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Reimagining Urban Fabric: Formal Analogies Between Informal Settlements and Ottoman Mahalle

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ABSTRACT

An intriguing formal analogy emerges when comparing the urban fabric of late Ottoman mahalle (residential neighborhood) with the contemporary informal settlements of 21st-century Ankara on urban scale. Despite both embodying a form of organic development, they diverge significantly in terms of urban continuity. While the former is esteemed as a foundational element worthy of conservation, the latter often faces condemnation and imminent transformation. This research posits the existence of a controlled and systematized organicity inherent in the evolutionary trajectory of 19th-century Ottoman mahalle as an archetype, stemming from their regulatory framework. Employing a comparative methodology, this study seeks to offer a novel lens through which to perceive the concept of "informal." Proposing an analogy through morphological analysis between late Ottoman mahalle and contemporary informal settlements, while bypassing considerations of legality, prompts critical inquiry into urban transformation and regeneration processes. To substantiate the analogy between the two urban fabrics, this study endeavors to synthesize the Typology as Themes of O.M Ungers with Caniggia and Maffei's process-based approach to morphological study. Its objective is to generate a three-column matrix comparing the urban fabric typologies of 19th-century Ottoman settlements with contemporary informal settlements and to show typological compatibility between them as well as thematic relation between them. Ultimately, this study reinterprets the building clusters of Ottoman mahalle as urban block typologies as well as the mixed clusters of gecekondu (informal units). Despite their deviation from pure geometric principles, these clusters offer a pathway for transformative processes. Embracing them as urban block typologies presents an opportunity for thematic urbanization rooted in formative analogy, steering away from wholesale destruction. Such formative comparison of urban form holds promise in shifting local transformation strategies towards more sustainable and inclusive urban regeneration through the generative side of thematic typology.

Keywords: Ottoman *mahalle*, informal settlements, typology as theme, urban fabric, urban block

INTRODUCTION: READING ORGANIC SETTLEMENTS

Despite extensive demolitions and urban transformations, a formal connection between distinct urban tissues persists, offering significant insights for future urban design interventions. Existing morphological studies of informal settlements often overlook how these areas adapt to and penetrate existing urban fabrics. Understanding the morphology of informal settlements is crucial for ensuring

a sustainable continuity of urban form. This research posits that there is a meaningful analogy and interconnection between the organic urban fabric of the Ottoman *mahalle* and the *gecekondus* that emerged adjacent to mahalles in Ankara's Altındağ district. By examining these relationships through the frameworks of "organism" (Caniggia and Maffei, 1979) and "Grossform" (Hattasch, 2016), this study aims to demonstrate how informal settlements and historical urban forms can constitute a cohesive whole through their morphological adaptations. This approach raises critical questions about how informal settlements can be integrated into urban design without resorting to total demolition or drastic transformations. The research seeks to address the following questions: *How can we enhance our understanding of the urban morphology of informal settlements to anticipate their contributions to urban development and identify sustainable continuity strategies? To what extent can informal settlements be considered adaptable to existing urban tissues? How can informal settlements be conceptualized in relation to different urban fabrics-historical fabric in this case- irrespective of their legal status? Can a morphological analysis of informal settlements within historical urban contexts offer new perspectives on informality and state-led transformations?* To explore these questions, this study first reviews relevant literature on informal settlements, urban morphology, and the urban history of Ankara. It then conducts a detailed morphological analysis to elucidate the findings.

The Literature on Informal Settlements

The term "informal" refers to settlements that develop outside the formal regulations of a state concerning land tenure, urban planning, design, and construction (Dovey and Kamalipour, 2017). This term also encompasses various labels such as slum and squatter (Dovey, 2012), shanty towns (Rodwin, 2022), popular settlements (Hernandez, 2009) and self-help settlements (Ward, 2015), unifying them under one heading to avoid overlapping meanings (Dovey and Kamalipour, 2017). In summary, informal settlements can be broadly defined as urban areas that have arisen independently of governmental oversight regarding urban design, planning, and construction (Kamalipour and Dovey, 2019: 63).

Numerous scholars have investigated the urbanity of informal settlements through diverse research questions (Roy and AlSayyad, 2004; Neuwirth, 2005; Davis, 2006; Dovey, 2012; Tonkiss, 2013). Despite the advancement of methodologies for examining urban form (Hillier, 1984; Moudon, 1994; Gauthier & Gilliland, 2006; Marshall, 2009; Sima & Zang, 2009; Whitehand, 2009), the morphology of informal settlements has remained largely underexplored.

As Kamalipour (2016) notes, Davis (2006) conducted a typological study focusing on the proximity of job opportunities, which led to the development of a taxonomy of informal settlements. In order to move the gaze from formal to informal in morphoplogical studies, Dovey and King (2011) aimed to define and categorize the typology of informal settlements based on growth processes, including settling, inserting, or attaching. Kamalipour (2016) also investigated the urban interfaces of informal settlements, focusing on their spatial relationships and connectivity to nearby public spaces. McCartney and Krishnamurthy (2018) sought to bridge the terminological divide in the literature between formal and informal settlements by categorizing the morphological structures of slums based on site factors, building typologies, and configurations of circulation space.

