

Fuzeta. A unique fishing village

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The current thesis studies the urban and architectural evolution of the maritime village of Fuzeta, in Algarve (Portugal). Founded by fishermen, this village stands out by its regular urbanism and a housing typology relatively uniform with unknown origins, different from the rest of Algarve's urban settlements. This research aims to analyse the urban evolution of the village since the first settlements to the current urban structure, and to study, through a typological, formal and constructive perspective the houses covered by pitched roof (*telhados de tesouro*) and vaulted terraces which defines its vernacular architecture. It is intended to investigate further the origins of the urbanism and the architectural features by comparison with other examples in the Algarve and in the European Mediterranean.

Considering the lack of documentation, publications, inventories or specific works on the village under study, except for a few generic references made by ethnographers, geographers and architects in the past that do not provide an overview of the chronology and history of the buildings or the urban fabric, this study is based on archival research and on-site buildings' surveys purposely made.



1. Aerial view of Fuzeta in the 1950s. (Source: Arquivo Municipal de Olhão).

2. Houses in Fuzeta, between Rua detrás das Cercas and the shoreline, in 1950s. (Source: Arquitectura Popular em Portugal, 1961)

Apart of the lack of information, there is two studies published in 1961 that should be mentioned: *Arquitetura Popular em Portugal*¹ that resulted from the survey on Portuguese Regional architecture carried out by the National Architects Syndicate; and the chapter *Açoteias de Olhão e telhados de Tavira*².

The primary sources, cartographies and manuscripts, used for trace the urban evolution came from national and regional archives, namely the National Archive Torre do Tombo, National Library of Portugal, District Archive of Faro, Municipal Archives of Olhão, Tavira and Vila Real de Santo António, Military Historical Archive of the Portuguese Army and the Archaeological Studies Office of Military Engineering, among others.

¹ Pires Martins, Artur *et al.* 1961. "Zona 6." In *Arquitetura Popular em Portugal*. Lisboa: Ordem dos Arquitectos II, 241-359.

² Ribeiro, Orlando. 1961. "Açoteias de Olhão e telhados de Tavira. Influências Orientais na Arquitectura Urbana." In *Geografia e Civilização*, 66-69. Lisboa: Livros Horizonte.

3. Aerial view of Fuzeta in 1972. Source: F-38junho1972, CIGeoE/Centro de Informação Geoespacial do Exército.



The on-site buildings' surveys were done in 133 houses in Fuzeta and 32 houses in the towns of Zahara de los Atunes, in Spain, Breil-sur-Roya, in France, the Island of Pantelleria, in Italy, and the Island of Thirasia, in Greece.

This document is divided in 5 parts following the thesis structure: introduction, chapter 1 about the urban evolution of Fuzeta; chapter 2 studying the architectural typologies; chapter 3 characterizing the constructive features of vaulted terraces; chapter 4 exploring the affinities with other Mediterranean vaulted houses; and conclusion.

Chapter 1. Settlement, allotment and urbanization

Fuzeta is located in the eastern Algarve, in a flat area called beach that extends up to the foot of a small hill, on the west bank of the mouth of a small river called *Ribeira do Tronco* (or *Rio da Fuzeta*), near a navigable channel between the cities of Tavira and Faro, at the edge of the salt marsh region called *Ria Formosa*. It is protected from north winds by the mountains, and subject to the high temperatures and low rainfall that give Fuzeta its Mediterranean characteristics³ (Figure 3). Its privileged location within the *Ria Formosa*, near

³ Feio, Mariano. 1949. *Le Bas Alentejo et l'Algarve*. Lisboa: Congresso Internacional de Geografia, 107.

4. Huts in the nearby village of Monte Gordo, in 1773. Source: BAHOP, "Topographic Chart", Nº I, 1772-1830, MR14, vol.1, p.121



