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The coast as an intelligent device / from conceptual to physical interventions

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Abstract

Coastal areas are commonly defined as the interface or transition areas between land and sea, including large inland lakes. Coastal areas are diverse in function and form, dynamic and do not lend themselves well to definition by strict spatial boundaries. Unlike watersheds, there are no exact natural boundaries that unambiguously delineate coastal areas (Pernetta & Elder, 1993).

This contribution explores the concept of the coast and a number of possibilities in relation to its transformation, from both an architectonic and a landscape perspective. The coast is explored as an intelligent device that is able to adapt and to address the challenges of climate change, as well as other issues related to energy consumption and production, urbanisation and 'touristification' processes, ecosystem protection, etc. The first section focuses on the concept of the coast and how it changed in the centuries, and possible interventions are then presented through different case studies and classified by their relationship with the coast.

The contribution results from a pair of lectures organised in the framework of Dr Loris Rossi's course Design Studio and Theory of Architecture IV entitled 'Network Archipelago: New Interpretative Tools to Promote the Albanian Riviera Landscape', which took place at POLIS University, Tirana, in 2016 and 2017. The two lectures which I wrote and delivered aimed to provide the students the first tools for approaching the design process for innovative touristic devices in the studio.

The coast as gate to the sea

The concept of the coast is ambiguous. The coast is often defined as the 'land next [or close] to the sea' or as a more general 'land next to the shore' (American Heritage Publishing Company, 2015; Cambridge University Press, 2013). This last generalisation allows inclusion of the liminal areas of other water resources, such as lakes and rivers, in the concept of the coast, but it also enlarges the cases' number. When referring to lakes and rivers, the word 'bank' is usually used, although for the purposes of this study, 'coast' is used in that context, especially when those areas enter into contact with the sea through their delta and/or lagoon systems. In time, the study of the coast assumed an increasingly important role, which led to

the creation of a specific branch of study: coastal geography. This subject focuses on observation and analysis of the changing region between ocean and land, both from the physical geography (geomorphology, geology, and so forth) and the human geography (sociology and history) of the coast. The variety of the fields of study involved perfectly shows the complexity of the coast.

Since time immemorial, the coast has been seen as a gate to the sea, and it has assumed a dual meaning, being a source of life and a cause of death. The Greeks of antiquity turned to the sea for food and for transport; for war, commerce and scientific advancement; and for religious purification and other rites. In her book *The Sea in the*



Fig1 / North California coast
source / the author, 2018

Greek Imagination, Marie-Claire Beaulieu (2015) explores the symbology of the sea in the common imaginary of ancient Greece through the classic literature. In the *Theogony* by Hesiod, the sea (Pontus) is one of the children born out of Gaia's parthenogenesis. Thus, the sea is one of the primaeval elements that help conceive and shape the world. Homer refers to the sea as 'fruitless' because of the sterility of salt water, while for others it represented the entrance to Hades (Beaulieu, 2015, p. 2). The sea has an ambivalent character in Greek culture. It is a source of food and a path of communication, but also an empty, barren and disquieting space that evokes death and can even lead to Hades (Beaulieu, 2015, p. 2).

The sea. Try to imagine it, to see it with the eyes of a man of the past: a limit, a barrier that reaches the horizon, an obsessive, omnipresent, marvelous, enigmatic immensity (Braudel, 1987, p. 31).

The dualisms of life/death, calm/danger and fascination/dread accompany the image of the sea throughout the centuries. The relation between man and the sea is strong. Cities concentrate close to water resources for many reasons. Psychologists connect the bond of man to water with the amniotic fluid (Schneider & Morton, 1981, p. 141). The French physiologist René Quinton (1866-1925) drew a parallel between blood and sea water; he affirmed that cellular animal life appeared in the sea (Ferreri & Lodispoto, 1976, p. 74). 'At the beginning there is the sea; it is the origin, the primordial entity

from which the amniotic plasma – where we are born – comes' (Amsellem, 2016, p. 11). In this subconscious link between human beings and sea water lies one of the main reasons why the coast assumes such an important role for man.

