The Impact of the Mongol Conquests on Earthen Cities in Central Asia

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Abstract

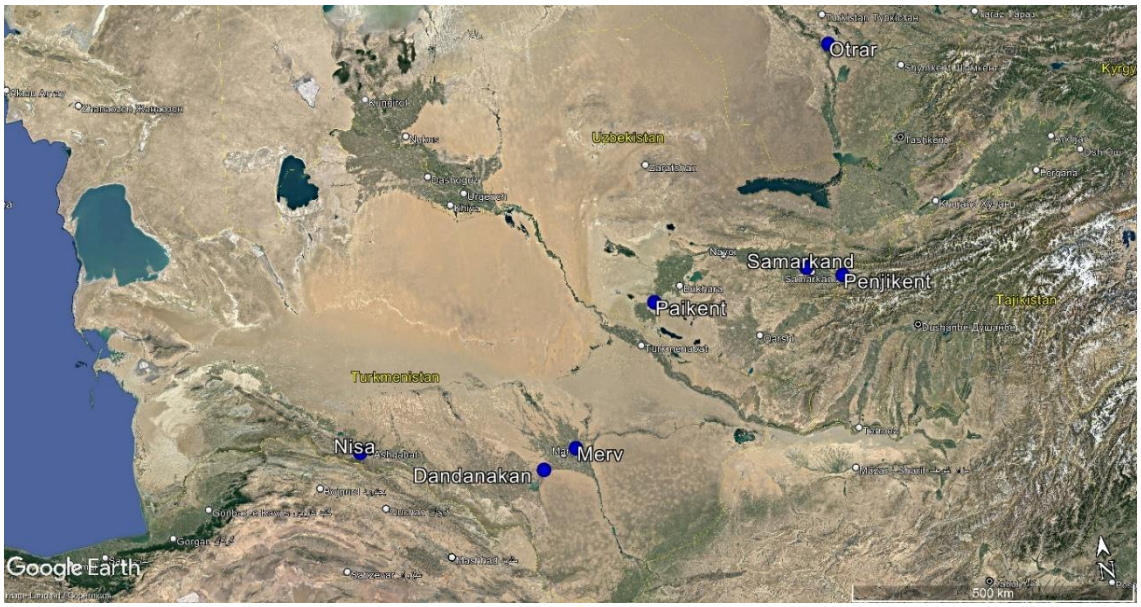
This article discusses the use of mud as a building material in the cities of Central Asia with reference to its role in perceptions of the Mongols' westward conquests from 1219-the 1250s. Outlining the patterns of construction, maintenance, and reconstruction of earthen architecture, I consider how an event such as the Mongol Conquest would have impacted urban occupation in cities using this material with a focus on examples from Merv, Turkmenistan, and Otrar, Kazakhstan. Given mudbrick architecture's need for continuous maintenance to prevent its decay, and the difficulties of reversing this process once it has begun, I argue that depopulation due to the conquests would have more significantly impacted the urban fabric than any deliberate demolition by Mongol armies. Additionally, I discuss the practicalities and difficulties of reusing mud as a building material and show that the abandonment of buildings and cities can be a conscious, pragmatic response to erosion or water supply rather than a catastrophic event such as the Mongol Conquest. Thus, I suggest that thirteenth-century historical accounts describing urban devastation and demolition should be reconsidered to include environmental impacts, and the flight of populations of Central Asian cities.

Key words: Central Asia, earthen architecture, Mongol conquests, cities, desertion, destruction, archaeology

The Mongol conquests, which took place in the first half of the 13th century, are considered one of the most significant events in world history, and in Central Asia a major cause of urban destruction, depopulation and economic chaos in the region's earthen-built cities. In only two years from 1219-21, Chinggis Khan and his Mongol armies deposed the Persianate Khwarazmian Empire, seizing its territories which spanned from Kazakhstan to the Persian Gulf and the Caucasus. Historical accounts, especially those of Rashid al-Din and Juvaini describe a violent and traumatic destruction in great detail, with Mongol forces flooding, burning and physically demolishing the buildings and infrastructure of cities as well as massacring and enslaving their populations. The extent to how literally these accounts might be taken is debated[1], but little evidence of the direct destruction described in historical accounts has been found during archaeological excavation in Central Asia, although convincing examples appear elsewhere in Russia and Eastern Europe[2]. By comparison, a trend of architectural abandonment and desolation is reported in archaeological excavation across Central Asia[3]. Indeed, scholarship notes that by the late 13th or 14th century some cities flourished with new construction initiated by the Mongol rulers [4] and economic revival, which led ultimately to the architectural glories of Samarkand in the late 14th and 15th centuries [5]. To explore this apparent contradiction, I consider the particular properties of mud as a building material. Especially in terms of its use in construction and maintenance of urban structures, the mechanics of their destruction, and how use of this material impacts both the archaeological evidence and the extent to which destruction might be recognised and recorded archaeologically.