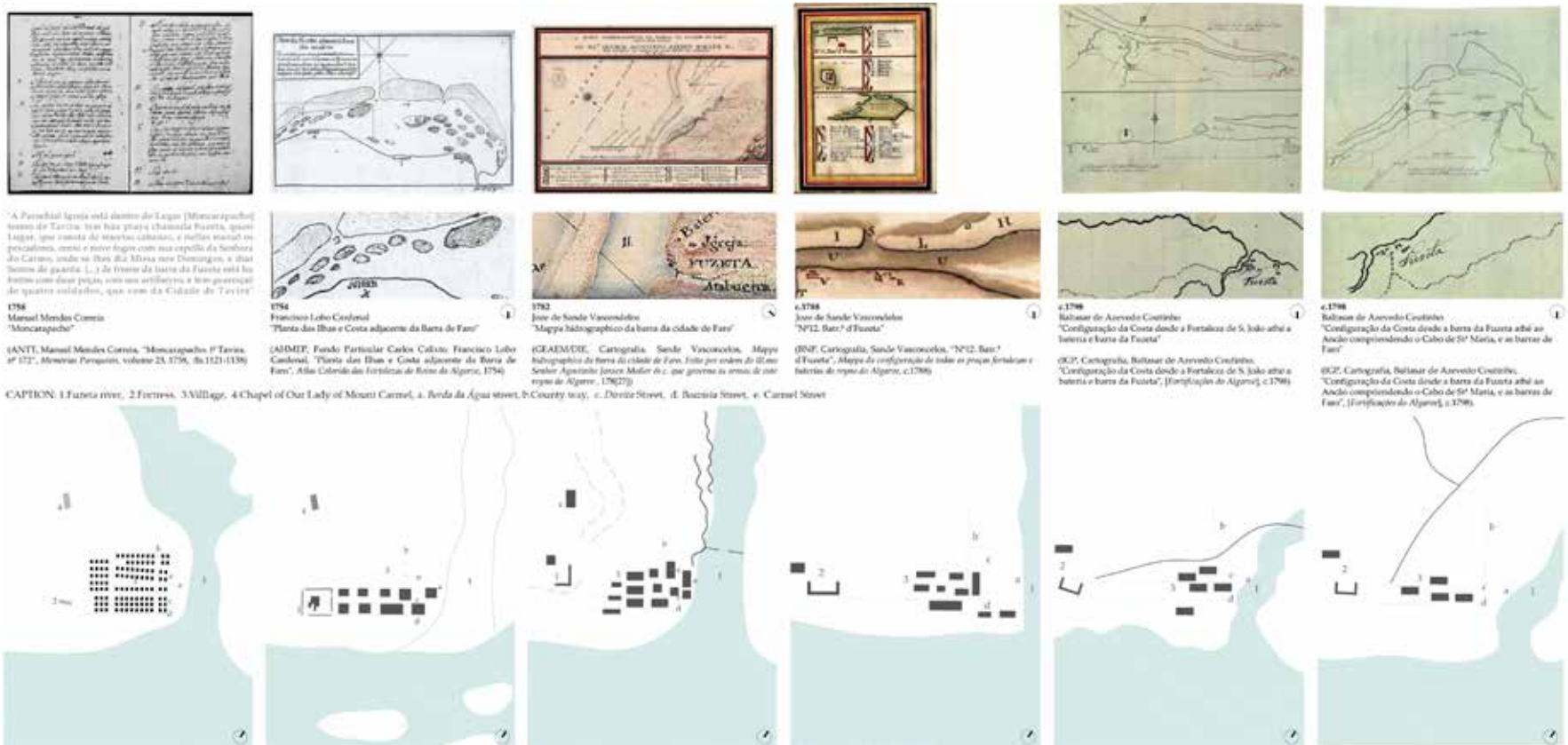
the *Barra da Fuzeta*, the only maritime waterway to the high seas between Olhão and Tavira, as well as its proximity of the cities of Faro and Tavira, made Fuzeta a strategic point. Since the 16th century, the region has been protected by watchtowers, with the closest one located in the Bias area, whose defences were reinforced by the Battery of Fuzeta, built in the 17th century⁴. According to the docu-

mentation found by Fernandes Mascarenhas, in the second half of 16th century it was already considered a place of residence⁵.

The urbanism of Fuzeta date from the 16th century with the first seasonal settlements of the fishermen in huts located at west side of the river of Fuzeta by the seafront, becoming permanent due to the security context provided by the construction of the Fortress

⁴ Vaz, Adérito. 1986. *As Origens da Fuzeta e seu Topónimo*. Olhão: Biblioteca Cultural Olhanense, 8-10.

⁵ Fernandes Mascarenhas, José. 1953. "A origem do topónimo Fuzeta e a sua evolução". Faro: *Jornal Correio do Sul*, September 10, 1953.



5. Urban morphology studies for Fuzeta reconstitution's plan in middle 18th century according cartographic sources from 18th century. (Author's drawing)



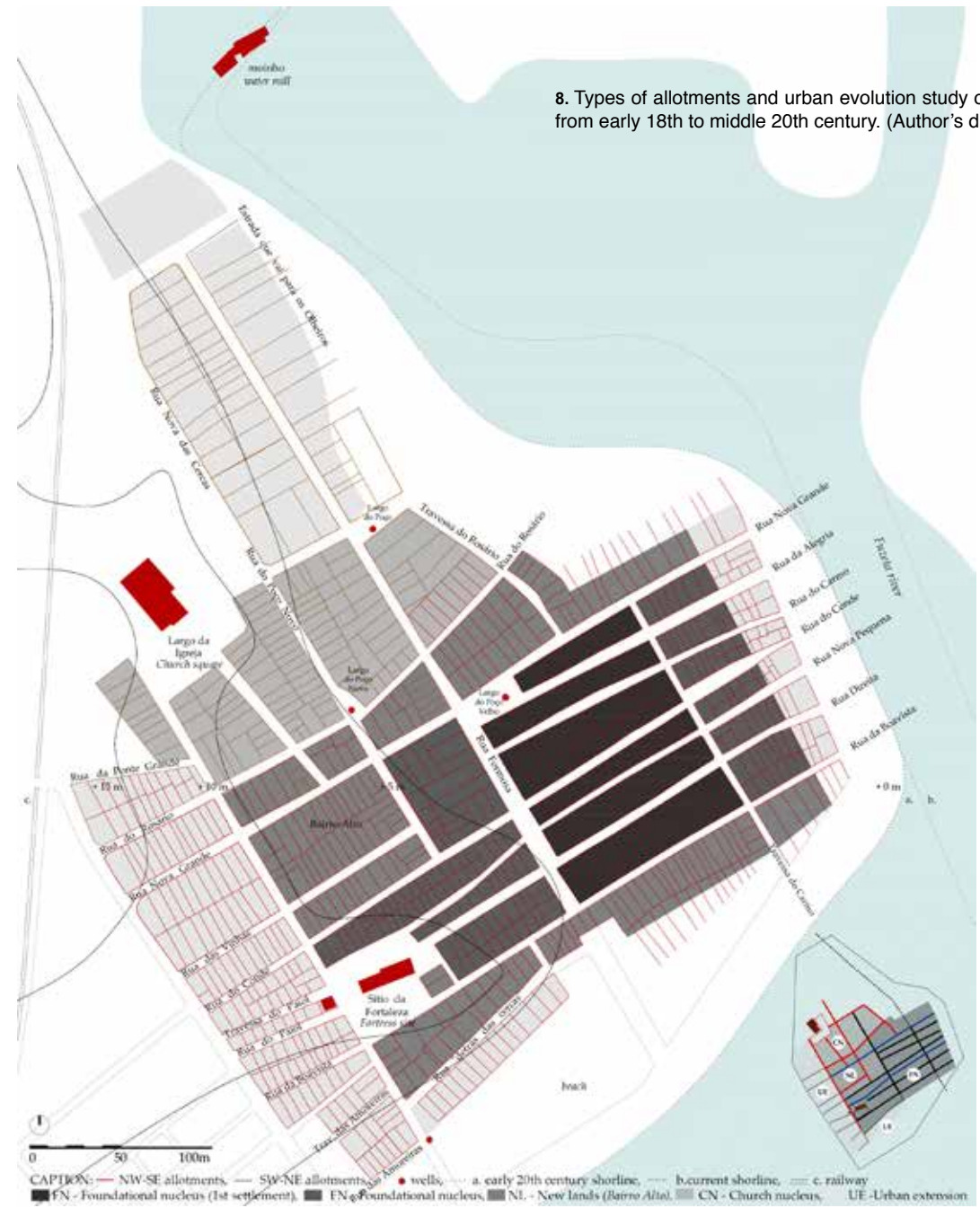
A few decades earlier, the “Parochial Memories” of the nearby parish of Moncarapacho⁸, reported the existence of a fishing settlement of huts on the beach, composed of 109 dwellings and the Chapel of Our Lady of Mount Carmel, annexed to the parish of Moncarapacho until 1835, when it was authorized to establish an independent parish (Figure 5).

