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Circular Vernacular: Pigeon Towers as Ecological Mediators in Urban–Rural Contexts

Vernáculo circular: Los palomares como mediadores ecológicos en contextos urbano-rurales

A arquitetura vernácula circular: Os pombais como mediadores ecológicos em contextos urbano-rurais

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Circularidad, Arquitectura en tierra, Estructuras ecológicas, Infraestructuras vernáculas, Palomares iraníes

Circularidade, Arquitetura de terra, Estruturas ecológicas, Infraestruturas vernáculas, Pombais iranianos

Abstract | Resumen | Resumo

This paper investigates how pigeon towers may be reimagined as contemporary ecological mediators incorporating environmental circularity and ecological diversity into urban–rural settings. Through archival research, field documentation, and comparative analysis of Iranian and other pigeon towers, the study argues for a dynamic and evolving understanding of these vernacular structures and their capacity for adaptation in contemporary contexts. Framing such vernacular infrastructures as dynamic, environmentally conscious architectures, the research examines how their materiality, tectonics, and spatial logic enable a circular, adaptive system across rural and urban contexts. It reveals how the material (raw earth) and construction logic of Iranian pigeon towers play a role in their deterioration, ultimately proposing a decay-informed construction cycle. The study recovers the vernacular wisdom embedded in traditional craftsmanship as knowledge applicable to contemporary design, research, and practice.

Este artículo investiga cómo los palomares pueden reinterpretarse como mediadores ecológicos contemporáneos que incorporen la circularidad ambiental y la diversidad ecológica en contextos urbano-rurales. A través de la investigación de archivo, la documentación de campo y el análisis comparativo de palomares iraníes y de otros lugares, el estudio plantea una comprensión dinámica y evolutiva de estas estructuras vernáculas y de su capacidad de adaptación a contextos contemporáneos. Al considerar estas infraestructuras vernáculas como arquitecturas dinámicas y ambientalmente conscientes, la investigación examina cómo su materialidad, su tectónica y su lógica espacial permiten configurar un sistema circular y adaptable en contextos rurales y urbanos. El estudio revela cómo el material (tierra cruda) y la lógica

constructiva de los palomares iraníes intervienen en su deterioro y, a partir de ello, propone un ciclo constructivo que incorpora este proceso de degradación. El estudio recupera la sabiduría vernácula presente en los oficios tradicionales como un conocimiento aplicable al diseño, la investigación y la práctica contemporáneos.

Este artigo investiga como os pombais podem ser repensados como mediadores ecológicos contemporâneos, incorporando a circularidade ambiental e a diversidade ecológica em contextos urbano-rurais. Através de investigação de arquivo, registo documental no terreno e análise comparativa de pombais iranianos e de outras origens, o estudo defende uma compreensão dinâmica e evolutiva destas estruturas vernáculas e da sua capacidade de adaptação em contextos contemporâneos. Ao considerar estas infraestruturas vernáculas como arquiteturas dinâmicas e ambientalmente conscientes, a investigação examina como a sua materialidade, tectónica e lógica espacial permitem configurar um sistema circular e adaptativo em contextos rurais e urbanos. O estudo revela como o material (terra crua) e a lógica construtiva dos pombais iranianos desempenham um papel na sua deterioração e, em última análise, propõe um ciclo construtivo que tem em conta esse processo de deterioração. O estudo recupera a sabedoria vernácula incorporada nos ofícios tradicionais como conhecimento aplicável ao design, à investigação e à prática contemporâneos.

Introduction

Beyond the static views often presented in scholarly research, this paper examines pigeon towers typologically as ecological structures that mediate interactions between humans, non-humans, and the environment, functioning as integral components of agricultural infrastructure. The discussion that follows is grounded in archival sources, direct fieldwork in Iran, and a comparative typological analysis of Iranian pigeon towers with those in other regions, considering how these vernacular structures have evolved and what that trajectory says about their capacity to adapt.

We situate Iranian pigeon towers in a global context, tracing the emergence and evolution of dovecotes across cultures and regions. Though pigeon towers have also been built elsewhere, we focus on earthen examples and types chiefly in Iran, Egypt, and Spain. Iranian towers are selected as the primary focus because they are unique in relying on unreinforced mud blocks/adobes as their sole material (Motalebi and Shaffer 2023). This singular material approach underscores their engagement with earth as both construction material and living resource, marking them as a distinctive vernacular type defined by tectonics, materiality, and circularity. Earth is viewed as an active, responsive element incorporated into construction, maintained through the towers' design, and enriched by their use, contributing in turn to the land's fertility and productivity. By examining the materiality, structure, design solutions, and contextual connections of such vernacular earthen structures, we can infer lessons for approaches in architectural design and research.

Most existing sources on pigeon towers are specific to one country or region and approach them in isolation, largely through documentation (e.g., Badiee Gavarti et al. 2022; Prieto Vergara 2025). This paper offers a typological compilation showing the similarities and differences in their origins, tectonics, and construction, tracing them to the present and considering how their evolution may inform contemporary practice. For Iranian and Spanish towers, our comparison draws on non-English sources that often contain in-depth analysis but are difficult to access without translation. Spanish sources were translated using online tools and Farsi sources were rendered directly and synthesized for reference.

The Iranian material presented draws on author fieldwork in July 2024 in which several towers were visited in the villages of Jilanabad and Gavart, Isfahan province, with exploration of spatial qualities, structural characteristics, and tectonics. These towers were mostly privately owned and access was limited, as some owners were unavailable or unwilling to grant access. Of the towers visited, two were unattended and accessible for interior exploration, as documented here. This firsthand material, read alongside historical and comparative sources, shows that these structures are systems that continue to adapt and evolve.

Vernacular Architecture: A Dynamic Perspective

The *Encyclopedia of Vernacular Architecture* (Oliver 1997) gives the following definition:

> *Vernacular architecture comprises the dwellings and all other buildings of the people. Related to their environmental contexts and available resources, they are customarily owner or community built, utilizing traditional technologies. All forms of vernacular architecture are built to meet specific needs, accommodating the values, economies and ways of living of the cultures that produce them.*

Attempts to define vernacular architecture are thus inherently limited by the vast diversity of building types, forms, functions, and traditions embraced (Oliver 1997). Though commonly applied to Indigenous, folk, and traditional building practices, the term resists a fixed definition, as the field spans multiple disciplines, each with its own priorities.

More broadly, Dell Upton (1993) argues that the vernacular draws us in through its irregularity, like classical ruins, producing what he calls a "dichotomy of us vs. them." This can result in admiration for what modern architecture lacks or in a sense of superiority, seeing "us" as progressive and "them" (the vernacular) as backward. This opposition reinforces the misconception that the vernacular is unchanging, in opposition to the dynamic realm of "high architecture" (Upton 1993).

Conventional vernacular studies have focused largely on cultural transmission, tracing efforts to preserve or replicate old ways in new contexts. While Upton acknowledges the value of this, he advocates a shift in focus toward the overlooked aspects of vernacular architecture—those that foster dynamic expression rather than mere replication.

In support of Upton, Marcel Vellinga (2006) says vernacular traditions should be treated as evolving rather than static practices, as this points to their relevance and integrates them into contemporary discourse. These traditions are built on ecological, resource-efficient practices that can inspire contemporary design. With challenges such as climate change, urbanization, and resource scarcity, incorporating vernacular ideas may help us create sustainable and resilient buildings (Vellinga 2006).

Vernacular types may thus be models for contemporary practice. Earthen pigeon towers, particularly those of Iran, represent a fascinating intersection of vernacular architecture, ecological functionality, and cultural heritage. Once central to rural life, they are now largely abandoned as a result of urbanization, changing agricultural practices, and environmental degradation. Through understanding the causes of this decline and the intentions behind their design and development, we can find ways to reassert pigeon towers as dynamic structures of value today.

Pigeon Towers / Dovecotes

Pigeon towers, also called dovecotes, have long been a prominent feature of vernacular architecture from the Middle East to Europe and Africa. The development of similar building types in different regions is common in vernacular architecture, in keeping with local materials, contexts, and traditions, though it is unclear whether pigeon towers developed independently in each region or if the concept spread from one to another. In any event, across different cultures they appear built of such local materials as earth, clay, and stone (Fig. 1). The main purpose of housing pigeons in the Middle East was to collect their droppings for fertilizer, though elsewhere the object was their meat and eggs.

The layout and circulation of vernacular dovecotes respond to the "two fundamental uses of the building: 'habitual' and 'circumstantial'" (Abril Revuelta 2015). "Habitual" refers to the pigeons' occupations, such as resting or rearing their young. "Circumstantial" refers to occasional human visits to provide water and grain and gather droppings. The relationship between these uses informs the design, as do the local building materials used.

