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The Mystery of the Afghanistan Earthquake of the Year 1505

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ABSTRACT

The Afghanistan earthquake of year 1505 has been described in the memoirs of the first Timurid-Mughal Emperor, Zahiruddin Muhammad Babur. In the same year, there was a major earthquake in Agra, India. Tibetan records suggest the date of the 6th of June in relation to an earthquake in the Himalayas, which would have been felt in Agra, but Indian sources record the date of the 6th of July for the Agra earthquake. Seismologists are of the view that the Agra and the Afghanistan earthquakes were different events. It has been suggested that the Indian writers conflated the Agra earthquake with the Afghanistan earthquake. This ultimately led to the assumption that the earthquake in Kabul described by Babur occurred on the 6th of July. A careful reading of the Baburnama would reveal that the Afghanistan earthquake occurred on the 25th (or the 22nd) of July and not on the 6th of July. This comprehensive review details the sequence and chronology of events leading up to the earthquake and discusses the reasons for the probable error in dating the Afghanistan earthquake.

Keywords: Afghanistan, Agra, Baburnama, Earthquake.

INTRODUCTION

Afghanistan is prone to earthquakes due to the Seismogenic zone that extends deep below the Hindu Kush (Perry et al., 2019). The seismic activity in this area is high with an annual average of four earthquakes of magnitude five or greater (Menon, Lai & Macchi, 2004). The Hindu Kush fault line extends in the northwest direction towards the Amu Darya basin in Uzbekistan while its northeast trend passes close to Kabul. The northeast seismic trend is more often associated with the strike-slip pattern of earthquake whereas the northwest trend predominantly shows the thrust pattern caused by the northern movement of the Indian plate and the eastern push of the Afghanistan and Lut plate from the southern side of the Hindu Kush. To the east of Lut and west of the Baluchistan arc lies the Chaman fault (Verma, Mukhopadhyay, & Bhanja, 1980). The fault systems of this region have been discussed in detail by Heuckroth & Karim (1973).

Several historical earthquakes have been recorded in the area that comprises today of eastern Iran, Afghanistan, Pakistan, and Northern India. These include the

earthquakes in Taxila (25 CE), Aikhanum (50 CE), Balkh (818-819 CE), Herat (848-849 CE), Daibul (893-894 CE), Urgun (1052-1053 CE), and Kabul (1504 CE) (Ambraseys & Bilham, 2003; Quittmeyer & Jacob, 1979). The earthquake of 1505 in Paghman, Kabul province, occurred on the Chaman fault. This fault is known for its intense Seismogenic activity: the Quetta earthquake of 1935, which led to thousands of casualties, was also related to seismic disturbances in the Chaman fault (Qiu, 2023). The Kabul earthquake of 1505 is well described because a contemporaneous account was provided by the Timurid-Mughal emperor Zahiruddin Muhammad Babur (1483-1530). Babur described the extensive damage caused by the tremors. The ground was split wide open, the walls of the gardens collapsed, houses were reduced to rubble, and there was significant loss of life. Babur records that 70-80 inhabitants died when a wall fell on them; his half-brother Jahangir Mirza (1485-1508) escaped unscathed. Between Paghman and Bektut, an entire section of the ground was split over a distance covered by a stone's throw (approximately 25 metres) up to the length of an arrow shot (approximately 125

meters). The landscape between Istarhij and Maydan (20 miles) was reconfigured rising to an elephant's height (approximately 3 metres) in some places and as deep in other parts. Babur further states that all houses in the village of Paghman and most houses in Teba collapsed because of the tremors. As many as 33 tremors were recorded on the first day. (Thackston, 2002a). The ramparts of the Bala Hissar fort in Kabul were damaged (Mashal & Sarwary, 2018). Paghman and Bektut are approximately 20 miles to the west of Kabul. Bektut lies south of Paghman. Istarhij, famous for its grapes, is 35 miles north of Paghman (Adamec, 1985). Weld (1859) calculated that the damage caused by the earthquake occurred over an area of 49 square miles. The moment magnitude of this strike-slip earthquake, which caused a 60 Km rupture of the northern extension of the Chaman fault, has been estimated to be 7.2 (Szeliga, et al., 2012; Wheeler et al., 2005; Rajendran & Rajendran, 2005). Babur became the king of Fergana at the age of 12. In his youth, he led extensive campaigns in Samarkand and Kabul before setting foot in "Hindustan", where he established the Mughal dynasty in the year 1526. Babur wrote his memoirs, which are now known as the Baburnama (Dale, 1990).