Since the primary settlement, empiric rules were used to locate and to organize the huts in the landscape and to establish the first streets to the fortress. The first streets –*Rua da Boavista, Rua Direita* and *Rua do Carmo*–, lead to a regular tracing with parallel fronts facing the sea, and perpendicular to the river, in a northeast-southwest direction, composing the “Foundational Nucleus”, which was the basis for the urban growth in the following centuries.

The registers about “rents and sales of lands”, done by the notaries Bento Freire Henrique (1800-1802) and Caetano Joze de Brito (1802-1806)⁹ indicates the first allotments of enclosed plot lands to build houses, close to the shoreline in the streets *Rua Direita, Rua da Boavista* and *Rua do Carmo*,

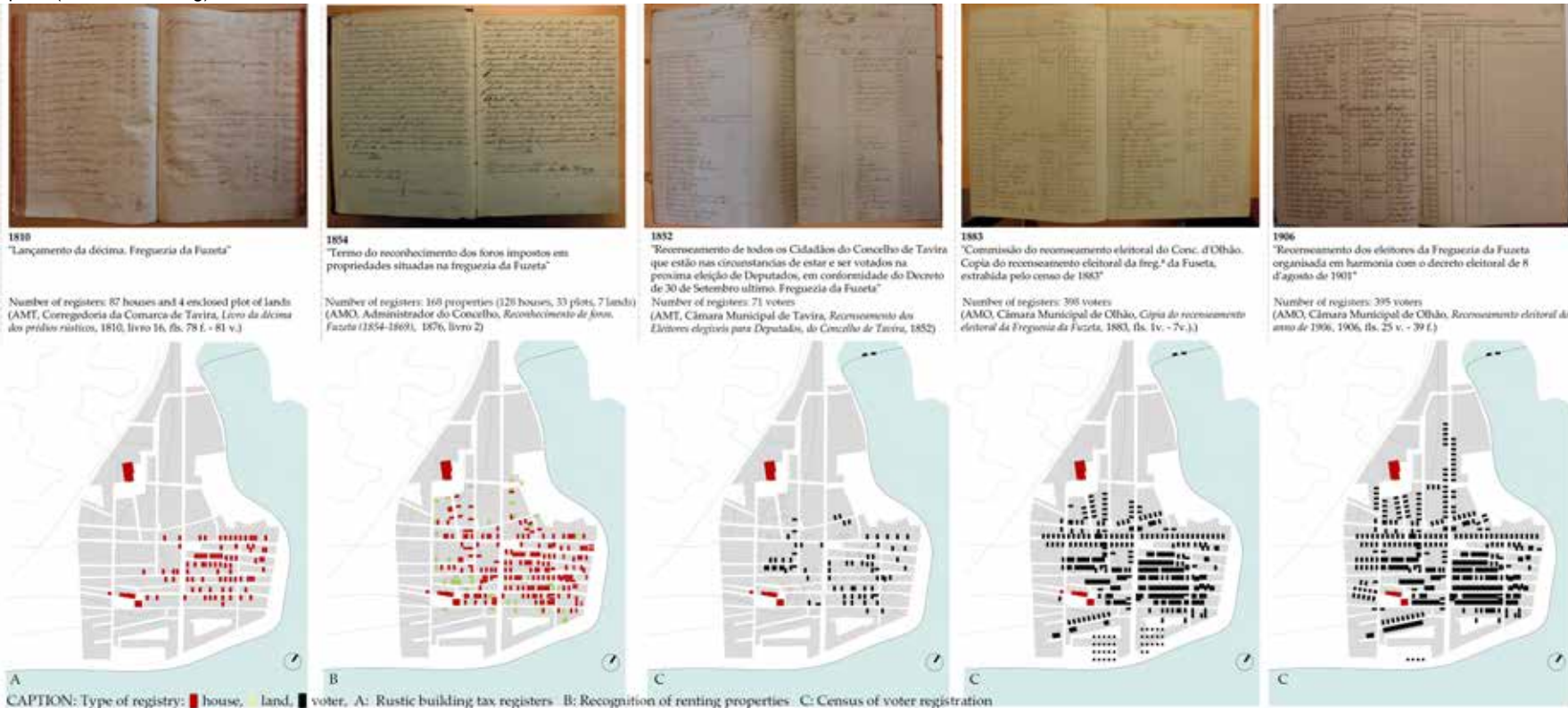
⁸ ANTT. 1758. “Moncarapacho/Tavira”, *Memórias Paroquiais* 23: 172; 1758; 1131-1140.