These studies show that informal settlements contribute to the sustainability of most developing cities despite their lack of formal regulations (Dovey, 2012). Regarding this, informal settlements show great potential of incremental adaptation within the mixture of different urban fabrics (Kamalipour, 2016). Self-organization is the key and dominant typological mode (Kamalipour and Dovey, 2019) contributing to this adaptation. Furthermore, because of their spontaneous development, they have been considered as “modern vernacular environments” (Lapping, 1973). On the other hand, there is a need of process for the cities to achieve the sustainable mix (Jacobs, 1961), while these settlements develop in the city. Van den Hoek (2008) defines this process as “cyclical transformation”. However, existing depictions of informal settlements are inadequate in capturing the complexity of their morphology, which is necessary to justify and facilitate their cyclical transformation (McCartney and Krishnamurthy, 2018).

Towards a Comprehensive Morphological Characterization of Informal Settlements

A healthy cyclical transformation for a city requires well-organized design interventions. Marshall and Çalışkan (2011) emphasize that poorly described urban morphology can lead to inadequate design interventions. Despite the existence of studies on the urban morphology of informal settlements, the current findings contribute minimally to design interventions, calling into question the methodologies used in these studies. Therefore, this study posits that a morphological characterization synthesizing two different approaches in urban morphology—process-based typology and typological theme—is necessary for a comprehensive understanding of informal settlements.

The development of morphological characterization has been maintained through different approaches (Kropf, 2011). Yet, the roots date back to the study of architectural typology. The idea of the categorization of typologies extends back to Durand, who first, introduced the concept of “model” which is equal to “type”, while systematizing a methodology: cataloging types, classification of formative constraints, and recomposition of constraints (Petruccioli, 1998). Cataloging types, in Durand’s manner, was the categorization of buildings first according to their function (church, temple, theatre), then their geometric and compositional constraints (footprint on: round shape, rectangular shape, horizontals). Following the works of Saverio Muratori, process-based typology (Caniggia and Maffei, 1979) has developed a substantial discourse in morphological characterization that adheres to the concept of urban form as a series of aggregations (Kropf, 2014). Caniggian approach analyzes urban form by representing hierarchical relationships (from part to whole on building footprints, the system of routes/streets, and topography) between and within different districts/towns (Kropf, 2009).

On the other hand, Aldo Rossi (1966) took a step further of Durand’s approach, prioritizing geometric and compositional constraints over function while putting forward the “autonomy” and “persistence” of form through the term “urban artifact” (Marzot, 2014). Rowe and Koetter (1978), furthermore, brought a new perspective through Collage City, which categorizes autonomous urban entities instead of independent buildings, based on their stimulative character in the city (such as memorable streets, stabilizers, the garden, and nostalgia-producing elements). The typological theme (Schrijver, 2021), which Ungers initially suggested and developed under the influence of Rowe (Hertweck and Marot, 2013), has the ability to bring together these concepts under a single heading: "*theme*". The term "theme" is an abstract concept used to encapsulate all initial ideas, illustrations, and content related to an architectural form—whether it be a building, a building ensemble, or an entire city—under a

single analogous figurative object, irrespective of its scale (Güngör, 2022). Although the idea first appeared to categorize architectural elements (buildings) through the term Grossform (megaform), it then began to show up in a kind of morphological characterization of cities (Dialectic City, 1999; City Metaphors, 1982; The City in The City: Berlin as an Archipelago, 1977). To better understand the interaction and typological relationship between Ottoman mahalle and informal settlements in Ankara, a synthesis of typological theme and process-based typology is necessary.

Urban history of Ankara: The Ottoman *mahalle* and informal settlements

As it was already mentioned, this research analyses the interaction between the urban fabrics of Ottoman mahalle and informal settlements, both situated adjacent to each other in the city center, atop two hills separated by the Bent stream (Figure 1).

The Ottoman mahalle plays a crucial role in defining urban form, functioning historically as both a physical and political unit. Cerasi (2001) describes the mahalle as a cluster of row garden-houses organized around a central public building or monument, such as a mosque, fountain, or medrese, with houses aligned along organic, winding streets. The 1924 military plan of Ankara depicts these clusters as distinct urban islands, each corresponding to a mahalle (Figure 1). This representation reinforces the idea that the mahalle can be viewed as a typological unit akin to an organic urban block in Ottoman settlements, underscoring its significance in understanding the urban fabric of historical Ankara.

