

The “Salt Landscape” of Margherita di Savoia: Traditional Character and the Technical Evolution of the Coastal Salt-Works

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INTRODUCTION

Travelling along the length of coast that runs from the Gulf of Manfredonia towards the mouth of the River Ofanto, one comes across a vast, watery expanse nestled between the cultivated countryside and the beach, divided up into basins by an orthogonal system of embankments. The saltworks of Margherita di Savoia, formerly known as the *Regie Saline di Barletta*, materialise in this way, squeezed between the dune borders that separate the lagoon from the sea to the north-east and from the calcareous ridges of the Murgia to the south-west. The saltworks are the result of the skilled transformation of the old swamp, known as the *Lago di Salpi*, changed over centuries by the construction of embankments dividing the surface into basins for salt production (the principles of production, in their fundamental elements, are unchanged from more of two thousand years (Hocquet 1990)). Following these interventions the original natural landscape has become a complex palimpsest where the salt-works interact with the whole anthropic system and, above all, with the urban settlement which has developed around them (it is possible to individualize different Mediterranean areas in which the productive infrastructures of the salt pans establish a strong relationship with the anthropic system and with the coastal settlements).

The *salt landscape* of Margherita di Savoia represents one of the most important productive wet areas of the Mediterranean, along whose coasts, thanks to its physio-climatic characteristics, one can find various coastal *saline palimpsests* characterised by the delicate balance between anthropic changes, new settlements, tourism, production demands and initiatives to protect the environment. These are all elements which seem to be at loggerheads, but which actually define the character of the area and its potential development through their interaction.

According to historical sources, exploitation of the original *Salpi* lagoon dates back to the fourth century AD when the Illyrians arrived from Dalmatia and colonised the coastal area. At that time there was only a large swamp on the site, separated from the sea by tightly packed sand dunes. The Illyrians took advantage of its natural disposition for the production of salt, which deposited itself along the banks of the swamp during the summer months. Through various periods of history, first in Roman times and later under Frederick II of Svevia, the saltworks of Margherita di Savoia have represented a fundamental economic and strategic resource for the whole area. The great land reclamation set in motion by the Bourbons in the middle of the eighteenth century testifies to this,

with Luigi Vanvitelli and Carlo Afan De Rivera's interventions to change the morphological set up of the area for good (Pecorari 1986).

With the start of the Bourbonic land reclamation the history of the area becomes inexorably linked to the slow process of transformation from the original insalubrious lagoon to a productive basin, characterised by the ever increasing exploitation of the lake as a salt-works and the establishment of the settlement of Margherita di Savoia along the narrow stretch of land that separates the salt-works from the sea. Its urban structure is the extreme manifestation of the dialectical relationship between "working" man and the natural conditioning of the site. Margherita di Savoia developed to address the need of giving the salt workers somewhere to sleep during the salt harvest in the summer months. These primary needs were materially translated into the construction of the first proto-urban nucleus, basic straw and wood huts (called *pagliai*) positioned along the southern edge of the basins. Their architectural and aggregative conception was directly linked to the building techniques used for the embankments and to the importance of not obstructing the wind and the resulting evaporation of the water in the basins. The positioning of the huts in a linear layout parallel to the coast shows the only possibility of expansion allowed and defined by the two insuperable borders of the sea to the northeast and the salt-works to the southwest. This original proto-urban layout was confirmed, as we shall see, by the successive stonework settlement in the nineteenth century that emerged from the previous dimensional modules. This was then enlarged and improved thanks to a construction law which established a maximum height for buildings, the distance between roads and the orientation of lots, all laid down in relation to the position of the salt-works and the techniques necessary for them to function.

From the implications of the morphological conditioning of the area, its technical and productive demands and the technical and architectural consequences on the settlement, it becomes evident how the anthropic palimpsest is structured around the salt-works and the production of salt, making it the basis of the transformation of the landscape, the technical evolution used to build the embankments and houses and, specifically, the profound essence of its history.