⁹ ADF, Cartório Notarial de Tavira. *Registos do Tabelião Bento Freire Henrique*, 1800, livro 1800-1802; *Registos do Tabelião Caetano Joze de Brito* 1802-1806, 51, 119.



8. Types of allotments and urban evolution study of Fuzeta, from early 18th to middle 20th century. (Author’s drawing)

9. Mapping data for urban evolution study from different sources of registers (building tax registers, rent registers and military census) from early 19th to early 20th century in current Fuzeta plan. (Author's drawing)



mentions its location, dimensions, tenants, previous tenants, and prices (Figure 6).

The second stage is associated with a perpendicular axis to the Foundational Nucleus aligning the fortress with the Chapel of Our Lady of Carmel. The construction of the church and its square, in middle 19th century, enhanced the northwest-southeast direction streets and the urbanisation of the upper will called "New lands".

The consolidation and densification of the urban fabric resulting from these stages of development led to the opening of two new

roads –*Nova Grande* and *Nova Pequena* in the northeast-southwest direction.

The analysis of the manuscript *Reconhecimento de Foros da Fuzeta*, 1854-1869¹⁰, containing 169 rental property registers with information about the tenants, locations, delimitations, princes and uses allowed to picture the urban evolution of the village in middle 19th century. (Figure 7)

¹⁰ AMO. 1876. Administrador do Concelho, *Reconhecimento de foros (...)*.

In this period, the urban structure of the village was already defined with a fabric consisting different sets of allotments that characterize different urban morphologies. The Foundational Nucleus, with streets running in a northeast-southwest direction, mostly subdivided, was occupied by masonry houses. The “New land” near the Fortress square was mainly empty plots to build. A new area emerged around the church square, the “Church nucleus”, with streets running in northwest-southeast direction, perpendicular to the Foundational Nucleus, with an ongoing process of subdivision and built occupation. The different lots and the levels of built occupation indicate the existence of three stages of urban development by the second half of the 19th century.

With these stages having established the nucleus of the urban fabric, a fourth stage can be considered, the “Urban extension”.

10. Photography of Rua da Igreja, in Fuzeta, during 1940s. Source: Floriano Andrade.



It consists of the urban fabric extension into the farmland to the northeast, to the salt marsh areas, and the land to the west, next to the railway line, whose Railway Station was inaugurated in 1904, leading to the opening of new streets and subdivisions in the rural areas: *Rua das Vinhas*, *Rua das Amoreiras* and *Rua das Cercas*. (Figure 8)

For the regularity of the Fuzeta’s urbanism contributed the 18th century legislation, particularly the law of 1776 related to the rent of county lands recommending the standardization of allotments’ dimensions and the prevalence of regular streets, applied on the allotments’ campaign of the enclosed plot lands during the 19th century, present in the regular front dimension of lots.

Other primary source complementary to the study of urban evolution on the 19th century was the military census to the population, frequently done –1852, 1870, 1883 and 1906, allowing to understand the housing dispersion and concentration in the urban structure¹¹. (Figure 9)

During the 19th century, huts were being replaced by masonry houses and new sets of houses were built in the new allotments following an architectural and constructive typology providing great coherence in the historical centre. Although huts continued to exist in Fuzeta until the end of the 19th century¹².

Chapter 2. Houses and vaults

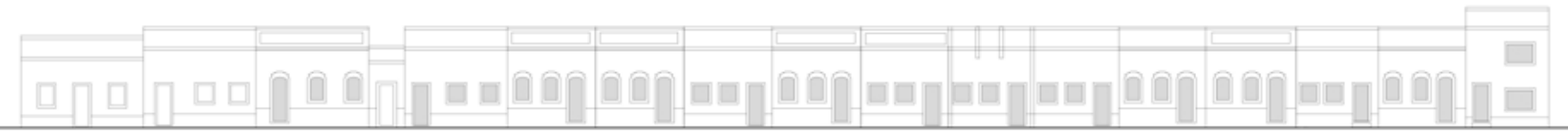
There is no documentation on the date of the construction of the first houses in Fuzeta, but according to Romba, the huts of nearby village of Olhão began to be replaced in 1715, with the first requests by residents to Queen Maria Ana de Áustria, wife of King João V, “to build masonry houses since they lived in huts”. In re-

¹¹ CMO, *Recenseamentos eleitorais*, (1852, 1870, 1883 and 1906)

¹² Leite de Vasconcelos, José. *Op. cit.*: 280.



11. Housing typology and roof construction systems according to in situ survey. (Author's drawing)



sponse to the second request for the same purpose, in 1718, the Queen strongly recommended that the house to be built must “be done right and not crossed”¹³. According to Vaz¹⁴, the replacement of Fuzeta’s huts should have begun in the 18th century. However, in the map made by Joze de Sande Vasconcelos, in 1775, entitled *Configuração de todas as praças, fortalezas e baterias do reyno do Algarve*¹⁵, it is explicitly stated that in Fuzeta “buildings are not made of earth, or of masonry”. Moreover, even in 1887, the Burguel neighbourhood (around the ruins of the Fuzeta Fortress) was formed by huts, constituting at least a third of Fuzeta’s buildings¹⁶. So, the substitution of most of the huts could only have occurred during the 19th century.