In 1505, Babur embarked on a military expedition to Kandahar from his base in Kabul, which he had acquired the year before (Eaton, 2020). The Paghman earthquake that caused the Kandahar campaign to be delayed (Thackston, 2002a) has been conflated with an earthquake that occurred in India in the same year and around the same time. The Indian earthquake also caused extensive destruction. In his historical account from the early 17th century, Muhammad Qasim Ferishta (1560-1620) described an earthquake in the city of Agra on the 3rd day of the Islamic month of Safar in 911 AH, which corresponds to the 6th of July 1505 (unless stated otherwise, all dates in this review pertaining to the earthquakes are either as per the Islamic calendar or the Julian calendar) (Briggs, 2013a). Abdul Qadir Badayuni (1540-1615) also recorded the date of the 6th of July for the Agra earthquake and assumed it to be the earthquake described by Babur (Ranking, 1973). Seismologists believe that a single earthquake could not have caused such extensive damage in Kabul as well as Agra. Details of an earthquake in Tibet on the 6th of June 1505, one month before the date cited by Ferishta and Badayuni, are captured in the biography (in some citations, autobiography) of Btsun Pa Chos Legs (1437-1521), a

Buddhist scholar of the Mahamudra doctrine (Jackson, 2002; Ehrhard, 2016). This Himalayan earthquake, with an estimated moment magnitude of 8.1 associated with a surface rupture of 110 Km, would have been felt in northern India (Ambraseys & Douglas, 2004; Arora & Malik, 2017). This led to the conclusion that the Agra earthquake was in June and the earthquake of the 6th of July cited by Ferishta and Badayuni was the Paghman earthquake. However, a close reading of the Baburnama reveals that the Paghman earthquake was not on the 6th of July but somewhat later.

Babur's narration for the year 1505 begins with the illness of his mother, Qutlugh Nigar Khanum, in the month of Muharram. The first day of Muharram in 911 AH corresponds to the 4th of June 1505. Qutlugh Nigar Khanum succumbed to her illness six days later, which would be the 7th of Muharram or the 10th of June. In the period of 40 days of mourning that was observed following her death, Babur received the tragic news of the demise of his maternal grandmother, Aisan Daulat Begum, and one of his uncles, Sultan Ahmad Khan (d. 1504, the news reached Babur in 1505) also known as Alacha Khan. Babur specifies the end of this period when he took off the black clothes of mourning. The last day of mourning, 40 days from the 10th of June, would be the 20th of July. Babur then embarked on the Kandahar campaign, but the troops had marched only till Qush-Nawar when he fell ill. It took Babur 4-5 days to recover. The earthquake is described in the memoirs following Babur's recovery from illness (Thackston, 2002a; Denison Ross & Elilias, 2008a). The date of the earthquake would correspond to the 25th of July and not the 6th of July.

THE EARTHQUAKE OF THE YEAR 1505 IN THE BABURNAMA

There are several translations of the Baburnama including the 19th century work of John Leyden & William Erskine, the translations by Robert Caldecott, an abridgement of Leyden & Erskine's work also from the 19th century, and by Annette Beveridge from 1922, and the recent work of Wheeler Thackston, first published in 1996. Frederick Talbot's version from 1909 is both abridged and illustrated. Lucas King revised Leyden & Erskine's work in 1921.

