in the pressure needed for the transportation of water to the height without the help of modern technology.<sup>87</sup>

In the Upper Gangetic plains, wells were the chief source of irrigation.<sup>88</sup> The wells became important for watering the Mughal gardens which were variously termed as *chah* or *wa'in* or *ba'oli* (well with stairs).<sup>89</sup> Babur ordered to build a 'chambered well' (*wa'in*) on the site of his first garden Ram Bagh at Agra.<sup>90</sup> Well as a source of water was so common that sometimes inspite of rivers in close proximity, wells were used to irrigate the gardens. For example, though river Betwa was not far from the gardens of Orcha which was built by the Bundelas on an Island yet the water for the gardens was obtained by wells.<sup>91</sup> The use of step-wells was in vogue in India from ancient times and continued to be effectively used by the early Mughals to feed their gardens.<sup>92</sup> The water lifting device for Mughal gardens from wells and step-wells was the '*charas*' or the 'leather bucket', lifted by yoked oxen, pulling a rope thrown over a pulley (**Plate: X**). This was the most common device used near Agra which was criticized by Babur as 'laborious and filthy way'<sup>93</sup>. Another device was the 'surface wheel' (Ar. *noria*) based on lever principle which was installed on the sides of lake and was generally in use wherever

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<sup>86</sup> Daud Ali, *Gardens and Ladscape Practices*, p. 53.

<sup>87</sup> Boyle's law describes the proportional relationship between the absolute pressure and the volume. Sanjay Subodh, 'State, knowledge and construction: A case Study of regional States' (Unpublished), paper presented at National seminar on the theme *State and Medieval India* in CAS, Deptt. of History, AMU Aligarh, p. 5.

<sup>88</sup> Irfan Habib, *Agrarian*, p. 28.

<sup>89</sup> Iqtidar Hussain Siddiqui, 'Water-works and Irrigation System', op.cit., pp. 64, 68-70. A large number of wells were constructed not only by the Delhi Sultans but also by the regional Sultans of Gujarat and Malwa etc.

<sup>90</sup> *Baburnama*, p. 211.

<sup>91</sup> Fairchild Ruggles, *Islamic Gardens*, pp. 135-36.

<sup>92</sup> Nadeem Rizavi, 'Exploring the Mughal', op.cit., p. 896.

<sup>93</sup> Irfan Habib, *Agrarian*, p. 28. For the mechanism of *charas*, see *Baburnama*, p. 191.

the water level was close to surface<sup>94</sup> (**Plate: XI**). The most effective water lifting device for garden was ‘*rahant/arhant*’ or ‘*saqia*’ or ‘Persian Wheel’<sup>95</sup> (**Plate: XII**) which Babur found as a novelty (because he had not witnessed it in Central Asia and Afghanistan) with its chain of pots and pin-drum gearing.<sup>96</sup> Water was lifted to the great height at Fatehpur Sikri by a series of geared wheel installed there.<sup>97</sup> According to Elizabeth Moynihan, Persian Wheels known as *rahant* in India were built into the corner towers of the supporting riverfront wall with supplemental wells on a lower terrace. These fed the water-courses and pools and their overflow irrigated the plots’.<sup>98</sup> Thus, *rahant* or *saqia* and *pur* or *charas* system provided water from the wells in the gardens of Humayun’s tomb at Delhi, Akbar’s gardens at Sikandra and Fatehpur Sikri, *Bagh-i Nilofar* of Babur at Dholpur, *Bagh-i-Jahanara*, *Bagh-i-Zahra* and *Bagh-i-Nursarai* at Agra, Shalamar Bagh at Lahore, *Bag-i Hayat Bakhsh* at Shahjahanabad and almost in all the Mughal gardens of plain region.<sup>99</sup> Moynihan drafted a water lifting plan which shows the stages of water lifting in the garden of Taj Mahal, a system which was earlier used by Akbar in the palace of Fatehpur Sikri (**Plan: II**). Interestingly, it was not only in the plain area but in the hilly area like Kashmir where water was in abundance, we find the reference of *rahat*, just to make the pressure more intense.<sup>100</sup> However, it was not only in the Mughal gardens but almost in all gardens, built by other nobles and rich persons in whole of the empire, such as in the Bahmani and Qutubshahi gardens of Deccan, gardens of Gujarat and Punjab etc., that this system of water lifting device found in use.<sup>101</sup> In the basaltic and

<sup>94</sup> Iqtidar Hussain Siddiqui, ‘Water-works and Irrigation System’, op.cit., pp. 66 and note.

<sup>95</sup> This device was also known as *arhat* or *rahat* equivalent to Arabic *saqia*, Persian *charakh* and Persian wheel in English. Cf. Iqtidar Hussain Siddiqui, ‘Water-works and Irrigation System’, op.cit., p. 65.

<sup>96</sup> *Baburnama*, p. 191, Eng tr., p. 486; Irfan Habib, *Agrarian*, p.28. Undoubtedly Akbar made certain improvements by inventing pin drum gearing which enabled water to be lifted from distant lowering places (Irfan Habib, ‘Akbar and Technology’ in *Social Scientist*, (Sep. - Oct., 1992), Vol. 20, No. 9/10, p. 8). For the mechanism of Persian Wheel, see also Abul Fazl, *Ain-i Akbari*, ed. Blockman, I, p. 199; Iqtidar Hussain Siddiqui, ‘Water-works and Irrigation System’, op.cit., pp. 63-65.

<sup>97</sup> Irfan Habib, *Medieval India: The Study of Civilization*, (New Delhi, 2007), p. 202.

<sup>98</sup> Moynihan, *Paradise as a Garden*, p. 102.

<sup>99</sup> Neeru Mishra and Tanay Mishra, *The Garden Tomb of Humayun-An Abode in Paradise*, (New Delhi, 2003), pp. 114, 120; Sylvia Crow et. al, pp. 31, 35; Irfan Habib, ‘Notes on Economic’, op.cit., p. 133; Moynihan ‘The lotus Garden Place’, op.cit., p. 141; R. Nath, ‘Bagh-i- Gul Afshan’, op.cit., p. 2.

<sup>100</sup> Pir Ghulam Hussain Koyahami, *Tarikh-i Hasan*, ed. Sahibzada Hasan Shah, (Srinagar, 1954), Urdu tr. by Shams-ud-din, *Shams-ut-Tawarikh*, (Srinagar, 2003), p. 296.

