Urban tissues and residential types in Cuenca (Ecuador)

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Abstract. *Architecture, and particularly the architecture of housing, has been critically important in the history of humanity; however, its analysis has not often addressed all of its complexity. There is a need to understand the built structures as a fundamental component of urban form and their historical evolution as the result of a dialogue with the city as a whole. In this context, and to contribute to this analysis, this paper discusses how urban tissues and residential types emerged during the twentieth century in the city of Cuenca (Ecuador). A two-stage qualitative and exploratory methodology was used: a) the identification of urban tissues related to residential uses that, jointly with the compilation and analysis of historical maps, allowed the understanding of the city's overall evolution; and b) the documentation of residential building types through the analysis of databases and historical archives that provided 221 case studies. From this, seven residential types were defined: Courtyard Houses, Houses on Steep Slopes, Compact Houses, Urban Villas, Attached Houses, Row Houses, and Residential Blocks. All types appear or evolve adapting to the conditions of the city, the changing needs of society, the external influences, and based on the form of their predecessor.*

Keywords: residential building types, urban tissues, urban fabrics, urban form, Latin America, residential building types

Introduction

Many authors have recognized housing as an important constituent of the transformation of humanity and have underlined how the study of residential building types contributes to the understanding of social needs (for example Bellal, 2004). However, the analysis of architectural transformations has not often been addressed in all its complexity. The traditional understanding of the history of architecture as a succession of styles does not encourage critical thought about the future of the discipline. There is a need to understand housing as a fundamental component of urban form and its historical evolution as the result of

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a dialogue with the city as a whole (Philippou, 2015). Residential building types are inseparable from urban tissues, and they constitute the main form of connectivity between private terrain and public networks (Dovey and Wood, 2015). The study of residential building types thus emerges as a response to the necessity of filtering the complexity of a city through a formal language that operates as a tool for the analysis of urban design (Dovey and Wood, 2015).

This work, on the one hand, debates the urban elements related to the housing process through the analysis of urban tissues, which are key for urban morphology (Kropf, 2011), since they provide an essential foundation for understanding the structure and complexity of the built environment; and, on the other hand, analyzes housing transformation through the recognition of residential types generated within different urban tissues. This twin approach makes it possible to relate the physical evolution of the city to its main social events, since urban tissues display not only physical properties but also social, political, economic and cultural particularities (Kostof, 1992; Muratori, 1959).

Specifically, this paper discusses how urban tissues and residential types emerged and evolved during the twentieth century, in the Ecuadorian city of Cuenca. This scope allows analysis of the historical evolution of residential buildings by emphasizing sets of descriptive categories that define the spatial characteristics of buildings through time. Therefore, it was possible to observe the historical origin of building types and explicitly relate it to the social processes of the city, not solely to its spatial manifestation, style or aesthetic notions as is normally the case (Remali *et al.*, 2016).

Study area

Cuenca is located in the southern Andean region of Ecuador. It was founded in 1557 by Spanish colonists, on the site of the Inca city of Tomebamba. The city has a population of approximately 330 000 (Instituto Nacional de Estadísticas y Censos, 2010), which makes it the third most populous city in Ecuador.

The first half of the twentieth century was defined by geographical isolation, due to the deplorable condition of the roads, where indeed they existed (Lloret, 2015), and the slow development of the national railway system, which never reached Cuenca. During this period, the city's economy was based on the export of quinine and Panama hats; which improved the previous economic instability of the city. This economic growth became visible in the urban landscape, where there was an evident French influence in housing development, particularly in façade design, which reflected the city élite's desire to demonstrate their recently-acquired wealth. Moreover, the economic growth produced by the export of Panama hats allowed the introduction of motorized vehicles. However, this growth was restricted to an élite group, which produced social tensions.

Between 1930 and 1950, the city's population shrank due to migration towards the coastal cities; and, during the second half of the century, the aftermath of the Second World War brought a reduction in the export of Panama hats. Nonetheless, towards 1950, the city's urban landscape was permanently transformed, not only in terms of population growth but also in its overarching territorial expansion (Figure 1). Industry, rural-to-urban migration and the investment in road infrastructure became the main factors in this transformation (Armijos, 2010).

In 1960, Ecuador's turn towards oil export strengthened the city's economy. Moreover, the government promoted housing projects in Cuenca's expansion zones. During the 1960s and 1970s, the city's connectivity was also improved due to the introduction of television, which marked the end of its isolation. While social tensions continued to rise, during the 1970s and 1980s a wave of migration resulted in the relocation of thousands of inhabitants to foreign countries such as the United States, a situation that produced a cultural hybridity and a certain dependence on the remittance money sent to their families by the emigrants. Finally, in 1982 the city was declared part