Although the mahalle's evolution dates to the fifteenth century, the earliest document on Ottoman settlements in Ankara is from 1924, produced for military purposes (Cengizkan, 2004). Despite transformations since the early twentieth century, the urban fabric of mahalle remains recognizable due to planning decisions and conservation policies in Ankara’s history. The first modern master plan of Ankara, Jansen Plan, maintained a deliberate separation between traditional and modern urban fabrics, aiding in preserving the Ottoman mahalle's form (Tankut, 1988). In the 1980s, documentation of Ulus's historical districts and the Ulus Historical Center Conservation Planning Competition (Çakır, Altınöz and Özüduru, 2019) reinforced this separation and heightened awareness of Ottoman mahalle typologies. Although post-2000 regulations have been controversial (Çakır, Altınöz and Özüduru, 2019), the urban fabric of Ottoman settlements has largely retained its historical characteristics, evidenced by street networks, building footprints, urban islands, and plot patterns.

Özdemirli (2019) notes that squatters or "gecekondus" in Turkish, on the other hand, began to emerge in Ankara primarily after World War II, during a period of rapid urbanization and migration. These makeshift settlements, lacking formal planning and infrastructure, were constructed so quickly they were referred to as “gecekondu,” meaning “built overnight” (Özdemirli, 2019). Although many have been demolished, gecekondus represent a significant part of Ankara's housing history. Over time, gecekondus in Ankara have undergone various stages of transformation through informal upgrading, government interventions, and policy changes. These stages include the authorization of demolition, pardoning of existing gecekondus, recognition of their political power and formalization, and eventually the criminalization and demolition of gecekondus as part of urban transformation initiatives (Özdemirli, 2019) (Figure 2). Unconventionally, there was a period when gecekondus in Turkey were formally recognized and granted construction rights, significantly influencing the current

urban form, including building footprints, urban islands, and plot patterns. However, since the 2000s, government policies have re-informalized and demolished many gecekondus, replacing them with high-rise apartment blocks through controversial urban transformation projects.

Regarding the aforementioned information, this research argues that despite the demolition and replacement of informal settlements, there is a clear formal connection between the urban tissues of the Ottoman mahalle and the gecekondus. This connection can inform future design interventions, providing potential insights towards urban transformation strategies.

Figure 1. The images in order: A part of 1924 military map of Ankara (Source: Günel and Kılıcı, 2015:80), figure-ground map of whole Ankara and focus area (Ulus) in 2015).

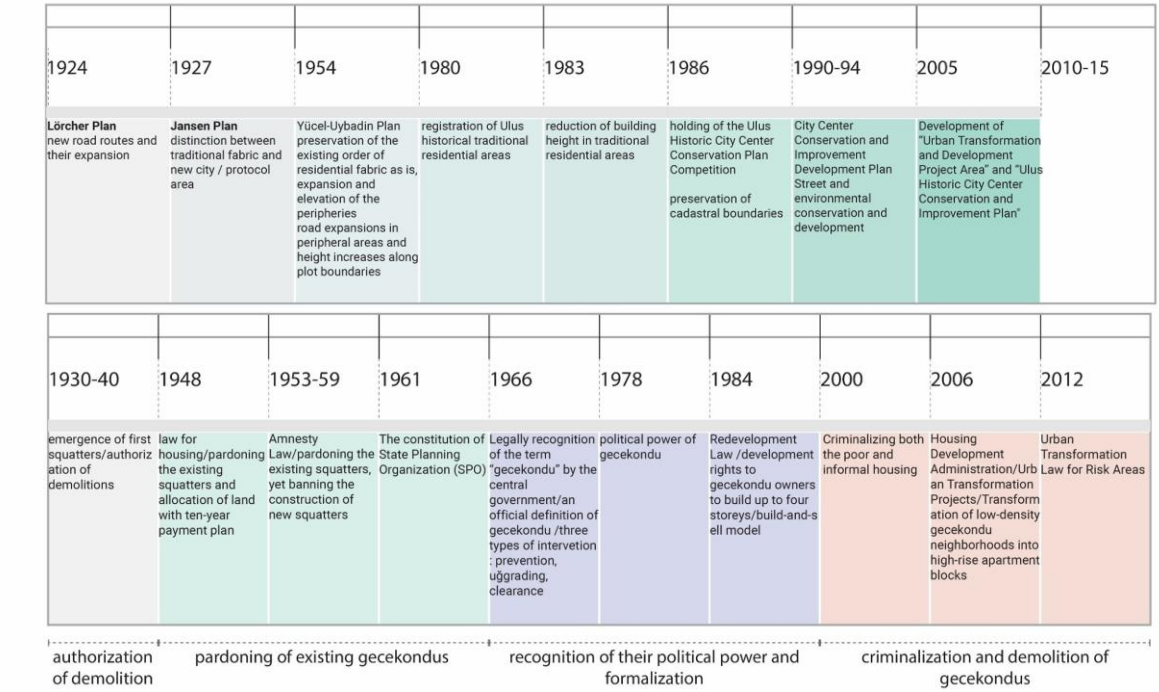


Figure 2. Regulatory timeline addressing the transformation and maintenance of historical and informal settlements in Ankara (Generated by the author. Sources: Tankut, 1988; Cengizkan, 2004; Çakır, Altınöz and Özüduru, 2019; Özdemirli, 2019)

METHODOLOGY : THE SYNTHESIS OF MORPHOLOGICAL APPROACH

To elucidate the formal analogy between informal and historical settlements, this paper posits that a morphological characterization of both informal and historical urban fabrics is essential. Given the variations and ambiguities in morphological characterization within urban form literature (Kropf,

2014), this research aims to synthesize process-based typology and typological theme to achieve a specific objective: thematic and compositional characterization.