History and Development of Pigeon Towers Across the World

The background of these structures can be traced through architectural and agricultural texts and the writings of travelers. In *Geōponika: Agricultural Pursuits*, a tenth-century Greek text, a chapter is devoted to the use of pigeon dung in agriculture and how to build a pigeon house with attention to the occupants' wellbeing and needs (Owen 1805). Thus pigeon towers should be built at a distance from other structures to discourage predators. The stone columns supporting them should be arranged in circular formation, or if stone is not available, wooden pillars may be used, to a height of 7 cubits. Latticed windows are required on the east and west sides for natural light and pigeon access along with an entrance on the south side for the caretaker.

In his *Agricultura General*, published in 1513, Gabriel Alonso de Herrera describes design criteria for pigeon towers in the Iberian Peninsula. Specifications for dovecotes are also given in *Ten Books of Architecture* by Leon Battista Alberti (1955 [1485]). Both authors emphasize similar considerations in terms of location, structure, material selection, and maintenance. Pigeon towers should thus be in open, treeless fields close to water. They should be built to a manageable height of around 3.5 m, allowing pigeons to glide in comfortably while allowing human access by a standard ladder of some 170 cm. Both Alberti and Herrera note the importance of protrusions for alighting and perching in the form of ledges or bricks projecting before the pigeonholes. Alberti says this is advisable because it prevents fledglings from having an open view of the sky. Plastering and whitewashing are highlighted by both as ways to keep dovecotes comfortable and

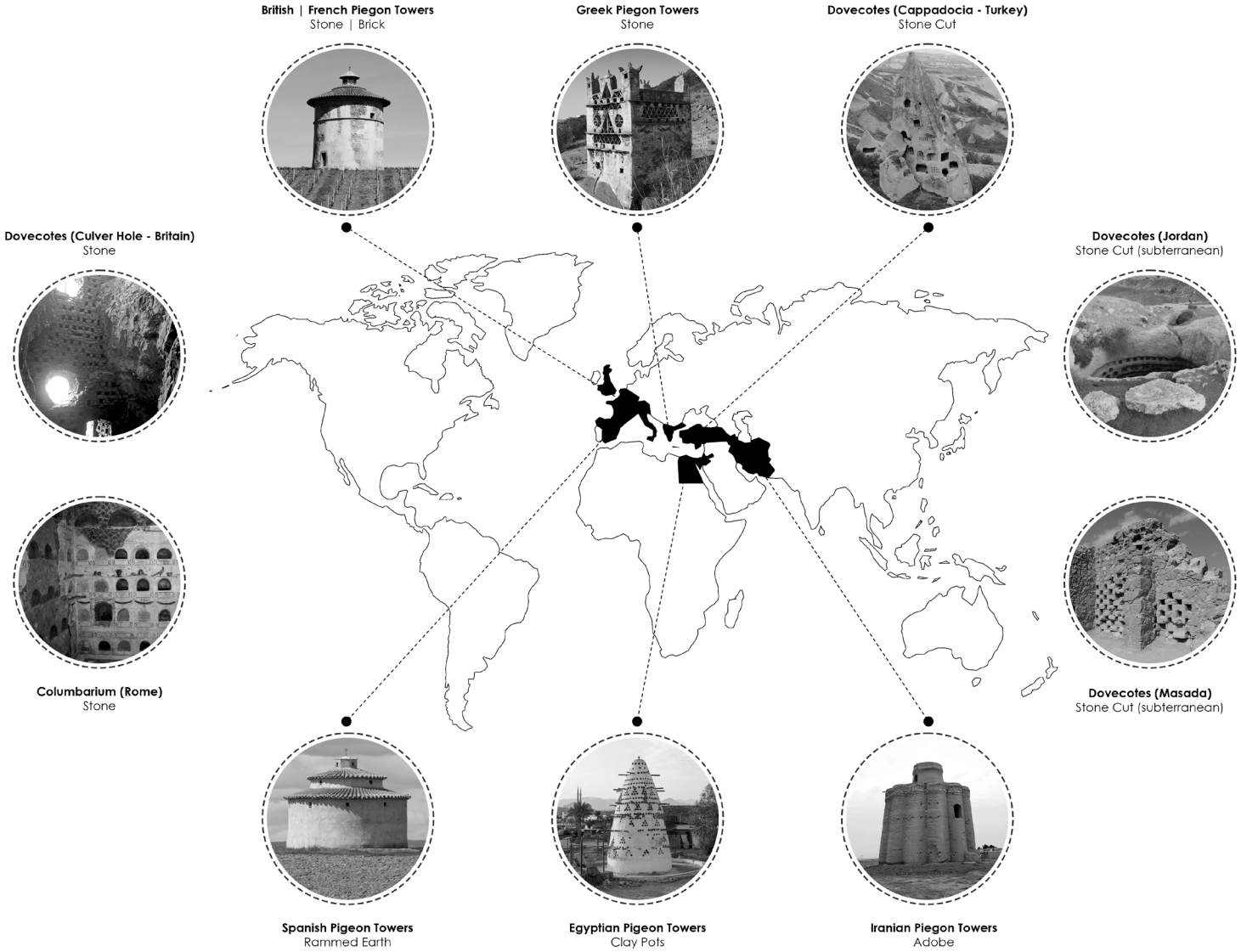


Figure 1: Regions where different types of pigeon tower are found, suggesting a possible route of transfer between east and west

clean for the birds and free of climbing predators. They also emphasize that human care is needed for both the structure and the pigeons, provided in such a way as not to disturb them.Alberti distinguishes clay and other earth-based materials as being most suitable, including bricks if not overbaked. Wood is considered useful, but not stone. This relates to the thermal comfort afforded by materials such as clay and brick and wood.

In his 1991 study *An Historical Enquiry into the Design and Use of Dovecotes*, John McCann identifies six factors in the design of pigeon towers for meeting pigeons' needs, based on British examples. These include appropriate height, a clear field of view, perches, a dark interior, moderate proximity to water, and distance from human activity, reflecting pigeons' sensitivity to disturbance. He also considers pigeons' homing habits, noting their preference for dark spaces, man-made structures, and gaps or cracks in buildings. He recommends materials that maintain comfortable interior temperatures and, like Alberti, observes that material choice may be guided by availability and convenience (McCann 1991).

Like many building types shaped by productive needs, pigeon towers have evolved in terms of use, material articulation, and relationship to their environment. These changes, whether aesthetic, functional, or technical, have been driven by shifts in agricultural practices, land use, and production demands as well as the encroachment of settlements upon rural landscapes, ultimately contributing to the decline of pigeon towers. As mentioned, pigeons inhabit towers only under specific conditions, which these evolving factors may disrupt, leading them to fall into disuse. Maintenance also requires sustained labor, whereas less labor-intensive fertilizers are now available.

Iranian Pigeon Towers

Literary evidence suggests that Iranian pigeon towers have existed since around the ninth century CE (Heidari Bani 1999). Over time they evolved from simple enclosures into highly refined structures, reaching a peak in the sixteenth-century Safavid era, when their design combined advanced construction techniques with intricate spatial and aesthetic details (Beazley and Harverson 1982). Found mainly in central Iran, particularly Isfahan province, they were built in fields near surface water or underground aqueducts (*qanats*) (Fig. 2), also serving as farmland boundary markers. *Qanats* are ancient systems that tap aquifers through a series of tunnels, supplying water for daily and agricultural use but not enough for continuous irrigation. As a result, agriculture in central Iran has always depended on fertilizers, given the region's arid to semiarid climate, and the importance of pigeon towers as fertilizer sources led to the development of vernacular construction expertise and innovation.

Typology

Iranian pigeon towers can be categorized in three main formal types: rectangular, circular, and clustered. These can be divided into subcategories (Fig. 3), depending on the desired capacity and the related structural requirements, integrating tectonics and geometry. Also considered is material efficiency while optimizing the interior surface area to accommodate as many pigeon cells as possible (Beazley and Harverson 1982).