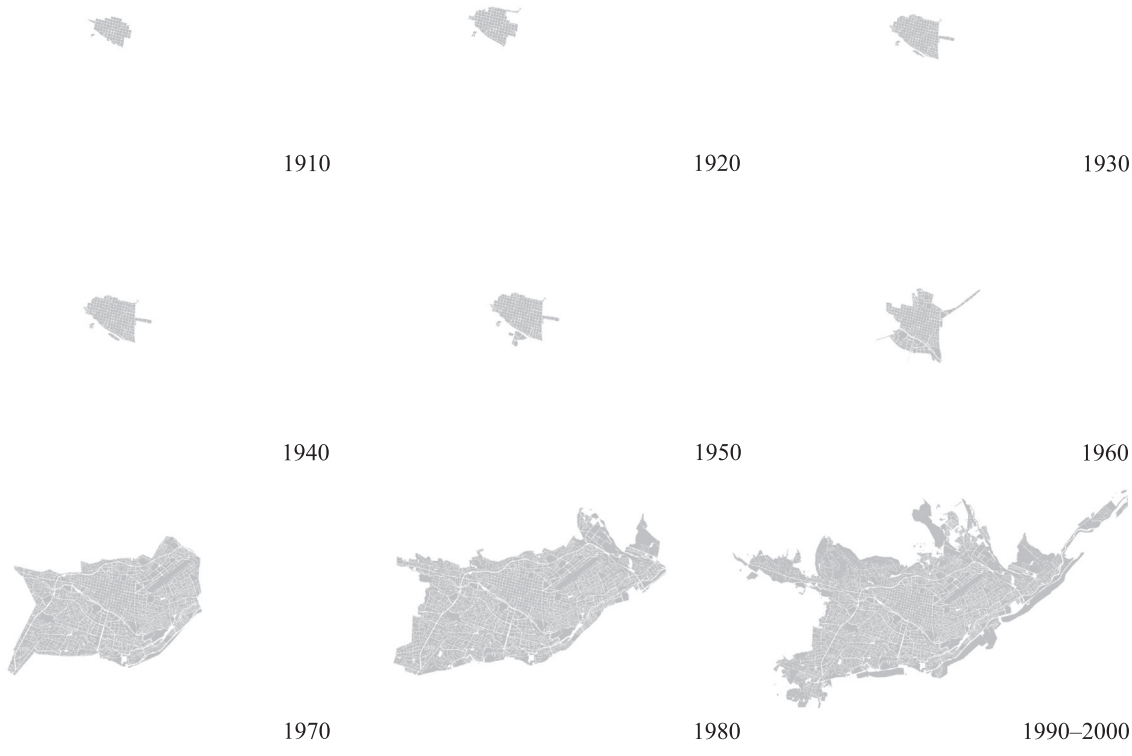

Figure 1. Cuenca's urban expansion during the twentieth century.

of the National Heritage, which produced an appraisal of the city's historical buildings and, in 1999, inscription in the UNESCO World Heritage List.

Theoretical background

The definition of the word 'type' appeared during the eighteenth century and its meaning has subsequently been transformed by philosophical and social connotations. The term 'typology', on the other hand, appeared during the nineteenth century, referring to the study of types, which included comparative analysis and the classification of characteristics (Mauro, 1985). One of the most popular and classic concepts of type in urban morphology comes from Caniggia and Maffei (1979, 1984), who defined it as a collective heritage that operates as a code for those that edify and experiment on what has been built. The transformation of types is a dynamic process that develops according to the evolutionary paradigms of each particular society (Remali *et al*., 2016). According to the characterization of the Italian School of design typology, of which Gianfranco Caniggia (1933–1987) was a leading member, a 'type' is the result of precedent and existing forms and their adaptation are the starting points for new 'types'. Whitehand *et al*. (2014) assume that the manifestation of a large number of new 'types' frequently occurs as the product of socio-economic events that become fundamental for its analysis in conjunction with their spatial manifestation.

Following this premise, as Güney (2016) comments, other authors have criticized the traditional conception of 'types' because it has caused a crisis in the historical process of, for example, modern architecture that, for non-experts on the subject, was thought of as creating an easily-repeatable appearance without any new cultural added value. Typological studies should, therefore, not be understood

only as tools for the development of new 'types', but rather as a way of facilitating the understanding of the historical processes that form them.

Change occurs through a series of morphological periods characterized by the introduction and diffusion of new forms, new street layers, building types and architectural styles that are then 'reproduced over variable amounts of time [. . .] before being succeeded by different predominant forms in the next morphological period' (Conzen, 1960, pp. 6–7; Whitehand, 1987, p. 65). Towards the end of a morphological period, and at the beginning of a new one, both old and new forms coexist (Whitehand *et al*., 2014). So transformation occurs when the new needs of a society cannot be met by adapting old forms, but require their replacement with new ones. Morphological processes create morphological periods that are visible in the new distinctive forms of the built environment and respond to the needs of a society at a specific period (Conzen, 1969).

Furthermore, the manifestation on the ground of large numbers of a new type frequently has to await a major socioeconomic event (Whitehand, 2014). Kropf (2011) states that the production of urban form is fundamentally a social and cultural process, which is the sequence of deliberate acts undertaken by organizations and individual people. Thus it is clear that social implications are embedded in urban tissues and housing types since they result from the interaction of several combined social, cultural and economic factors over a long period; reflecting the conditions of various periods (Han, 2015).

Methodology

This study is based on qualitative methods: archive analysis and observation. It was executed through the analysis of publicly-available photographs, databases and maps that provided historical information about the city and its houses built during the twentieth century. The research was structured in the following stages:

a) Identification of urban tissues

Wheeler (2015) identified 27 types of urban tissues through a visual analysis of 24 cities around the world (including cities in North America, South America, Europe, Asia, Africa, and Oceania). In broad terms, this classification highlights the importance of street patterns, which was the key consideration for urban landscape typologies; however, land use was an important secondary factor since it significantly influences the look and feel of a place, evolving jointly with form (Wheeler, 2015). More specifically, Wheeler's classification of urban tissues emphasized a) street and block patterns; b) parcelization and land use; c) building form, scale, and placement on lots; d) street and parking design; and e) relationships between green and grey landscape elements. Wheeler recognized the variation of each urban tissue type worldwide; nonetheless, despite such variations, other significant features remain the same to constitute distinct types of built landscapes.

In Cuenca, specific tissues have been identified (Hermida *et al*., 2019), from which only the nine related to housing were included for analysis (Table 1). It is also important to emphasize that a classification based on several cities worldwide enables the local tissues of an individual city to be related to the international context. In this stage, historical maps published by Albornoz (2008) were also analysed to understand the city's development in relation to its urban tissues. Geographical, historical and graphic information regarding the streets, plots, and the location of the buildings was gathered. Maps were examined and those that contained uniform representation and symbols with historical relevant information were selected.

b) Identification of residential types

The information regarding residential buildings in Cuenca was compiled from the University of Cuenca's archive of theses related to the history of the city and its architecture, as well as relevant historical publications.