The typological theme approach can be observed in a series of Ungers' works, including "Grossform," "Dialectic City," "Architecture as Theme," "The City in the City: Berlin as a Green Archipelago," and "City Metaphors" (Schrijver, 2021). Among these, "Grossform" and "The City in the City: Berlin as a Green Archipelago" provide a clear set of definitions and methodologies, which this study interprets for synthesis. These works refer to "megaforms" not in a literal sense, but metaphorically, as mature forms that have achieved self-sufficient complexity in their geometry and form, regardless of scale (whether a building, an urban block, or an urban district). To achieve thematic characterization, this study adopts Ungers' four criteria of self-sufficient complexity as described via Grossforms*: the presence of an over-accentuated element, a connecting element, the existence of figure and theme, and an ordered principle* (Schrijver, 2021).

The process-based typological approach is employed initially to reveal the ordered principles of informal and historical settlements in Ankara. Furthermore, Ungers' definition of ordered principles is insufficiently clear and can be better described through the hierarchical relations delineated by Caniggia. Consequently, this research adopts Caniggia's compositional terminology and analytical system, focusing on building and street layers: unit, structure, system, organism, and route; matrix route, planned building route, and break-through route.

Although Caniggia's system is inherently applied to gridded settlements, this study extends its application to organic settlements to uncover analogies between the figure and theme of informal and formal settlements. Unlike Ungers' approach-which does not apply scalar hierarchy-, this study synthesizes typological themes and process-based typological methods by thematizing the hierarchical components described by Caniggia (1979) (unit, structure, system, and organism).

The analysis involves the diagrammatic representation of Ottoman settlements and informal settlements in the Altındağ district of Ankara. The morphological characterization is carried out by analyzing six distinct periods using a range of historical data, including the 1924 military map, the Jansen Plan, the 1944 map, the 1953 map, as well as GIS data from 2015 and 2024. Unlike other historical studies of Ankara's urban form, this research does not focus specifically on each planning period. Instead, it emphasizes selected periods that reflect significant changes in laws and regulations concerning gecekondus, aiming to provide clear depictions of the figure-ground data of Ottoman settlements across different periods since founding of Turkish Republic. First, the analysis compares the differences between each period. It then conducts a morphological characterization on various scales (organism, system, and structure) using thematic analysis. To establish an analogy between the formative components on different layers (building footprints and street systems), this study creates a typological sequence matrix, inspired by "The City in the City: Berlin as a Green Archipelago."

RESULTS AND DISCUSSIONS

Results

The initial development of Ottoman settlements exhibits an organic progression in structural scale. However, the typology of these structures cannot be determined due to the lack of information or

maps documenting building development from that period. The Ottoman mahalle, influenced by the steep topography, displays a distribution characterized by a homogeneous structure that shows an *unfolding* distribution. Although the Jansen Plan proposed converting a significant portion of Ottoman settlements into elongated urban blocks, which would have compromised the unfolding nature of these historical settlements as an organism, these plans were not executed. This is evidenced by the 1944 map, which clearly shows the expansion of the settlement, maintaining its original boundaries (Figure 3).