<sup>101</sup> Klaus Rotzer and Pushkar Sohoni, ‘Nature, Dams, Wells and Gardens: The route of Water in and around Bidar’, in ed., Daud Ali, *Gardens and Landscape*, pp. 54-73; Yazdani, *Bidar:Its History*, p. 53; Sadaf Fatma, ‘Gardens in Mughal Gujarat’, op.cit., pp. 441-452.



plain laterite of Bidar, besides dam or lake, water harvesting was done sometimes by indigenous and sometimes by imported techniques from the Persian World during the 15<sup>th</sup> and 16<sup>th</sup> century. After surveying the gardens of Bidar, Rotzer and Sohoni report that besides dams or lake, the ‘well’ was the most important features in Deccani gardens which was of three types: (i) *baolis* with staircase, (ii) wells comprising a vertical square shaft with water lifting device, and (iii) *qanat*, horizontal wells with manholes.<sup>102</sup> The royal garden of Bidar bellow the Takht Mahal was fed by two *baolis*, two wells and two *qanats* simultaneously.<sup>103</sup> Former two sources of water were indigenous and were in use in Northern India also but the last one was adapted in Deccan by the immigrants from Iran, even before the coming of the Mughals.

The most important development was the construction of canals by harnessing of big rivers in Northern India. Although the famous canal *Nahr-i faiz* or *Nahr-i bahisht* also known as *Shahnahr* (royal canal) which provided water to the gardens near the capital Delhi was built under the reign of Shah Jahan, its origin goes back to the canal of Firozshah Tughlaq (modern West Yamuna canal) that originated from the river Jamuna<sup>104</sup>. This was the main canal, in the palace of Shah Jahan, flowed like the ‘water of life’ from the *shah burj* through *hammam*, *diwan-i-khas*, *khwabgah* and *rang mahal* and its branches served the individual gardens and houses. The pavilion and halls for the emperor Shah Jahan and his *zanana* were threaded with this canal along the riverfront and it became the source of water for the two gardens, Hayat Bakhsh and Mahtab bagh, of the palace and also for its two pavilions *Sawan* and *Bhadon*.<sup>105</sup> The main tank of the garden of Hafiz Rakhna was filled by a canal which was cut to Sirhind by Sultan Firozshah Tughlaq (1360 AD) and worked upto the reign of Jahangir. After that it may

<sup>102</sup> Rotzer and Sohoni, ‘Nature, Dams, Wells’, op.cit., pp. 56, 58.

<sup>103</sup> Ibid., p. 65.

<sup>104</sup> Firozshah’s canal was repaired by Akbar but was again silted up. Shah Jahan decided to reopen it from its mouth Khizrabad down to Safedon and from there dig a new channel (the canal), nearly 80 miles in length for the use of his new city Shahjahanabad. Ali Mardan Khan’s name is generally associated with this canal but his name is given only in the later traditions. cf. Salih Kambuh, *Amal-i Salih*, III, p. 29; Syed Ahmad Khan, *Aasar-us Sanadid*, ed., Tanveer Ahmad Alvi, Urdu Academy, (New Delhi, 2011), pp. 135-36; Irfan Habib, *Agrarian*, pp. 33-34.

<sup>105</sup> Salih Kambuh, *Amal-i Salih*, III, p. 26; *Aasar-us Sanadid*, pp. 123, 127, 131, 135-36; Bernier, p. 257; Manucci, I, p. 184, II, p. 463; Zafar Hasan, *Monuments of Delhi: Lasting Splendour of the Great Mughals and Others*, (New Delhi, 1997), I, p. 21-22, 156-57; Ebba Koch, ‘Mughal Palace Gardens from Babur’ op. cit., p. 153; Ebba Koch, *Mughal Architecture, an Outline of its History and Development, 1526-1858*, (Munich, 1991), p.111.

have gone dead because when Shah Jahan visited the place, he ordered to connect it with a canal to Sutlej.<sup>106</sup> Another important canal ‘Shahnahar’, providing water to the gardens of Lahore, was excavated during the reign of Shah Jahan and took water from the river Ravi at Shahpur up to Lahore, a distance of 84 miles.<sup>107</sup> This canal, also known as Hasli canal, was constructed on the advice of Ali Mardan Khan, a famous canal engineer and viceroy of Lahore and Kashmir in the year 1631 AD with the help of Mulla Alaul Mulk Tuni, an expert in hydrology. It was after the completion of this canal that the site of the famous pleasure garden Shalamar of Shah Jahan was chosen. Initially it provided water only to the Shalamar garden but later on the *ulema* and nobles were also allowed to irrigate their gardens.<sup>108</sup>

In Kashmir where the source of water was natural springs, the Mughals laid out canals to water their garden easily from the streams coming down from the surrounding mountains.<sup>109</sup> In Kashmir, canals had been excavated even before the comings of the Mughals. Pir Ghulam Hussain Koyahami, the author of *Tarikh-i Hasan* informs us that Sultan Zainul Abidin laid out a canal named *Shah ju-i nahr* to water the gardens and for the general use of public which was the fifth canal of the river Sandhar.<sup>110</sup> Later the Mughal nobles brought out the water of the same canal to the garden *Bagh-i Ilahi*, *Bagh-i-Bahr Ara*, *Bagh-i-Gulshan*, *Darshani Bagh* and *Bagh-i Inayat* etc.<sup>111</sup> There were so many other canals in Kashmir to feed the gardens.<sup>112</sup> Jahangir built a canal named ‘*Jui-i-Shahi*’ to water his garden Nur Bagh from Lar (Sind) and Shah Jahan laid-out another canal named ‘Shahnahr’.<sup>113</sup> A canal was built by Jahangir to water the Shalamar Bagh brought out from the river Haroon which was further carried out by Asaf Khan for his

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<sup>106</sup> Firishta, *Rise of mohamdan Power in India*, tr., John Briggs, (London, 1829), I, p. 453; Subhash Parihar, *Mughal Manuments*, pp. 11-12.

<sup>107</sup> Bernier, p. 396; Irfan Habib, *Agrarian*, p. 36.

<sup>108</sup> Lahori, *Padshahnama*, I (ii), pp. 24-25; Latif, *Lahore*, pp. 55, 142, 253; Muhammad Ishtiyag Khan, *Shalamar: The Glory that was*, published by the department of Archaeology and Museum, Ministry of Culture, Archaeology, Sports and Tourism, Government of Pakistan, Karachi. Also see, Sadaf Fatma, ‘Waterworks in Mughal Gardens’, op.cit., pp. 1268-78.

<sup>109</sup> Irfan Habib, *Agrarian*, p. 39.

<sup>110</sup> *Tarikh-i Hasan*, pp. 149-50.

<sup>111</sup> Ibid., pp. 149-50, 297, 299, 302-07.

<sup>112</sup> Ibid., pp. 141, 146, 149-50, 299.

