

Sounding the Unheard City – An Approach to the Soundscapes of Urban Vacant Lands in Lisbon

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ABSTRACT: In this paper, we will present preliminary results of our ongoing study on the soundscapes of vacant lands in Lisbon Eastern Zone (LEZ). Our methodology comprised two stages. Firstly, all the vacant lands of Lisbon municipality were identified and geo-referenced using remote sensing methods and high-resolution aerial photography. In the second stage, a field survey with the purpose of characterising the morphology, vegetation, and animal and human occupation of the vacant lands was conducted, along with field recordings of their soundscapes. The results of our study include the classification of vacant lands and of their soundscapes. We argue that listening to the sounds of urban vacant lands defies traditional notions of the urban soundscape as dominated by anthrophonies.

KEYWORDS: soundscapes, field recording, vacant lands, urban space.

1. Introduction

Proliferation of vacant lands has been a common phenomenon in cities undergoing shrinking processes (Deng and Ma 2015). Recent research on urban shrinkage has focused not only on the economic consequences of such processes (Fol and Cunningham-Sabot 2010), but also on the potential social and ecological benefits of the ecosystem services that vacant lands can provide when covered by vegetation (Burkholder 2012; Nassauer and Raskin 2014). However, the use and appropriation of these spaces by humans and animals has not been sufficiently explored. In project *NoVOID – Ruins and vacant lands in the Portuguese cities: exploring hidden life in urban derelicts and alternative planning proposals for the perforated city* (PTDC/ATP-EUR/1180/2014), we are exploring the sounds of urban vacant lands in Lisbon as a means to approach what we call ‘the hidden life’ of urban derelicts, meaning the human and non-humans appropriations of these spaces. While doing so, we are also listening to and recording an often unheard urban soundscape, dominated by geophonies and biophonies.

Our ongoing study aims at recording, classifying and mapping the soundscapes of vacant lands in Lisbon Eastern Zone (LEZ). In this paper, some preliminary results of our ongoing study will be presented, which include the identification of vacant lots and the classification of their soundscapes. The paper is divided in four sections. Firstly, we will approach the production of urban vacant lands and the issues related to listening to its soundscapes. Afterwards, we will present our methodology. Thirdly, we will present the preliminary results of our study, which include the classification of vacant lands in LEZ, and the classification of their soundscapes. Lastly, we will present some brief conclusions and the future steps of our research.

2. Learning from listening to urban vacant lands

In the last decades, the combination of processes of urban shrinkage and urban sprawl has produced a porous urban form in which occupied and abandoned spaces are scattered throughout the urban landscape (Florentin 2010; Deng and Ma 2015). Thereby, urban vacant lands, as well as ruins and empty buildings, have become recurring elements of the urban landscape. In economically dynamic regions, these spaces tend to be quickly reoccupied and regenerated; in peripheral or economically depressed regions, they tend to remain unused during greater periods of time (Brito-Henriques 2017). Yet, vacant lands are often thought of as spaces in transition that are merely waiting for human intervention, and their life is often unnoticed; not seen or not heard.

However, urban vacant lands are important for a number of reasons. They are important for vegetation growth, and it has been pointed out that “lawn grass, shrubs, trees and

woods on vacant land provides a variety of critical ecosystem services”, such as preventing soil erosion, improving water quality, preventing floods, or storing carbon (Deng and Ma 2015, 89; see also Kim, Miller and Nowak 2015). On the other hand, social ties can also be enhanced when these spaces become valuable public spaces where activities such as urban vegetable gardening take place (Burkholder 2012; Morckel 2015). Furthermore, these spaces are important for arthropods, birds, small reptiles and mammals that are searching for food, or for spaces to mate and to nest in (Gardiner, Burkman and Prajzner 2013).

Urban vacant lands also have particular soundscapes that are often unnoticed by urban dwellers. The sounds of urban vacant lands defy our common sense understanding of the urban soundscape. The sounds of the city are usually associated with the sounds of humans and human technologies. Most studies on urban soundscapes or listening in urban environments are in a way a by-product of such associations as they focus mostly on human-related sounds, such as communities of communication in public space (LaBelle 2010), personal stereos and radio (Bull 2007, McCormack 2013), cars (Bijsterveld, Cleophas, Krebs and Mom 2012), artistic performances (Simpson 2016, Doughty and Lagerqvist 2016), or church bells (Hernández 2004, Belgiojoso 2014). As places with myriads of simultaneous sound sources, urban soundscapes have also been traditionally defined by scholars as lo-fi (see Schafer 1994). As Wissmann argues,

The lo-fi environment of the city is often linked to electro acoustic sounds of the city. Traffic noise, electronic devices, and loudspeakers add to a cacophony that early soundscape researchers evaluated negatively. (2014, 87–88)

The lo-fi urban soundscape is often contrasted with the hi-fi soundscape of natural places where sound signals are clearer. This understanding of the sounds of the city tends to reduce the urban soundscape to anthrophonies, defined by Krause (2008) as human-induced noise which can be either electromechanical or physiological, and leave out the non-human – and nature-produced sounds (Matless 2005).

Listening to the sounds of vacant lands defies this definition of the urban soundscape. It unfolds a seemingly not-heard and not-seen space within the urban realm, one that illustrates that vacant spaces, like ruins, are the place we humans have left behind (Beasley-Murray 2010, Brito-Henriques 2017). In result, despite the fact that images of vacancy and ruination are a recognized part of the contemporary urban landscape, although often associated with marginality and postapocalyptic scenarios (Gandy 2013, Brito-Henriques 2017), the soundscapes of these spaces have been somewhat silenced.