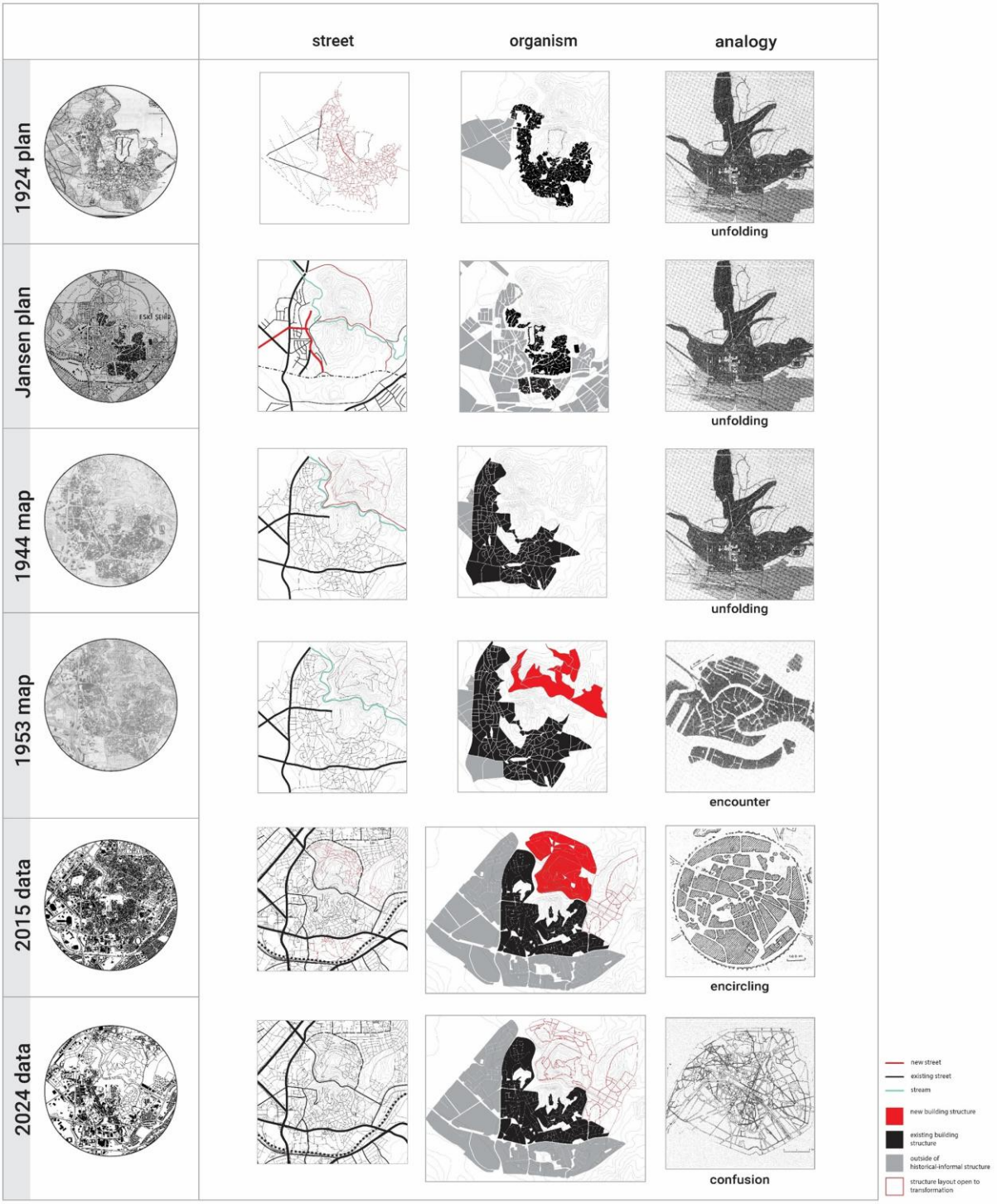
The 1953 map marks the initial emergence of informal settlements on the other side of the hill, which is divided by Bent Stream (Bentderesi). This area had remained undeveloped, likely due to its steep slope. The distinct topography of the small hill and the gradual establishment of gecekondus resulted in the formation of an organism constituted by the meeting of the two halves of the divided hill. While it may seem tenuous to describe this as an encounter solely based on the cellular development of informal and historical settlements, the 1953 map also allows for the observation of the structural and unit development of buildings. The buildings' scales, as elementary units, are remarkably similar in both the informal and Ottoman settlements, which justifies the notion of defining this development as an *encounter* (Figure 3).

The urban data acquired in 2015 indicates that the interaction between the two urban halves reached its own spatial boundaries, which were defined by the lowest sidehill isohips. The topography shaped this urban organism into a distinct encirclement, clearly illustrated in the organism diagram. At this juncture, the southwest half of the hill was predominantly occupied by Ottoman mahalle, while the north half consisted exclusively of informal settlements. The transformation of the southern part into macro-scale dispersed building campuses significantly altered the urban fabric from smaller cells to larger ones, reinforcing the *encircling*. This change is evident in the street diagram, where the street pattern's evolution from the 1953 map to the 2015 data is distinctly observable. The development of informal settlements based on the 1953 map suggested a potential second tangential encirclement. However, this potential was nullified by urban transformation projects initiated in the 2000s.

While the streets emerging in 1953 displayed an organic layout parallel to both Ottoman and informal settlements, a part of (northeast) 2015 street layout revealed a markedly different urban fabric. The building footprints and the large point blocks from 2015 do not exhibit any logical or parallel alignment with the previous urban fabric, indicating a significant shift. By 2024, urban data reveals the complete erasure of the north half of the hill, as buildings were demolished in accordance with urban transformation regulations. Nevertheless, original street layout remains intact. Together with the new street layout on the northeast for the point blocks and demolished north halve, the urban fabric evolve into a state of *confusion* (Figure 3).

Due to the absence of maps showing building footprints from the periods of 1924 and the Jansen plan, a comparative analysis of the structural systems with subsequent periods is not feasible. However, data from later periods provides significant insights into the typologies of mahalle-gecekondu urban fabric. Based on the 1944 map, the Ottoman mahalle was the predominant urban form, whereas a systematic presence of gecekondus was not evident at that time. The urban systems displayed an organic layout, with the elementary units—historical Ottoman housing—exhibiting a recurring pattern. This repetition creates what Pettruccioli (2007) describes as an "*occasional seriality*," where

the organic layout of each mahalle is interspersed with repeated units, forming a serial system. In contrast, the gecekondus did not conform to either an organic or serial group layout. Instead, they



were sparsely scattered along the isohips on the hillside, lacking any cohesive pattern (Figure 4).