Table 1. Twenty-seven worldwide tissues (Wheeler, 2015) and selected tissues in Cuenca

Selected tissues in Cuenca	Similar to selected tissues	Discarded tissues not related to residential buildings	Tissues not found in Cuenca
1. Apartment Blocks	10. Garden Apartments	15. Workplace Boxes	22. Long Blocks
2. Incremental Mixed		16. Malls & Boxes	23. Hillside
3. Organic	11. Loops & Lollipops	17. Cemetery	24. Civic
4. Quasi Grid	12. Alliterated Grid	18. Heavy Industry	25. Allotment Gardens
5. Rectangular Blocks		19. Commercial Strip	26. Trailer Park
6. Rural Sprawl	13. Country Roads	20. Campus	27. New Urbanism
7. Upscale Enclave		21. Airport	
8. Urban Grid			
9. Garden Villas	14. Garden Suburbs		

Initially, 76 theses were selected, from three departments: Urbanism and Architecture (70), Engineering (1) and Philosophy (5); and 13 relevant historical publications were chosen, which included private publications, public documents, magazines, and books published by the city council.

A total of 218 houses was identified in these documents. Nevertheless, only 116 were chosen for analysis because they were still in existence and graphical and geographical information was available for them. These selected houses were geographically located using a GIS tool, were chronologically organized in a timeline and were correlated with historical events and maps**.** The identification of housing types consisted of systematic observations focused on finding strong similarities and differences in terms of location, chronology, origin, relationship with the urban environment and form.

Results

The relation between historical periods, urban tissues, residential building types and socioeconomic conditions is shown in Table 2.

Urban Grid, Quasi Grid, and the Courtyard House and the Compact House types

The Urban Grid began with the foundation of the city in 1557 (Figure 2). It comprises small blocks with varied land uses. This geometric organization of urban space, called *damero*, contains the Courtyard House type, predominant during the first half of the twentieth century. The residential buildings belonging to this type are attached, and have a direct relation to the street that differed with the presence or absence of porches. These houses have interior courtyards that define the spatial configuration; symmetrical façades with ornaments and organic lines; and show a clear European influence that, however, did not affect the overall urban form.

The Quasi Grid tissue (Figure 3) began to consolidate with a street pattern that was basically regular, but with some irregularities due to topography, design or incremental development. The first Quasi Grid areas were the expansion areas of the city at the borders of the Urban Grid. Development in these edge zones encountered differences and limitations, especially related to topography. A significant part of this tissue still held the Courtyard Type but it also allowed the rise of a new type, the *Compact House.* This took several characteristics of its predecessor – the *Courtyard House* – since its location features were alike, but it adapted to the new influences of the Modern Movement. This type emerged as an attached house, less ornamented, with straight lines in the façade, flat concrete roofs and an interior yard that eventually disappeared at the beginning of the 1960s because of the demand for space for garages and commerce.

Table 2. Urban tissues and residential building types in Cuenca in the 20th century

Historical periods	Urban tissue	Residential building types	Socio-economic conditions
From before the 20th century to 1950	Urban Grid Quasi Grid	*Courtyard House*	Geographical isolation. Lack of communications and connectivity.
	Organic	*House on Steep Slopes*	No architects. Slow city growth.
From 1940 to the end of the 20th century	Urban Grid Quasi Grid	*Compact House*	Influence of international urban planning. First architects start working in the city.
From 1950 to the end of the 20th century	Organic Garden Villas Rural Expansion Upscale Enclave	*Urban Villa*	Consolidation of expansion areas. Better communication and connectivity, therefore more external influences.
From 1970 to the end of the 20th century	Mixed Incremental Organic Rectangular Blocks Apartment Block Rectangular Blocks	*Attached House* *Row Houses* *Residential Blocks*	Important growth of the city. The country's economy improves due to oil exports and social housing projects emerge.

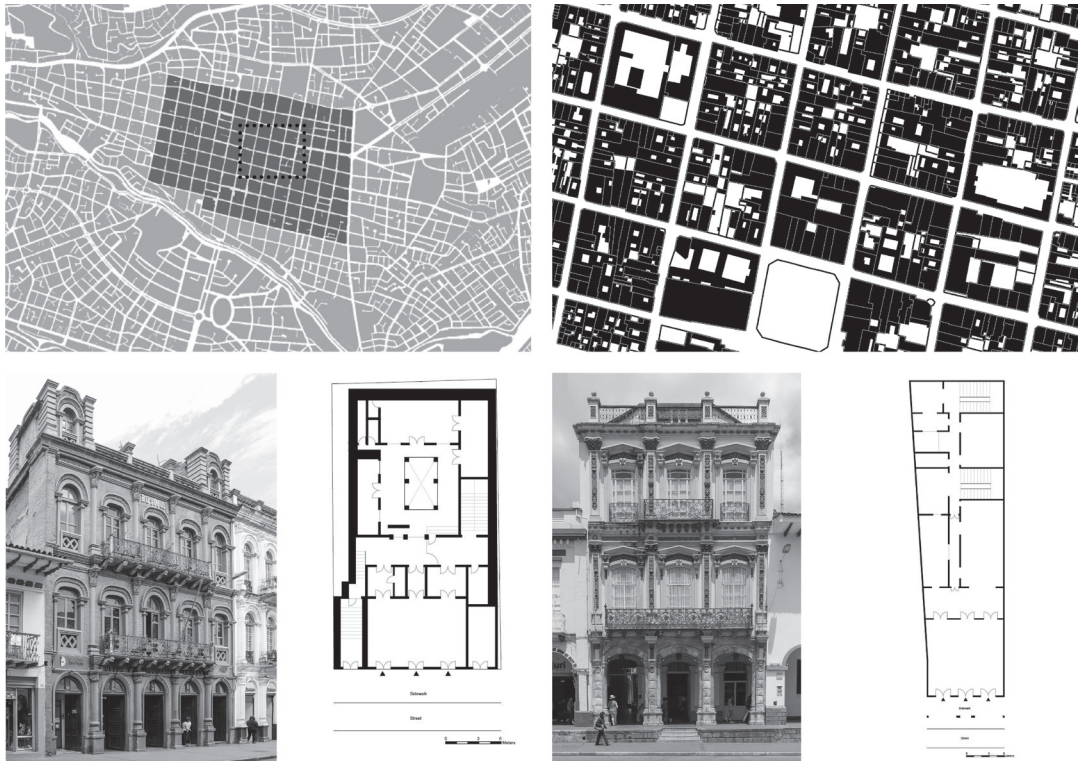

Figure 2. Urban Grid. Left: the *Courtyard House* without porch: Sojos House, 1907. Right: the *Courtyard House* with porch: Mata House, 1909.