The construction of masonry houses in Fuzeta, whether original or to replace huts, was associated with a current house type characterized by contiguous dwellings with a single floor, placed in narrow lots currently with homogeneous widths, around 5 to 6 varas (the measurement unit used until 19th century, equivalent to 1.1m), correspondent to the “standard lots”. The houses have a modular composition, organised in 2 or 3 sectors – façade, middle and back – majority with individual brick vaults ceilings with terraces above, exception for the pitched roof (*telhados de tesouro*) in the façade sector, currently disappeared. The main façade of a house in a standard lot is composed by two windows and a door and topped by a frieze protecting the



12. Façade, section and plans of a set of houses with different types located in standard lots in the former Rua de trás das Cercas (current Rua Dr. Manuel da Silva Ramos) in Fuzeta. (Author’s drawing)

¹³ Romba, Sandra. 2015. *Evolução Urbana de Olhão*. Olhão: Sul, Sol e Sal, 56-57.
¹⁴ Vaz, Adérito. *Op. cit.*: 16.
¹⁵ BNP. 1775. *Mappa da Configuração de Todas as Praças, Fortalezas e Baterias do Reyno do Algarve*, no.12, 4, 12.
¹⁶ Leite de Vasconcelos, José. *Op. cit.*: 280.



13. Photography of vaulted rooms and correspondent façade in the houses lots in the former Rua detrás das Cercas (current Rua Dr. Manuel da Silva Ramos) in Fuzeta. (Author’s photos)

terrace and hiding the roof system. On the back of the lot, there is a courtyard and frequently a water well. (Figure 10)

The houses in standard lots can be composed by 2 or 3 sectors, usually the middle one is covered by barrel vaults perpendicular to the façade and the back one with a parallel barrel vault. On the façade sector is the living room, called the *casa de fora*, with a square layout covered by a pitched roof, a sail vault (*abóbada de vela*) or a dominical vault (*abóbada barrete de clérigo*), and a corridor covered by a barrel vault. The middle sector consist of two or three alcoves covered by a continuous barrel vault and an interior living room, called *casa de dentro*, and a kitchen, usually in the back sector covered by a barrel vault parallel or perpendicular to the previous sector. Sometimes, the indoor kitchen is complemented by a covered outdoor space with a fireplace and oven, embedded in the roof terrace's stairwell, extended by a porch to the back courtyard. (Figures 11, 12 and 13)

The house in narrow lots, with less than 5m front, are also composed by 2 or 3 sectors. The difference stands in the façade sector, without corridor and just the *casa de fora* room. The middle and back sectors are covered by barrel vaults perpendicular or parallel to the façade.

The house settled in large lots, with more than 6m front or resulting of the junction of two standard lots, is composed by 2 or 3 sectors. It has an internal distribution with a central corridor, similar to the Portuguese traditional house called *risca ao meio* (symmetrical plan and façade), and has also a symmetric façade composed by a door in the middle flanked by one or two windows, and a courtyard in the back, depending on the geometry and location of the lot. The façade sector made up of two main rooms, the living room and the bedroom, covered by dominical vaults and separated by a corridor with a barrel vault. The middle sector is covered by two continuous and parallel barrel vaults, one covering the bedrooms or alcoves; and other covering the interior living room and the kitchen. These

types of houses have a modular in character, emphasized by the independent vaults coverage that can be identified on the roof terrace.

Chapter 3. Vaults as a constructive system

As mentioned before, the traditional houses of Fuzeta are covered by a terrace supported by barrel, sail or dominical vaults, or by a pitched roof called *telhado de tesouro*, on the room. Due to the lack of conservation, the last exemplars with pitched roof were replaced by reinforced concrete slabs, during the 20th and 21st century. The pitched roof was introduced in the cities of the Algarve in the 16th century as an architectural element of prestige¹⁷. The use of pitched roofs in the houses of Fuzeta and Olhão, probably since the huts began to be replaced by masonry houses, is a direct influence from the urban houses of the neighbour cities of Faro and Tavira. Besides, the local consolidation of the construction technique over four centuries provided the necessary knowledge for their construction.

The pitched roof has a 45° slope, followed by an almost horizontal ledge supported by the wall. Its characteristic wooden structure is usually visible in the interior and the roof lining is placed between the structure and tiles, and is constituted of rows of reeds arranged horizontally and alternating with wooden boards. The interior pyramidal volume, together with the porous lining, induces rising air

¹⁷ Vieira Caldas, João. 2007. *A Arquitectura Rural do Antigo Regime no Algarve*. Lisboa: Instituto Superior Técnico, Universidade Técnica de Lisboa, vol. I, 196.



14. Photography of the interior of the roof of the main room *casa de fora* of houses in Fuzeta: sail vault, dominical vault and pitched roof. (Author's photos)

and a cyclic ventilation process which increases the thermal comfort in the room. Thus, this roof type leads to a technical solution well adapted to the local climate.

Contrary to what has been argued¹⁸, the vaults of the Modern Era only began to be used in the noble houses of the Algarve in the mid-18th century, and were probably first employed in common houses at the end of the same century¹⁹.

The oldest vaults are of the barrel vault kind, usually with a springing of stone masonry and haunches²⁰ filled with transversal rows of solid bricks and mortar, laid at a 45° inclination in order to be supported by the previous row without requiring formwork. Although having a more complex geometry, the dominical and sail vaults were constructed according to a similar process and, in their constructional perfection, reveal their builders' total command of the technique. (Figure 14)

After constructing the soffit of the vault with brick and filling the spandrels, the terraces were then carefully clad with plain tiles and lime washed, not only for insulation but also for accessibility and other

¹⁸ Ribeiro, Orlando. *Op. cit.*

¹⁹ Vieira Caldas, João. *Op. cit.*

²⁰ The springing is the start of the vault in the vertical extension of the walls which support it; and the haunches are the part midway between the crown and the springing.