<sup>113</sup> Jahangir, *Tuzuk-i Jahangiri*, ed., Syed Ahmad, (Ghazipur and Aligarh, 1863-64), p. 347; Lahori, *Padshahnama*, I (ii), pp. 24-25.

garden Nishat Bagh but was later stopped by Shah Jahan.<sup>114</sup> The author of *Tarikh-i-Hasan* furnishes very interesting information that in 1663 AD, after seeing the incomparable beauty of the garden, Shah Jahan praised the gardens three times that ‘it is a good garden and very beautiful’ with the expectation that Asaf Khan would offer to the royal presence but he remained silent which made Shah Jahan upset and he ordered to stop the canal to Nishat garden. One day Asaf Khan slept in melancholy (*gham-o ranj*) but he woke up with the noise of the rippling fountains and cascades and came to know that the stopped canal was opened by the gardener (*baghban*) since they were worried for the condition of his master. On this, the gardener was weighed in gold by Asaf Khan. When the news reached the emperor, he was summoned to the court but Shah Jahan presented him a robe of honour (*khil’at*) and issued a *farman* to reopen the canal to Nishat Bagh, especially on the condition that it should not be harmful to the houses (*makan*) and crops (*zara’at*) of the villagers on the way and should be used for agriculture (*kheti*) forever.<sup>115</sup> Thus, the construction of canals provided more dependable water supply and the watercourse became wider studded with fountains on the principle of pressure.<sup>116</sup> Even in the early eighteenth century, the green and fresh gardens in the desert area like Jaipur, were irrigated by the canals. The documentary evidence shows that there was a special canal, *Nahri Bagh Ke Baste*, constructed especially for the use of a large number of gardens and the water of which was also carried towards the Amber gardens.<sup>117</sup>

The first and foremost example of the gardens irrigated by natural springs in Mughal India comes from Kashmir. On account of the natural springs, there was availability of water in abundance needed for the beautiful gardens. Thus, even at the time of independent Sultans, there were a large number of gardens in Kashmir. Wherever

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<sup>114</sup> *Tarikh-i-Hasan*, p. 146; Also, Sadaf Fatma, ‘Waterworks in Mughal Gardens’, op.cit., pp. 1268-78.

<sup>115</sup> This is visible in the text of *Tarikh-i-Hasan* and Villiers Stuart account. Whatever may be the cause but Villiers Stuart says that when Asaf Khan woke up with the noise of running water, he inquired the matter and after knowing that it was opened by the servant Asaf Khan rebuked him for his zeal and hastily had the stream closed again. Whereas, *Tarikh-i-Hasan* informs us that ‘Asaf Khan weighed the gardener in gold’ (*Tarikh-i-Hasan*, pp. 302-307; Villiers Stuart, *Gardens of the*, pp. 168-170).

<sup>116</sup> Moynihan, *Paradise as a Garden*, p. 100.

<sup>117</sup> *Kapad-Dwara*, map and Note No. 170-First quarter of 18<sup>th</sup> century. The Document is preserved in the Rajasthan State Archives, Bikaner. I am thankful to my friend Farhat Kamal, who is working on the Jaipur city, for providing and translating the documents for my use.

a suitable and beautiful place around natural springs was found, Sultan Zainul Abidin used to lay the foundation of buildings and gardens.<sup>118</sup> After coming of the Mughals, it literally became a *gulistan* as innumerable gardens were built by the emperors and their nobles around natural springs.<sup>119</sup> The gushing water of the natural springs was supplied to the gardens sometimes directly and sometimes through canals and made all the decorative features like fountains and *abshars* more lively. Like Kashmir, the mountain garden at Wah (Taxila) received water from natural spring. On the basis of excavated trenches, it has been noticed that a number of natural spring welled up at different spots in the garden. The direction of the source of water was flowing from southern hillside to the north. The water accumulated in the central pond and was further directed westwards and finally collected in the main tank, which ultimately bifurcated into various channels.<sup>120</sup>

In Bidar, Bahmanis created extensive underground canals or wells (*qanat*) from the mouth of the spring by widening rift in the rock, engineered by the Afaqis to irrigate the fort and gardens.<sup>121</sup> The valleys bellow these springs provided space for plantation and gardens. For example, in 1671 AD under the reign of Aurangzeb, the Mughal governor Mukhtar Khan built a terraced garden called as Farah Bagh (garden of joy) bellow the spring in the valley of Ahmadnagar.<sup>122</sup> As Bidar's hydrology was Basaltic in nature and did not allow permeation of water, the recharging of groundwater through *qanat* added the concentration of water to the desired point. To improve the flow of the spring, a tunnel was carved out into the aquifer to create *qanat* which was a familiar device for the Iranian engineers to maximize the quantity of water obtained.<sup>123</sup> These *qanats* were the sloping subterranean tunnels dug into the alluvium or sedimentary rock to pierce the underground water table with square manholes at closely spaced intervals in order to have access to the channel to clear the blockade. This gravity for flow of water

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<sup>118</sup> *Tarikh-i Hasan*, p. 293-94.

<sup>119</sup> *Ibid.*, pp. 293-316.

<sup>120</sup> Makin Khan, 'An Introduction to the Historical', *op.cit.*, pp. 466-67.

<sup>121</sup> Ali Akbar Hussain, *Scents in The Islamic Garden*, p. 29.

<sup>122</sup> *Epigraphia Indo-Moslina, 1927-28*, p. 33; Yazdani. *Bidar: Its History*, p. 176-77.

<sup>123</sup> Rotzer and Sohoni, 'Nature, Dams, Wells', *op.cit.*, p. 64. *Qanat* is an Arabic word meaning subterranean canal or conduit of water. Persian word for the same is '*karez*'. The *qanat*, horizontal well, was invented in Iran and dates back to 500 B.C. For the detailed mechanism of *qanat* in Iran, see Sylvia Crow et. al, pp. 31-32; A.K.S. Lambton, 'The *Qanats* of Yazd', *Journal of the Royal Asiatic Society*, Third Series, Vol. 2, No. 1.

supply was suitable especially for the dry region as it allowed minimal loss of water through evaporation and also to create the pressure needed for the fountains in gardens.<sup>124</sup> Thus, the main source of water for Bidar fort and its garden was *qanat*. Generally water architecture in medieval India is associated with the coming of the Mughals but in Deccan, Bahmanis made the use of hydrology in their fort much before that, as the remains of broken devices like pipes, cisterns, water channels and fountains are still found.<sup>125</sup>

The waterworks inside the Mughal gardens often denote ‘symbols’. The terraces in Mughal gardens, it is believed, represented those of the *Quranic* gardens of the Paradise.<sup>126</sup> Octagon pools and platforms in their early gardens was a favourite design of the Mughals but later Shah Jahan usually used the square. So the octagon, evolved from the squaring of the circle, symbolizes reconstruction of the material side of man, represented by the square with the circle of eternity.<sup>127</sup> As it is believed, four water channels symbolize the Islamic heavenly rivers of honey, milk, wine and water and also represent four rivers of life.<sup>128</sup> The *Quranic* four rivers also symbolize the four rivers of Eden.<sup>129</sup> Walcher tried to symbolize water, trees and gardens and narrates that water decodes ‘as the Christian and Muslim symbol of moral and sacred purification; the fish as unequivocal symbol of life; the towering cypress trees pointing to the metaphysical after-life and as symbol of death; and lastly, the garden as universal metaphor for the positive and symbiotic relation between man and nature, where water channels give

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<sup>124</sup> Sanjay Subodh, *op. cit.*, p. 3.