BUILDING THE EMBANKMENTS AND THEIR INFLUENCE ON *BUILDING* THE TERRITORY

The coastal *salt landscapes* can be considered a specific variant on water landscapes as water is the main element that characterises the whole territory; in both its natural form, the seawater that bathes the coast and the salt-works, and its *anthropic* form, the water from the salification process which is channelled into the basins. These basins make up a productive territorial substructure contained by embankments. This system of basins and embankments is the expression of a centuries-old building tradition, linked to the production of salt and to the continual process of renewal that confers the whole of its anthropic development in correspondence to the techniques used to build the basins and embankments.



Figure 1. Margherita di Savoia. The *salt palimpsest* with the salt-works and the coastal settlement

Margherita di Savoia's palimpsest landscape, therefore, is the result of man's transformation of the structure of the salt-works following innovations in the techniques of salt production. The embankments are technological products which, from a technological point of view, are made by putting together constructive elements coherent with both their productive and technical functions and are the solid result of centuries of salt workers' know-how, but at the same time, from a territorial point of view, define the structure of the coastal territory through their linear extension. We shall now examine the principal phases of the transformation of the salt-works through the diachronic analysis of various methods of building the embankments.

From the start of the systematic exploitation of the salt-works in Roman times the embankments were built using natural resources found in the area: clay and sand, bulrushes, tamarisk and wood cut from nearby forests on the mountainous ridges – these were the first building materials to be used due to their easy availability and low cost. Sand and clay, natural materials that partly make up the earth in the area, were also used to build the salification basins to keep the base compact and to ensure the necessary drainage. The embankments, on the other hand, were made by reusing the earth that had been dug out to build the basins and positioning it along the edges of the basins, where it was shaped and compacted to optimal form. So, in this historical era the embankment was simply *moved earth*, with a low level of *artificiality*.



Figure 2. Different types of embankments. From the 'soil movement' to the built structure

It was probably in medieval times that improvements were made to slow the process of water erosion on the earth embankments. To do this bulrushes or tamarisk lashed together and reinforced with lengths of pinewood were used. This technique was an important evolution linked to the transformation of natural materials into building materials. This expresses the change from the embankments being seen as simply *moved earth* to them being seen as built structures, in the tectonic sense.

From the eighteenth century the old technique of cladding, using bulrushes was gradually substituted or added to by the use of sawn and planed fir planks to reinforce those sections of the embankments which were susceptible to water erosion. This technique, used to this day, maintains the relationship and coherence between the materials used at the salt-works and the character of the landscape, which is so crucial in an area of great environmental and natural importance. During the

eighteenth century stone materials were introduced, both as the yield from quarries and as a building element in blocks. The technique of construction with stone used on the embankments shows the ever-closer relationship between the building of the salt-works and the techniques being used in civil architecture.

It was Luigi Vanvitelli who introduced the systematic use of embankments made of calcarenite blocks as a technical device to redefine the saltworks of Margherita di Savoia. He was involved in the productive and formal restoration of the salt-works from 1754 to 1761 (Poso 1976) and his plans have stood the test of time with their solutions to the technical and productive difficulties, which were constantly correlated to the need for order and architectonic *ratio* throughout the structure. The modularity and temporal scansion of the salt production process became Vanvitelli's *architectonic pretext* for the formal, ordered transformation of the process itself, defining a veritable project of landscape architecture in which the tufa stone embankments represent the material and functional transformation.