The sites considered here are within the historical regions of Transoxiana and Greater Khurasan [Figure 1]. Historical accounts indicate that both regions suffered extensive damage and massacre during the Mongol conquests between 1219 and 1223[6]. However, recent

reassessments of these narratives not only question the plausibility of cited massacre figures, but also consider the extent of regional physical damage[7], local infighting[8] and decline before the Mongols arrived[9]. Changing political boundaries and the north-eastwards movement of the Khwarazmshah rulers to sack and incorporate cities on their frontier closest to the Mongols' homeland, left their empire weakened, and some cities, such as Samarkand, barely able to defend themselves[10]. Archaeological research has been carried out at urban sites conquered by the Mongols for more than a century. These archaeological remains constitute a valuable source of information to clarify the impact of the conquest, assess the veracity of written sources, and investigate the broader context of the conquest.



<Figure 1 here>
Figure credit Katie Campbell, background imagery Google Earth
The map shows an overview of the region mentioned in the article

Mud in the form of brick or rammed earth was the primary building material in vernacular architecture of a large part of medieval Central Asia[11]. This is due to a lack of stone and timber, with limited fuel also meaning that firing bricks was relatively costly and difficult[12]. Variation in the lifespan of mudbrick compared to stone-built cities and the differing roles of building materials as a historical and archaeological source have been noted as important[13] but rarely considered in detail, especially in the context of the Mongol Conquest. Yet the mudbrick architecture of the cities conquered by the Mongols in Central Asia and Iran, may have impacted contemporary narratives of urban destruction. With the help of archaeology, a study of mudbrick architecture, particularly its material properties and limitations, can provide a localised and detailed perspective on these thirteenth century events. A detailed, direct comparison between stone, fired brick, timber, and earthen architecture would require a larger set of data and more complex analysis than is possible in this study. Rather, in this article, I outline some of the characteristics of earthen cities and the processes required to construct, maintain, and demolish them. The aim is that this may facilitate future comparative analysis between cities constructed of different materials. First, it is useful to briefly summarise the characteristics of mudbrick as a building material which may differ from the traditional characteristics of cities built in brick, wood, or stone. Then with the help of specific archaeological and architectural examples, I aim to show how cities

constructed of this material might be understood in a different way to their stone, brick and wood built counterparts.

Mud as a Building Material

Although commonly referred to as 'mudbrick-built', cities across Central Asia and Iran were in fact built of various forms of earthen architecture, using different techniques depending on the size and type of building, local materials, preferences, and expertise. More than one technique can be found in the same building, and by the twelfth century fired brick and even stone are included in earthen structures, but are used sparingly in construction. For larger buildings where the structure must be load- bearing, the three main types of earthen building materials used are 'mudbrick,' which consists of shaped mud blocks, '*pisé*'[14], also known as rammed earth, and '*pakhsa*', which is placed earth[15]. All three techniques make use of materials widely available in a riverine oasis such as Merv and Otrar. These are earth (moistened or dry) as the primary material, with the addition of straw or chaff, used to control shrinkage, and on occasion material like ash, dung, hair, and carbonates, such as lime, to give the earthen matter certain additional properties [16].



<Figure 2 here>
Figure credit Katie Campbell
Figure 2: A mudbrick arch in a large residence or palace in the Shahriyar Ark at Merv, Turkmenistan

Mudbrick is the most versatile of these building materials and can be used for walls, domes, arches, and vaults [Figure 2][17]. As a result, mudbrick is commonly found in urban settings, especially in architecturally complex buildings such as mosques, palaces, and madrasas. *Pisé* is a simpler method of construction that consists of ramming dry earth into shuttering. A large, typically wooden, mould is filled halfway with earthen material and a small amount of water (typically 10% or less depending on the soil's moisture content). Further earth layers are added above as the mould is lifted, to build up the wall up to the desired height. As the *pisé* method produces large earth blocks, this technique is well-suited to simple forms of monumental architecture, such as fortifications, platforms, and foundations, and is often used in defensive walls [Figure 3]. Placed earth, known as 'cob' in the UK, '*pakhsa*' in the Central Asian republics, and '*chineh*' or '*china*' in Iran, is the simplest of the three techniques [Figure 4]. This method consists of moistening earth, often adding chaff or straw and then kneading the mixture until it becomes plastic[18]. This material is used to construct freestanding walls by hand, without the aid of a mould, and can also be placed, or thrown, to build up courses of an earthen wall. Typically, each 'course' is then flattened with an implement, such as a shovel, and left to dry before the next line of mud material is added. Once constructed, earthen walls were generally covered with a mud plaster or render and may have been decorated with moulded or painted stucco panels, glazed tiles, or faced with fired brick [19].