<sup>125</sup> Yazdani, *Bidar: Its History*, p. 1 & n; Rotzer and Sohoni, ‘Nature, Dams, Wells’, *op. cit.*, p. 63. Yazdani is of the view that ‘*qanats* were probably first introduced in Bidar during the Bahmani period by Persian immigrants and were used in the fort and the city for supplying drinking water and for irrigation’. After that this technology was re-exported to other basaltic traps of the Deccan at Bijapur, Ahmadnagar, Aurangabad and Burhanpur by 16<sup>th</sup> century but not in the northern region of India.

<sup>126</sup> Moynihan, *Paradise as a Garden*, p. 100.

<sup>127</sup> *Ibid.*; Sylvia Crow et. al, pp. 17, 20.

<sup>128</sup> *Quran*, 47:15. Apart from the symbolic features of Mughal gardens from the water point of view, there were other symbols of Mughal gardens corresponding to the Paradise like the symbol of chinar tree, other fruit trees and flower beds etc. Villeirs Stuart has given her own version of symbology with Hindu culture. Also see Villiers Stuart, *Gardens of the*, pp. 20, 46-47.

<sup>129</sup> There are four rivers in the Garden of Eden to water the garden namely Pison, Gihon, Tigris and Eupharates (The Complete Parallel Bible, (Oxford University Press, 1989), Genesis 2, 10–4).

replenishment, green trees render comforting shade, and fruit orchards extend pleasure and nourishment'.<sup>130</sup>

The fountain was the symbol of 'life cycle' which rises and merges and rises again. The Paradise possessed two fountains: '*salsabil*' and '*uyun*'.<sup>131</sup> Salih Kambuh, a native of Lahore, described very artistically the water system and its symbolic meaning in the garden of Shalamar at Lahore that 'in the center of this earthly paradise a sacred stream flows with its full elegance and chanting, fascinating and exhilarating nature and passes through the gardens irrigating the flower beds. Its water is as beautiful as greenery. The vast stream is just like clouds pouring rains and opens the doors of divine mercy. Its chevron patterns (*abshar*) are like an institution of worship where the hearts of believers are enlightened.'<sup>132</sup> However, in Mughal gardens, water became the central theme. In the lack of water, one cannot even think about the existence of Mughal paradisiacal gardens.<sup>133</sup> When Babur came to India he was in search of hillside spring like Persia and Central Asia where he could lay symmetrical terraced garden with rippling water from one terrace to another in a series of waterfall which was later found in Kashmir and at Wah where gardens were laid-out with certain improvement and development by his successors. But when Babur reached Agra, he disgusted and criticized its lack of 'running water' (*ab-i rawan*) from the point of constructing gardens.<sup>134</sup> Thus, he stressed on running water in his garden that water should be made to flow by means of wheels (*charkhaha*) erected wherever he might settle down and built artificial terraces with water-chutes and fountains to fulfill his ideal of garden in the *Bagh-i Nilofar* (Lotus garden at Dholpur), *Ram Bagh* (*Aram Bagh* or *Bagh-i Gulafshan*) and *Bagh-i-Hasht Bahisht* located on the bank of river Jamuna at Agra.<sup>135</sup>

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<sup>130</sup> Heidi A. Walcher, 'Between Paradise and Political Capital: The Semiotics of Safavid Isfahan, in *Yale Forestry and Environmental Studies Bulletin*, (1998), vol. 103, p. 333. For the details on the symbolic interpretations of Iranian gardens which inspired the Mughals, see Hanaway 'Paradise on Earth: the terrestrial garden in Persian literature' and Ralph-Pinder Wilson 'Persian garden: *Bagh* and *Chahar Bagh*', in MacDougall and Ettinghausen (eds.), *The Islamic Garden*.

<sup>131</sup> *Quran*, 15:45; 26:57; 44:25; 51:15; 76:17.

<sup>132</sup> Salih Kambuh, *Bahar-i Sukhan*, fol. 119 as cited in Abdul Rehman, 'Garden Types in Mughal Lahore', op.cit., p. 164.

<sup>133</sup> Sadaf Fatma, 'Waterworks in Mughal Gardens', op.cit., pp. 1268-78.

<sup>134</sup> *Baburnama*, pp. 191, 210.

<sup>135</sup> *Ibid.*, p. 210; Nadeem Rizavi, 'Iranian Influence on Medieval', op.cit., p. 130.

Ebba Koch's division of Mughal gardens based on architectural features into three formal versions of *chaharbagh* sheds light upon its 'water system' also: (i) a canonical cross-axial: the tomb of Humayun , (Delhi,1562-71AD) (ii) terraced: Shalamar garden, (Kashmir, 1620 AD, 1634 AD) and (iii) waterfront: Taj Mahal, (Agra, 1637 AD)<sup>136</sup> **(Plan: III)**. In the first category comes typical *chaharbagh*, consisting of square, divided by cross axial paved walkways into four equal parts and later sub-divided into further quadrants with a garden pavilion or mausoleum or a pool (*hauz*) at its centre. The funerary gardens of Humayun, Akbar and Jahangir are the best examples of first category. The second type is natural terraced garden which the Mughals inherited from their homeland and developed in Kashmir by laying out on a slope into the landscape of the region. The water was collected from the spring and the individual terraces were given separate canonical four-part like the Shalamar garden of Kashmir. Thirdly the waterfront gardens where the source of water was not wells or an artificial tank of lively springs on a mountain slope but a large slow flowing river from where the running water was raised to the gardens. Babur's choice of the riverfront side created riverfront gardens as a module of the riverfront city, a *chaharbagh* with the main building on terrace overlooking the river. In this type the main building was not in the center as in the classic *chaharbagh* but was on the terrace (*kursi*) running along the riverfront and the *chaharbagh* component was on the landward side. Taj Mahal was its best example and after idealized there, this scheme was used in the residential garden Angoori Bagh in Agra fort by Shah Jahan. Later it was adopted in Shah Jahan's new city Shahjahanabad at Delhi for the gardens and courtyard of Red Fort. It was also realized, to certain extent, at other Mughal capital Lahore.<sup>137</sup> However, this type of scheme was adopted by Babur himself in his early gardens at Agra opposite the side of Taj. Thus the aim of the planners of Taj was to make perfect example of the existing waterfront gardens and then to enhance it to the level beyond the approach of common mortal in order to create an ideal paradisiacal garden for the deceased. However, it is possible that basically this model was

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<sup>136</sup> Ebba Koch, *The Complete Taj Mahal*, p. 24