Measuring the coastline

To address the issue of dimensions, it is necessary to introduce a second concept: the coastline, which is 'a line that forms the boundary between the land and the ocean or a lake' (Merriam-Webster, 1994). This second concept emphasises the existing ambiguity concerning the meanings of the word 'coast' and 'coastline' and their geographical transfer. If the coast is an ambiguous concept, the coastline is an even more fleeting one. The coastline is affected by many different elements that lead to its complete transformation. All those elements need to be differently measured in order to perceive the correct set of dimensions for coastal interventions.

The paradox of the coastline, observed by Lewis Fry Richardson and further elaborated by Benoit B. Mandelbrot (Mandelbrot, 1983), shows how difficult it is to measure the coastline. According to this theory, the smaller the ruler, the longer the resulting coastline will be. If we add a third dimension, the coastline will assume another feature: thickness. The external factors that influence the coastline, such as daily tides and winds, climate change and sea level rise on the global scale, contribute highly towards continuous transformation of this space. The coastline loses its two-dimensional

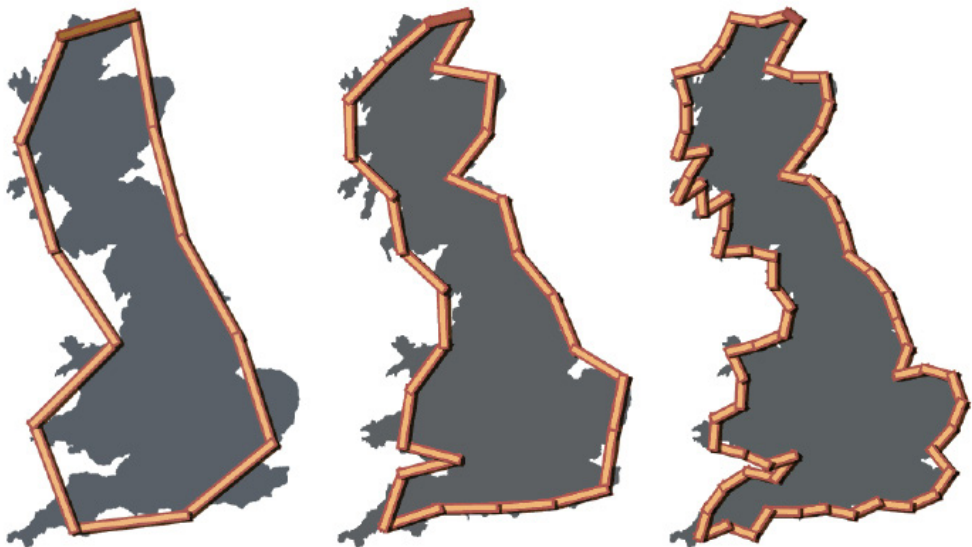


Fig2 / The coastline paradox
source / Fatima et al, 2015

characteristic and becomes a filter area where land and sea meet, which is in continuous metamorphosis.

The coast [...] is intended as harmonious interpenetration in continuous visual, material, functional, interactive and dynamic transformation between the action of man, sea and land. The coast represents the edge where to intervene. With its porosity and open boundaries, it is capable of responding to climate change and functioning as a resilient device (Porfido & Sani, 2018, p. 105).

According to this definition, which emerged from previous research on the Brazilian coast in 2015, the coast is considered in its thickness and continuous transformation. This new entity passes from being a two-dimensional line to a space with its own boundaries, although permeable and unfixed. In this space, designing a project is challenging and uncertain.

Sea as connector, resource and opportunity and coast as its spatial expression

The following sections present different design projects placed on the coast. The main differences between them are related to the functions of the sea, which in this study are grouped into three main categories:

- sea as connection: ports, lighthouses and castles;
- sea as resource: off-shore oil extraction platforms and fish-farming structures;
- sea as place of leisure: touristic activities.