<Figure 3 here>

Figure credit Katie Campbell
Figure 3: An example of different techniques used in a single structure with pisé *blocks in the lower part, and upper courses of* pakhsa *in the rabad wall. Otrar, Kazakhstan.*



<Figure 4 here>

Chamsia Sadozaï/CRAterre
Figure 4: *Placing mud plaster in the preventative conservation of the Great Kyz Kala, Merv, Turkmenistan.*

Although fired brick appears in Central Asian construction by the twelfth century, it was used sparingly, often only in high status structures, such as shrines and mausolea, or in buildings for which mudbrick was unsuitable, such as bathhouses. The vast majority of urban buildings were constructed predominantly of earth [20]. So The three earthen techniques (mudbrick, *pisé*, and *pashka*), thus comprise the main construction types in cities conquered by the Mongols in Transoxiana and Khurasan. Therefore, mud was the primary building material of cities purportedly destroyed by Mongol armies. However, since mud is non-flammable, any 'levelling of defences' or 'razing' the citadel to the street [21] would have required a significant amount manual labour to demolish mudbrick structures, far more than the Mongol army, moving at the speed it did, would have had the time or manpower for. Moreover, many cities supposedly depopulated and destroyed by the Mongols show evidence for occupation through the thirteenth century[22]. In addition, many of the cities survive with substantial earthen walls to this day, and although the historical accounts should probably not be understood literally, the extent to which their descriptions of destruction have been exaggerated has rarely been seriously interrogated by historians or archaeologists working in the region.

Maintaining Earthen Architecture

Although the initial outlay in construction of mud architecture is relatively low by comparison with quarrying and working stone or firing brick, it requires regular maintenance,

often due to the constant relaying or damping down of mud floors, to more substantial rebuilding, due to weathering and erosion. Over time, this maintenance can lead to remodelling or even complete rebuilding of the original structure. Both ethnographic and archaeological evidence, such as microstratigraphic analysis of mud floors, indicate that basic maintenance happened frequently, perhaps even daily[23]. To remain functional, earthen buildings required constant monitoring and repair of external layers of mud plaster, to act against gradual weathering and erosion[24]. In places where mud architecture is still in regular use, maintenance of various components of the building follow different patterns. Depending on the climate and weather, maintenance may be infrequent (once every two to three years)[25], biannual[26], annual, or associated with a particular calendar event, such as Nowruz[27]. Constant monitoring and maintenance are essential for ensuring the continued utility of earthen buildings.

The burden of maintenance, relative affordability, and ease of rebuilding meant that earthen structures, from modest residences to monumental defences, were often abandoned. These abandoned buildings were regularly demolished to their foundations, which served as the footings for subsequent structures [Figure 5]. Over time, through this process, cities were built up into the mounds of mudbrick architecture known as *tepes* or tells. Although this phenomenon does not happen automatically and depends to some extent on human actions[28], the density of an urban occupation makes the formation of a mound highly likely and perhaps also desirable. At Otrar in southern Kazakhstan and Penjikent in Tajikistan, several phases of tightly packed residential buildings have been excavated overlying each other, built on the foundations of earlier structures[29]. In some cases, these appear to have been modified and maintained during their use[30], while others suffered catastrophic destruction by burning[31] before they were rebuilt [Figure 6]. In both cases, the houses were eventually abandoned and rebuilt over the original structures, presumably because rebuilding was more convenient or cost-effective than repairing structures. Human decision-making and actions are crucial to the outcome of individual buildings and entire cities, with short-term decisions not to maintain a structure impacting the deterioration of mudbrick architecture, a process which is difficult or impossible to reverse. As Lee Horne noted after ethnographic work in north-eastern Iran ‘a building tends to fall apart because it is abandoned; it is not abandoned because it falls apart’[32], underlining the importance of maintenance for the continued functioning of a neighbourhood or city, and the implications of ceasing to care for earthen structures.



<Figure 5 here>

Figure Credit Katie Campbell

Figure 5: Three layers of overlying buildings in Otrar, Kazakhstan. The dark line in the middle of the three clearly shows the dark line of a burnt, collapsed roof and heat discolouration can be seen in the mudbrick.