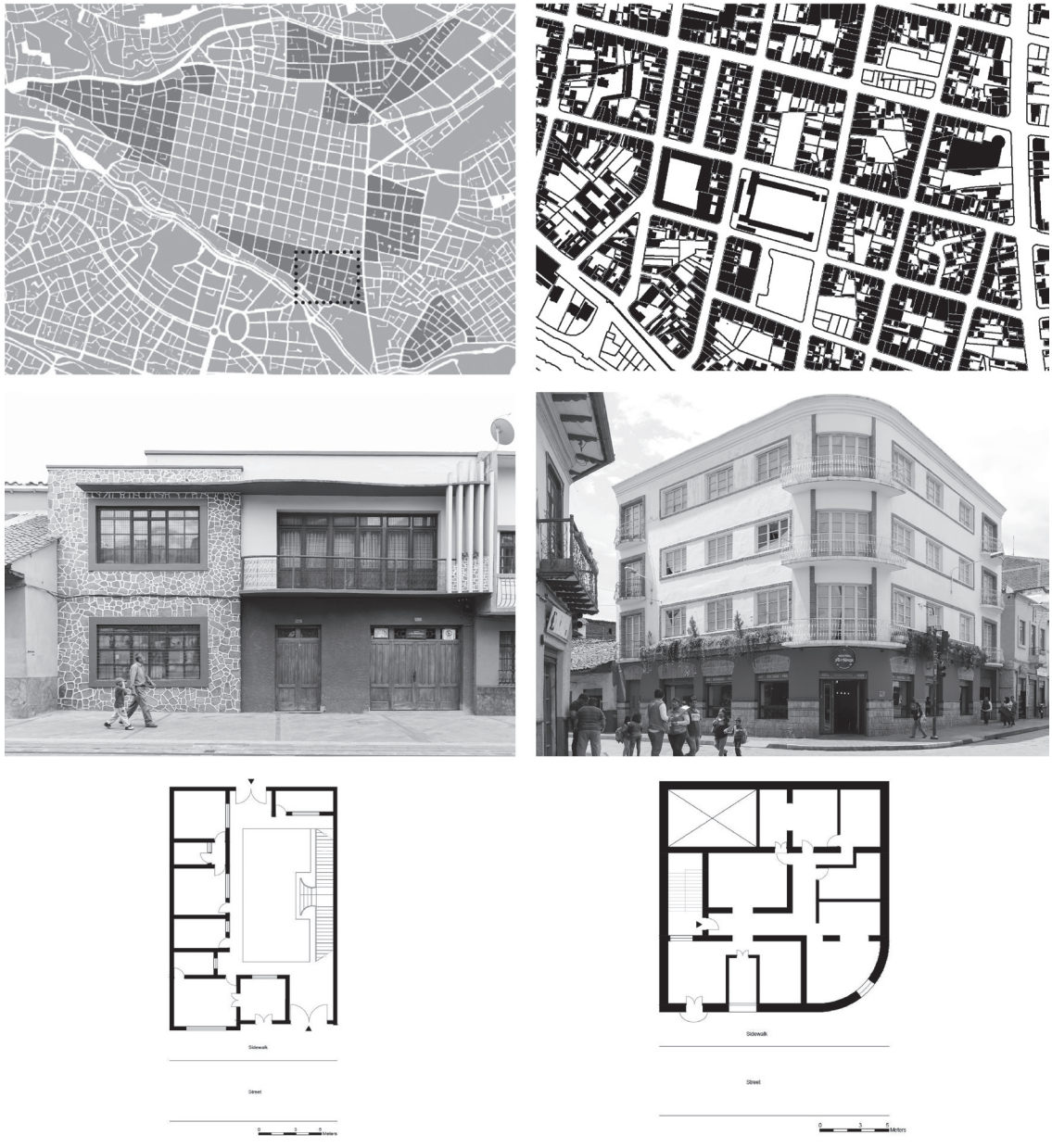

Figure 3. Quasi Grid. Left: the *Compact House* with courtyard: Aguilar House, 1956. Right: the *Compact House* as a multi-family building: Coronel House, 1952.

Small buildings for apartments also emerged and took the characteristics of the *Compact House*, embracing the need to accommodate diverse families in a common area but assuring their privacy.

Organic tissue and the House on Steep Slopes

The Organic tissue is characterized by street patterns that are often curvilinear, adjusting to the topography (Figure 4). In Cuenca, it is strongly influenced by the urban rivers, especially the Tomebamba River, which divides the city in two major sections characterized by their different levels. The interface between the city and the river conditions the characteristics of the built environment: the blocks take organic forms and the houses are built adapting to the natural slope of the plots without the courtyard, which was the main housing