All translated works agree that close to the 40th day of mourning, Babur was visited by his maternal step-grandmother, Shah Begum (d. 1507) (mother of Sultan Ahmad Khan), his maternal aunt, Mihr Nigar Khanum

(1455-1507), and Muhammad Hussayn Kuragan Dughlat (d. 1508) who was the husband of Khub Nigar Khanum (d. 1501), also Babur's maternal aunt. The translations attest to the distribution of food to the poor and the needy at the end of the mourning period following which, Babur began the expedition to Kandahar. However, Babur was incapacitated for 4-5 days because of an illness. The first mention of the earthquake is after he recovered from his illness. Thackston (2002a) translates the text as "*Just then there occurred such an earthquake...*", which suggests an immediate occurrence. Leyden & Erskine's and Beveridge's translations are less specific. Leyden & Erskine's (1826) text, retained as such in the revision by King (1921), reads "*At this period there was such an earthquake...*" and Beveridge (1922a) writes "*At that time there was a great earthquake...*" both of which convey a relatively imprecise chronology. In the translation by Caldecott (1844), Babur's "*expedition was delayed by an earthquake*" around the time he was down with fever. Talbot (1909) skips some important and relevant details. The repair of the Kabul fortress took 20-30 days. Babur cites his illness and the earthquake as the reasons for the delay caused to his Kandahar campaign.

Overall, the English language texts agree with each other to a large extent with the exact timing of the earthquake being the only partially unresolved question. Still, the timeline can be ascertained by the sequence of events. In the memoirs, the first mention of the Kandahar campaign is at the time of its commencement following the end of the period of mourning. The campaign was interrupted, first by Babur's illness in Qush-Nawar, which was probably very soon after the expedition commenced because Qush-Nawar is only approximately three miles from Kabul (Thackston, 2002b), a distance that the army would have easily covered in a few hours, and then by the earthquake. The campaign was resumed after the damage caused by the earthquake was repaired. Thus, we can conclude that the earthquake could not have occurred immediately after the mourning or around the time of mourning because that would have prevented the start of the Kandahar offensive. It follows that the earthquake struck after the commencement of the Kandahar campaign but not before Babur fell ill. After Babur got better, the earthquake led to a further delay due to the necessary repairs that had to be carried out on the Kabul fortress. The sequence of events, Babur's illness followed by the earthquake, has also been highlighted in the doctoral thesis of Akhtar (1983). Taking all the available

evidence together, the earliest that the earthquake occurred would be immediately following Babur's recovery as translated by Thackston (2002a). This would be 45 days from the death of Qutlugh Nigar Khanum, a period comprising of 40 days of mourning and five days of Babur's illness. Thus, the earliest possible date of the Paghman earthquake is the 25th of July.

Babur was a highly gifted and cultured Timurid ruler. His memoirs contain valuable information pertaining to history, science, art, and literature. Babur composed at least 118 "ghazals" (Dale, 1996). He was fluent in Turkic and Persian, and it is apparent from his memoirs that he gained knowledge of Urdu during his four years in India (Ghani, 1929). Babur was a keen observer of self and others (Forster, 1936). His vivid narration of the Paghman earthquake of 1505 is probably the only eyewitness account of this event. In his catalogue of earthquakes, Baird-Smith (1843) states that Kandahar, Ghazni, and Jalalabad might also have been affected by the Kabul earthquake of 1505, but the source of this information has not been cited. The Baburnama provides no information about the effects of the earthquake outside the Kabul region. Samarkand was also spared: an earthquake occurred in this historic city in 1490 but there is no record of any major earthquake in the 16th century (Borjjan, 1996). While not much is known about his childhood, Babur records that his engagement to Ayesha Sultan Begum, daughter of Sultan Ahmad Mirza (1451-1494) (not to be confused with Sultan Ahmad Khan), took place in Samarkand when he was five years old *i.e.*, in 1488 (Beveridge, 1922b). Babur may have experienced the Samarkand earthquake of 1490. Towards the east, Namangan was hit by tremors in 1494 (Abdyldaev et al., 1982; Korzhenkov et al., 2021). This earthquake too occurred in Babur's lifetime.

There are reports of many other unrelated earthquakes in the region during this period some of which are poorly documented. Babur's maternal cousin, Mirza Muhammad Haidar Dughlat (1499-1551) (son of Khub Nigar Khanum and Muhammad Hussayn Kuragan Dughlat) in his book *Tarikh-i-Rashidi* states that their stepcousin and Alacha Khan's son Shah Shaikh Muhammad Sultan died when a palace collapsed during an earthquake but does not provide any specific details in relation to the geography or the chronology (Denison Ross & Elilias, 2008b). Milne (1911) in his catalogue dated an earthquake to the year 1504 in Afghanistan but does not provide any details. Koul (1925) narrates a destructive earthquake in