Figure 3 Transformation matrix of the morphological relationship between the traditional mahalle and the gecekondu in Ankara over time. (Diagrams generated by the author based on maps. Source: VEKAM Locloud Collection, TU Berlin Data Collection)

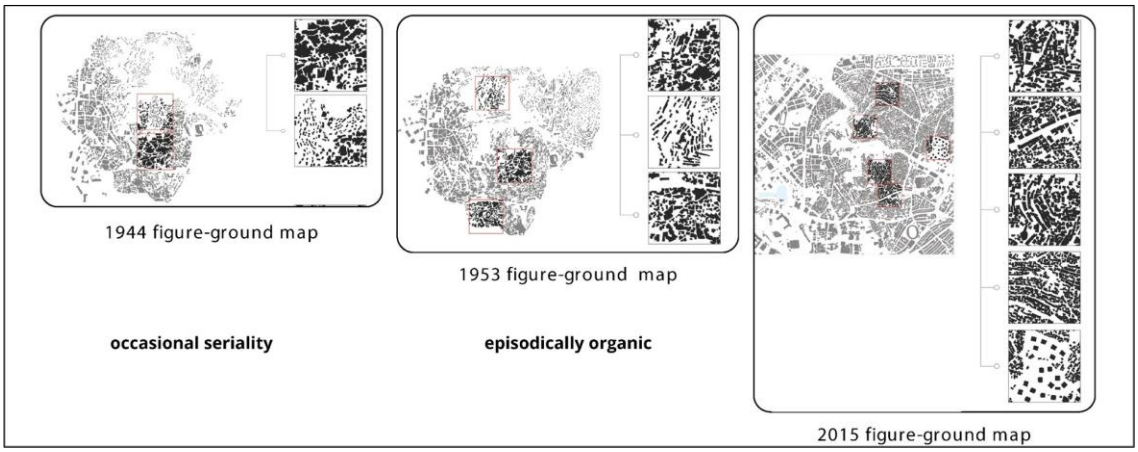


Figure 4. Structural systems of mahalle and gecekondu over time

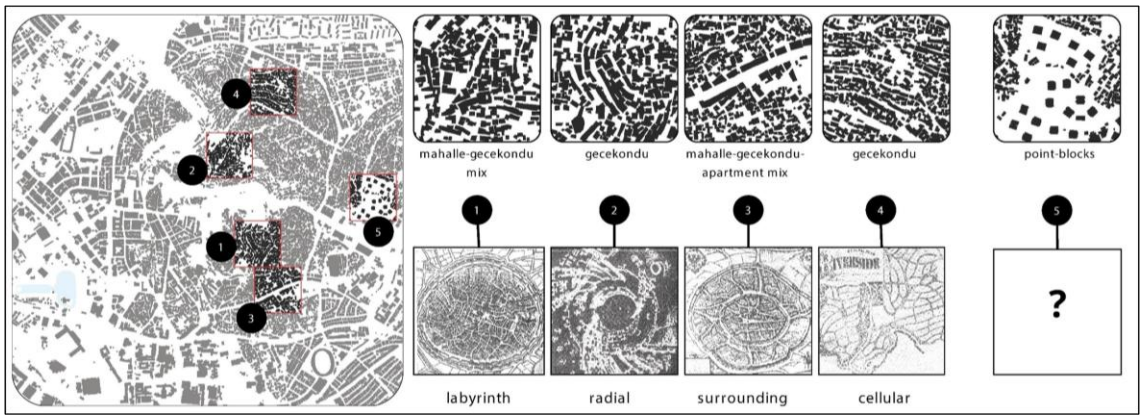


Figure 5. Morphological comparison of the structural systems of the mahalle and gecekondu in 2015

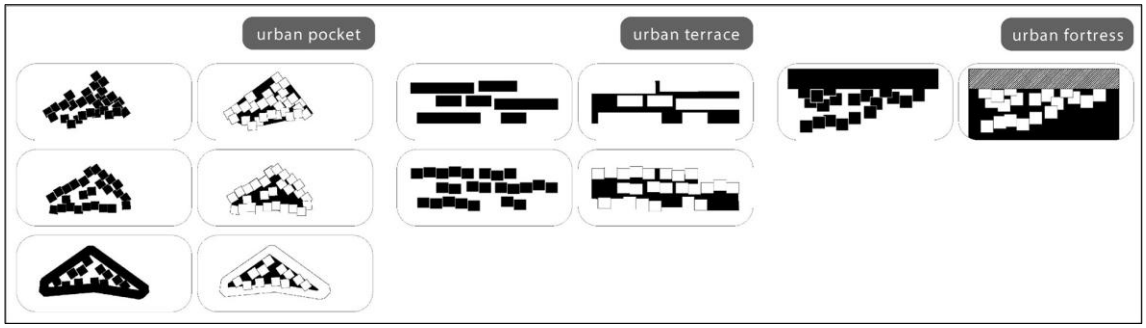


Figure 6. Potential transformative themes of elementary structures derived from the morphological combinations of mahalle and gecekondu units

The 1953 map reveals that the Ottoman mahalle maintained its characteristic occasional seriality, while the gecekondu units began to penetrate the organic layout of mahalle cells on the southwest half of the hill. Initially scattered on the north half, the gecekondu units started forming a serial repetition by attaching to each other linearly along the isohips. This development suggests the emergence of a new structural typology, which Pettruccioli (2017) refers to as "*episodically organic*." In this context, the elements themselves reflects organic growth patterns but occurs in distinct episodes rather than as a continuous process. This hybrid form represents a significant shift from the purely organic or scattered layouts observed in earlier periods (Figure 4).