<sup>137</sup> *Ibid.*, pp. 23, 29, 32, 69. For details of Angoori Bagh at Agra Fort and Mahtab Bagh at Red Fort, see Salih Kambuh, *Amal-i Salih*, II, pp. 6-7, III, pp. 22-36; Lahori, *Padshahnama*, I, (ii), pp. 223-25, 240-41; *Aasar-us Sanadid*, pp. 127, 128,131; Moynihan, *Paradise as a Garden*, pp. 136-38; Ebba Koch, 'Mughal Palace Garden from Babur', *op.cit.*, pp. 148, 149, 153-54, 156, Idem, 'The Mughal Waterfront Garden', *op.cit.*, p. 144.

inspired by Timurid model of waterfront garden mentioned in the Persian manual *Irshad-al-Zira'a* written by Qasim Ibn Yusuf in Herat in 1515AD.<sup>138</sup> The riverfront garden scheme on the bank of river Jamuna at Agra and Delhi resembles the gardens in the capitals of two other great Muslim empires: Ottoman's Istanbul where royal and non-royal suburban garden villas were situated on the bank of river Bosphorus; and the Safavid Isphahan garden residences on the shores of the river Zayandah which Shah Jahan's court poet also compares.<sup>139</sup>

The Mughals developed hydraulic system by using Persian wheel to lift the water and obtained adequate pressure necessary for gardens. The main reason behind the location of gardens on the bank of river was that water was raised to the level of the enclosure wall by Persian Wheel standing on the bank from where it was conducted through aqueduct, to the garden where it ran from the top of the wall in a terra-cotta pipe which also produced adequate pressure needed to work the fountains.<sup>140</sup> Thus, the gardens in Mughal Gujarat such as Fateh Bari, Shahi Bagh and Rustam Bari etc. were built on the bank of rivers.<sup>141</sup> In the Shalamar garden of Lahore, built on three terraces, the main source of water was canal (Shahnahr) built by Ali Mardan Khan but as the strong current was needed to fill the large tank in the second terrace and for remaining cistern in the third terrace, two large wells *Baran Hataa* (twelve wheels) were constructed outside the garden in the West and East side of the uppermost terrace and aqueduct were constructed on the top of the wall to convey the water of the wells to the second and third terraces<sup>142</sup> (**Plate: XIII**). In the garden of Hafiz Rakhna at Sirhind, Subhash Parihar has found two wells whose parapet was built very high through the channels topping the enclosing wall of the garden from where water rippled down the chutes and gushed out the fountains.<sup>143</sup> The water was usually drawn from the wells to the raised reservoir in Mughal gardens.

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<sup>138</sup> Cited by Lisa Golombek, 'The Gardens of Timur, op. cit., p. 139; Ebba Koch, 'The Mughal Waterfront gardens', op. cit., pp. 142-44.

<sup>139</sup> Ibid., op. cit., p. 143.

<sup>140</sup> James Dickie, 'The Mughal Garden', op.cit., p. 113; Also see, Sadaf Fatma, 'Waterworks in Mughal Gardens', op.cit., pp. 1268-78.

<sup>141</sup> For detail of the gardens in Mughal Gujarat see Sadaf Fatma, 'Gardens in Mughal Gujarat', op.cit., pp. 441-452.

<sup>142</sup> Latif, *Lahore*, p. 247.

<sup>143</sup> Subhash Parihar, *Mughal Manuments*, p. 13; Subhash Parihar, *History and Architecture*, p. 205.



Usually the main channel which used to connect the water source and garden, was aqueduct, which conducted the water to the tanks or pool for further distribution whether in the gardens of plain or on the mountainous gardens in Kashmir and at Wah.<sup>144</sup> The wide discourse of water channels placed the Wah garden in a distinctive category. Excavations reveal that the water channel emerging from the northern center of the main tank first ran northwards and then after 98 feet turned to the west to run parallel to the Northside of the tank. It gradually converged towards the side of the tank and at one point the span between the channel and the side wall of the tank was reduced to 87 feet. At this point another channel measuring 5 feet crossed the northern channel at right angle. It formed the base-line for further dividing the northern channel into three short channels that ran parallel from the northwestern side of the first terrace towards the second terrace. It was wider than its supply channel. The water channels exposed on the first terrace which measure 2 feet 9 inches in width while the channel on second terrace, measure 5 feet three inches in width, and the other side channels exposed measure 4 feet 2 inches each. The variations in the width of channels on first and second terraces are worth-noting. Moreover, the southern channel, issuing from the bottom of the hillock, measure three feet in width, ran from east to west along the mountain on the southern side of the main tank. This system of water channels, concludes Makin Khan, is a remarkable example of garden planning and constructional technology.<sup>145</sup> In the Wah garden, the supply of water entered into the main tank by a single arched channel which was exceptionally large with a dimension of 214'x 220', made of brick but remains revealed additions and alterations to the original structure.<sup>146</sup> Furthermore, excavations unearthed seven elegant arches on either side of the platform found on the eastern side, in which only one arch was blind<sup>147</sup> (**Plate: XIV**). Likewise, in the garden of Vernag built by Malik Haidar, a Kashmiri engineer of Mughal Court on the behest of Jahangir, from the natural spring which is considered as the source of river Jhelam (Bihat), there was a huge octagon reservoir of 20 yards by 20 and of 4 *gaz* in depth, around which Vernag garden

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<sup>144</sup> Ebba Koch, *The Complete Taj Mahal*, p. 57; Moynihan 'The Lotus Garden Palace', op.cit., p. 141; Mohammad Azher Ansari, 'Palace and Gardens of the Mughals', in *Islamic Culture*, (1959), vol.33, p. 68; Makin Khan, 'An Introduction to the Historical', op.cit., pp. 462-63.

<sup>145</sup> Makin Khan, 'An Introduction to the Historical', op.cit., p. 462-63.

<sup>146</sup> Ibid., p. 460.

<sup>147</sup> Ibid., p. 462.

was laid out by Jahangir in 1619-20 AD.<sup>148</sup> Jahangir ordered to surround the octagon spring pool with stone walkways (*khiyaban-i sang*) and construct a garden with other buildings like *baradari* and *hammam*. From the arched octagon reservoir with its complex of domes and niches, there started a long and straight water canal of 180 *gaz* in length, 4 *gaz* in width and 2 *gaz* in depth towards the gate of the garden in the North and further discharged and disappeared into the river Jhelum<sup>149</sup> **(Plate: XV)**.