15. Geometrical study of the barrel vaults with three-centred arches in different rooms of houses in Fuzeta. (Author's drawing)



uses, in particular for drying fruit, fish or clothing, the maintenance and storage of fishing gear, or collecting water that was then stored in underground cisterns, totally aligned with the Mediterranean costumes.

Chapter 4. Mediterranean vaulted houses

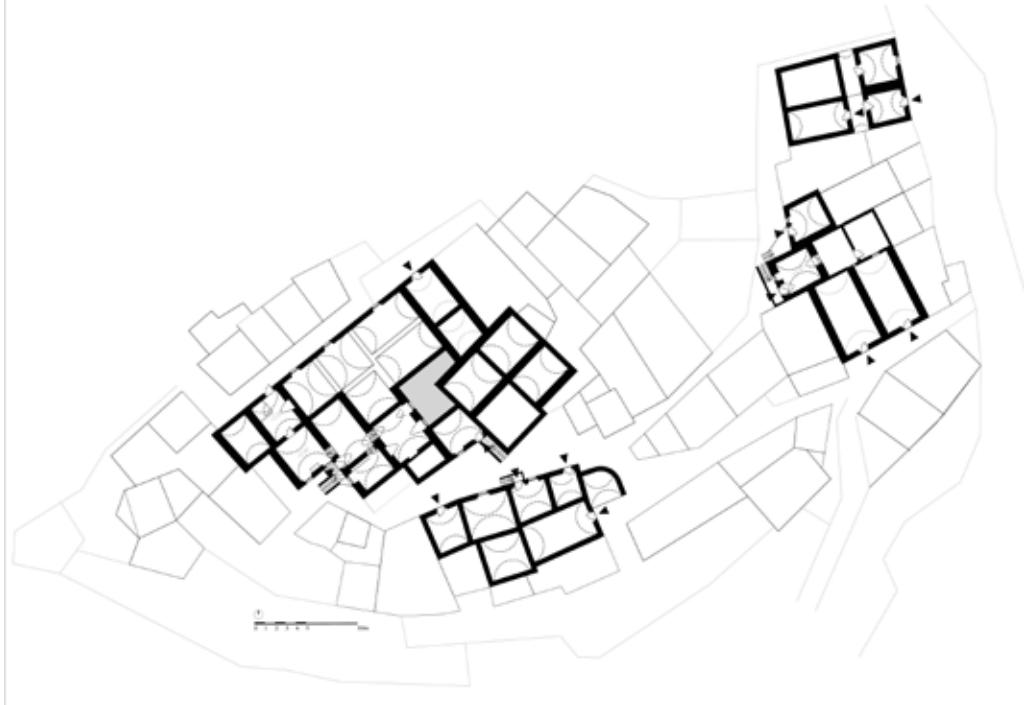
The present chapter focuses on a comparison undertaken on Mediterranean traditional houses, present in the European national surveys carried out in 20th century, with similar construction systems to those used in Fuzeta, particularly the vaults and roof terraces, aiming at understand and reinforce the erudite origins of the Fuzeta vaults.

The first European systematic studies on traditional construction were carried out in Italy, and began in the late 1920s with the research on *Rural Housing in Italy* published in the collection *La Casa Rurale* between 1938 and the 1980s. The Sicily's volume revealed the presence of vaulted houses in the small island of Pantelleria, a volcanic island located in the Strait of Sicily, between the island of Sicily and the Tunisian coast.

The Italian dammuso house

The traditional house, called *dammuso*, are an example of the vaulted roof terrace house typology. Although the island has a rural character, marked by isolated houses on agricultural land, there are a few urban settlements, such as Pantelleria, Scauri, Kamma and Gadir.

The dammuso is characterized by a main volume consisting of three vaulted spaces: the rectangular central space and living room (*cammara*), and two attached rooms, the bedroom (*alcove*), and the dressing room (*cammarinu*), with a storeroom, separated from the living room by a curtain. Secondary volumes are also vaulted, and are attached to the main volume and have complementary uses, according their rural or urban surroundings. The main volume is the morphological and structural basis of the three types of con-



16. The *dammuso* vaulted house of Pantelleria, in Sicily, Italy. Plan of houses near Patelleria city and Via Madonna della Margana and Via Farchicalà. (Author's drawing)

17. The *casun* vaulted house of Breil-sur-Roya. Plan of the houses in Cotte, around Chemin de Breil. (Author's drawing)

struction on the island: the urban (or agro-urban) palace, the rural house and the rural chapel²¹.

The *dammuso* rooms are covered by three dominical vaults, visible on the roof terrace, which irregular and asymmetric forms are a result of the nature of the building materials, volcanic stone, and the local construction technique. The vaults geometry is defined by the wooden formwork on which the mortar and stones are laid and subsequently compacted and lime washed, waterproofing the vaults' surface. The vault soffit is also lime washed, and sometimes decorated with friezes, ribs, and frames with geometric, plant and maritime motifs. In the interior of the rooms, the walls have inset niches, shelves, cabinets and benches. The vaults are supported by thick stone walls with a few small windows and doors (one in the main façade oriented to north or northeast) giving a fortified aspect. Annexed to the main volume is the kitchen, the cistern and, sometimes, other complementary rooms (stable, barn, cellar and store-room for agricultural and fishing tools). The house is sited around an open space, usually a path, a courtyard or a threshing floor, according to solar orientation and exposure to prevailing winds, to protect from the cold winter winds and the warm south winds in the summer. The land is bounded by stonewalls, including an orchard called the "Arab garden", which has a proto-circular shape, protecting the fruit trees from the winds.