<Figure 6 here>

Figure Credit Katie Campbell

Figure 6: Detail of burnt roofing material. To the left is straw thatch and to the right a wooden roof joist with remnants of a woven fabric which was possibly part of a storage bag in the rafters or a rag for roof insulation, Otrar.

The affordances of earthen building material are therefore very important in shaping urban development and the use of cities, with the formation of *tepe*s leading to particular ways of managing the urban space. This is underpinned by the context of human activities and decisions on when and whether to maintain, abandon, modify, or rebuild an earthen structure, which itself may be dependent on the broader social, economic, and political situation. Furthermore, earthen architecture decays gradually, with seasonal changes leading to a steady pattern of decay as the walls slowly erode, rather than catastrophic collapse of a brick or stone wall once the foundations or mortar have eroded. Decayed urban architecture leaves distinct archaeological deposits as the material erodes to cover occupation layers, which means this evidence is often well-preserved but complex to excavate and understand. The effect of earthen building material on both the development of a city and the physical evidence through which we can investigate its past are therefore worth considering carefully in order to critically assess archaeological and architectural evidence.

Urban Development and Redevelopment

Although there may be similarities in urban development across building materials, the preeminent use of earthen architecture across Transoxiana and Khurasan means that it has contributed to the organisation and architecture of its cities. The traditionally understood layout of cities in the region, with a raised, and usually fortified *shahristan* or *ark* (citadel) surrounded by the lower *rabad* zone containing residences, industrial areas, and other buildings such as caravanserais and bath houses, is a pre-Islamic trend[33]. This urban model relies to some extent on the build-up of mudbrick architecture to create the physical height for a walled citadel, especially within the flat oasis landscapes of cities such as Merv in south-eastern Turkmenistan and Otrar. As the fortified mound grew, surrounding defensive walls could be easily expanded and widened to create a formidable defensive circuit [Figure 7]. In spite of the substantial earthen walls which had built up over several centuries to defend the cities of Central Asia, they appear to have been ineffective against the Mongol armies between 1219 and 1221.



<Figure 7 here>

Figure Credit Katie Campbell
Figure 7: The various phases of a defensive wall at Gyaur Kala, Merv, which survive to a height of 20m. Gyaur Kala was constructed around the 3rd century BCE and was slowly abandoned from about the 8th century CE to the Mongol Conquest.

The elevation of occupied urban areas also caused issues, especially in relation to water provision and distribution. In Otrar, bathhouses were built in the lower *rabad* area because of difficulties supplying sufficient water in the raised *shahristan*[34]. At Merv the major shift of occupation from the Hellenistic city of Gyaur Kala to the Islamic city of Sultan Kala appears to have begun in the 8th century.It was at least partially caused by difficulties providing water into the rising city [35]. with the westward movement of occupation to Sultan Kala taking advantage of existing water channels. Water has been identified as a major influence in settlement patterns across Central Asia, with shifts in river courses blamed for the abandonment or depopulation of many sites. Human activity is implicated both in the impact of rising *tepes*[36] and shifting water courses in the malleable geology of Central Asia, thus causing problems in water supply[37]. Archaeological evidence from the main 'Majan' canal which runs through the centre of the medieval city of Sultan Kala has shown that its water systems required constant maintenance[38], while complex canal and irrigation systems were frequently adapted to the needs of the population in the Otrar Oasis[39]. Since shelter and water were two of the most important factors for sustaining the urban population in the

region, they required an unusual level of management and maintenance. Complex irrigation systems running through the cities and their hinterlands required monitoring, cleaning, and maintenance to ensure water provision in these marginal agricultural zones, while the need to maintain earthen architecture relied on a stable population.