The coastal interventions belonging to the first category are mainly related to the idea of transportation, such as ports and lighthouses. But it is also worthwhile to mention those uses which, considering the sea to be a threatening place, aim to protect the land and its population, such as castles and sighting towers. Furthermore, the sea is a resource for fish, oil, salt and other products. The second category includes all those interventions related to extraction, cultivation and production, such as fisheries and offshore oil platforms. These first two categories are characterised by the corporeality of resources, while the last one is related to activities. Man benefits from the sea not only in terms of material resources, but also physically and psychologically. This is why the coast become a touristic destination upon the discovery of thalassotherapy in the XVIII century (Pié & Rosa, 2013). The coast became a locus of expression for leisure activities (Toulier, 2016). New cities arose for this sole purpose, and architects began to design piers, promenades, waterfronts, and so forth.

The study cases are presented by location on the coast and by the link they create between the elements. The first case named 'Cidade de Deriva', from the book *The Petropolis of Tomorrow* (Bhatia & Casper, 2013), is apparently located only on the sea, but functionally, it is strongly related to the land. The touristic city of Port Grimaud is presented as an example of the sea extended into the land to create an artificial inlet, while the artificial peninsulas and other recreational devices

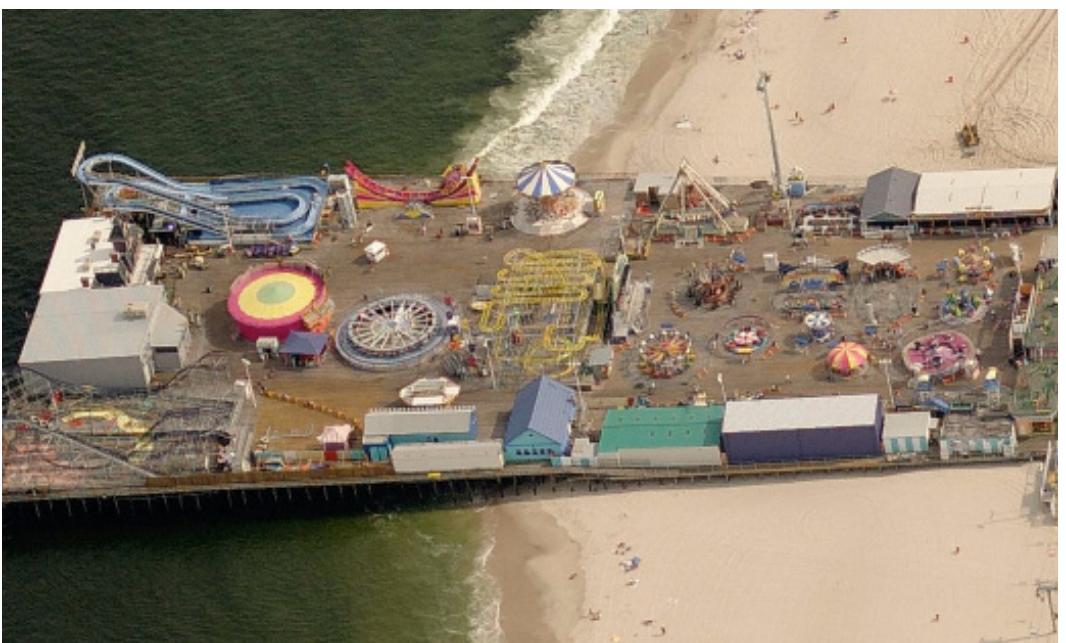
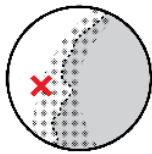
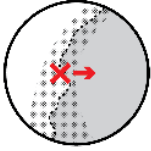


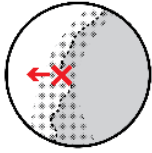
Figure 3 / from top to bottom: Elmina Castle, Ghana; Offshore platform in Norway; Casino Pier, located in Seaside Heights, NJ. source / the author, 2015; stormgeo.com, 2016; Andrew Mills/The Star-Ledger, 2012.