Sometimes canals directly entered to the gardens through the wall and travelled the whole garden through the terraces by supplying waters to the pools, water-chutes and fountains. In the Shalamar garden of Lahore, the canal brought from the river Ravi entered the garden from South, flowing the main canal and filling the central tank, intersected the beautiful garden and discharged itself in the main tank of middle terrace by rippling its water through marble cascade and from there the canal water was passed into the lower terrace. Eventually it flowed out via the Northern side of the Shalamar garden.<sup>150</sup>

Thus, to feed the Mughal gardens with gushing water, there were two forces that worked: the ‘natural gravitational force and the ‘artificial gravitational force’. The natural gravitational force was applied in the naturally terraced garden like the gardens of Kashmir which offered a new opportunity like Persia where water was not laboriously raised with wheel from the mountain but steep mountain slope provided dramatic water landscape. Powerful streams and springs from the hills fell in the garden with strong force over water-chutes, fountains and pools. Terrace succeeded over the terrace through the artificial waterfall like the three terraces of Shalamar, twelve of Nishat Bagh, six of Pari Mahal, seven of Dara Shikoh’s garden, three of Wah Bagh near Hasan Abdal, six of

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<sup>148</sup> *Tuzuk*, pp. 34-35, 292, 298, 313; Bernier, pp.413-14; Sylvia Crow et. al. pp. 11-12; Jan Haenraets, (ed.), *Mughal Gardens of Kashmir: (Towards UNESCO World Heritage Nomination)*, (Kashmir, 2013), p. 15. The literal meaning of the word Vir-nag is ‘worship of snake’. It was a place of worship since earlier times. Jahangir visited the place twice during his father’s time. One characteristic of the grand pool of the garden was that it was full of fishes as described by Jahangir and Bernier. The place was so dear to Jahangir (and Nur Jahan) that he wished to be buried there.

<sup>149</sup> *Tuzuk*, pp. pp. 34-35, 292, 298, 313; Sylvia Crow et. al. pp. 11-12.

<sup>150</sup> Latif, *Lahore*, pp. 140-41, 142; Muhammad Ishtiyag Khan, op.cit. For the details of the Shalamar garden at Lahore see also, Mohammad Shafi, ‘The Shalimar Garden of Lahore’, op.cit., pp. 58-66; H.I.S. Kanwar, ‘Origin and Evolution of the Design of the chaharbagh Garden’, *Islamic Culture*, (1974), vol. 48, pp. 105-117; Azher Ansari, ‘Palace and Gardens of the Mughals’, op.cit., pp. 50-72; James Dickie, ‘The Mughal Garden’, op.cit., pp. 128-137; Moynihan, *Paradise as a Garden*, pp. 141-45.

the Fidai Khan's garden in Pinjor where they took the advantage of natural slope running down to the Ghagghar torrent and many more.<sup>151</sup> The artificial gravitational force exercised in those gardens in which terraces were not natural like Kashmir. The Mughals made artificial terraces even on the slightly slopping site to provide gardens the artificial gravitational flow and after that the hydraulic pressure by Persian wheel made the flow smoother.<sup>152</sup>

Inside the gardens they used wells, octagon and square tanks in the corner of the garden to provide the water through water channels to the central tank and to the whole garden by cascading into different tanks or pools and also through terra-cotta pipes to the plots of flower and fruit beds for irrigation and especially to the fountains.<sup>153</sup> A separate underground channel was also there which took its course from the original tank to the central tank.<sup>154</sup> However, generally the Mughal gardens had wells outside the enclosure where Persian wheels were installed to fetch the water and distribute it in the inside tanks and *hauz* etc. The same feature was found in number of Mughal gardens in Banaras and Golkunda. However, according to Rotzar and Sohoni the aim was totally different in Mughal gardens where to feel a typical paradise, Mughals separated the manual labour, sweat and noise from the soothing experience of Paradise; whereas in the later gardens of Banaras and early gardens of Golkunda the purpose was not the separation of tedious labour from the paradise but was the public accessibility of water.<sup>155</sup> In the eighteenth century gardens of Banaras, with Mughal features, wells outside the enclosure were built for irrigation and water decorative devices of gardens as well as for general public use, such as a well in the Shish Mahal garden, four wells in the royal complex of Ramnagar, two wells in the gardens of Raja Talab and Rani Bazar, 3 wells in Ratanbagh garden and

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<sup>151</sup> Bernier, pp. 398-401, 413; Sylvia Crow et. al, pp. 38, 94, 130; Moynihan, *Paradise as a Garden*, pp. 127-28; G.M.D. Sufi, *Kashir: Being a History of Kashmir from the Earliest time to our own*, (Lucknow, 1974), vol. II, pp. 515-537; Sylvia Crow et. al, pp. 38, 94, 130; Moynihan, *Paradise as a Garden*, pp. 127; Azher Ansari, 'Palace and Gardens of the Mughals', op.cit., pp. 69-71; Subhash Parihar, *Mughal Manuments*, p. 14.

<sup>152</sup> R. Nath, 'Bagh-i- Gul Afshan', op.cit., pp. 18-19; Neeru Mishra, *The Garden Tomb*, pp. 107-113.

<sup>153</sup> Ebba Koch, *The Complete Taj Mahal*, p. 42; Moynihan, *Paradise as a Garden*, pp. 105-6, 114; Neeru Mishra, *The Garden Tomb*, pp. 113-14, 115; Salim Javed, 'Mahtab Bagh: An Imperial Mughal Garden at Agra', *PIHC*, Kannur session ( New Delhi, 2009 ), pp. 1086, 1087.

<sup>154</sup> R. Nath, 'Bagh-i- Gul Afshan', op.cit., pp. 19-20.

<sup>155</sup> Rotzer and Deokar, 'Mughal Gardens', op.cit., pp. 144; Rotzer and Sohoni, 'Nature, Dams, Wells', op.cit., p. 63.

two wells in the Salarpur garden and Pokhra complex.<sup>156</sup> Outside the Pokhra garden at Banaras, platters of the preparation of *bhang* was found in the survey by Rotzer near one of the two wells. It suggests that it was the center of *bahri alang*.<sup>157</sup>

An important architectural feature of the gardens was the pavilion set within water, like in the Shalamar gardens of Kashmir and Lahore. In Kashmir, it is roofed (**Plates: XVI A & B**), whereas in Lahore it is open (**Plate: XVII**). The inspiration of this type of floating pavilion goes back to the palace Madinat-al Zahra, which was built by the Umayyad caliph Abd al-Rahman al-Nasir, at Cordoba in 936 AD.<sup>158</sup> In contrast to Madinat-al Zahra, the water structure of Shalamar garden of Kashmir represents more mature form.<sup>159</sup> In an innovative way, Akbar introduced floating gardens in Kashmir. At the time of his arrival, floating gardens on thousands of boats were ready to welcome the emperor.<sup>160</sup> The Mughal tradition still continues in Kashmir. In the Dal Lake, house boats carry the gardens of vegetables and fruits. The first floating garden is associated with Humayun, under whom it was built like other wooden structure, such as wooden floating palace and bridge, on the river Jamuna. Often the emperor Humayun used to sail on them from Firozabad, Delhi to Agra with his courtiers.<sup>161</sup> Akbar also had, like his father, a special liking for floating gardens. In 1574 AD, during his march towards Bengal through river, some wonderfully fashioned boats were made, equipped with everything including the gardens and residences for the emperor and the nobles.<sup>162</sup> The author of *Akbarnama* praised the garden made on the boat and proclaimed that ‘there were gardens on the boat such as clever craftsmen could not make on land.’<sup>163</sup>

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<sup>156</sup> Rotzer and Deokar, ‘Mughal Gardens’, op.cit., pp. 149, 157, 159, 161, 163, 165.