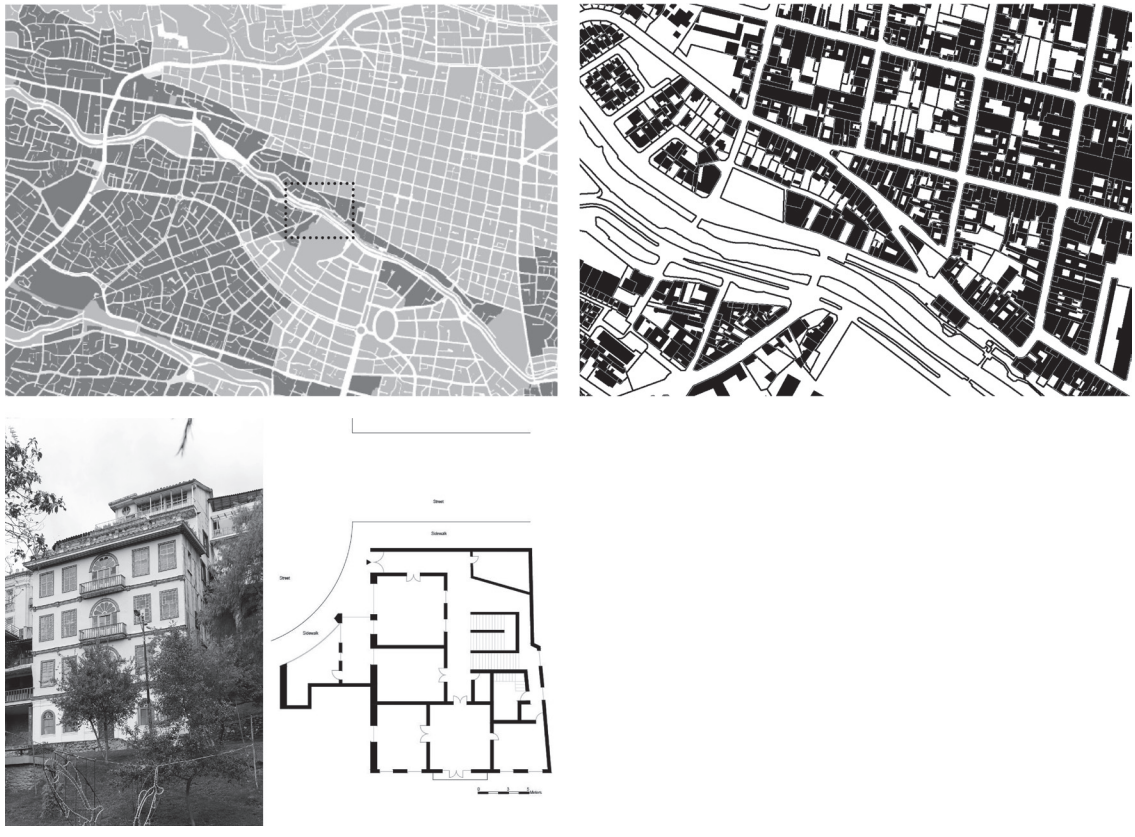

Figure 4. Organic tissue and the associated *House on Steep Slopes*: Casa de los Arcos, 1904.

element at the beginning of the twentieth century. This type is termed the *House on Steep Slopes*.

Garden Villas, Organic tissue and the Urban Villa

Urban plans began to be important from 1950 and promoted both the expansion of the city into little-inhabited areas in the borders, and the social segregation of residential areas. Consequently, new tissues and new city lifestyles developed. The *Garden Villas* (Figure 5) comprised independent dwellings along well-connected curvilinear streets with considerable vegetation. This tissue shows the influence of suburban designs in developed countries, with longer distances to downtown and larger gardens, and is characterized by the presence of the *Urban Villa* type, comprising isolated houses on large plots.

The key element that favoured the appearance of these isolated houses was the urban expansion caused by rural-urban migration, which was related to the growth of the industrial sector and the investment in road infrastructure (Armijos, 2010). Similarly, the implementation of urban-territorial plans and ordinances reshaped the form of the city in this period. An example is the main urban plan known as *Plan Regulador de la Ciudad de Cuenca* proposed by Gilberto Gatto Sobral in 1947. Although this plan was not implemented, it influenced both the alignments of some important avenues and the city zoning. It linked Cuenca with global modernity through the promotion of highway construction, giving solutions to the problems of increasing numbers of motorized vehicles and the garden city, since it suggested large plots for isolated houses with gardens.

In this context, the *Urban Villa* type emerged, influenced by the Modern Movement and the

Figure 5. Garden Villa tissue. *Urban Villa*: Vázquez House, 1962.

newly-created necessities of urban life that demanded new spaces. This type is characterized by the elimination of ornament; straight lines dominating façades, flat concrete roofs, and less-compact floor plans; however, over time it took different characteristics and incorporated local materials and sloping roofs. Urban Villas were also present in the Organic tissue (Figure 6); which, from the 1960s onward, became the dominant tissue.

Rural Sprawl, Upscale Enclave and the Urban Villa

The Rural Sprawl tissue (Figure 7) has very large plots but these are not densely vegetated; they are mostly single-family houses ranging from one to three floors. This tissue responds to the geographic conditions of the place; it has been present throughout the history of the city and has been transforming into other urban fabrics. It contained different types of rural houses that have transformed on smaller plots with urban houses. These are agricultural or forest areas where the new buildings appear piecemeal and do not always respect the building construction regulations.

This Rural Sprawl tissue has favoured the appearance of *Urban Villas*, many of which are located in gated communities, which form Upscale Enclaves (Figure 8). These are prosperous residential landscapes, planned or developed progressively with exclusive single-family, detached houses of medium to large size. In Cuenca, these fabrics emerged in the last decade of the twentieth century, and are now very common. Gated communities exacerbate social segregation because they privatise public space and the presence of high walls and closed doors prevents free movement and the connection with the public road network.

Figure 6. Organic tissue. *Urban Villa*: Carvallo-Vega House, 1977.

Incremental Mixed, Organic and the Attached House

The *Attached House* is the dominant type in Cuenca, although it is poorly-studied due to its perceived low architectural quality. These houses are mostly located in the Incremental Mixed (Figure 9) and the Organic tissue (Figure 6) areas. The Incremental Mixed tissue contains mainly single-family dwellings; although it also has some multifamily buildings, shops, light industries, and small plots. It originated in the 1970s when the city began to expand.