Design and Construction

Design and construction methods for pigeon towers, like much vernacular architecture, may vary even within one region. But the general design remains based on the common features of interior nesting spaces, small openings for pigeon entry/exit, access for humans, and a prominent

Figure 2: Iranian pigeon towers along a stream (François Molle, WikiMedia Commons)



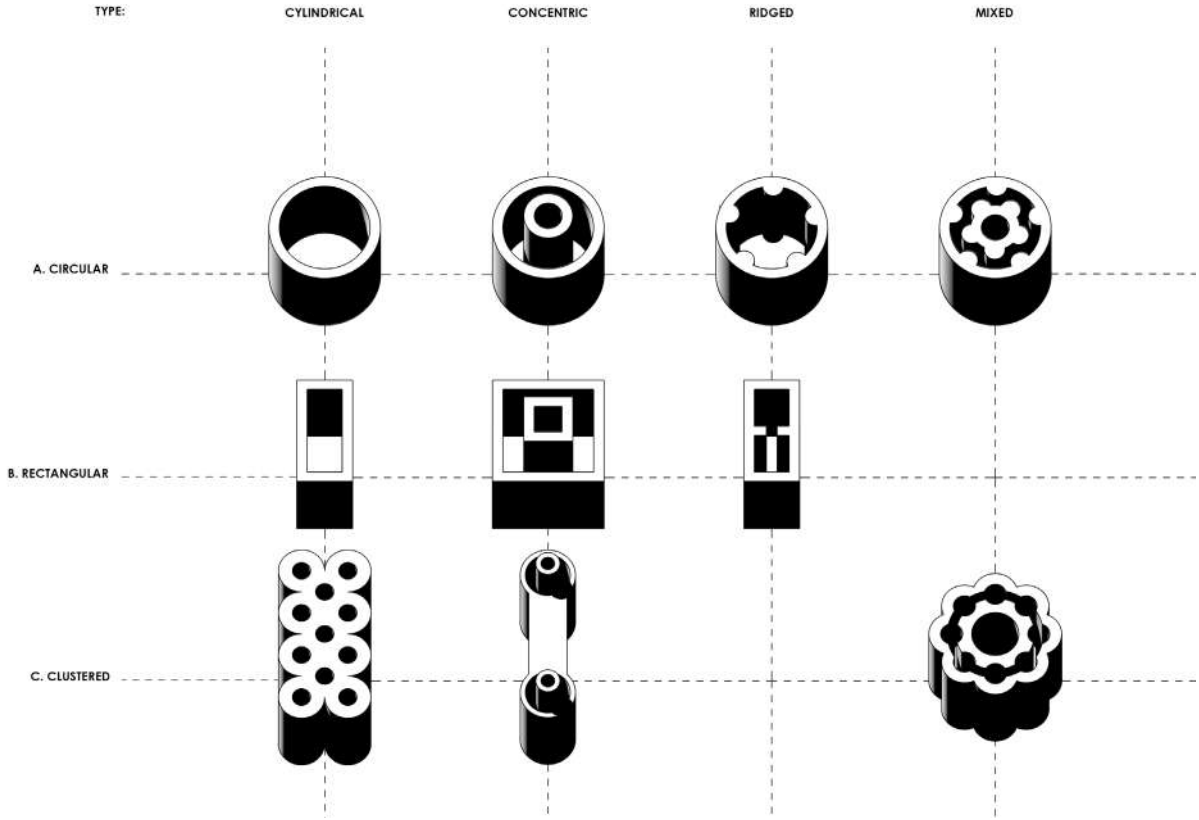


Figure 3: Typological variation in Iranian pigeon towers

white gypsum band on the exterior (Ansari 2013). The smooth gypsum surface is thought to prevent predators such as snakes from climbing the tower, though the white color may also serve to attract pigeons (Badiee Gavarti et al. 2022). A drainage course is also formed at the top edge with patterns of brick (often fired adobes) designed to keep out water (Fig. 4).

What distinguishes Iranian pigeon towers from parallel examples is their multistory design. Unlike many single-space dovecote types, which typically rely on movable ladders for access (McCann 1991), Iranian towers with concentric walls around a core typically have multiple levels (usually two) connected by masonry stairs. This also gives access to the roof, facilitating maintenance (Fig. 5).

Pigeonholes in Iranian towers are created by leaving gaps between the inner blocks. The solid-void pattern in the repetition of holes and perches shows an integration of function and aesthetics (Beazley and Harverson 1982) (Fig. 6). Measuring approximately 20 × 20 × 15 cm, the holes inform the tower's interior geometry, with an asymmetrical mud pyramid below each one as a perch, facilitating the collection of droppings. Given the sloping form, other pigeons have easier access to the adjoining cavities (Beazley and Harverson 1982).

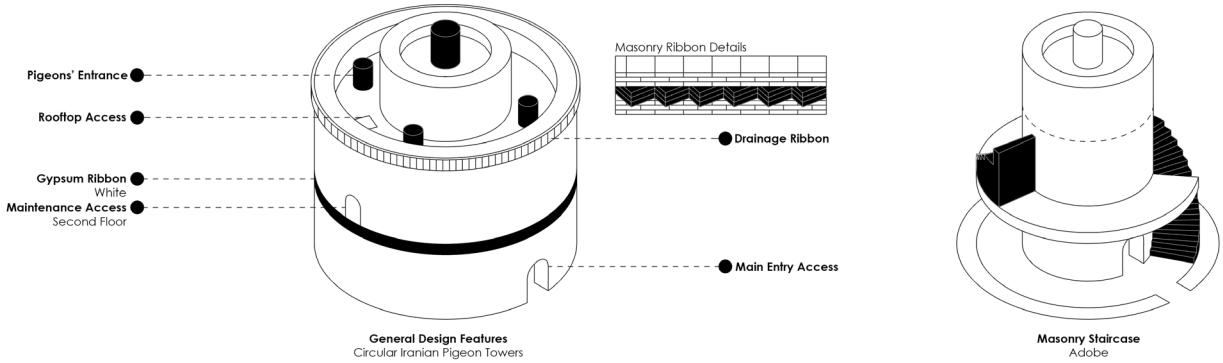


Figure 4: Typical architectural features of Iranian pigeon towers

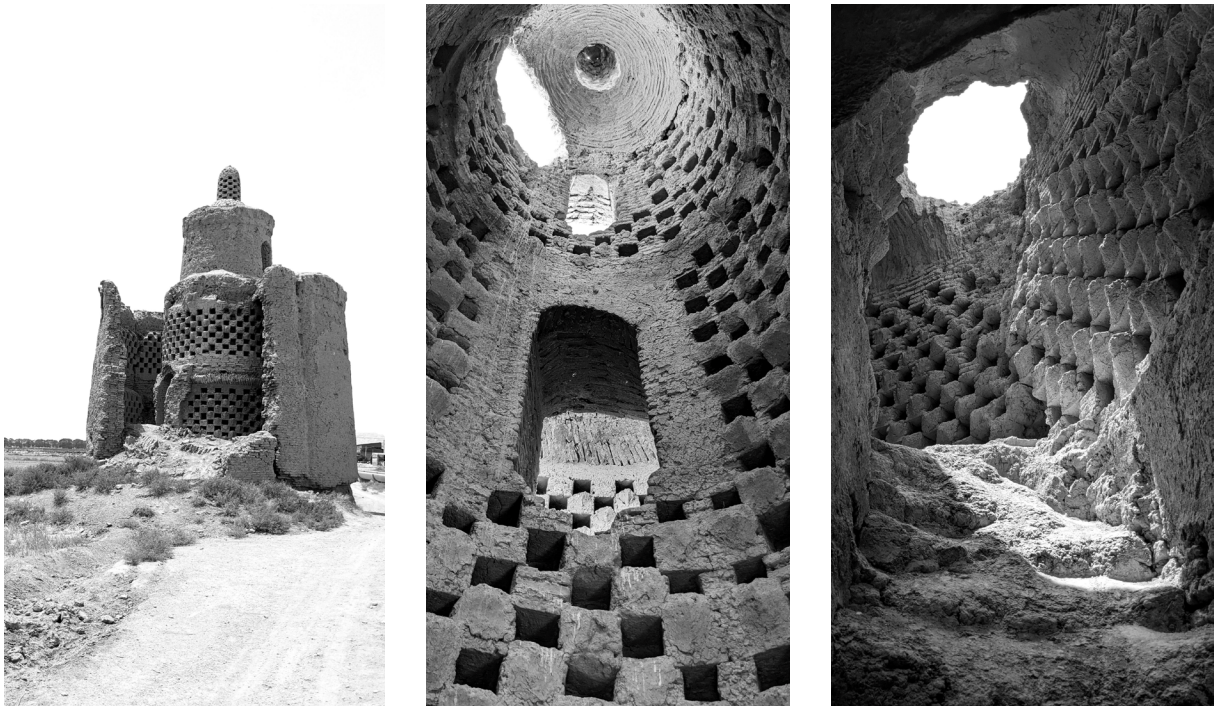


Figure 5: Exterior and interior of a pigeon tower in Isfahan province, with its core, solid-void pigeonhole pattern, and masonry stair to the top