<sup>157</sup> Ibid., pp. 165, 166. *Bahri alang*- A common pastime of the inhabitants of Banaras, particularly the artisans in which they used to go to a well or *ghat* and joined friends where they prepared and consumed *bhang* (hemp) before leaving to the place of work.

<sup>158</sup> Fairchild Ruggles, ‘The Mirador in Abbasid and Hispano-Umayyad Garden Topology’, *Muqarnas*, (1990), VII, pp. 73, 75-76, 82 n.

<sup>159</sup> Ibid., p. 82 n.

<sup>160</sup> Sylvia Crow et. al, p. 78.

<sup>161</sup> S.M. Jaffar, *The Mughal Empire from Babur to Aurangzeb*, reprint, (Peshawar, 1936), p. 42; Idem, *Some Cultural Aspects of Muslim Rule in India*, reprint, (Delhi, 1939), p. 119. Under the instruction of Humayun, carpenters (*najjars*) made four boats for him to float on Jamuna. There were shops, *bazars* and gardens on those boats. It is said that especially the moving garden was made on the surface of the water of Jamuna for the emperor.

<sup>162</sup> Abul Fazl, *Akbarnama*, Eng. tr., H. Beveridge, (Delhi, 1973), III, p. 120; See also, Atul Chandra Roy, *History of Bengal: Mughal Period (1526-1765AD)*, (Calcutta, 1968), pp. 513-14.

<sup>163</sup> *Akbarnama*, Eng. tr., III, p. 120.

Another unique Persian feature of Mughal garden was its underground room. During the time of Aurangzeb, an underground summer room was constructed, surrounded by water in the gardens of the watermill at Aurangabad, with all Mughal features. Soloman, who visited Aurangabad garden, was much impressed by its underground room. He termed this garden as ‘secluded Moghul garden’ with much charm and elegance.<sup>164</sup>

Other artistic water device was *abshar* (water-chute) and fountain which indeed gave life to the Mughal gardens. Water-chute was a characteristic feature of Mughal gardens. These water-chutes were, usually, made of marble or stone with the design carved as fish-scale (*mahipusht*<sup>165</sup>) (**Plate: XVIII**) and shevron (zig-zag) (**Plates: XIX A & B**) pattern to produce a rippling effect<sup>166</sup> Generally these water-chutes were connected with the source of water through water channels, from where the water was thrown up and broken into splashes by running over them. The water through the tank to the channels of causeways was down through chutes and the water from the canals in the garden also used to discharge from one terrace to another and from one pool to another or to narrow water channels through these marble chutes by rippling and cascading over these stone chutes. In Kashmir, where the source of water was natural spring, the ground was in the series of terraces and where waterfall became the striking feature, *abshar* looked much effective and magically beautiful (**Plates: XX A & B**). However, even in the plains with the slightest slope of only one or two feet, Mughals created charming waterfalls in their gardens<sup>167</sup> (**Plates: XIX A & B**). The abundance of water in Kashmir enabled its gardens to be more effectively cascaded into imaginative *chadars*. The *chadar*, meaning white ‘shawl’ of water, under the surface of crystal clear water with niches (*chinikhana*), in which flower vase was placed in the day and candle light at night behind the curtain of water, indeed looked much beautiful<sup>168</sup> (**Plates: XVI A & B**). Salih

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<sup>164</sup> W.E. Gladstone Soloman, ‘The Garden of the Watermill: Aurangabad’, *Islamic Culture*, (1936), X, pp. 88-93.

<sup>165</sup> In Persian it was called pigeon-breast. (Moynihan, *Paradise as a Garden*, p. 61).

<sup>166</sup> Neeru Mishra, *The Garden Tomb*, p.107; Nadeem Rizavi, ‘Iranian Influence on Medieval, op.cit., p. 130. In a survey of the garden of Fatehpur Sikri conducted by AMU, Aligarh, a stone *abshar* with fish-scale design was excavated (Nadeem Rizavi, ‘Exploring the Mughal’, *PIHC*, p. 897).

<sup>167</sup> Neeru Mishra, *The Garden Tomb*, pp. 107-08.

<sup>168</sup> Salih Kambuh, *Amal-i Salih*, II, p. 2; Neeru Mishra, *The Garden Tomb*, p. 115; Nadeem Rizavi, ‘Iranian Influence on Medieval, op.cit., p. 130; Idem, ‘Exploring the Mughal’, op.cit., pp. 896, 900; Zafar Hasan,

Kambuh has symbolized *chadar* and candle light of the Shalamar garden (Lahore) with sages and learned men. In his view, the chute of water together with the lamps appears to be spreading beads and arches along with cascades like that of scholarly people.<sup>169</sup> Similarly, in the contemporary hanging garden of *maunbari* in the vicinity of the palace of Amber in Rajasthan, there were hundred niches and before the arrival of the ladies at night oil lamps were placed by the attendants which created never ending irradiations and reflections amidst flowing water.<sup>170</sup> Modern scholar James Dickie terms *abshars* as ‘transition in level’ of the Mughal gardens. He further explains that since the Muslim mind apprehends reality in terms of pattern, the surface of the water has been inlaid with chevrons to emphasize the movement of water, or carved in a fish-scale pattern to produce a rippling, coruscating effect. Thus, water becomes a liquid arabesque. Finally, the water links dynamically the two levels: the upper, or tectonic; the lower, or vegetal.<sup>171</sup> The emperor throne was often built across the canals above a cascade and seemed to float on the water where water splashed out over the *chadar*<sup>172</sup> (**Plate: XVI, XVII**).

Fountain which symbolizes the life cycle by rising, merging and again rising became a very important feature of the Mughal gardens. According to *Mirat-i Sikandari*, the idea of constructing pleasure gardens with fountains in Persian style was first introduced in Sultanate Gujarat.<sup>173</sup> The single jet from Persian tank finally developed into hundreds of fountains in the later gardens of Shah Jahan.<sup>174</sup> The raised water produced pressure to work the fountain. The fountain, apart from the canal water, was also fed by independent arrangement which included wells and elevated large reservoirs outside the gardens. Generally an earthen colaba, made of glazed terra-cotta, supplied water to the

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*Monuments*, II. p. 117; III, p. 34; Muhammad Ishtiyag Khan, op.cit.; Latif, *Lahore*, pp. 141,142, 247; Sylvia Crow et. al, pp. 108, 116, 152, 153, 166; Moynihan, *Paradise as a Garden*, pp. 106, 112, 125, 138, 143; Subhash Parihar, *Mughal Manuments*, pp. 11,14; Idem, *History and Architecture*, p. 193.