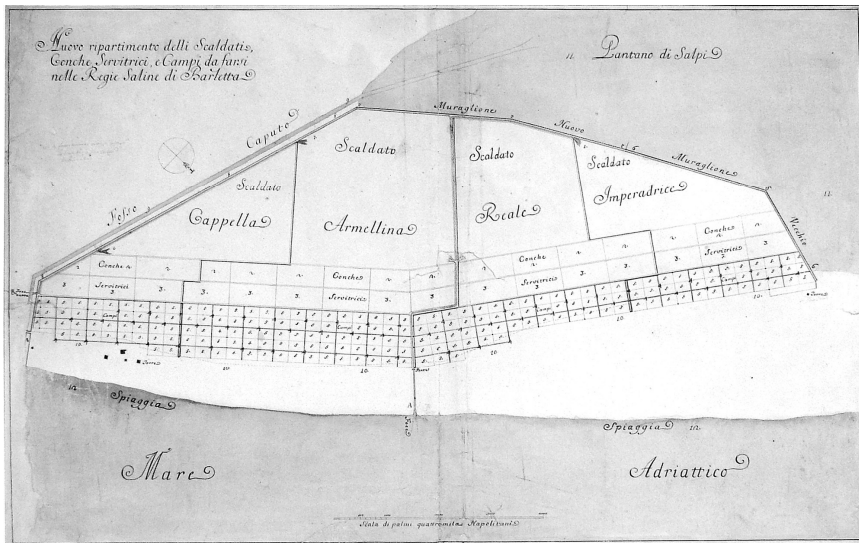
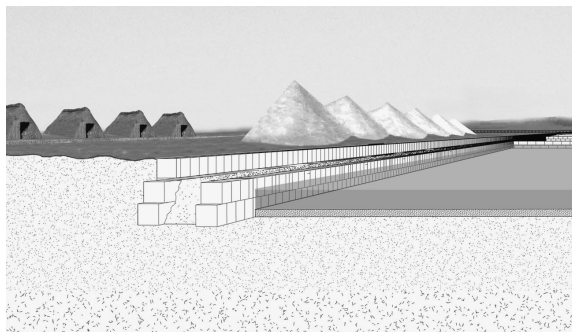


Figure 3. The project for the salt-works by Luigi Vanvitelli

With the intensive use of dry calcareous stone embankments, various problems were resolved simultaneously - compared to earth and wood embankments they were far less susceptible to water erosion and required less ongoing maintenance (the limestone came from the nearby quarry of the mountains of Murgia). Furthermore, the technique of stone construction reinforced the close relationship with the surrounding area, establishing a perceptive link with the dry stonewalls used to divide the agricultural land and thereby, in a technical sense, connecting the salt-works to the calcareous ridges and their quarries.

THE TYPOLOGICAL PROCESS OF SETTLEMENT: INNOVATIONS IN THE BUILDING TECHNIQUES USED ON THE EMBANKMENTS

The emergence of the coastal settlement parallel to the *Salpi* swamp area represents extreme human adaptation in the decision to settle in this insalubrious area that was often decimated by serious illnesses yet, evidently, remained fundamental to the kingdom's economy. Margherita di Savoia's urban structure constitutes the extreme synthesis of the anthropisation of the area, and its diachronic analysis is fundamental if we are to understand the technical associations of the system of producing the embankments with the habitable units.



Figures 4 and 5. The traditional hut (*pagliai*) and its disposition in the proto-urban coastal settlement.

The first recorded structures in the settlement were *pagliai*, basic habitations common along the southern Adriatic coast up until the second half of the last century. They were built using techniques developed from the methods used by the salt-workers to make the embankments. The weight bearing structure, in particular, was made of pine posts tied together, while the plugging structure

and the covering were made from a weave of tamarisk and samphire, gathered along the basin edges and also used to protect the embankments.

The building type comprised a single room with a rectangular base, with an area of approximately thirty meters squared, and a near pyramid shaped cross-section. The *pagliai* had only one door, which was on the south side of the building, and one window to the south-east. Thanks to its intrinsic versatility, the *pagliai* had many potential uses, as habitations but also as agricultural stores or stables. The definition of the type and positioning of the doors and windows reflected the precise demands of ventilation and adaptation to the place, both so as not to obstruct the flow of wind to the saltworks, and to aid aeration of the buildings, which was so important in an area where malaria was rife (Riondino 2003). Even the positioning of the buildings was the result of these necessities, empirically interpreted into a basic orthogonal, linear scheme with no urban hierarchy, with the *pagliai* positioned in series to the east of the existing residential area.