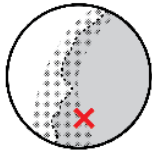
apparently only sea : water archipelago



sea to land : artificial fiords



from land to sea : artificial peninsula



apparently only land : land archipelago

Fig 4 / Diagrams of the projects' location
source / the author

represent the extension of land into the sea. Last is the case of the WeatherField project by Luis Callejas in Abu Dhabi, which appears to be placed only on land but has a peculiar connection with the sea.

Cidade de deriva: from sea to land

This project deals with the supply routes that serve the Brazilian offshore oil industry today. The 'drift and drive' strategy creates a consolidated transport network connected with the existing pipeline structures in order to develop a real floating city. The city is organised in islands characterised by different types of production (agriculture, fishing, energy, and so forth). The route is organised in two phases; the first, from south to north, is motor-powered, and it brings oil and people from one platform to the other according to the working timetables. The second phase is possible due to natural ocean currents, and it allows the free-energy transportation of agricultural products and other resources. All along this route, thematic islands are staggered in order to increase the production in terms of agriculture and energy.

The island system is based on the alternation of agriculture and energy islands. Energy islands contain fields of single-point energy harvesters that passively generate tidal, solar and wind energy. The energy collected is then moved through the drift boats to the main hub and the agricultural islands. Agricultural islands are highly specialised and adapted to specific crops, such as rice, wheat, starches and vegetables.

The project proposes a new configuration for moving products from sea to land, embracing an ecological and political agenda around the economy of production. It reduces the ecological footprint of the existing offshore system, and at the same time, it tries to fulfil the worker-residents' needs. It transforms a floating system into a real territory.

Port Grimaud: the sea extension on land

Due to the boom of mass tourism in the 1970s, the coast of southern European countries along the Mediterranean became the new trend in touristic destinations. New cities were created ex nihilo for the specific touristic purposes related to the sun, sand and sea model of leisure travel (Pié & Rosa, 2013; Barbaza, 1970; Lozato-Giotart, 2008). Port Grimaud is one of those, but it is not a unique case. It is, in fact, the result of a development strategy applied along the southern French coast. In 1964, the architect Francois Spoerry proposed to a group of private investors to build a new Venice close to the famous touristic spot of Saint-Tropez. This area was a wetland, so a large intervention with drainage and engineering solutions was necessary.

Nowadays the city is completely private, much like Costa Smeralda in Sardinia. All infrastructures and public areas are private and maintained by the owners' taxes. In order to avoid a huge influx of tourists, some streets and channels are today closed and accessible only to the residents.