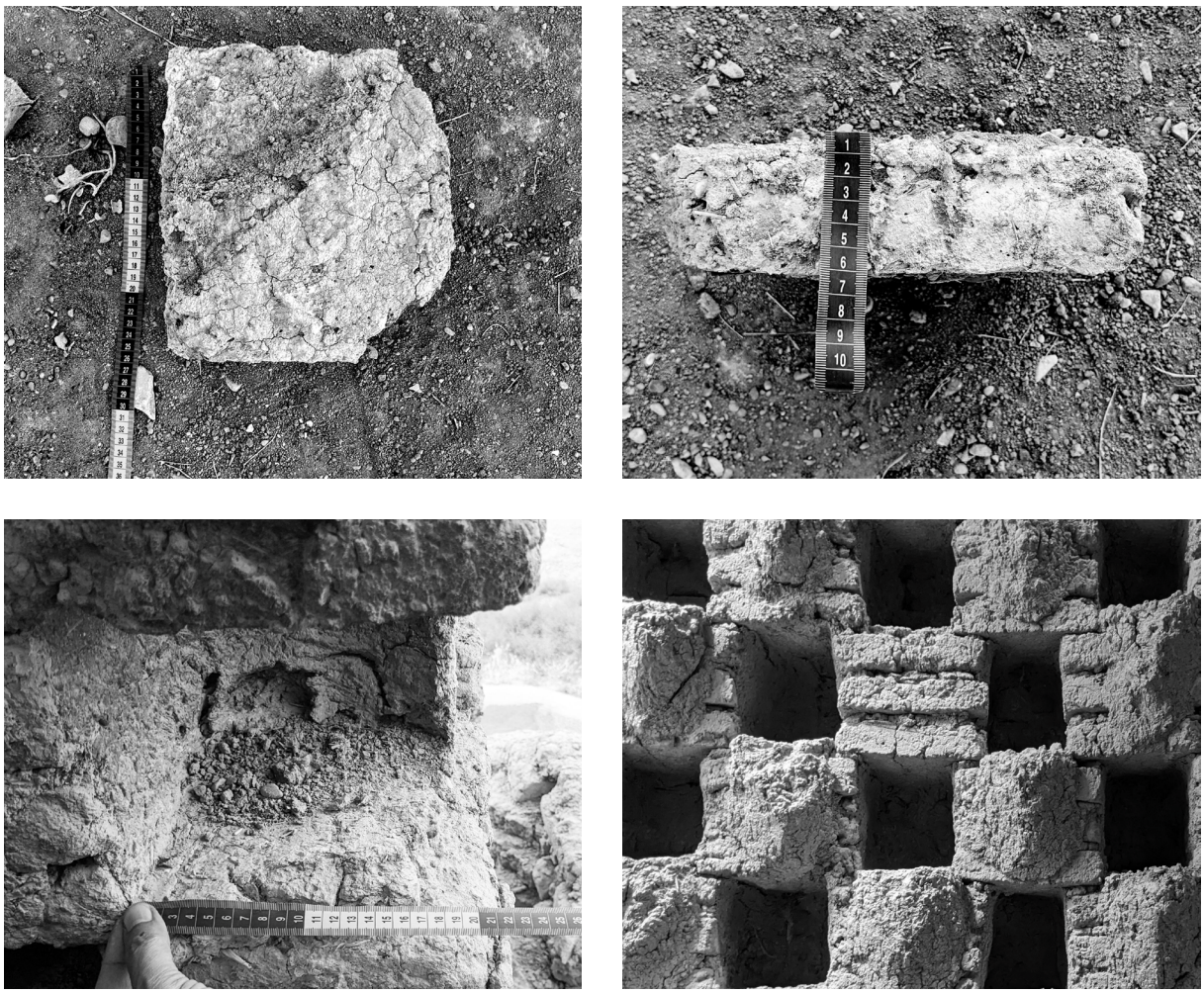


Figure 6: Top: Dimensions of an adobe brick from an Iranian pigeon tower (25 × 25 × 5 cm). Bottom left: Pigeonhole measurements (approx. 20 × 20 × 15 cm). Bottom right: adobe courses forming pigeonholes

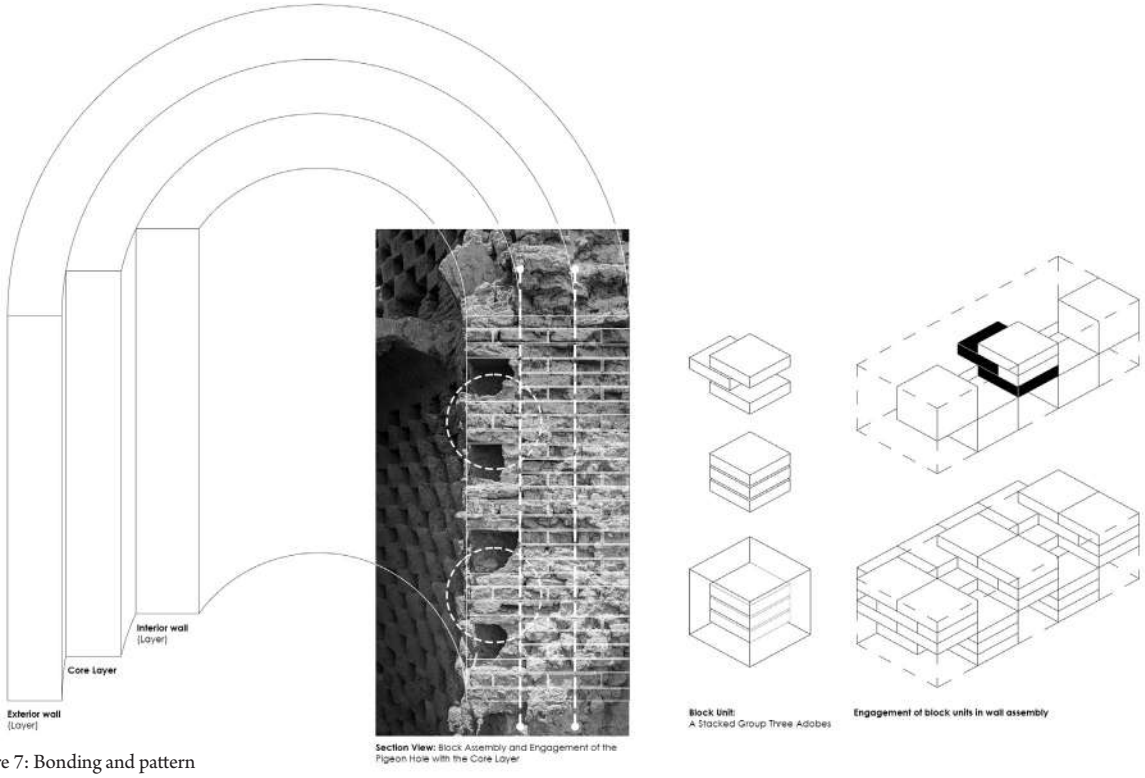


Figure 7: Bonding and pattern of earth blocks in Iranian pigeon towers and the resulting courses

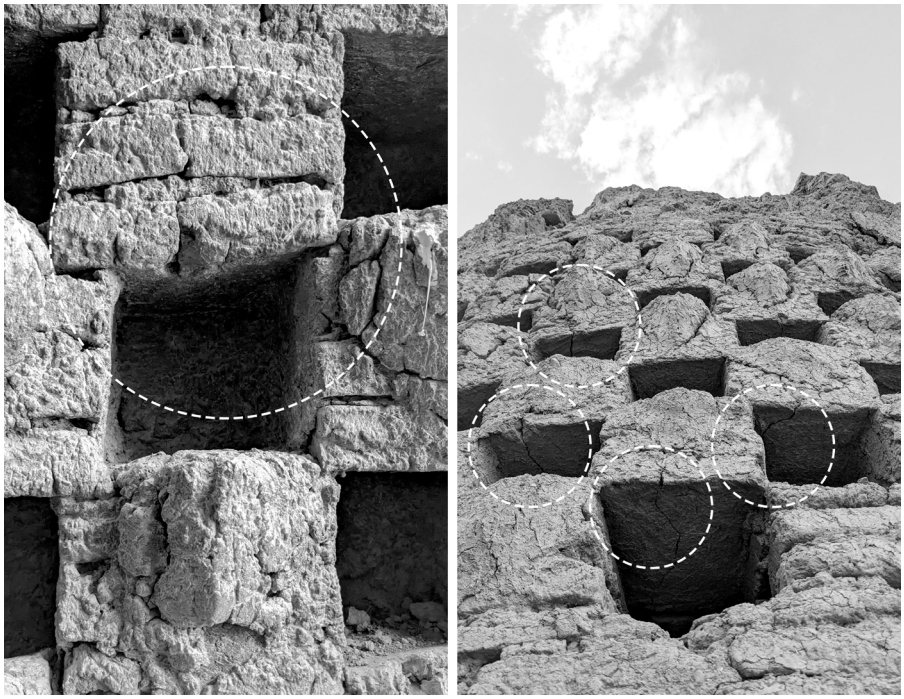


Figure 8: Cracking in the sides of blocks over voids, developing mainly along the central axis and near the supported bottom corners

A close examination of wall tectonics and masonry patterns in Iranian pigeon towers shows that a stack of three earth blocks serves as the basic building unit. This may relate to the block dimensions, as stacking three makes a cube and thus forms pigeonholes of suitable size. This configuration also results in structurally stable walls while integrating a solid-void pattern in their width. This is achieved by cantilevering the middle blocks of each stack so as to engage with the set of blocks in the layer behind. The middle block thus has a crucial structural role, while the bottom block is more vulnerable, bearing greater loads without direct support beneath (Figs. 7 and 8). Laying blocks in this pattern may be straightforward in a linear wall assembly but adapting it to the curved walls of circular towers and resolving the associated structural challenges takes skill.