The French *casun* house

In 1941, contemporary with the first Italian publications, the French survey on regional architecture, *Chantier intellectuel 1425*, was launched by Georges-Henri Rivière, director of the National Museum of Arts and Popular Traditions. The project was conducted

²¹ Bonasera, Francesco. 1968. "La Dimora rurale nelle isole minori pertinenti alla Sicilia Occidentale. L'isola di Pantelleria." In *La Casa Rurale nella Sicilia Occidentale*, 172-181. Fionzenza: Leo S. Olschki.

between 1942 and 1945 and published as *L'architecture Rurale Française*²². The volume *Comté de Nice* revealed the existence of vaulted houses in Breil-sur-Roya region, in the Maritime Alps, called *casun*.

The *casun* is a two-storey house with vaulted roof settled in blocks with regular allotments, around 4.5m front, imposed by the vault building system, with perpendicular and/or parallel orientations. The ground floor is a semi-basement and intended for shelter of animals, to the granary and storage the farm tools. The upper floor is used for housing and consists of two vaulted compartments: a kitchen and a bedroom. The barrel vault used in the *casun* is made of stone masonry with lime mortar, has an arched profile that tries to approach the semi-circle. It was made using a wooden formwork, with a filling that reaches the highest thickness in the corners, giving strength and reducing the inclination of the extrados, currently protected by a lime screed or coated with a layer of earth and the soffit is whitewashed.

The Spanish *cañon* house

In Spain, the book *Folklore y Costumbres de España*, published in 1934 by Leopoldo Torres Balbás, dedicated a chapter to "Popular Housing in Spain". This pioneering approach was the basis of two further investigations: *Arquitectura Popular Española* published in 1973 by Carlos Flores, and later *Itinerarios de Arquitectura Popular Española* published between 1974 and 1984 by Luis Feduchi. However, these two sources did not mention the vaulted houses of Zahara de los Atunes, the *cañon* house.

The origins of the urban centre of Zahara de los Atunes brings it closer to Fuzeta, both founded on a seasonal settlement of huts

²² Raybaut, Paul. 1982. "Modes de groupement de l'habitat." In *Comté de Nice. Architecture rurale française*. Paris: Berger-Levrault.



18. The *cañon* vaulted house of Zahara de los Atunes, in Spain. Plan of the houses settled in the Calle Agustin Medina Chico.

19. The *spiti* vaulted house of Thisasia. Plan of the houses in Manolas (left) and Potamos (right)

and masonry houses located next to the seaside, at the mouth of a river. Despite the similarities in the genesis of implantation, the vaulted constructions of Zahara de los Atunes date back to at least the 16th century, being, therefore, much earlier than of Fuzeta.

The urban form of the foundational nucleus of Zahara de los Atunes was defined based on streets parallel to the maritime and fluvial margins, originating an irregular grid, which compared to the foundational core of Fuzeta highlights its urban ruled morphology, where the tendency towards a regular urban layout, that determined its evolution, has prevailed since the first hut installations.

The vaulted houses of Zahara de los Atunes are composed by few and multipurpose compartments, accommodating different functions throughout the day, and it is covered by a single barrel vault. The vaults are made by bricks, placed in straight rows perpendicular to the top walls, similar to the Roman constructive system and needing the use of formworks for its construction. They present a variable geometry and high (between 2.65m and 3.20m) with arches starting at 1.5m height. The vaults' soffit and extrados are covered and whitewashed, and the filling of the corners attenuates the curvature, although the roof terrace is not used. The oldest vaults have a more irregular soffit due to the use of the stone masonry.

The Greek *spiti* house

One of the most recent national surveys in the Mediterranean region was *Greek Traditional Architecture*, published in 1983 by Dimitri Philippides, which provided theoretical reflections on traditional Greek architecture, influenced by the chronological distance of the first European surveys. Philippides identified three types of houses in the Cyclades Islands of Santorini: rural, urban and mansion, that could be completely built, partly-built or carved. The traditional urban house is sited in a cramped lot, with various floors, in over-

lapping volumes, leading to a more organic internal organization and the absence of a façade type. In the 19th century, the urban house within the city walls, evolved into an erudite model of the house, inspired by the Italian and Venetian Renaissance house, and characterized by a monumental façade, known as the *Santorini mansion*²³. The rural house is sited on a single floor and follows a typological internal distribution around a courtyard that is reflected in the façade.

Thirasia is a small island at the northwest side of Santorini's main island where the traditional houses prevail, with an urban and constructive coherence, unlike the urban areas of Fira, Pyrgos, Karterados or Oia, on the main island of Santorini, partly destroyed in the 1956 earthquake, and largely reconstructed using new techniques and adapted to the needs of tourism.

Manolas is one of the three settlements on Thirasia Island, located along the ridge line. It is an urban settlement, with longitudinal pedestrian streets set into the slope, and a regular lot division perpendicular to the streets. The narrow lots fomented the construction of row houses with the same architectural type and in a solid block, with greater resistance to earthquakes²⁴. As the width of the lots directly influenced the typology of the roof, in these islands, the houses are covered by vaults made with volcanic stones, differing from the flat roofs of other houses of the Cyclades, using wooden structural beams and lath, coated with a pumice, pozzolan or clay mortar²⁵.