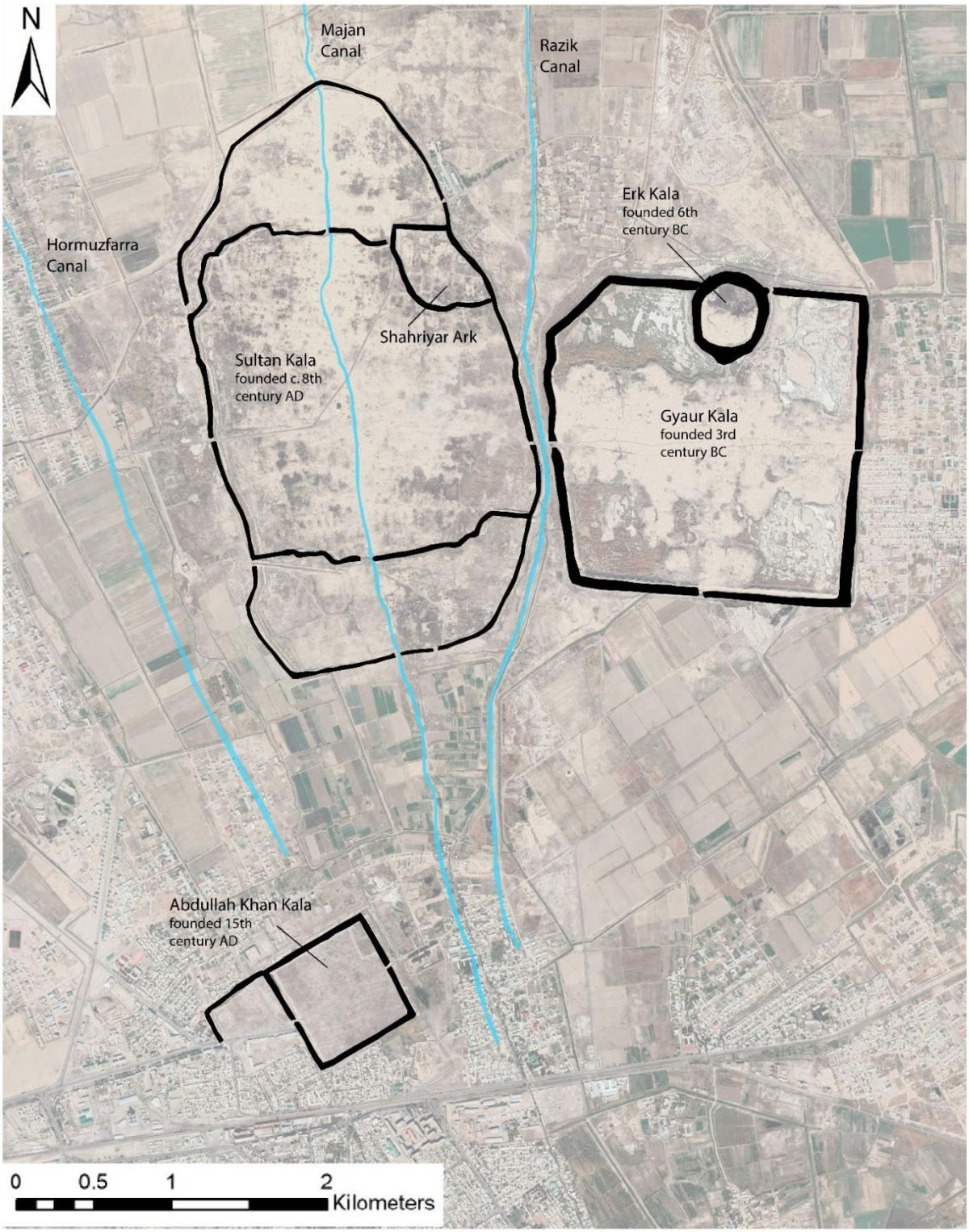
Longevity of the City

One of the main reasons that mudbrick city structures are more difficult to understand compared to their more sturdily built stone and fired brick counterparts is because of their relative lack of longevity, which can lead to more rapid urban change in cities constructed on this material[40]. Earthen-built cities can also be more challenging to analyse architecturally as fired brick or stone are visibly recycled as spolia in later buildings, whereas mudbrick is rarely recognisably incorporated into later structures. This pattern of decay and reuse mean that earlier phases of fired brick and stone construction tend to be easier to identify at complex urban sites.. Conversely, the lack of robbing trenches for building materials and the dismantling of earlier architecture means that earthen structures are often archaeologically more complete, even though decayed mudbrick structures can be difficult to excavate and interpret. The identification of mudbrick structures and their archaeological relationships is crucial to understand urban development but requires meticulous excavation[41], which can seem futile when faced with an archaeological landscape spanning hundreds of hectares and metres of vertical stratigraphy such as Merv and Otrar. The gap in understanding these cities comes both from the way these sites functioned in the past and the modern techniques used to analyse them.