Structural System

A notable aspect in pigeon-tower design and construction is resistance against forces such as earthquakes, wind, and recurring micro-vibrations from fluttering wings. Given the characteristics of the materials used in Iranian towers (unfired earth blocks), local architects have sought to enhance stability and durability through formal considerations involving a uniform distribution of forces. Even transfer of forces is more easily achieved in structures with less complex, symmetrical designs in which all load-bearing elements are well distributed (Houri-Zadeh 2014). This is also linked to the tectonic logic of the building materials. Circular towers appear to be the commoner type, and the tectonics of earth blocks allow the construction of various coherent configurations, as seen in the several types of Iranian pigeon tower, relying on a single material unit (Mashhadi 2014). The standard circular plan is important, as the tectonics of construction with earth blocks requires the entire structure to be under compression to limit tensile stress (Beazley and Harverson 1982). A circular plan also creates a dynamic form that more effectively diverts lateral wind forces, whereas a rectangular plan with flat surfaces obstructs the flow and receives greater loads (Fig. 9).

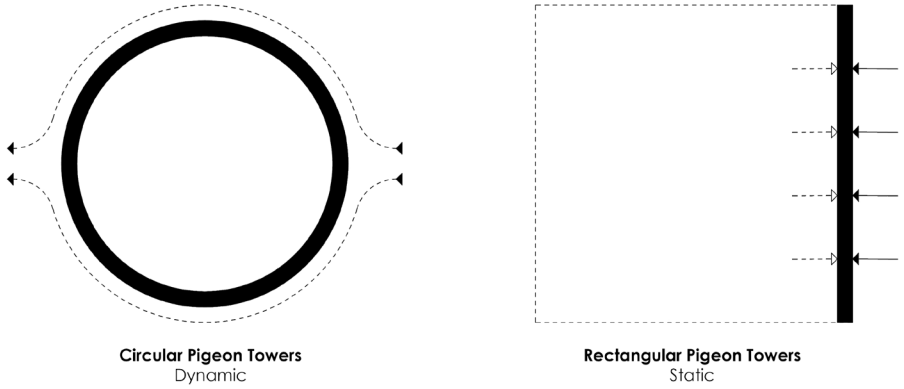


Figure 9: Lateral wind forces on rounded exterior surfaces versus flat surfaces, which face the wind and receive greater loads

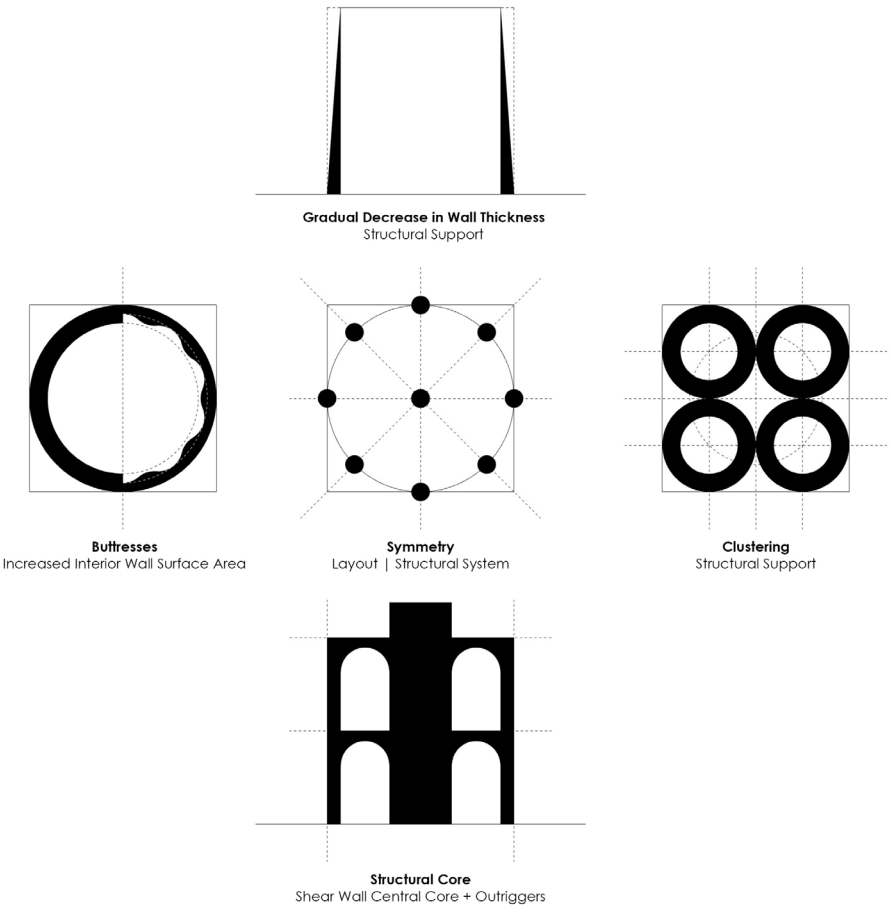


Figure 10: Iranian pigeon tower configurations to enhance stability

In both the circular and rectangular types, the wall thickness gradually decreases from base to top, forming a tapering profile as the inner side remains straight and the exterior slopes inward. This enhances resilience against lateral forces and vertical loads while reducing the amount of material needed. In types with concentric walls, the central walls function as a shear core structure, similar to the core systems used in high-rise buildings (Houri-Zadeh 2014 and Ansari 2013). The exterior wall(s) is/are connected to the core by arches acting as buttresses in an integrated structural system. In towers with ridged walls the thickness is reduced, as the ridges serve as buttresses (Fig. 10).

Damage Analysis

Although these structural methods mitigate degradation, the towers remain vulnerable to various agents of deterioration in relation to their structural characteristics and components, broadly classifiable as aging (of both materials and structure), human activities, and environmental factors. Damage commonly manifests as structural cracking, partial collapse, or material disintegration.

Cracks typically appear at the top and bottom, often vertically, generally resulting from structural movements in opposing directions due to a range of interacting factors (Warren 1999). Cracks originating at the base tend to have wider openings that narrow as they extend upward, whereas cracks from the top progressively close as they extend downward.

Cracking in the upper portions may occur when irrigation water is absorbed by the lower parts, leading to differential settlement, stress redistribution, and transverse deformation, including the Poisson effect (Ansari 2013). Rainwater infiltration and drainage leaks can produce similar cracking patterns at the top, often leading to localized deterioration (Warren 1999).

Cracks forming in the lower portions are primarily associated with material aging, gradually weakening the performance of mortars. The structure thus becomes increasingly susceptible to deformation and cracking under sustained loads and environmental stresses, including transverse strains (Ansari 2013).

While water absorption remains the dominant factor of deterioration in earthen structures, other agents such as wind may also exert erosive effects. Although these impacts are often minor, cumulative action can amplify material loss and structural damage over time (Warren 1999). As mentioned and illustrated in Fig. 9, the overall dovecote geometry also influences the magnitude of wind loads, resulting in varying patterns of deterioration.

The exterior of pigeon towers is more susceptible to disintegration due to its exposure to various factors as compared to the center or interior. This also applies to the core structure of concentric towers. The core is typically found to remain intact, or to disintegrate more slowly than other parts (Fig. 11).