Kashmir in the year 1500 but an identical description has been provided for the year 1501 (Ahmad, Bhat & Bali, 2009). Yousuf and colleagues (2020) are of the opinion that the Kabul earthquake of 1505 also affected Northern Kashmir, but the source of their information is unclear. Abdullah (b. 1540) reported an earthquake in Afghanistan in 1506 (Lokhandwala, 1974) but minute observations in his description such as the number of tremors felt on the first day are identical to Babur's description so this must be the 1505 earthquake. Abdullah's writing is from more than 50 years after the event (Denison Ross, 1927). Some years later, on the 3rd of January 1519, an earthquake occurred in Jandool valley, in present day Khyber Pakhtunkhwa, Pakistan. This happened a few days before Babur's assault on Bajaur. As per Baburnama, the Jandool valley earthquake lasted for half an hour (Thackston, 2002c). Data in relation to historical earthquakes are vital because they improve our ability to predict hazards. A first-hand assessment of historical records is not always possible but where such records are available, they can be of immense value when reconstructing the events (Ambraseys, 1971). Babur was meticulous with dates and events. He often supported the dates by citing the day of the week.

CONFLATION OF THE PAGHMAN EARTHQUAKE WITH THE EARTHQUAKE IN AGRA

The 1505 earthquake in India has been conflated with the earthquake described by Babur. Badayuni thought that both earthquakes represented the same event. His assertion that there was an earthquake in Agra on the 6th of July may be correct, but this may have been an aftershock of the Tibetan earthquake of the 6th of June. Alternatively, he may have confused an entire calendar month and so the 6th of July earthquake may have been the 6th of June earthquake. Badayuni states that the earthquake in Agra was so powerful that it was felt afar in Kabul and Persia (Oldham, 1882), which is improbable given the nature of destruction. From the footnote commentary of the relevant portion of the translation of Badayuni's work, it becomes clear that George Ranking in 1898 acknowledged the gap of several weeks between the demise of Qutlugh Nigar Khanum and the occurrence of the earthquake but failed to correlate it with the date of the Paghman earthquake. Ranking (1973) assumed the 40-day period of mourning as a rough estimate when in fact it is a specific duration based on Islamic traditions.

The Timurid-Mughals followed this custom. Extended 40-day mourning was observed following the death of Maham Begum (d. 1533) (Banerji, 1938), Babur's queen consort and mother of Humayun (1508-1556), and oblique references to 40 days of mourning can be found in the memoir of Gulbadan Begum (1523-1603) (Beveridge, 1902a), daughter of Babur and Dildar Begum. The 40-day mourning ritual is still observed in Central Asia (Rasanayagam, 2014). Badayuni's text *Muntakhab-ut-Tawarikh* is also from several decades after the earthquakes, so he did not have any direct information of the events. Badayuni's text, which appears to be the primary source for this confusion has been widely cited in almost all subsequent descriptions of the Paghman earthquake (Milne, 1911; Ambraseys & Jackson, 2003; Berberian, 2014; Bilham, 2019). Conversely, Babur does not mention any earthquake in India in 1505 as has sometimes been misunderstood (Malik et al., 2017; Wilson, 1930). Some reports have erroneously cited a Hindi novel "Mrignayani", which narrates an earthquake affecting the north Indian cities of Gwalior and Mandu around the same time (Khan, 2014). Although set in the 16th century, this work by the novelist Vrindavan Lal Verma is a 20th century publication that lacks historicity. Still, at least one historical record, the *Tabaqat-i-Akbari* of Khwajah Nizamuddin Ahmad (1551-1621), indicates that the earthquake affected several Indian towns besides Agra, but these towns have not been named either in the contemporaneous records (De, 1927) or in later texts (Halim, 1974). The town of Jais, 270 miles east of Agra, may also have been affected as described by the well-known poet Malik Muhammad Jaisi (1477-1542) in "Akhiri Kalam" (Shukla, 1982), an Awadhi language text from 936 AH (1529-30 CE), but if Jaisi indeed referred to this earthquake, it would bring into question the presumed year of his birth (Singh, 2009). The city of Agra suffered the most with significant damage to the old Badalgarh fort (Latif, 1896). Based on a relevant passage in *Akbarnama* of Abul Fazal (1551-1602), Rajendran & colleagues (2013) correctly proposed that the earthquakes in Agra and Kabul were separate events that occurred in different months, but they did not comment on the precise chronology.