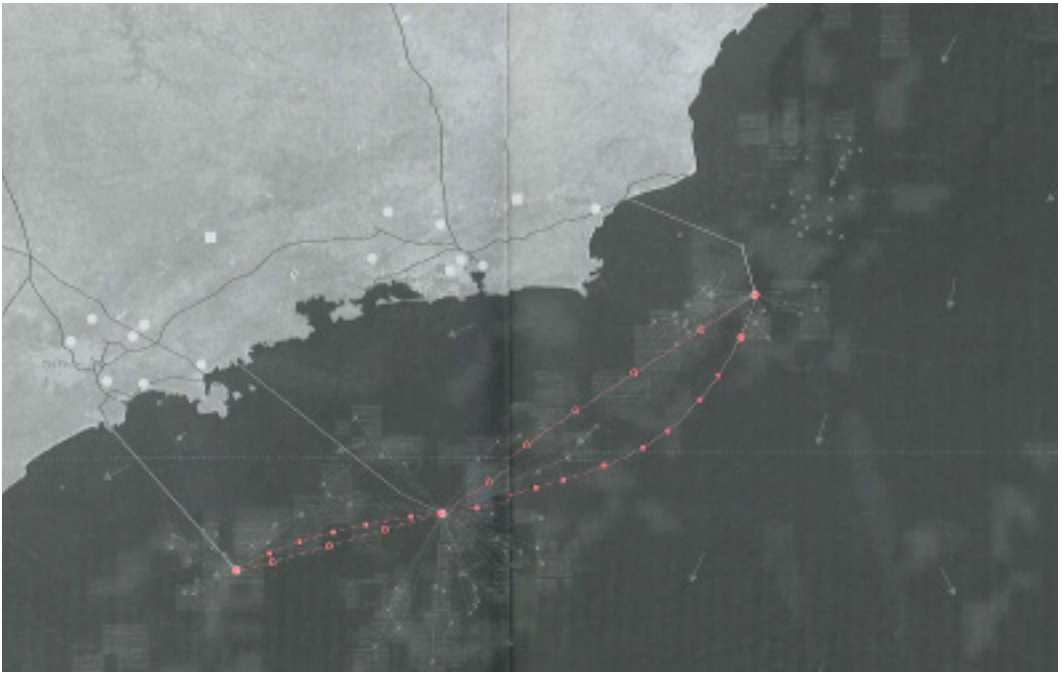


Figure 5 / General masterplan of Cidade da deriva by J. Luo, W. Song, A. Yuen
source / Bhatia & Casper 2013, 295



Figure 6 / Port Grimaud, before and after
source / Yves Lhermitte 1963, GoogleEarth 2018

From bath machines to piers and promenades: the land extension of the touristic devices

In the XVIII century, tourism started to spread, and with it spread the need for services in touristic destinations. This phenomenon strongly affected the coastal areas where most of the middle-class families began to travel (Pié & Rosa, 2013). On the coast, two different types of intervention appeared: accommodation and tourism-service providers. Before mass tourism, the projects with the most impact on the coastal landscape concerned the creation of opportunities for recreational activities.

One example is the bathing machine – a small wooden cabin which was designed for entering the water, where people could change their clothes and leave their personal objects. Bathing machines also provided shadow and allowed women and children to hide from strangers' eyes. The bathing machine became fancier and more sophisticated, such as the one belonging to the Spanish king Alfonso XIII on a private beach in San Sebastian, which, using a rail system, allowed the royal family and guests to have their own privacy with all the comforts of home. Another important architectural element that represents a milestone of coastal



Fig7 / *La plage a l'heure des bains, Boulogne-sur-mer 1890*
source / Toullet, 2016

touristic colonisation is the pier. Piers were used for transportation but also as land extension for casinos and medical centres offering thalassotherapy. Piers were the first combination of the sea with the earliest complex devices for the provision of touristic services.

Abu Dhabi Weatherfield: from land to sea

WeatherField is a research project by Luis Callejas along a strip of sandy beach in Abu Dhabi between Yas and Saadiyat Islands. It is an energy generation park; it is 'a public space capable of harvesting the abundant renewable wind resource' of the area (Callejas, 2017). A series of 200 'para-kites' is located in the field, and each one is equipped with two flexible posts; they do not touch the ground or the water ecosystem. These para-kites use an innovative parafoil system to stay aloft and to harvest the wind energy, which is later collected and distributed.

The park offers different possibilities for public interaction. From homes, a sponsoring resident may have free electricity and a view of the Gulf. On the park's site, a visitor may see the view using an embedded 'periscope' in each post, or a more adventurous visitor may be harnessed to a para-kite to witness the view first-hand (Callejas, 2017).

Conclusions

Such different projects provide an illustrative catalogue of possible interventions on the coast, which we have discussed in its manifold aspects of production. The archipelago created in Cidade de Deriva, the artificial inlet of Port

Grimaud, the bath machines and the para-kite archipelago of the WeatherField park show different design approaches to an area in continuous transformation.

The coast is an intelligent device that is adaptable, permeable and continuous in metamorphosis, just as a design approach should be in order to take advantage of the coast's potentialities and to show awareness of its risks. A project that conflicts with natural phenomena or does not fully consider them is destined for failure.