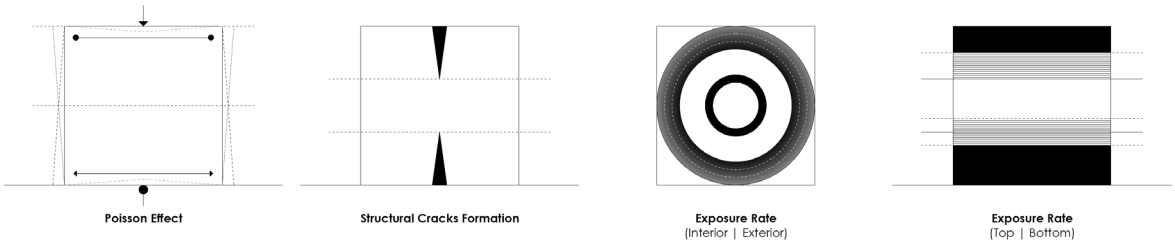


Figure 11: Factors contributing to material and structural deterioration

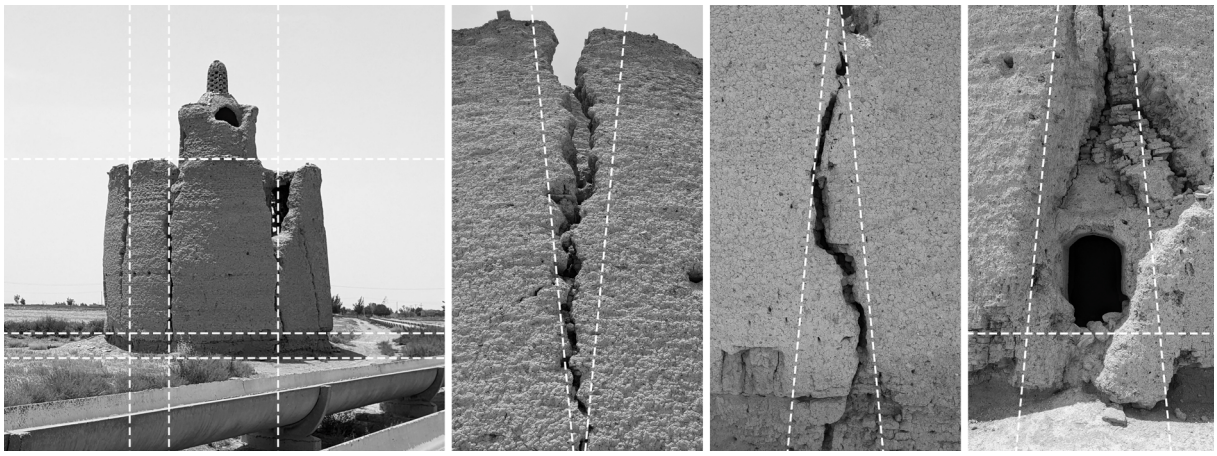


Figure 12: Damage analysis and deterioration patterns. Left: Cracking and crumbling at the base due to moisture. Right: Structural cracking and layered deterioration according to exposure

An analysis of disintegration across tower exteriors shows that the lower third is most affected, given its higher exposure to loads and ground moisture. Next is the top third, with lower exposure, whereas the middle third fares best, with damage mainly caused by wind or gradual material aging (Fig. 12).

Decay, Deterioration, and Circularity

Many examples of Iranian pigeon towers have fallen into disrepair due to disuse or abandonment. Farmers are increasingly inclined to demolish them to make more space for crops, which has led to a drop in the number of exemplars.

While some towers still subsist in farmland, the expansion of settlements has incorporated others into urban fabric, compromising both the pigeons' comfort and safety and the structures' intended function, contributing to their decline.

Recent efforts have been made to restore and maintain these pigeon towers, though they have often failed to capture the essence of the original concept, prioritizing monumentality over functionality and ecological integration. Fig. 13 shows an Iranian pigeon tower under renovation/reconstruction. As pictured below, cement-stabilized earth blocks are being used (with a higher proportion of cement lower down), disrupting the tower's material homogeneity for the sake of durability. This also undermines its material integrity with their environment, negating the potential for true circularity.

The materiality and intended function of Iranian pigeon towers position them as a form of agricultural infrastructure rooted in soil-based architectural intelligence. Built almost entirely of unfired earth blocks, they operate as a truly cyclical building type, directly embedded in local ecologies. Their primary objective, to house pigeons so that their droppings may be used as fertilizer, establishes a closed loop between architecture, biodiversity, and agricultural soil. In this cycle the building becomes an active mediator between species and land: pigeons inhabit the earthen structure, their waste nourishes the surrounding soil, and the crops grown in turn sustain human communities, builders of dovecotes. These towers therefore function as ecological interfaces rather than mere objects, embodying biological processes in spatial and material form. They show how vernacular earthen construction integrates material performance, environmental processes, and agriculture into a coherent system, offering a model for rethinking architecture as ecological infrastructure that supports both human and other-than-human life while maintaining the resilience of the land/earth (Fig. 14).



Figure 13: Iranian pigeon tower under reconstruction using cement-stabilized earth blocks/adobes, with human settlement and infrastructure encroaching on the farmland (Serhii Ivashchuk)



Figure 14: Conceptual illustration of how Iranian pigeon towers enhance agriculture through the embrace of decay and innovative material use

Parallel Earthen Typology: Pigeon Towers in Egypt and Spain

Earthen pigeon towers are also found in Egypt and Spain, shaped by locally available materials, climate, and building knowledge. Both regions share earth as a base material, though their construction methods and material combinations differ from the Iranian model. Below we examine these two types in turn, contributing to broader comparisons with Iranian examples.

Egyptian Pigeon Towers

In ancient Egypt, pigeon towers were tall, sturdy buildings of clay housing hundreds or even thousands of birds for both food and fertilizer. The most common design featured walls lined with hundreds of clay pots embedded sideways into thick walls, with their mouths serving as nesting holes (Figs. 15 and 16). These dovecotes were frequently built over granaries or as upper stories, with human access by a wooden ladder (Husselman 1953). In some cases, tree branches were inserted into the walls as perches (Fig. 17).

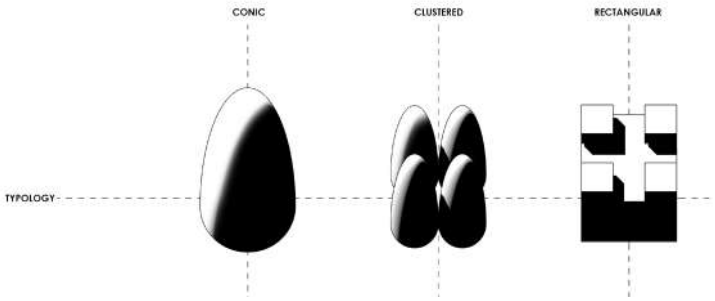


Figure 15: Egyptian pigeon tower typology

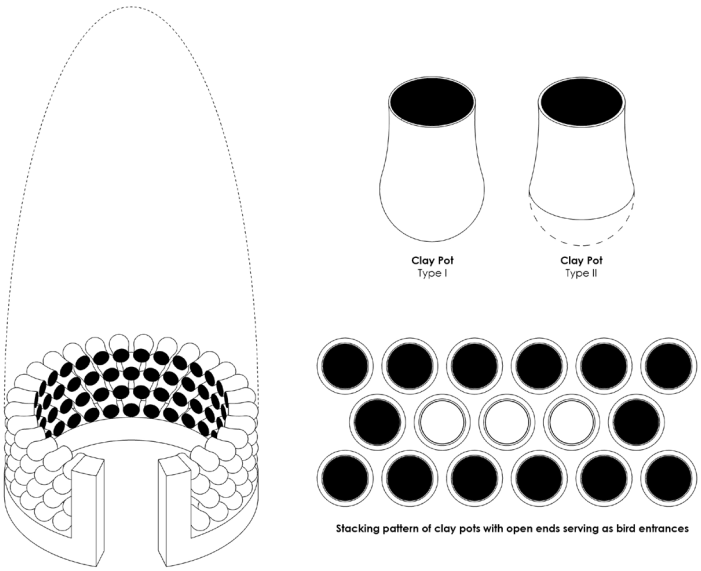


Figure 16: Tectonics and use of clay pots in Egyptian pigeon towers

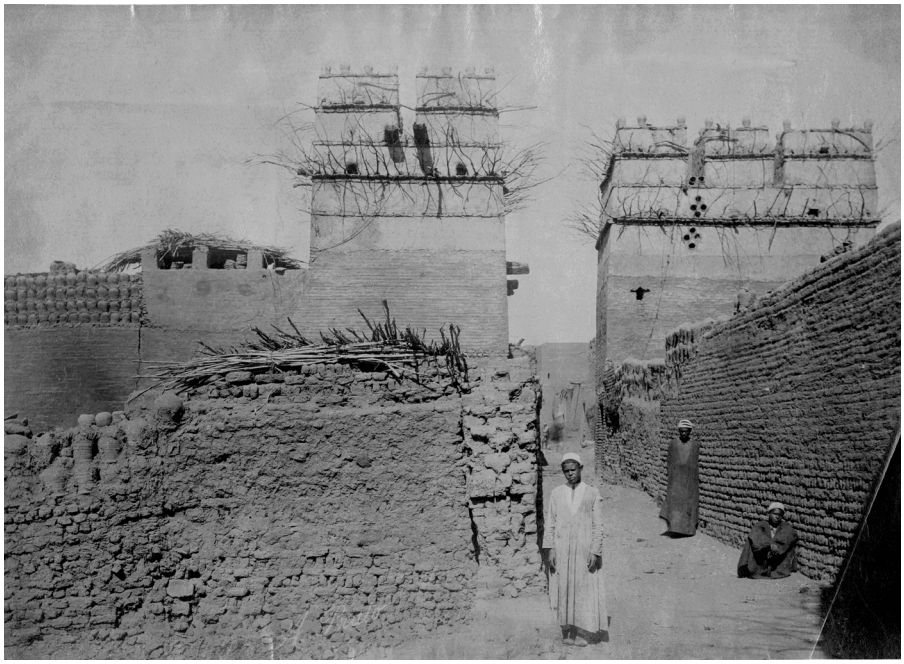


Figure 17: Pigeon towers in an Egyptian village with clay pots visible on the left. Pots are also used as decorative elements at the top (A. Beato, Archivio fotografico Museo Egizio, Turin)