Badayuni's contemporaries were attentive to details. Ferishta dates the earthquake in Agra to Sunday, the 6th of July, but does not conflate it with the Paghman earthquake described by Babur (Briggs, 2013a). However, in the passage leading up to the Paghman

earthquake, Ferishta incorrectly records the date of Qutlugh Nigar Khanum's demise as the 1st day of Muharram (the 4th of June) (Briggs, 2013b) while Babur clearly states that his mother fell ill in the month of Muharram but died six days later (Thackston, 2002a). Ferishta had access to Babur's memoirs. Abul Fazal and Bakhtawar Khan (1620-1685), the author of *Mirat-ul-Alam*, also cite the earthquakes of Kabul and India without conflating them (Beveridge, 1907; Oldham, 1882). The memory of the earthquake lingered on for several centuries. A nineteenth century guide for travellers to Agra reminded them that the city had experienced a violent convulsion (Mukerji, 1892). Richard Ogle's illustration of this calamity was published in Hutchinson's *History of the Nations* (Temple, year of publication unknown).

THE EARTHQUAKES OF THE YEAR 1505 IN THE MODERN LITERATURE

Several published papers in the late modern literature date the Paghman earthquake to the 6th of July 1505 assuming it to be the same as the Agra earthquake although Baird Smith (1843) cites the date for the Agra earthquake as the 15th of July 1505, a date that was probably arrived at by converting the Islamic calendar of 911 AH to the Gregorian calendar, introduced by Pope Gregory XIII (1502-1585), which skipped ten days in the year 1582 (Cohen, 2000). Citing Leyden & Erskine's (1826) translation of Babur's memoirs, Stenz (1945) claimed that the Paghman earthquake occurred on the 6th of July and that it also affected India and Iran, but he provides no reference for this latter observation. The Oxford History of India attributes the destruction over the sizeable landmass extending from Persia to India to a single event, also without any reference (Smith, 1919). Other colonial era records describe the earthquakes in Agra region only. The Imperial Gazetteer records an earthquake in the United Provinces in the year 1506 (Anon., 1908), but this probably refers to the event of 1505. The Agra earthquake has also been mentioned by Burgess (1913) in his chronological account of Indian history. On comparing the Indian texts, Jackson (2002) concluded that two earthquakes had been erroneously assumed to be one event by the Irish geologist Thomas Oldham, who had consulted the texts of Badayuni (Ranking, 1973) and Ferishta (Briggs, 2013a). Counting from the first day of the Islamic year, Oldham (1882) calculated the number of days to the earthquake, and then

consulted the 'useful tables' (Prinsep, 1836) to verify the day cited by Ferishta (Briggs, 2013a), but in the process, assumed the two earthquakes to represent one event. Seismologists were not convinced that two large earthquakes over such a wide area represented a single event. Having asserted that the Agra and the Paghman earthquake could not represent the same catastrophe, Ambraseys & Jackson (2003) attributed the date of the 6th of June to the Himalayan earthquake, which would have been felt in northern India, based on the Tibetan records. Consequently, the date of the 6th of July was no more attributed to the Agra earthquake but the date for the Paghman earthquake was not revised. Perhaps this was not necessary in the seismological context, but it had an unfortunate consequence: it inadvertently negated the occurrence of any earthquake in India in the month of July and deprived the Indian narratives of their legitimacy without a thorough reappraisal.