The positioning of the buildings was the result of two fundamental problems, the first being the limited space available between the salt-works and the coastal dunes that forced the expansion of the settlement along the only stretch of land available. The second problem was the importance of not obstructing the northerly, south-easterly and north-easterly winds that were essential to evaporate the water in the basins. The expansion of the proto-urban aggregation followed the old Roman coastal road, originally a spur road of the via Traiana towards the coast. Up until the end of the sixteenth century the only additions to the urban aggregation, the parish church, the salt-works manager's house, the civic tower and the officers' homes, were built with load-bearing walls (the *Torre delle Saline* was built in 1534 and it is one of the numerous coastal defence towers that was built on the Adriatic coast, from the mountains of the *Gargano* to the south Puglia, *Salento*). They were markedly different from the wood and bulrush constructions on the inside in both their style and materials, and these differences constituted the main polarity of the settlement.

The original Cartesian layout of the *pagliai* was reconfirmed by the successive stonework development in the nineteenth century.

This confirmed the logic of the linear settlement by expanding the salt-works with an orthogonal north-south layout on the principal east-west coastal axis. The change in materials and building techniques used for the habitations came about following a serious fire towards the end of the eighteenth century that destroyed nearly all the *pagliai* and thereby necessitated general reconstruction. The rules regarding urban aggregation had been confirmed over time by the serial positioning of the new stonework *pseudo-row houses* in a layout between through-roads of the salt-works. The town of the nineteenth century takes its distributive and aggregative character from the traditional system of the *pagliai*. The basic single-room structure kept the two apertures with the entrance to the south and the window opening to the southeast. However, the built structure varies definitively with specific stonework characteristics. The single-room structure was, on average, 7

by 6.5 metres, with the side that gave on to the road characterised by the tectonic tri-partition: a calcareous stone base, plastered tufa stone elevation and stone finishing. In fact the construction of the façade hides the covering structure, a roof with two orthogonal pitches on the side that gave on to the road, resting on wooden roof trusses. The stonework structure built using a system with a nucleus in clay stone between two calcarenite parameters reflected the same building methods being used in the salt-work's new perimeter embankments that Vanvitelli was reworking at that time. Once again the close relationship between the innovation of building techniques being used to build both the embankments and the houses is evident.



Figures 6 and 7. The relation between the urban structure and the embankments of the basins

The single-room structure gave rise to many variations:

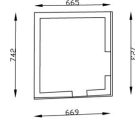


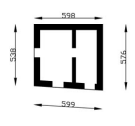


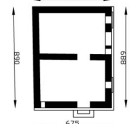

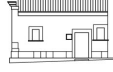
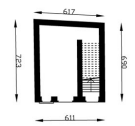

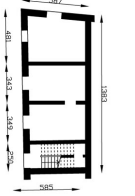
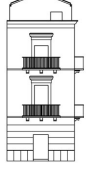

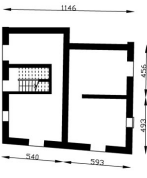
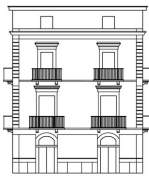

Synchronic variation – two-roomed type to allow enlargement - In this case, the doubling of the main room is orthogonal so the house maintains the same basic characteristics in the development of the façade.

Synchronic variation with height increase - This variation was the basis for the building type that became most popular in Margherita di Savoia during the nineteenth century. It is a house for more than one family on two or three floors. The ground floor is characterised by a habitable room and the staircase area orthogonal to the road, which was connected to the outside via the front door and the window that aerated and illuminated the room. The first and second floors, which consisted of a single room, had a balcony to the outside while the possible attic floor looked out onto a small veranda. The two or three floor structure for more than one family gave rise to the terraced structure that occupied the entire front of the previous *pseudo-row* structures.