²³ Philippides, Dimitri. 1983. "The approach to vernacular architecture." In *Greek Traditional Architecture: Eastern Aegean, Sporades, Ionian Islands*. Athens: Melissa Publishing House, vol. I, 167-177.

²⁴ Georgalli, Maria-Christina. 1991. "The morphology of traditional dwellings within an insular context: Amorgos, Greece." In *Traditional Dwellings and Settlements Review*. California: IASTE, vol. 2.2, 54.

²⁵ Philippides, Dimitri. *Op. cit.*: 155; 158.

The Manolas house consists of two rooms, similar to *spiti*, where the smaller one connects with the kitchen (*parastia*). The interior alcove lies in the continuation of one of the rooms, depending on the lot geometry. The façade reflects the two main rooms with corresponding doors and windows. The main room has two windows, one each side of the door, and is more than 6m deep. The secondary room has just one window and is the same depth or less, allowing an inner alcove three metres deep. There is also a difference between the two rooms in terms of width, with the secondary room with the alcove usually being wider.

As in Santorini, the houses of Thirasia are covered by barrel vaults built with volcanic stone and mortar. The common barrel vault's geometry approximates to a semicircle, with an irregular and sometimes inaccurate aspect, due to the irregularity of the raw material, the stone, and the popular nature of the construction process. Until the first quarter of the 20th century, the barrel vault was executed by assembling volcanic stones with mortar perpendicular to the vaults' curvature. Later, the vault construction process changed to the use of a mortar composed of small volcanic stones, pozzolan and pumice placed on the formwork, creating a lighter *vault*²⁶. The morphological analysis of a Thirasia house emphasizes the spatial composition based on the aggregation of spaces covered by a barrel vault, according to the local and traditional house typology, whose basic compositional unit is the *spiti* room.

²⁶ Papas, Constantin. 1957. *L'Urbanisme et l'Architecture Populaire dans les Cyclades*. Paris: Dunod, 144-148.

Conclusions

The research of primary sources, manuscripts and cartography from the archives, with further analysis and synthesis using the drawing as reflection process, allowed to reconstruct the stages of the urban evolution of Fuzeta and to identify the influence of urban laws in an urbanism that evolved without the use of plans, then considered “spontaneous”.

The urban morphological analysis of Fuzeta highlights the organised pattern of its urban fabric and the preferred orientation of the long and narrow blocks in a northeast-southwest direction, parallel to the sea. Probably, with their origins in the parallel rows of the first settlements of huts, with their fronts facing the sea.

Regardless of its orientation, “streets parallel to the sea” is the common representation of Fuzeta's settlement in the cartographies of the Algarve coast, made in the last decades of the 18th century. The cartographic representations have sufficiently developed scale and detail for this type of organization to be explicit. Furthermore, this organization was confirmed a century later by Leite de Vasconcelos through the significant number of remaining huts observed, as well as by the “rental property registers” from the middle of the 19th century.

The analysis of the architectural evolution of Fuzeta's houses pointed out the replacement of the precarious hut constructions with the laborious construction of housing typologies, whose constructional features (particularly the roofs) refer to erudite buildings from the nearest urban centres. The use of a standardized architectural typology in most of the houses and its adaptation to the homogeneous allotments formed the basis of the construction of urban ensembles.

The consolidation of Fuzeta's house types and the absence of local typological ancestors enabled intermediate stages of housing

experimentation to be identified that could explain the evolution of huts to masonry houses. The chronological gap between the beginnings of the process of replacing the huts in Olhão and Fuzeta, allowed a later systematic use of a housing typology in Fuzeta. Conversely, in Olhão, the process of replacing the huts resulted from a slower evolution.

Furthermore, the research on the fishermen's settlements, namely the Zahara de los Atunes and the *cañon* house, Breil-sur-Roya and the *casun* house, Pantelleria and the *dammuso* house, Thirasia and the *spiti* house, and the parallels found with Fuzeta's architectural and constructive morphology, led to an understanding of the different stages of the consolidation process of the vaulted house typology.

The comparison of the interior layouts of these vaulted house typologies reveals that the type of compartmentation can be associated to the stage of the typology's consolidation. It is possible to outline an evolution from primitive and basic compositions, which respond to forms of basic dwelling with polyvalent spaces, to hierarchical layouts and compositions, separating different uses of the house and originating more rooms. The houses on Zahara, Breil-sur-Roya, Thirasia and Pantelleria have a limited number of rooms (around four or less), with multiple uses, contrasting with the number of rooms in Fuzeta's houses (between six and eight) with defined functions. This fact may be explained by whether the familiarity with these constructional techniques, especially the vaults, originates more from "popular" or "erudite" knowledge.

Although the vaults of Fuzeta and its Mediterranean similar share the same constructive period, between the 19th and the mid-20th centuries, and their construction processes are the result of the local transmission of knowledge, the different construction methods of the vaults and their origins are reflected in the quality of

the finished surfaces. Popular vaults, such as the ones found in Thirasia and Pantelleria made by volcanic stone, the Zahara using bricks or the Breil-sur-Roya using stone, tend to have "approximate geometries" with imperfect finishes, while Fuzeta vaults are made using bricks, with a more perfect geometry, assemblage and finish.

The comparison of the housing and vaults typology of Fuzeta with other similar vaulted houses, allowed to establish, as rigorously as possible, the regional and Mediterranean architectural affinities, based on the used materials, constructive systems and adopted geometries.

The study of Fuzeta's urbanism and architecture contributes to investigate further the understanding of the History of Urbanism and the Traditional Architecture within the wider context of the Algarve and the European Mediterranean region, and raises the question of the difficulty in establishing boundaries between the popular and the erudite knowledge, being in a limbo zone between these two terms, generally taken as opposites.