THE AGRA EARTHQUAKE - ALTERNATIVE POSSIBILITIES

The Himalayan earthquake, for which the date of the 6th of June is not in doubt, may have produced significant aftershocks (Riesner et al., 2021). If the earthquake of the 6th of July in Agra was an aftershock of the earthquake from a month ago, why, given the extent of destruction, the mainshock on the 6th of June has no mention in the Indian records has not been satisfactorily explained. It has been estimated that an earthquake of such a magnitude at the present time would cause more than 500,000 deaths (Wyss, Gupta & Rosset, 2018). In this context, it is important to cite a verse from Badayuni's *Muntakhab-ut-Tawarikh*, which is translated as "*In 911, the city of Agra became the goal of several successive earthquakes*" (911 AH corresponds to 1505-06 CE) (Ranking, 1973). Similar passages are found in other contemporary sources including *Tabaqat-e-Akbari* of Nizamuddin Ahmad and the *Tarikh-e-Daudi* of Khwaja Abdullah compiled during the reign of the fourth Mughal emperor and Babur's great-grandson, Jahangir (1569-1627), himself an accomplished writer (Iyengar, Sharma & Siddiqui, 1999). Although translators have varied in the interpretations of some of the verses (De, 1927), it appears that there was a collective recognition of several earthquakes, and not just one earthquake, in Agra. The possibility that in some regions, the aftershock on the 6th of July may have been more damaging than the mainshock from the preceding month of June may need to be

considered, and in such a scenario, the aftershock rather than the mainshock may have been worthy of a detailed record. In a recent example, the main earthquake in Darfield, New Zealand, on the 4th of September 2010 (moment magnitude 7.1) caused structural damage but no fatalities but an aftershock (moment magnitude 6.3) led to 185 deaths in the city of Christchurch five months later (Potter et al., 2015). Also, stronger mainshocks are known to follow the first mainshock (Reasenber & Jones, 1989). If this was true for the Himalayan earthquake, it is possible that the second mainshock was missed in the Tibetan records if the first mainshock had caused extensive damage, destruction, and displacement. Aftershocks of greater magnitude than the mainshock are rare but occur farther away from the epicentre (van der Elst & Shaw, 2015). The seismology of the mainshock or aftershock tremors in the tele-seismic zones is beyond the scope of this review. It is still possible that the description of Badayuni and Ferishta pertains to the earthquake of June but has been incorrectly dated to July due to an error in the records of exactly one month and, additionally, in the case of Badayuni, the Agra earthquake has been conflated with the Paghman earthquake. Whatever may be the case, the date provided by Badayuni and Ferishta does not match with the chronology in Babur's memoirs.

THE QUTUB MINAR

Irrespective of the chronology, how such a severe earthquake in Agra, where "*large and substantial buildings were utterly destroyed*" as per Tarikh-e-Daudi (Elliot & Dowson, 1872) "*and an earthquake was felt throughout most of the provinces of Hindustan*" as per Tarikh-e-Khan Jahan Lodi by Khwaja Nimatullah Heravi (Elliot & Dowson, 1873), caused little damage to the Qutub Minar in Delhi, only 150 miles away, has not been satisfactorily explained (Rajendran & Rajendran, 2005). During the reign (1351-1388) of Firoz Shah Tughlaq (b. 1309), the structure was damaged by a lightning strike. The sultan funded the renovation of the Qutub Minar and raised its height (Elliot & Dowson, 1871), which would have made it vulnerable to seismic disturbances (Rajendran et al., 2019). Inscriptions on the tower confirm another lightning strike in 1503, which also led to structural restoration of the monument during the reign (1489-1517) of Sikandar Lodi (b. 1458) (Munshi, 1911). This repair is dated the 23rd of September 1503 (Page, 1926). Ramamurthy (2014) states that the top

storey of the Qutub Minar was damaged by an earthquake in 1503, but the source of this information is unclear. The possibility that repairs were carried out on the tower in 1505 has also not been entirely dismissed (Spear, 1943; Bilham, 2019) but there is no contemporaneous account of an earthquake related damage to the Qutub Minar in 1505. In contrast, the ancient town of Bayana, 60 miles to the west of Agra, was badly affected and was probably abandoned directly because of this calamity (Shokoohy & Shokoohy, 2005). Sikandar Lodi founded the new township of Agra in 1506 (Halim, 1939), which supports a prior upheaval. The Minaret of Jam, constructed during the reign of Sultan Ghiyas-ud-Din Muhammad (1140-1203) in what was then Firuzkuh, the summer capital of the Ghurid rulers (Raverty, 1873), was also resilient to the effects of the earthquake at Kabul. The Minaret was probably shielded because of the attenuation of ground motion as it is at a much greater distance from the fault in the Hindu Kush (Menon, Lai & Macchi, 2004). Thomas (2007) has provided a fascinating account of Firuzkuh, a region located in central Afghanistan. Babur visited Firuzkuh in 1517 on his way to Kabul as described by Ghiyas-ud-Din Muhammad Khvandamir (1475-1535) (not to be confused with Sultan Ghiyas-ud-Din Muhammad mentioned above) in his historical text *Habib-al-Siyar* (Beveridge, 1922c).