New laws were passed during the nineteenth century concerning the distance between buildings and their maximum height which could not exceed three and seven metres respectively in order to guarantee the passage of wind from the coast to the salt-works, following the same principles

previously described regarding the *pagliai*. The tightly knit organisation of the habitations brought about unusual spatial and morphological characteristics creating pedestrian pathways between the buildings that also acted as each block's semi-private space.

Table 1. The typological process in Margherita di Savoia

Ordinary type			
Ordinary type (subdivision in two rooms)			
Synchronic variation with allow enlargement of the ordinary type (two rooms)			
<i>Synchronic variation with height increase two-family type with two floors</i>			
Two-family type with three floors			
Linear type			

At the start of the nineteenth century the urban structure extended along the principal coastal stretch only on the northern side. The small settlement's hierarchy stemmed from various polarities: the salt-work's head office, carefully positioned towards the basins, the parish church and the *Torre delle Saline*. Positioned symmetrically to the main layout was the salt gathering area with its characteristic conical mounds, which, rhythmically connected to the basins and equidistant one from another, interacted with the buildings in the perception of the main road. The fundamental characteristic that could be identified right from the first stonework structure was the presence of two waterfronts, the first towards the sea and the second towards the basins of the saltworks. This double waterfront was the manifestation of specific physical conditions imposed on the town by the salt-works, not only in the choice of building materials but above all in the layout of the aggregation and in its spatial characteristics.

In this case the two waterfronts can be defined as anti-nodal in relation to the parallel matrix of the road that cuts centrally through the linear structure of the settlement.

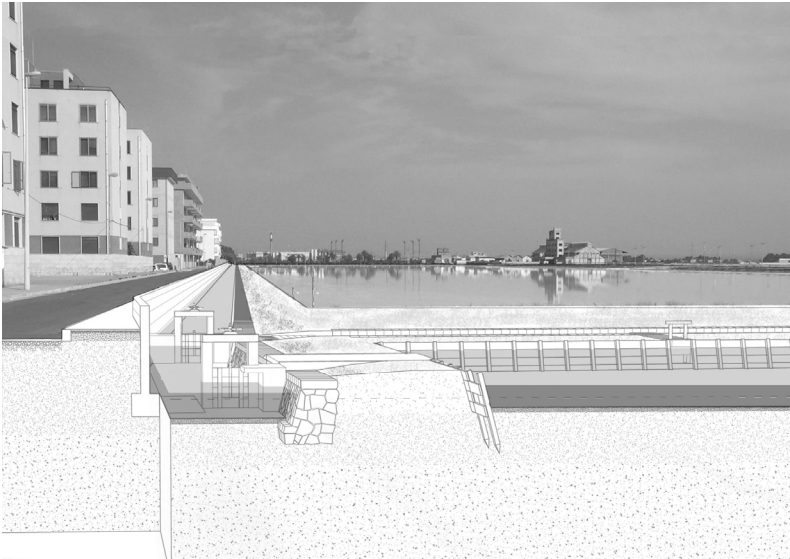
Towards the middle of the nineteenth century the urban structure began to take on a more complex layout with the doubling of the *pseudo-row structures* on the salt-works' side.

The new headquarters was built as the centre of the new expansion opposite the parish church, thereby constituting the first urban area of public life. The doubling of the aggregation to the south of the matrix road was completed at the end of the nineteenth century with the overturning of the habitable units up to the edge of the old vanvitellian canal, thus defining a linear structure given hierarchy by the specialised buildings.