When evaluating the longevity of a city, the timeframe of occupation within individual houses, neighbourhoods, or entire urban spaces can be considered. As shown above, individual structures are often pulled down and reconstructed, but the abandonment and rebuilding of entire cities also occurs, with shifts occurring within the city's immediate hinterland or throughout a wider oasis area. The lifespan of individual residential buildings is difficult to deduce because it typically ranges in the decades rather than centuries, a timeframe difficult to record precisely through archaeological means. Ethnographic studies of mudbrick buildings in use in the 1960s in north-eastern Iran, in a similar climate to Merv, indicate a lifespan of fifty to one hundred years with proper maintenance [42]. This correlates with archaeological fieldwork at Otrar where coins and pottery indicate that architectural phases of small, tightly packed residential buildings tend to last for around a century (often with remodelling and renovation)[43], while radiocarbon dating demonstrates that three phases of overlying mudbrick houses span a 150-year period[44]. For larger structures with thicker walls, occupation may persist over longer periods. The excavation of a palatial structure in the enclosed Shahriyar Ark citadel at Merv, for instance, suggests that it was continually occupied, with some modification from the mid-twelfth century until well into the fourteenth century[45]. The partial survival of several centuries-old mudbrick buildings in Merv and its surrounding oasis[46] demonstrates that large mudbrick structures can survive, in some form, over centuries, although more typical residential quarters may become unusable after a few months or years of neglect.

In addition to the abandonment of individual structures, a trend of complete urban abandonment and rebuilding is also observed across Central Asia. Merv is one of the best examples of a shifting city, since it is now deserted and has multiple, easily traceable building phases [Figure 8]. This pattern of urban development is also shown by archaeological evidence at Samarkand[47], Nisa,[48] and other sites throughout the Otrar Oasis[49]. In addition to such shifts, short term[50] or complete[51] abandonment is not uncommon. The reasons for these

shifts are complex and particular to each city. However, as mudbrick is relatively cheap and easy to make from scratch, if it is reused, this tends to happen shortly after building abandonment, before it has significantly eroded. Therefore mean that shifting the entire city may be preferable compared to rebuilding following desertion. Other factors such as changes in population and water supply may also contribute to the decision to shift cities. A declining population might lead for example to difficulties in maintaining earthen architecture and infrastructure such as defences and water supply systems. An increase in the number of residents might also induce changes, leading to urban expansion outside the city walls and the gradual abandonment of the original site. Environmental and climatic factors are also likely to contribute to changes in urban occupation, and work on assessing their contribution is ongoing[52].



<Figure 8 here>
Katie Campbell, background imagery ESRI
Figure 8: Map of Merv showing the growth of settlements from Erk Kala to Gyaur Kala, the shift westwards to Sultan Kala, and the depopulation of the fifteenth-century city of Abdullah Khan Kala.

Although mud building material is reused, this is typically degraded or demolished earth, rather than complete bricks or blocks. This eroded material is mixed with water and often some new clay, silt and occasionally other inclusions such as straw or aggregate, before being worked into new building material[53]. Whereas, worked stone and fired brick are frequently targeted by extensive robbing activities[54], mudbrick and *pakhsa* do not suffer the same fate given the ready availability of this building material and the additional work required to make it suitable for reuse. This means that mudbrick was probably only reused for structures close to where it was originally used (or re-used). Archaeological examples of overlying buildings (seen in Figure 5) show that mudbrick foundations are rarely, if ever, robbed for reuse. Thus, recycling the earthen walls may be as much a levelling strategy, to create a flat platform for the new building, as for reusing the material itself. This pattern of reuse means that a city could be occupied indefinitely, notwithstanding the problems of providing water to a raised mound, and both the continuity of a city or its movement to a new site indicate a conscious (though not necessarily collective) decision by the inhabitants of the city. The reasons for a shift are likely to be complex, but the relative availability and affordability of mud building material mean that with the exception of fortifications, which were added to, rather than replaced, earthen structures did not particularly benefit from being rebuilt in the same location. This is because the reuse of this construction material requires considerable recycling, with the material needing to be dismantled and reshaped with the addition of water and inclusions such as straw. Mudbrick was thus unlike stone, baked brick, and wood which were often immediately reused, saving a considerable amount of quarrying or firing labour in the process.

The Mongol Conquest and Earthen Cities

The cities encountered by the Mongols through their conquest of Central Asia between 1219 and 1221 would have been the large cities described above, many of which had an imposing fortified *tepe* and thick defensive walls. Yet, these cities were also dependent on a stable population to maintain earthen structures and sophisticated irrigation systems upon which their populations depended to survive. Evocative historical descriptions of the Mongol conquests provide both a generalised picture of regional devastation and specific accounts of destruction related to individual cities. At Otrar, Rashid al-Din's account suggests a five-month long battle followed by the enslavement and massacre of its inhabitants, and the levelling of the city's defences[55]. In Merv, Juvaini reports that the defences were destroyed, the citadel was levelled, and the main mosque was damaged by fire[56]. In addition, Ibn al-Athir's account of Merv's conquest claims that the Mongols set the city on fire, burning the tomb of the Seljuk Sultan Sanjar (*d.*1157) and digging up his grave, looking for money[57]. Yet, the citadels and defences at Merv and Otrar are still visible, and there was no fire damage evident on the tomb of Sultan Sanjar long before its 1990s restoration[58]. Furthermore, no convincing evidence of destruction dating to the period of the Mongol invasions has been found at either of the two cities, despite decades of archaeological excavation at both sites.