The 2015 data indicates that the density of gecekondus and their structural system reached a level where the two halves of the hill could be perceived as a unified organism, characterized by similar unit and structure scales in the urban fabric. However, there are nuanced differences between the systemic composition of gecekondus and Ottoman mahalle.

The linear aggregation of gecekondus on the northern hillside resulted in the emergence of a *cellular* structure. In contrast, on the southern hillside, the aggregation of gecekondu units produced a *radial* structure. The Ottoman mahalle meanwhile, maintained its occasionally serial structure with the encroachment of gecekondu units, leading into a mixed structure which can be interpreted as a *labyrinth* form. The modern linear apartment blocks constructed since the 1957 Yücel Uybadin Master Plan of Ankara thickened the boundaries of Ottoman mahalles along the lowest isohips of the southern half of the hill (now Ulucanlar Avenue). This thickening can be interpreted as a *surrounding* form, reinforcing the concept of encirclement and emphasizing the reading of the hill as a single organism composed of Ottoman and informal settlements (Figure 5).

High-rise point apartment blocks, constructed adjacent to the hillside border, on the other hand, do not generate a consistent typology with either the Ottoman or informal settlements, nor with the rest of the city (Figure 5). These high-rises were intended to relocate gecekondu residents from the northern half of the hill, but their vague typology caused significant ambiguity after 2015, effectively resetting the urban fabric of the organism to its initial state when half of the hill was empty. This regression is clearly shown in the 2024 urban data.

On the other hand, the elementary structures of the aforementioned forms—namely the mix of gecekondu-mahalle, apartment-mahalle, and gecekondu structures—exhibit variations in spatial identities that can inform future urban transformations. They also highlight the significance of the spatial themes created by these structures within the urban context. The combination of gecekondu-mahalle can be interpreted as an urban pocket, offering potential access points to an organic block that can accommodate urban activities in spatially dynamic ways for future transformations. The elementary structures composed solely of gecekondus reveal a terrace configuration, which can be seen as urban terraces ripe for future interventions. Moreover, the combination of mahalle, gecekondu, and apartment structures generates a theme reminiscent of a fortress, where gecekondu-mahalle units are integrated with thick substantial apartment buildings. This arrangement conceals the organic open spaces between the gecekondu-mahalle units that lie behind the apartments. Thus, this configuration can be interpreted as an urban fortress that opens up to open-air activity spaces, providing opportunities for future interventions (Figure 6).

Discussion

The synthesis of typological theme and process typological approach while analysing the informal and ottoman settlements reveal several facts in organism scale. Regardless of their legality and the occurrence of demolitions, the aggregation of gecekondus generates a distinct urban tissue. This urban tissue shares significant similarities with Ottoman settlements, with minor differences at the structural scale, resulting from historical preservation implementations. According to Petruccioli (2007, p.184), different urban typologies can be integrated into a cohesive whole if they respect and

adapt to each other's spatial logic, leading to typological compatibility. This compatibility is evident at both macro and micro scales when comparing Ottoman and informal settlements.

The analysis reveals five distinct typological themes concerning the reciprocal formation of Ottoman mahalle and gecekondu urban fabric on a macro scale: ***unfolding, encounter, encirclement,*** and ***confusion***. Up until the theme of confusion, the temporal transformation of these typological themes shows how the interconnection between Ottoman mahalle and gecekondus adapts over time, culminating in an encirclement. This adaptation is also evident in the encroachment of gecekondus into the inner courtyards of Ottoman mahalle urban blocks. Thus, gecekondus not only dominate the northeast half of the hill but also penetrate the structural system of the Ottoman mahalle. Comparison of conservation timeline and urban fabric analysis reveals this fact clearly.

The analysis of both mahalle and gecekondu reveals notable similarities and differences. On an urban scale, the elementary units and their structural systems share similarities, while the structures of these elements exhibit slight differences. Both Ottoman houses and gecekondus are nearly identical in proportion, contributing to their similar appearance. However, the aggregation patterns of elementary units to constitute a structure differ: gecekondus align linearly along the isohips without providing interior courtyards between buildings, whereas Ottoman houses follow a trapezoidal arrangement along the street edges, adhering to the primary property distribution layout established during Ottoman times. This consistency in following plot edges is likely rooted in Ottoman regulations regarding house construction.