From the start of the twentieth century the settlement was preoccupied with the surge of expansion linked to the industrialisation of the salt-works, with the construction of processing plants and the increase in production. During this time the town tripled its linear layout with the construction of a second east-west axis parallel to the principal route, along which seafront structures could be seen such as the lido and the spa, thereby forming the second specialised urban centre at the intersection between the coastal boundary and the north-south axis to Trinitapoli. By this time the town had an extensive layout that, nonetheless, maintained its original typological and aggregative characteristics.

In the 1960s the town expanded to the detriment of the salt-works using several disused and filled in basins for new construction work. The expansion to the south represented the abandonment of the Cartesian linear layout, which was substituted by the isolated linear houses. This urban phenomenon was constantly added to in the following decades with the selection of new areas to the south and southeast, one connected to the industrial settlement, the other stretching towards Barletta from the edges of the basins. Here we see the final abandonment of the aggregative logic that had emerged two centuries previously as a metaphor of the subdivision of the basins into productive fabric, substituted by an incoherent plan at the mercy of the planners.

The following years brought the total congestion of the area to the east between the coastal road to Barletta and the peripheral road around the salt-works to the south: row houses also completes the urbanisation of the border that touches the old nineteenth century settlement, definitively confirming the current trend.



Figures 8 and 9. The “salt structure” of the basins in relation to the waterfront

Table 2. The correspondence between embankments and houses.

		MARGHERITA DI SAVOIA	
EVOLUTION AND TRANSFERENCE BETWEEN SOIL' BUILDING TECHNIQS AND HOUSES' BUILDING TECHNIQS	CHRONOLOGICAL ANALOGIES OF TECHNICAL EVOLUTION - (centuries)	XIII	XIII
		XIV	XIV
		XV	XV
		XVI	XVI
		XVII	XVII
		XVIII	XVIII
		XIX	XIX
		XX	XX
		XX	XX
		XX	XX

the epoch of the reconstruction is considered (their origin is very remote)

Introduction of the hydraulic machines

TAMARISK AND WOOD USED FOR BUILDING EMBANKMENTS AND "PAGLIAI"

period of the tax of "gabella"

EMBANKMENTS AND HOUSES BUILT IN TUFA

The intervention by Luigi Vanvitelli

The reclamation by Afan De Rivera

The lake *Salpi* become the new area of evaporation

Introduction of the current Industrialized salt productive cycle

Introduction of the many year harvest

THE TECHNIC OF THE REINFORCED CONCRETE, FROM THE CITY TO THE SALTWORKS

CONCLUSION

An important aspect to highlight, at the end of this paper, is the *continual transference* of building methods from the salt-works to the settlement, from the technical form of the embankments to the technical form of the buildings. Indeed, we can identify a common chronological progression of the renovation and innovation of the salt-works and the typological changes in the habitations and the settlement. As we have seen, in Margherita di Savoia the bulrushes and tamarisk used for the embankments were also used to build the *pagliai*. The building methods were identical and express an identical approach to construction, which is also due to the use of the same manpower as was used in the salt-works.

In the transition phase from earth and wood embankments to stone, at the end of the eighteenth century, we can also see the transformation of the settlement that takes on a more complex, hierarchy-oriented structure in correspondence to the technical evolution in the salt-works. Indeed the introduction of tufa stone from the quarries at Canosa and Bisceglie to the salification basins took place only a couple of years after Vanvitelli's intervention, which first introduced this material as a substitute for the clay and bulrushes that had been used until then.

The technical and architectural correspondence between the salt-works and the settlement, between the embankments and the habitations, is the result of a long process of technical assimilation which has always seen the salt workers involved in the anthropisation of the territory, at least until the threshold of the twentieth century. The salt-works, in the specific case of Margherita di Savoia, have always represented an area of experimentation and introduction of building techniques linked to the use of local materials and perfectly coherent with the character of the area, and the extension of this to the settlement and the habitations was inevitable. Indeed, the inhabitants were the very workers who needed to base themselves near the salt lake for most of the year, both to harvest the salt and to build and maintain the embankments, confirming the eternal connection in the salt landscape between production and settlement.

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