Rectangular Blocks, Apartment Blocks, Row Houses and Residential Blocks

The urban expansion of the 1970s resulted from wealth generated by oil exports. This allowed the increase of urban tissues such as the Rectangular Blocks (Figure 10) as an attempt to provide housing for poorer people. This tissue is residential with small-scale retail stores located along the main routes; it has homogeneous plots and mainly single-family houses but with some multifamily buildings.

It contains *Row Houses* and *Residential Blocks*, built both by the government and by private developers. The government-built *Row Houses* include large uniform houses with small plots and tiny front or back yards. Its uniformity has decreased over time since they have been transformed according to each family's needs and financial resources, while non-government *Row Houses* have not changed so much due to their larger size and better-quality construction. Government *Residential Blocks* appeared in 1980, followed in subsequent years by non-government blocks with similar or better characteristics.

Figure 7. Rural Sprawl.

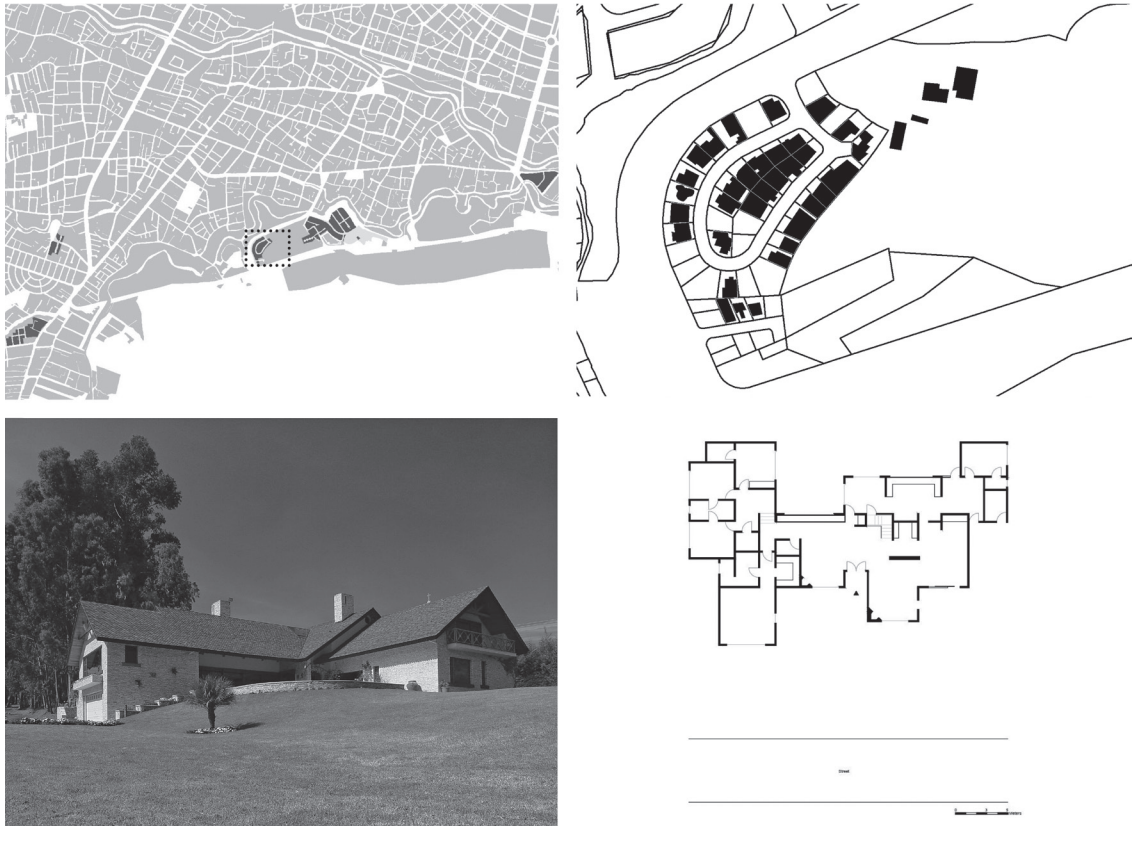

Figure 8. Upscale Enclave. *Urban Villas*: De la Pradera House, 1997.

The government *Residential Blocks* offered small apartments and more public and green spaces than the privately-developed ones. On the other hand, the Apartment Block tissue (Figure 11) is a relatively uniform landscape of large residential blocks, mostly multifamily residences with some shops or offices on the ground floor, and located in large and separate plots. In Cuenca, this tissue consolidated with private developers' residential building projects at the end of the twentieth century.

Figure 9. Incremental Mixed. *Attached House*.

Discussion

The analysis of urban tissues, historical data and spatial characteristics of the residential types leads to a broad periodization or abstraction of Cuenca's twentieth-century history, which can help understanding of issues related to housing and urban conditions. As Kropf (2011) suggests, the importance of studies based on urban morphology lies in seeing the balance between continuity and change, a balance that is crucial for effective management of the built environment. In Cuenca, continuity is found in urban tissues that are a product of a long process of consolidation and slow transformations that are only evident after a long period of time; and change is found in residential types. The different tissues and building types identified here represent morphological periods that allow better understanding of both the interaction of urban processes along with the evolution of housing.

The evolution of the city was characterized by several decades of very little change, from 1900 to 1950, and two decades of significant transitions: the 1950s and 1970s. The urban tissue that has persisted is the Urban Grid, present since the city's foundation over 460 years ago, and which has interacted with the Rural Sprawl tissue that has been subject to considerable transformation over time.

The natural geographical constraints were important factors in shaping the city's form. The urban rivers defined the alignments of some streets and served as axes for tissues such as the Organic tissue. At the same time, the topography constrained the urban form and led to tissues such as the Incremental Mixed. Nevertheless, geographical conditions were also overcome in some situations. For example, in the layout of the Urban Grid the traces of streams were erased by the geometric urban organization, and in 1959 some small hills were levelled in the processes of

Figure 10. Rectangular Block. Top: Government *Row Houses*: Tomebamba, 1980. Middle: Private developers' *Row Houses*: Andrade Houses, 1986. Bottom: Government *Residential Blocks:* Multifamiliares del IESS, 1980.