At Merv, rather than destruction, archaeological investigations have found ample evidence of desertion, including at ceramics workshops and houses which were abandoned with some haste[59]. There is also significant evidence for the city's continued occupation from the thirteenth to fourteenth centuries, although the urban area shrunk to sites along the main roads leading to the city's gates, near the south of Sultan Kala and the Shahriyar Ark[60]. The shift of occupation between the twelfth and fifteenth centuries also demonstrates the stark

decrease in the city's population. This is visible in the shrinking size of the walled urban area of Merv, which transforms from the large settlement of Sultan Kala to the much smaller Abdullah Khan Kala in this period (seen in Figure 8). However, several monuments such as ice houses and a pavilion between the two cities suggest that the urban areas extended beyond the defensive walls of the city in this period. At Otrar, no major evidence of Mongol destruction has been recorded, with abandonment deposits again appearing to characterise the archaeological remains of the 13th century [61]. However, recent radiocarbon dating suggests this abandonment began more than fifty years before the arrival of the Mongol armies[62]. Therefore, from an archaeological perspective, Mongol-related destruction is invisible, while shifts in these cities' urban layout and occupation are clear. At Merv, urban occupation was shrinking from later half of the twelfth century and further declined following the Mongol Conquest of 1221,, while Otrar successfully recovered to flourish in the fourteenth and fifteenth centuries[63].

Although the immediate destruction of the Mongol Conquest might be contested, its impact, especially on the urban populations of Central Asia and Iran appears to be extensive, underlined by historical accounts and less emphatically by archaeological data. Historical evidence tells us that many people who could afford to flee in advance did so, including the historical geographer Yaqut who left Merv in 1219, and the city's governor Khan Malik who fled southwards[64]. The enslavement and conscription of city dwellers is also attested to[65] and analysis of the conquest has suggested that far more than destroying the physical infrastructure, the Mongols were 'herders of human beings', depopulating the cities they encountered[66]. Moving the urban inhabitants from their homes, to become cannon-fodder in the Mongol army or to utilise their skills in pottery manufacture, writing, or metalworking, meant that cities invaded by the Mongols in Central Asia and beyond shrank in size. Urban infrastructure in these cities, such as defences, residential and public buildings, and irrigation systems, all of which required constant maintenance, were largely abandoned. The example of Merv demonstrates how the remaining inhabitants survived in the city, before giving up on maintaining its deteriorating buildings, and moving upstream to establish the new city of Abdullah Khan Kala nearly two centuries later (see Figure 8).

In addition to the absence of overt destruction in archaeological records, the lack of clear evidence regarding victims of the Mongol conquests and the difficulties of physically demolishing mudbrick architecture are rarely considered. Although historical accounts such as those of Juvaini and Rashid al-Din describe large scale murder during the period of Mongol incursions, no evidence of these events, such as mass graves, have convincingly been found in archaeological investigations at Merv or Otrar. Concurrently, as previously mentioned, mudbrick architecture is non-flammable and the complete destruction of extensive urban defences would have been difficult, although a limited campaign of destruction at key points in a defensive circuit may have rendered these structures useless. Ultimately, in cities that were subsequently ruled by and flourished under the Mongol Khans the defences were rebuilt, such as at Otrar which witnessed a significant programme of renovation in the fourteenth century[67]. Burning mudbrick structures is possible when their roofs and other components are made of flammable, organic material, but no evidence of this during a conquest (Mongol or otherwise) has yet been found in Merv. At Otrar, burning appears to be incidental and confined to individual buildings and phases rather than malicious, widespread destruction of an entire neighbourhood[68]. Thus, the historical descriptions of complete urban destruction and population genocide are not archaeologically evident. This does not deny the fact that the conquests had significant or catastrophic impacts on cities of Central Asia. However, the evidence at hand does suggest that it is worth

considering a more complex series of factors at play than the widely cited historical narratives might suggest.