THE DAY OF QUTLUGH NIGAR KHANUM'S DEATH

There is one final mystery. As per Babur, Qutlugh Nigar Khanum died on a Saturday. Babur further states that she was interred on the Sunday in the gardens of Ulughbeg Mirza (1394-1449) (Thackston, 2002a). I have stated in the introduction that Babur's mother fell ill in the month of Muharram 911 AH (1505 CE) (Babur does not specify the date and so the first day of Muharram has been assumed to be the first day of her illness) and died after six days of illness. Gulbadan Begum also records that her grandmother's fatal illness lasted six days (Beveridge, 1902b). The 7th day of Muharram in 911 AH (10th of June 1505) was a Tuesday, not a Saturday, and so there appears to be some discrepancy between the day and the date. If we assume that Qutlugh Nigar Khanum fell ill leading up to the month of Muharram and the memoirs have captured a considerable worsening of her illness on the first day of the month, then she might have died on Saturday, the 4th day of Muharram, or the 7th of June, which brings the date of the Paghman earthquake forward to the 22nd of July (45 days from the 7th of June).

It is known that Babur carefully revised and edited his memoirs, in particular his diary of earlier years (Lane-Poole, 1899). In other entries pertaining to the year 1505, Babur mentions the death of Khwaja Abdullah Murvari (b. 1460), who was in the court of Sultan Hussain Mirza (1438-1506) of Herat, even though the Khwaja died in 1525 (Thackston, 2002a), which suggests a later edit. If the relevant portion covering the earthquake was also subjected to subsequent edits and revisions, Babur's recall of the day of the week when this tragedy happened in his personal life ought to be more credible and so the date of 22nd of July may be more accurate.

SUMMARY AND CONCLUSION

There may have been three earthquakes in 1505: on the 6th of June in the Himalayas (Ambraseys & Jackson, 2003), which has been exclusively described in Tibetan writings, an aftershock of this earthquake or possibly a second mainshock on the 6th of July in Agra described by Indian historians (Ranking, 1973; Briggs, 2013a; Iyengar, Sharma & Siddiqui, 1999), and the Paghman earthquake on the 25th (or the 22nd) of July chronicled by Babur (Thackston, 2002a). The possibility remains that the earthquake of the 6th of June was incorrectly dated to the 6th of July, in which case there were two earthquakes. The Paghman earthquake probably did not occur on the 6th of July as per the evidence that can be gathered from Baburnama. There are many other examples of incorrect dating of earthquakes in history (Musson, 2004) although calendrical confusion has been considered in some cases when dates do not align (Honigmann, 1944-45). The most striking example of incorrect dating is Willis's (1928) oversight in failing to convert the years of the Islamic calendar to the corresponding years in the western calendar which led to six centuries of dating error. Willis (1928) had based their work on the Egyptian scholar Al-Suyuti's (1445-1505) catalogue of earthquakes, *Kashf Al-Salsalah 'an wasf Al-Zalzalah*. This 15th century thesis was translated by Sprenger (1843). Willis (1933) subsequently published a notice of correction (Ambraseys, 1962). Al-Suyuti compiled as many as 130 earthquakes in his manuscript (Esmeir, 2020), which was also translated into French by the Moroccan scholar Said Nejjar (Cigar, 1978).

Occurrence of two unrelated earthquakes around the same time, lack of contemporaneous account in India for the Himalayan earthquake of June 1505, conflation by authors such as Badayuni, assumptions made by scholars

of the late modern period, lack of cultural insight, and insufficient attention to the primary sources of literature are the factors that may have led to the incorrect dating. This work has examined the chronology for an important event, lends additional support to the theory that the Himalayan and the Hindu Kush earthquakes were separate events that occurred several weeks apart, and provides legitimacy to the work of the Indian writers in relation to the earthquake in Agra, which has been assumed to represent the earthquake in Paghman in modern scientific literature. This review should trigger further work in this field by experts to verify the chronology of the events.

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