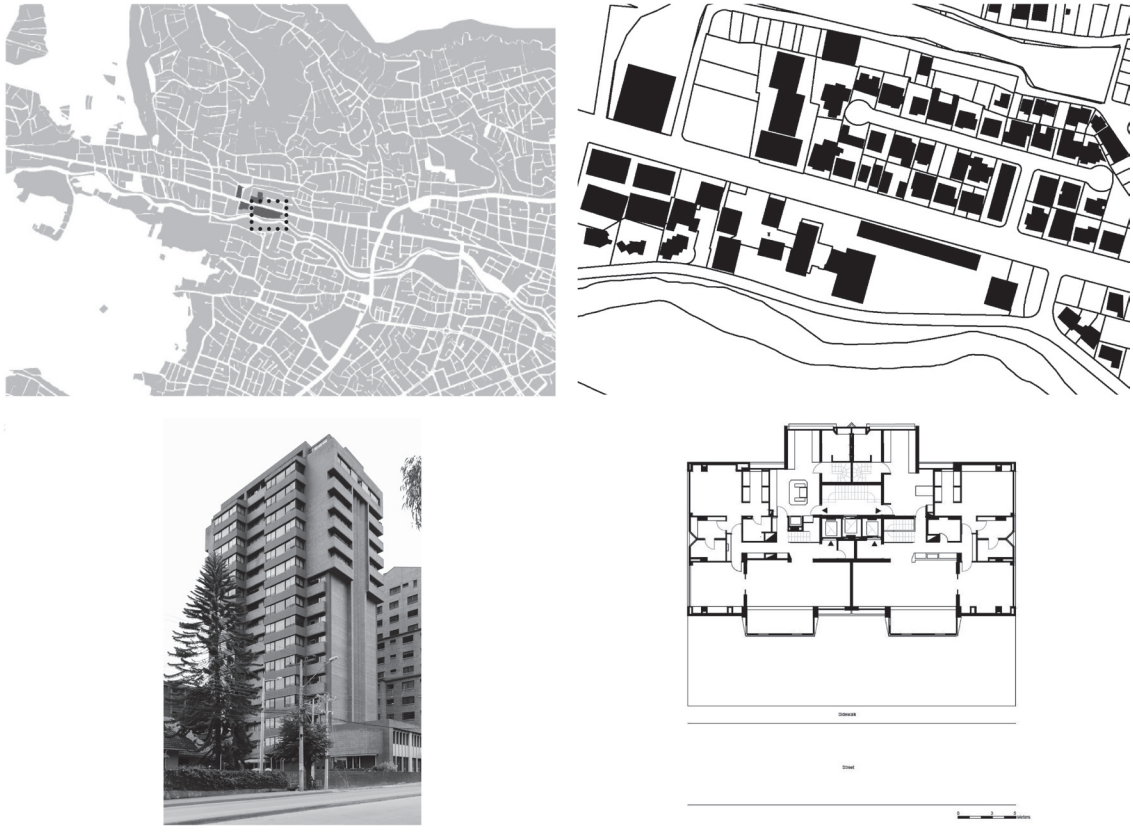

Figure 11. Apartment Block. Non-Government *Residential Blocks:* Santa Fe Building, 2001.

urban expansion, transforming the natural landscape.

Despite this evidence, social and economic conditions were the most significant influencing factors. As Han (2015) discusses, the main turning points in architecture and urban planning have been related to historical events. In Cuenca, since the middle of the twentieth century, the urban-rural migration process and the national industrial growth led the city authorities to become interested in urban planning and convinced of the need for urban expansion. In the 1970s, the new income from oil exports and the rapid urban growth led to new residential building types within new urban tissues that have persisted to the present. In addition, the type that characterized the first decades of the century, the *Courtyard House*, was gradually abandoned for residential purposes and other uses were incorporated. Today, the city continues with a spreading pattern occupying agricultural land.

Another important point in the evolution of the city is the influence of urban transformations across the world. For instance, the Urban Grid tissue in Cuenca clearly has European influences since, during the colonization era, the Spanish Laws of the Indies promoted the spread of this tissue type throughout the Americas (Wheeler, 2015). The *Plan Regulador de la Ciudad de Cuenca* is also an example of how external ideas led the way in which the city developed. In Cuenca, the plan introduced notions of global modernity through the promotion of highway construction solutions to the problem of vehicle numbers and congestion, the garden city and the city zoning, which led to the generation of different tissues – *Garden Villas* and the Organic tissue. These tissues and the building types that they contain express foreign

design ideals, such as the ideals of garden suburbs promoted in the early-twentieth century by Ebenezer Howard and spread worldwide (Ward, 1992). Today, the adoption of international regulatory standards, as well as the globalization of design ideas and education methodologies, continues to promote the spread of similar urban forms throughout the world (Guggenheim and Söderström, 2009).

Urban tissues are constituted only through the concurrence of buildings that follow similar patterns (Jun and Yoon, 2012). Together with the generation of new tissues and types, new lifestyles also emerge. A single type can characterize different periods or a single period can be characterized by different types, depending on the socio-economic status of the city in any particular period. It was noted that some types emerge based on the forms of the previous types, confirming that previous types act as a code for those who design and build (Caniggia and Maffei, 1979, 1984): but types also change over time until they lose all of the characteristics related to the previous period. The morphological changes, according to Whitehand *et al*. (2014), can occur by the introduction of new building types or the adaptation of existing forms. New types derive from previous ones or not, but always according to the limitations and potentials of the road and plot systems (Li and Gauthier, 2014). Moreover, it was found that these road and plot systems are highly influenced by the geographical systems that each location offers.