Conclusion

The Mongol Conquest had a significant impact on settlement patterns across large tracts of Asia and Europe, but it was not the only cause of abandonment in the predominantly earthen-built cities in Central Asia. Furthermore, the nature of earthen architecture and archaeological evidence suggests that urban change around the time of the Mongol Conquest may have a far more complex set of causes compared to the overarching historical accounts of destruction. Dating at Otrar and Merv is providing a clearer view of the events at each of these sites from the twelfth to fourteenth centuries[69] and showing that the Mongols did not cause every urban destruction or abandonment attributed to them. Issues with the water supply are often cited as a cause for decline. Paikent in the Bukhara oasis of Uzbekistan was significantly depopulated in the tenth to eleventh century and abandoned by the thirteenth due to issues with its water supply[70], while later settlements at Merv were abandoned following an attack by the Emir of Bukhara in the mid-eighteenth century which damaged irrigation systems and disrupted water supply to the city and its agricultural hinterland[71]. The city of Dandanakan between the Merv and Tejen Oasis was completely abandoned by the mid-twelfth century and perceived as a ruin by Yaqut, who blamed its desolation on raids by the nomadic Ghuzz[72], although an unreliable water supply may also have sealed its fate. As an incredibly complex and multi-faceted series of events, the Mongol conquests and their aftermath were transformative for many cities, with some areas facing significant decline, while others recovered and thrived. It is probable that the economic, political, and environmental stresses caused by the Mongol disruptions exacerbated pre-existing issues and hastened urban decline in cities which were already struggling. Yet, it is important to consider issues such as the earthen building material, which is so ubiquitous that it is often overlooked, alongside the suite of other evidence for the Mongol Conquest and the urban change which it caused.

The abandonment and movement of neighbourhoods and entire cities is not unique to the post-Mongol period, and urban abandonment occurs for a number of reasons in different periods. Both archaeological and ethnographic evidence demonstrate the importance of maintenance to earthen built cities and the potential for significant disruption to urban infrastructure, especially architecture and irrigation, which would occur from a decrease in population. Within this model, it is possible to see that depopulation, either a result of fleeing citizens in advance of the Mongol arrival or capture and murder during and after their conquest of the city, had a more significant impact on the urban remains than direct destruction by Mongol armies. The specific properties of earthen architecture, especially the availability and affordability of mud as a building material, led to low-level reuse and eventual movement of cities after it was no longer possible to maintain them. A catastrophe on the scale of the Mongol Conquests, with the extensive economic and population disruptions it brought, would have had a greater impact on cities, which require a sizeable population to undertake their basic maintenance. Even an abandonment or depopulation of a few years would have initiated a deterioration of the urban fabric that was difficult or impossible to reverse. Additionally, a lack of appetite for reuse of the material, compared to the fired brick or stone, which require greater initial outlay and are more durable, meant that

earthen buildings, and sometimes entire cities, were abandoned and rebuilt across the region. I would argue therefore that historical sources describing the destruction and desolation of cities by the Mongols should be considered within the context of patterns of construction and maintenance which had persisted in these earthen cities for centuries. Although it is likely that they caused some damage to the urban fabric, the Mongols did not literally destroy entire cities. Nonetheless, they did cause an urbanism crisis in Central Asia, predominantly because they disrupted cycles of maintenance by creating a fleeing urban population and then conscripting, murdering, and enslaving significant numbers of those who stayed behind. The result was a series of 'destroyed' cities, but as most of the archaeological evidence has shown, these sites were more likely destroyed by natural erosion rather than by the Mongol attacks.

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Figure 4: *Placing mud plaster in the preventative conservation of the Great Kyz Kala, Merv, Turkmenistan.*

Figure Credit Katie Campbell
Figure 5: Three layers of overlying buildings in Otrar, Kazakhstan. The dark line in the middle of the three clearly shows the dark line of a burnt, collapsed roof and heat discolouration can be seen in the mudbrick.

Figure Credit Katie Campbell
Figure 6: Detail of burnt roofing material. To the left is straw thatch and to the right a wooden roof joist with remnants of a woven fabric which was possibly part of a storage bag in the rafters or a rag for roof insulation, Otrar.

Figure Credit Katie Campbell
Figure 7: The various phases of a defensive wall at Gyaur Kala, Merv, which survive to a height of 20m. Gyaur Kala was constructed around the 3rd century BCE and was slowly abandoned from about the 8th century CE to the Mongol Conquest.

Katie Campbell, background imagery ESRI
Figure 8: Map of Merv showing the growth of settlements from Erk Kala to Gyaur Kala, the shift westwards to Sultan Kala, and the depopulation of the fifteenth-century city of Abdullah Khan Kala.

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