Building on the design factors discussed above, the Egyptians may have made these clay-pot pigeonholes following behavioral observation of pigeons nesting in earthenware. Pots were fitted where pigeons naturally roosted, and their use may also reflect the preexisting Egyptian practice of using clay pots to mummify venerated birds. This might have led to their adoption in dovecotes once the use of pigeon droppings as fertilizer became widespread in fourth-century BCE Greco-Roman Egypt (Bailleul-LeSuer 2012). The shape and materiality of clay pots also seem suitable, with good thermal performance and a secure bulbous space for nests and eggs.

Spanish Pigeon Towers

Pigeon towers called *palomares* can be found across many Spanish regions, such as Tierra de Campos (Roldán Morales 1983; Malmierca Zurdo 2004; Canova 2005; Abril Revuelta 2015), La Mancha (Castilla Pascual et al. 2020), or Asturias, which has distinct stone-built types (Prieto Vergara 2025), all shaped by local materials, climate, and tradition. The use of earth and clay is apparent in most Spanish examples. These remarkable pigeon towers were circular, square, or rectangular in plan, often including a central courtyard (Figs. 18 and 19) as a transitional space attractive to pigeons, with a water trough (Abril Revuelta 2015).



Figure 18: *Palomares* in Malva, Spain (Rodelar, Wikimedia Commons)

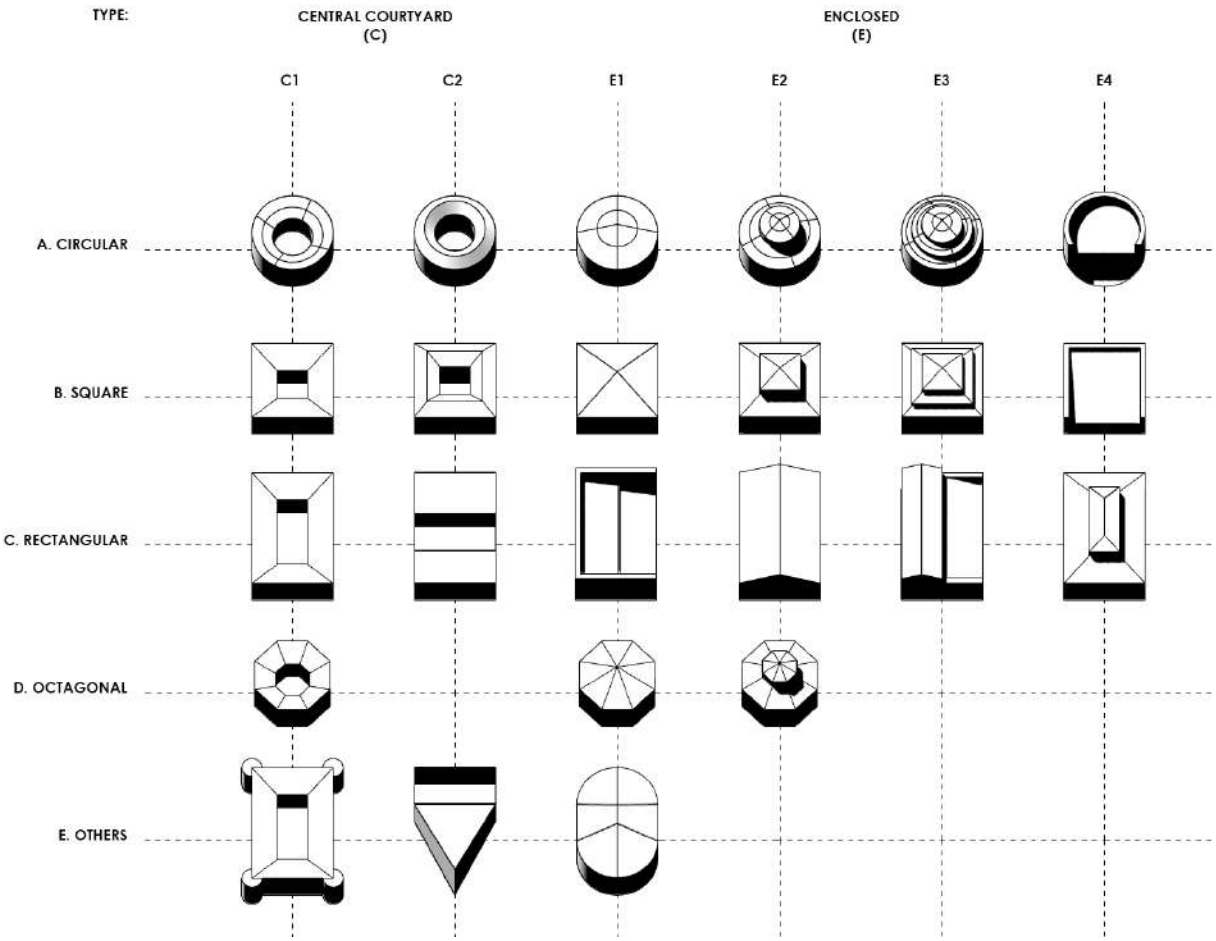


Figure 19: Typological variation in Spanish pigeon towers in Tierra de Campos (Drawing adapted from a chart by Manuel Malmierca Zurdo, 2004)

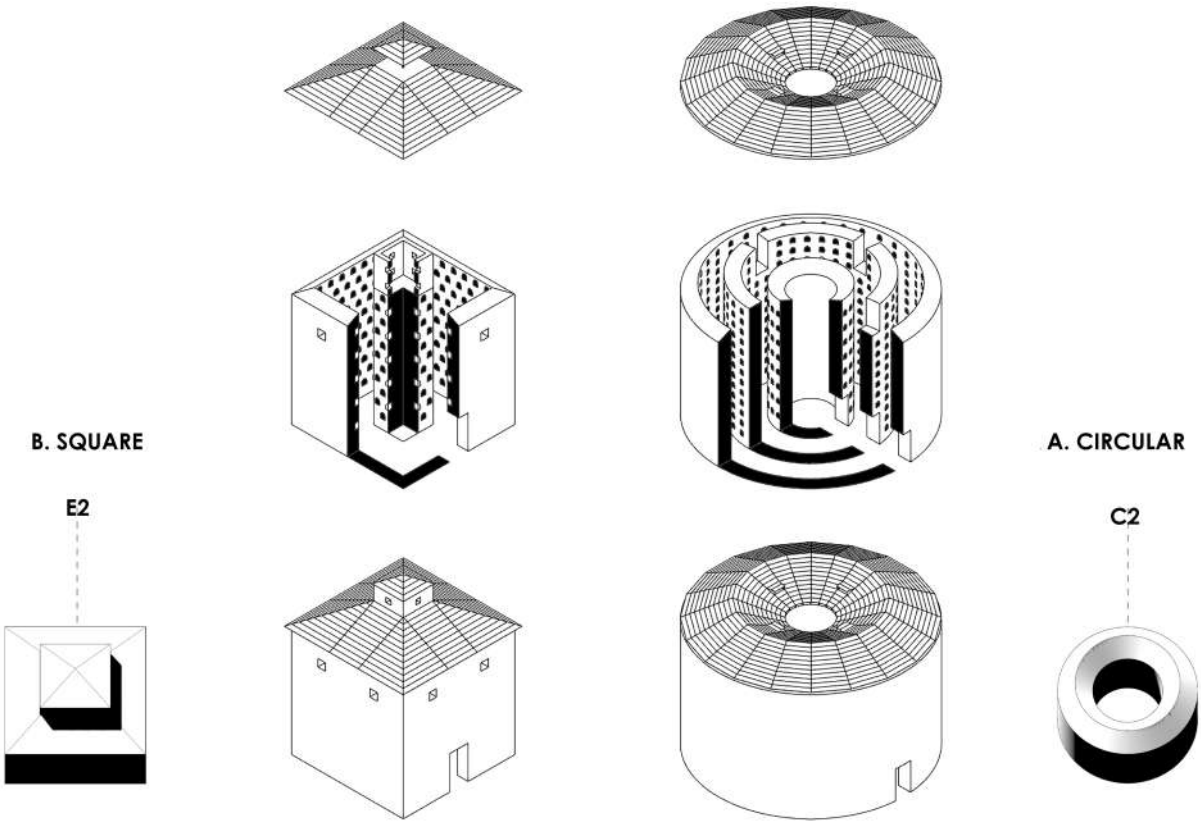


Figure 20: Left: Square pigeon tower with a central pillar. Right: Circular pigeon tower with a courtyard and concentric walls (Adapted from drawings by Roldán Morales)