Conclusions

In Cuenca, the new tissues coexisted with the existing ones during the twentieth century; the new consolidating areas merged around the prior tissues, developing a pattern of interlaced, rather than overlapping, historic layers. These layers retain information about geographic and socio-economic conditions of the different periods. However, there was some overlapping of tissues in the final years of the twentieth century, with the introduction of *Residential Blocks*, which began to become embedded in already-consolidated tissues. This transformation influenced the interaction and perception of the different urban elements and is stronger at the present time. Although this transformation contributes to the development of a more compact city, it is important to identify which areas are adequate for its development and which are not.

In terms of the limitations of this analysis, certain obstacles relating to documentation and cartographic information were encountered. For example, the historical maps did not provide detailed information about plots; and the building registries did not have complete information of the original space configuration. These limitations have also been recognized in other cities, as in the Turkish city of Çamlıbel (Ünlü and Baş, 2017). Most of the data repositories and main studies of Cuenca's building have largely focused on public edifications and high-status residential buildings, which could imply a certain bias for this research. Because of this, further investigation regarding the registry and analysis of the historical houses of middle and lower socio-economic sectors, which have so far been disregarded by the majority of studies, could be useful.

Finally, it is important to note that the patterns identified in this analysis were based on specific variables; however, many other structures and patterns could also be found (Kropf, 2011) and could lead to different classifications and, eventually, establish different categorizations. This study not only contributes to the understanding of the complexity of urban built environments in a local scale but also becomes a point of reference for the comparison of the evolution of other Hispanic cities.

References

Albornoz, B. (2008) *Planos e Imágenes de Cuenca* (Ilustre Municipalidad de Cuenca, Cuenca).

Armijos, D. (2010) 'Estudio de los 50 elementos históricos artísticos científicos, más significativos de Cuenca del siglo XVI al XX valor y uso turístico', Bachelor's thesis, Universidad de Cuenca, Cuenca.

Bellal, T. (2004) 'Understanding home cultures through syntactic analysis: the case of Berber housing', *Housing, Theory and Society* 21(3), 111–27.

Caniggia, G. and Maffei G. L. (1979, 1984) *Composizione architettonica e tipología edilizia. l. Lettura dell'edilizia di Base. 2. n Progetto nell'edilizia di Base* (Marsilio editori, Venice).

Conzen, M. R. G. (1960) *Alnwick, Northumberland: a study in town-plan analysis* Institute of British Geographers Publication 27 (George Philip, London).

Conzen, M. R. G. (1969) *Alnwick, Northumberland: a study in town-plan analysis* 2nd edition Institute of British Geographers Publication 27 (Institute of British Geographers, London).

Dovey, K. and Wood S. (2015) 'Public/private urban interfaces: type, adaptation, assemblage', *Journal of Urbanism* 8(1), 1–16.

Guggenheim, M. and Söderström, O. (eds) (2009) *Re-shaping cities: how global mobility transforms architecture and urban form* (Routledge, Abingdon).

Güney, Y. (2016) 'Type and typology in architectural discourse', *Balıkesir Üniveritesi Fen Bilimleri Enstitüsü Dergisi* 9, 3–18.

Han, J. H. (2015) 'Transformation of the urban tissue and courtyard of residential architecture: with a focus on the discourses and plans of Paris in the 20th century', *Journal of Asian Architecture and Building Engineering* 14, 435–42 (https://doi.org/10.3130/jaabe.14.435).

Hermida M. A., Cobo, D. and Neira, C. (2019) 'Challenges and opportunities of urban fabrics for sustainable planning in Cuenca (Ecuador)', *Central Europe towards sustainable building, Prague 2019* IOP Conference Series: Earth and Environmental Science 290, 012118 (doi: 10.1088/1755–1315/290/1/012118).

Instituto Nacional de Estadísticas y Censos (2010) Censo 2010 (Instituto Nacional de Estadísticas y Censos, Quito).

Jun, N. and Yoon, C-S. (2012) 'A typological comparison of tri-form urban hanok in modern housing districts in Seoul', *Journal of Asian Architecture and Building Engineering* 11, 231–8 (https://doi.org/10.3130/jaabe.11.231).

Kostof, S. (1992) *The city shaped: urban patterns and meanings through history* (Thames & Hudson, London).

Kropf, K. (2011) 'Morphological investigations: cutting into the substance of urban form', *Built Environment* 37, 393–408.

Li, Y. and Gauthier, P. (2014) 'The evolution of residential buildings and urban tissues in Guangzhou, China: morphological and typological perspectives', *Urban Morphology* 18, 129–49.

Lloret, A. (2015) *Biografía de Cuenca (Tomo 1)* (GAD Municipal del cantón Cuenca, Cuenca).

Mauro, T. D. (1985) 'Typology', *Casabella* 509–510, 88–91.

Muratori, S. (1959) *Studi per un'operante storia urbana di Venezia* (Centro studi di storia urbanística, Roma).

Philippou, P. (2015) 'Building types and built forms', *The Journal of Architecture* 20, 1127–38.

Remali, A. M., Salama, A. M., Wiedmann, F. and Ibrahim, H. G. (2016) 'A chronological exploration of the evolution of housing typologies in Gulf cities', *City, Territory and Architecture* 3(1), 14 (https://doi:10.1186/s40410-016–0043-z).

Ünlü, T. and Baş, Y. (2017) 'Morphological processes and the making of residential forms: morphogenetic types in Turkish cities', *Urban Morphology* 21, 105–22.

Ward, S.V. (ed.) (1992) *The garden city: past, present and future* (Spon, London).

Wheeler, S. M. (2015) 'Built landscapes of metropolitan regions: an international typology', *Journal of the American Planning Association* 81, 167–90.

Whitehand, J. W. R. (1987) *The changing face of cities: a study of development cycles and urban form* (Blackwell, Oxford).

Whitehand, J. W. R., Gu, K., Conzen, M. P. and Whitehand, S. M. (2014) 'The typological process and the morphological period: a cross-cultural assessment', *Environment and Planning B: Planning and Design* 41, 512–33.