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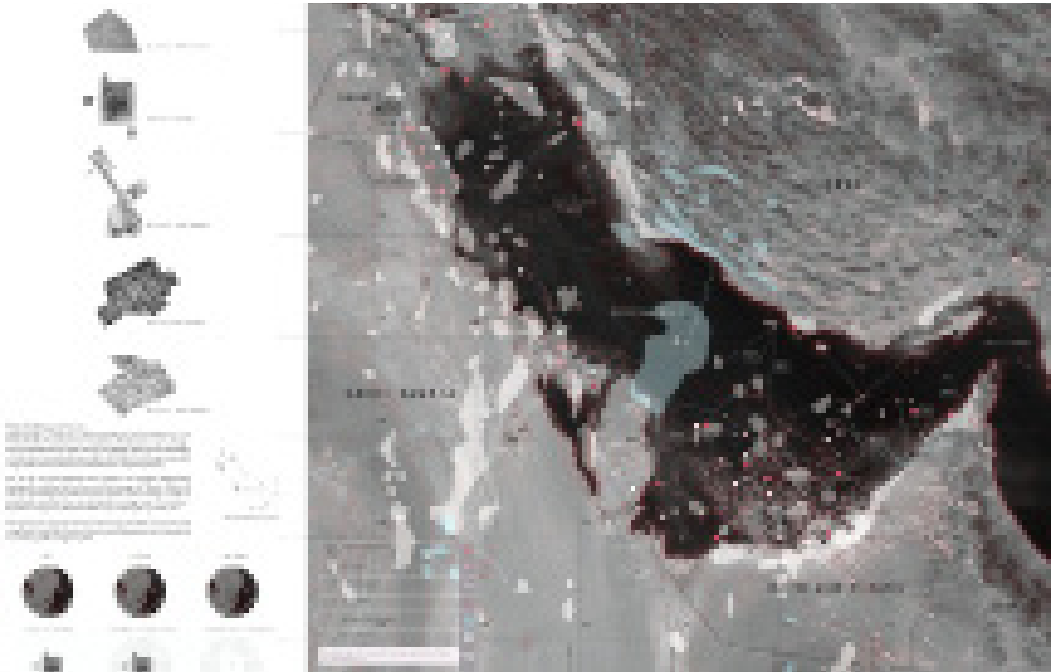


Fig8 / Weatherfield regional network
source / Callejas, 2017

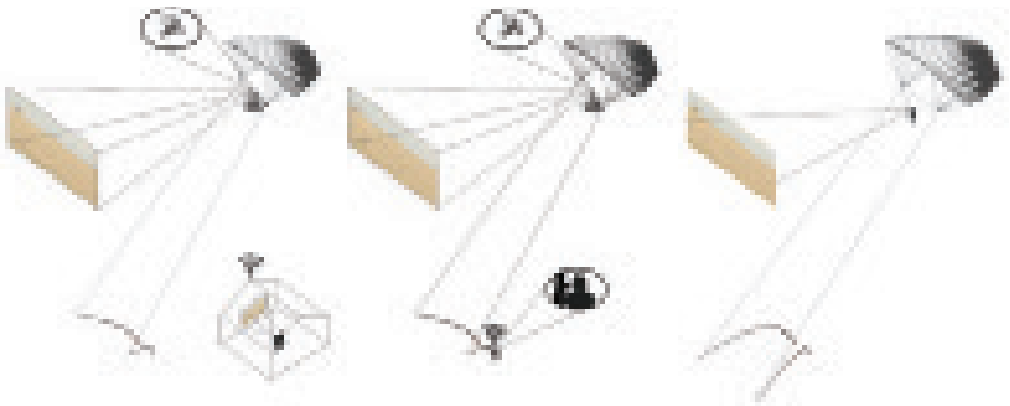


Fig9 / Weatherfield three typologies of public experience
source / (Callejas, 2017)

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