Figure 21: Ruined Spanish pigeon tower revealing its construction techniques, with mud and straw plaster, adobe higher up, and a rammed earth wall lower down (Left: Luis Fernández García, Wikimedia Commons. Right: David Pérez, Wikimedia Commons)

Spanish dovecotes employ diverse spatial variations to maximize the number of nests. Concentric layouts with a central pillar or core have pigeonholes built into both outer and inner wall surfaces. The interior configurations determine the roof structure, with multi-leveled forms that slope inward or outward with curved red terracotta tiles (Manuel Malmierca Zurdo 2004). The central pillars found in some towers also support a timber roof (Fig. 20). Openings are incorporated in the roof or in a *castillete*, a turret in the roofline for pigeon access. They are executed by interrupting the tiled roof slope between two rafters or with a small dual-pitched roof section including a little window set into the vertical plane. Several such openings may appear along the same roof slope, according to the dovecote's size and subdivisions (Castilla Pascual et al. 2020).

The pigeonholes are typically carved directly into the walls using a pickaxe and a template for uniformity before the earthen material has had time to cure (Manuel Malmierca Zurdo 2004). In some examples in La Mancha, however, a lining wall is built inside the enclosing wall or by the partitions, leaving the outer wall intact (Castilla Pascual et al. 2020). These walls are of rammed earth, roughly 80 cm thick, resting on a low stone base laid over a foundation. The upper parts often incorporate adobe, providing flexibility for a sloped roof and supporting small beams with wooden boards nailed to them (Abril Revuelta 2015) (Fig. 21).

Deterioration in these towers stems from lack of roof maintenance: displaced tiles let in water, which progressively damages the timber framing and can lead to eventual collapse. Castilla Pascual et al. (2020) also identify the buildup of uncleared pigeon droppings (*palomina*) on structural floors as a common source of damage, as the accumulated weight can cause deformation.

The design, tectonics, and materiality of Spain's *palomares* are recognized to be influenced by Middle Eastern and Asian knowledge and customs introduced to Iberia between the seventh and fourteenth centuries CE in the Islamic era (Bailleul-LeSuer 2012). There are notable similarities in design and materiality with their Iranian counterparts, such as being built of earth and having concentric walls. But Iranian pigeon towers exhibit distinct differences in design and construction. Egyptian and Spanish towers are built of earth and clay with other materials, by various construction methods. Spanish towers incorporate rammed earth, adobe, terracotta blocks, and wood, and Egyptian ones have clay pots, clay walls, and in some cases fired bricks. Iranian towers, on the other hand, rely on a single material: raw earth. This characteristic integrates material efficiency with building tectonics, focusing on the structural and morphological potential of earth blocks as the sole component. The design and construction of Iranian pigeon towers therefore reflects a set of dependencies across different scales, from a single building block (of unfired, non-stabilized earth) to architecture (earthen building) for serving the intended function while ensuring structural stability (Motalebi and Shaffer 2023).

Discussion: Pigeon Towers as a Model of Adaptive Ecological Infrastructure

Despite these towers' decline, the underlying concepts endure. Dovecotes are still to be seen as architectural remnants or for contemporary pigeon-keeping in urban settings, where ecological relationships continue to be expressed through built form. While these structures are often preserved as static monuments, they may also be reimagined—not as outdated low-tech agrarian features but as examples of inclusive ecological infrastructure able to address contemporary challenges in either urban or rural landscapes. This raises the question of how their materiality and vernacular tectonics may inform contemporary building practices that prioritize circularity.

Examples of what may be called "contemporary vernacular" can be found in the landscapes of Glasgow, at the top of apartment buildings in the Garbage City of Cairo, or in the urban fabric of Isfahan. In Glasgow, pigeon fanciers build "dookits" of recycled or found materials to house their birds, in a practice ecologically mindful of the impacts of material production while promoting a cohabitation of humans and nonhumans. Both Scotland and Egypt historically deployed dovecotes for agricultural purposes, although in these contemporary examples, the structures are recreational. In both



Figure 22: Top: Glaswegian Dookits, derived from "Doocot," Scots for dovecote (Stephen Mclaren). Bottom: Pigeon towers in Garbage City, Cairo (Greg Maka)



Figure 23: Hezaar-Jarib pigeon tower in Isfahan (Isfahan.ir)

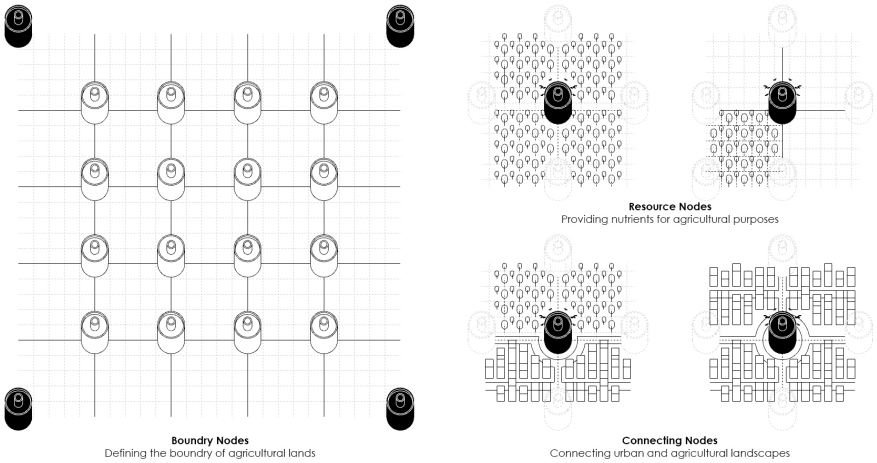


Figure 24: Reimagining pigeon towers as active nodes in urban/rural contexts, in keeping with their former function as boundary markers

cases, a clear separation from human activity is maintained (particularly in Egypt), as the dovecote's height keeps the birds clear of the bustle of the city (Fig. 22).

Some remaining pigeon towers in Isfahan have been renovated as architectural attractions or repurposed as tourist restaurants and cafés. As these towers once functioned as boundary markers, delimiting plots and organizing farmland, now that urban expansion and changes in land use have absorbed many such territories, many towers exist at the fringes of or within transformed environments (Figs. 23 and 24). Reimagining pigeon towers as active nodes in urban and rural life allows them to be understood and engaged with differently. In all events, a study of Iranian pigeon towers alongside comparative examples offers insights into the dynamic nature of vernacular architecture and its capacity for adaptation in contemporary contexts.

Conclusion

This study has sought to go beyond static readings of vernacular earthen architecture by comparing the evolution of pigeon towers in different regions as models for contemporary practice, focusing on earthen examples in Iran, Egypt, and Spain. All the studied types, tectonics, materials, and designs are responses to local climate, available resources, building techniques, and traditions, producing distinct embodiments of a common function. Iranian pigeon towers are notable for relying solely on unreinforced earth blocks, in a material dependence linking design, structure, and decay at every scale—for purely agricultural purposes, with no intention of the pigeons being food or a commodity. Such towers function less as containers for pigeons than as a working link between the environment, humans and nonhumans, and the land: the pigeons' waste enriches the surrounding fields, and the fields in turn sustain the people who work them, and build dovecotes. A pigeon tower is therefore not a passive shelter but an active participant in this cycle, embodying a biological process in spatial and material form.

The contemporary examples discussed also show that the underlying logic of these structures—coexistence between humans and nonhumans, and material accountability to the land—still has relevance today. Taken together, these cases suggest that vernacular earthen construction has more to offer us than questions merely of preservation. Pigeon towers may operate as spatial and ecological mediators, linking past agricultural practices with contemporary urban and rural settings and reasserting their role within evolving ecosystems in support of diverse and sustainable urban–rural environments.

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