<sup>169</sup> Salih Kanbuh, *Bahar-i Sukhan*, fol. 121-22, cited by Abdul Rehman, ‘Garden Types in Mughal Lahore’, op. cit., p. 165.

<sup>170</sup> Tilloston, *The Rajput Palaces*, p. 193; Jan Pieper ‘Hanging gardens in the Princely Capitals’, op. cit., pp. 557-8.

<sup>171</sup> James Dickie, ‘The Mughal Garden’, op.cit., p. 130.

<sup>172</sup> Jahangir used to sit in his black marble throne over the water in the Shalamar Bagh of Kashmir. In the same manner emperor Shah Jahan’s throne was built of white marble in the Shalamar garden of Lahore (Sylvia Crow et. al, pp. 98, 152; Moynihan, *Paradise as a Garden*, pp. 124, 143; James Dickie, ‘The Mughal Garden’, op.cit., p. 135; Muhammad Ishtiyag Khan, op.cit.). A number of such types of marble thrones are placed across the water at Nishat bagh in Kashmir (Sylvia Crow et. al, pp. 116).

<sup>173</sup> Sikandar bin Manjhu, *Mirat-i Sikandari*, ed. S. C. Misra, (Baroda, 1961), pp. 139-40.

<sup>174</sup> Sylvia Crow et. al, p. 45.

fountains and around that pipe, brick was laid in lime mortal in order to protect the colaba line. There were separate concealed terra cotta pipes for the fountains installed in the center of the pool.<sup>175</sup> In the excavation of the Mughal garden at Wah, a terracotta pipe for supplying water to the fountains has been unearthed (**Plate: XXI**). Thus, numerous channels and terracotta pipes used to supply water to generate enough pressure for operating the fountains.<sup>176</sup> The hydraulic system at Wah garden explains the accelerated velocity of water for generating pressure. Excavation unearthed a channel constructed at a depth of about four feet from surface on the southern side of the garden. Calculations reveal that the 460 feet long drain had a three and a half (3 ½) feet slope. The uniform slope of the drain and the volume of the water were adequate to create sufficient momentum to operate the fountains. To operate fountains, a constant flow of water and pressure gradient creates an effective Siphon system. Furthermore, the terracotta pipeline containing the fountains was laid 38 inches below the general floor level of the channel. Starting from the main tank towards the west, 12 fountains were located at a distance of 7.6 feet from one another. Two more fountains have also been recorded on the second terrace. The water dropped down 8 feet from the elevation of the first terrace to the second terrace, thus generating enough pressure for fountains of the second terrace. It has been observed that the terracotta pipeline was composed of a series of small cylindrical pipes measuring nine inches in length and four and a half (4 ½) inches in diameter. Each pipe is tapered at one end whereas the other end is wider in which the tapered end was fitted. Indeed, the design and type of hydraulic technology was unique for the Mughal period.<sup>177</sup>

Usually the weak gravitational force provided low fountain and high provided high. In the heavy flow of water, as in Kashmir, there was a long row of the jets of water. These fountains were linked with each other by the underground glazed terra-cotta pipes for uniform supply of water and circular pits with spouts made of marble in the shape of lotus bud and sometimes metallic also as were found the remains in the excavations.<sup>178</sup>

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<sup>175</sup> Muhammad Ishtiyag Khan, op.cit.; Neeru Mishra, *The Garden Tomb*, p. 96.

<sup>176</sup> Makin Khan, 'An Introduction to the Historical', op.cit., p. 463.

<sup>177</sup> Ibid., pp. 470-71.

<sup>178</sup> Kanwar, 'Origin and Evolution', op.cit., p. 115; Mohammad Azher Ansari, 'Palace and Gardens of the Mughals', op.cit., p. 70; Salim Javed, 'Mahtab Bagh', op.cit, p. 1086; Villiers Stuart, *Gardens of the*, p.

Thus the pools, tanks and canals were full of fountain jets which played continuously in the canals and pools with whitened spray. The Shalamar garden of Lahore had 450 fountains and the pressure was so high that the water was thrown up in jets twelve feet high.<sup>179</sup> The glistening water shoots up almost four meters high and dropped back to a rippling pattern on the water surface. The returning jets of water from fountains created a delicate floral pattern on some pools.<sup>180</sup> A constant flow of water and pressure with slope creates a workable and effective siphon system to operate fountains effectively which was used in the gardens. The development of fountains to such an extent was based on the gravitational force with ‘principle of siphoning’.

For all these hydraulic works a high level water management was needed. The hydraulic laws like ‘Principle of Siphoning’ and ‘Application of Boyle’s law’ were working in the gardens. And, there was no lack of technical and experienced officials like the outstanding engineers Ali Mardan Khan, Mulla Alaul Mulk Tuni, Haidar Malik and Ustad Ahmad Mimar etc. who showed their talent. Thus, water played most important role in the Mughal gardens, whether as a pool, channel, *abshar* and fountain or to irrigate the flower and fruit beds. Jellicoe rightly observed that in Mughal gardens ‘water’ was perhaps even more important than ‘soil’.<sup>181</sup> The use of water, as a central theme, is shared by Mughals and Italians at the same time, though in attitude quite different. The difference is described by Sylvia et. al. by saying, ‘in Italian gardens, the water gushes from carved figure and flows into wrought basins but the intricate carving of the *chadar* in the Mughal garden is designed not to be seen itself but to give shape to the falling water’.<sup>182</sup>

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145; Sylvia Crow et. al., p. 136; Moynihan, *Paradise as a Garden*, p. 143; Indian Archaeological 1979-80-A review edited by Debala Mitra, Director General, ASI, (New Delhi, 1983), p. 74.

<sup>179</sup> *Tarikh-i Hasan*, pp. 297,299; *Aasar-us Sanadid*, p. 124; Sylvia Crow et. al, pp. 116, 152, 153, 160; Moynihan, *Paradise as a Garden*, p. 124.

<sup>180</sup> *Ibid.*, pp. 142-43; Sadaf Fatma, ‘Waterworks in Mughal Gardens’, op.cit., pp. 1268-78.

<sup>181</sup> James Dickie, ‘The Mughal Garden’, op.cit., p. 130.

<sup>181</sup> Moynihan, *Paradise as a Garden*, pp. 112, 114, 124, 142, 147; Sylvia Crow et. al, pp. 44-45; Neeru Mishra, *The Garden Tomb*, p. 114; Also, Sadaf Fatma, ‘Waterworks in Mughal Gardens’, op.cit., pp. 1268-78.

<sup>182</sup> Sylvia Crow et. al, pp. 54-55.