Despite differences in structural organization, both systems exhibit an organic pattern. This research posits that the steep slope of the hill significantly influences this similarity. From this perspective, the research suggests that the spontaneous consciousness emerging during the Ottoman period and after the 1950s, when gecekondus were constructed, shares a similarity. Both periods emphasize topography through the organic system, highlighting the impact of the hill's topography on the settlement patterns. However, there is a key distinction: in the evolution of Ottoman mahalle, the street and plot patterns were established first, whereas in the evolution of informal settlements, construction of gecekondus played a primary role with street patterns developing subsequently. This causes an essential difference in structural formation within the two halves of the hill.

Regarding these observations, the primary difference between Ottoman and informal settlements lies in the emergence of their elementary structures. The elementary structure of an Ottoman mahalle adheres to a set of rules that create defined street edges and internal courtyards, contributing to consistent spatial qualities. In contrast, gecekondus do not follow a prescribed pattern but instead develop organically in response to natural conditions, resulting in a lack of consistent spatial quality. Yet, since they follow the isohips in different levels, there is a recognizable radiality that offers a potential spatial quality for future urban transformation. From this perspective, this research asserts that, despite its organic nature, the occasionally organic structure of the Ottoman mahalle creates a type of organic urban block with distinct spatial qualities, which is not clearly visible/differentiable in informal settlements.

Another vital fact concerning the difference between occasional seriality of mahalle and episodically organic structure of gecekondu is related to the consistency of the elementary unit types: the Ottoman house and the gecekondu. Despite the similarity in unit scale, gecekondus lack a repeating unit type

at the architectural level because they were constructed independently and without mastery. Conversely, the Ottoman house has consistent types—with features such as cumba/loggia, avlu/internal courtyard, and two-storey construction—that exhibit synchronic variations across the southwest half of the hill. Regarding these findings, this research asserts following points that could be important to understand formative relations between Ottoman and informal settlements:

1. There is a **typological compatibility** between ottoman and informal settlements despite the differences arising from the system of evolution.
2. The informal urban tissue composed of gecekondu generates **an encroachment tissue**, which generates a mix of gecekondu-mahalle units with thematic potentials for urban transformation strategies.
3. Gecekondus create a distinct urban fabric alongside mahalles, which helps define the combined characteristics of Ottoman and informal settlements. This composition reflects four principles of Ungers' Grossforms: a) the presence of an over-accentuated element, represented by organic urban blocks formed by a mix of gecekondu and mahalle units; b) a connecting element, such as the isohips of the topography; c) the existence of both figure and theme, characterized by encircling and interlocking elements; and d) an ordered principle as organic serial development. In this context, the interconnection of mahalle and gecekondu structures on either side of a hill can be seen as a unique **Grossform**. The typological compatibility and overlap of informal urban fabrics further support the concept of Grossform by weaving together Ottoman mahalle and gecekondu urban elements.
4. Typological thematization of urban tissues offers **new compatible urban transformation strategies** for future implications on different scales (organism, system, structure), which brings a new perspective to the continuity process of informal settlements through a formative approach.

CONCLUSIONS

In conclusion, this research elucidates the morphological parallels between Ottoman mahalle and gecekondus in Ankara, revealing a typological compatibility that transcends their legal and historical differences. Despite the challenges posed by urban transformation initiatives, the study shows that both settlement types share a consistent spatial logic influenced by the topography of the hills they occupy. The synthesis of process-based typology and typological themes provides a nuanced understanding of these urban fabrics, offering a framework for future urban interventions that respect and integrate the spatial qualities of both formal and informal settlements.

By identifying five distinct typological themes—unfolding, encounter, encirclement, and confusion—this research underscores the dynamic interaction between Ottoman and informal urban forms. These themes highlight the potential for creating a cohesive Grossform, referred to as the Encircling-Interlock form, integrating different urban typologies into a harmonious whole. This compatibility suggests new avenues for urban transformation strategies that can enhance the continuity and sustainability of informal settlements, leveraging their inherent adaptability and spatial coherence.

Due to the scale and detail of accessible data, the morphological characterization is limited to the organism, system, and structural scales, omitting the elementary scale, which requires detailed floor plans. Additionally, the plot patterns are not clearly visible in the maps used, leading to an oversight

of this aspect. Future analyses should aim to integrate plot patterns for a more comprehensive morphological characterization. The findings of this study suggest that understanding the Grossform of informal and historical settlements can be beneficial for future urban transformation projects, especially in areas like Altındağ where remnants of street layouts and some gecekondus are still recognizable. Moreover, reading informal settlements through their typological compatibility could contribute to a global understanding of informal settlements, potentially redefining the term "informal" in morphological studies and emphasizing its value in design developments and interventions. Ultimately, recognizing and preserving the formal connections between historical and informal urban tissues is vital for developing more inclusive and sustainable urban environments. This study advocates for design interventions that build on the identified typological themes, promoting a more holistic and integrated approach to urban transformation in Ankara and similar contexts.

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