Since derelict and vacant lands are places that, for a period of time, “exist outside the city’s effective circuits and productive structures” (Solà-Morales 1995, 120), others soundscapes that are not actively engaged in the human everyday life are more prominent. One

may argue that instead of anthrophonies, these places are filled with biophonies and geophonies – the other two basic active acoustic sources that Krause (2008) identifies – that signal the natural life that appropriates them. Biophonies can be defined as “emerging nonhuman sound produced by living organisms in a given biome”, and geophonies encompass “all the sounds produced by nonbiological natural agents such as winds, volcanoes, sea waves, running water, rain, thunderstorms, lightning, avalanches, earthquakes, and floods” (Farina 2014, 8).

The soundscapes of urban vacant lands are filled with such sounds, but these are often unheard, for two reasons. First, the sounds of vacant lands often have less volume than consolidated urban areas where anthrophonies dominate the soundscape. On the other hand, as vacant lands are often inaccessible for or not frequented by city dwellers, these low volume sounds do not usually reach human ears. As a result, the sounds of these spaces are left out of the recognizable soundscape of the city and urban vacant lands are often thought of as silent.

Yet, urban vacant land soundscapes have very distinct, quiet and soothing tonalities that could be valued by city dwellers, mainly as spaces that have been appropriated by nature. Natural spaces are often associated with certain types of sound that must be preserved for its harmony, musicality, and “complex but rich aesthetic (...) where not only birds but plants might sing” (Matless 2005, 750). The sounds of natural spaces within the city are also associated with slower life rhythms and a greater aesthetic appreciation (Wunderlich 2013). Vacant lands therefore provide interesting resources for a better quality of life (Rupprecht, Byrne, Ueda, and Lo 2015) especially given that direct contact with nature tends to be rare in the everyday life of city dwellers (Cox, Hudson, Shanahan, Fuller, Gaston 2017).

3. Methodology

Our study was conducted in two stages. Firstly, all the vacant lands of Lisbon municipality were identified and georeferenced in a geodatabase using remote sensing methods and high-resolution aerial photography. Lisbon is a city where the urban development model of the last decades has led to a fragmented urban growth that has produced several vacant lands (Brito-Henriques 2017). Lisbon Eastern Zone (LEZ) has a high concentration of vacant lands in its area, and for this reason it was selected as a case study to approach the soundscapes of urban vacant lands. LEZ is defined by Lisbon City Council as one of the five Units of Territorial Intervention (the others being the Historic Core, Central, North, and Occidental zones), and it includes four parishes: Beato, Marvila, Olivais, and Parque das Nações (CML 2017). A total of 142 vacant lands were identified in LEZ, which together amount to 101.6 ha.

In the second stage, a field survey with the purpose of characterising the morphology, vegetation, and animal and human occupation of the vacant lands was conducted. Following Matless (2005), we understand soundscape as consisting of sounds themselves, but also the material objects and subjects which produce them, and the social and cultural circumstances of the listening act. For this reason, we believe it was important to characterize the vacant lands themselves before mapping their soundscapes.

In this field survey 4 vacant lands that were now occupied were eliminated, and 2 new vacant lands were found, so the total number fell down to 140. We then eliminated 81 lots that had an area inferior to 3000 m², as we considered these too small for our study. Out of remaining 59 vacant lands, we were able to visit 48. We used a set of 9 variables to characterize the vacant lands (see Table 1). With this information, vacant lands of LEZ were classified through a cluster analysis and data was mapped. In this stage, we also conducted exploratory field recordings in selected vacant lands. We conducted 5 minute audio recordings in wav format (24-bit, 96 kHz) using the Zoom H4nsp recorder.

Table 1. Variables used to characterize vacant lands.

| Area | Terrain | Relief |
|------------------------------|---------------------------------------|------------------------|
| 3000 – 10000 m ² | Waterproof (stone, cement, tar) | Rugged |
| 10001 – 20000 m ² | Artificial permeable (cobble, gravel) | Flat |
| 20001 – 40000 m ² | Dirt | Mixed |
| > 40001 m ² | Vegetation | |
| | Mixed | |
| Water | Vegetation | Access |
| Puddle | Discontinuous herbaceous formations | Open |
| Brook | Continuous herbaceous formations | Fenced |
| Mallard | Woody and herbaceous formations | |
| Other | Predominantly Woody | |
| Vicinity | Traces of human occupation | Constructions |
| Residential Buildings | Utensils | Sheds |
| Non-residential Buildings | Clothing | Urban Vegetable Garden |
| Road | Furniture | Walls |
| Parking Lot | Litter | Small Ruins |
| Train\Subway\Tram | Graffiti | Other |
| Park\Garden | Trail | |
| Ruins | Parking | |

4. Sounding the unheard city

The methodology we conducted allowed us to classify the vacant lands in LEZ according to morphology and soundscapes. These results will be summarized in the following two sections. The first section presents the classification of urban vacant lands into five groups according to morphology, vicinity and traces of human appropriation. The second section regroups the vacant lands into three groups that share common traits in terms of soundscapes.

4.1. Classifying Vacant Spaces

Considering the variables listed in Table 1, a hierarchical cluster analysis of the vacant lands was conducted considering the method 'Between Groups Linkage' and the measure 'Square Euclidean distance'. For that, we used the software IBM SPSS Statistics. Thus, 5 vacant lands clusters were identified according to their morphology, occupancy (land cover) and situation (see figure 1).

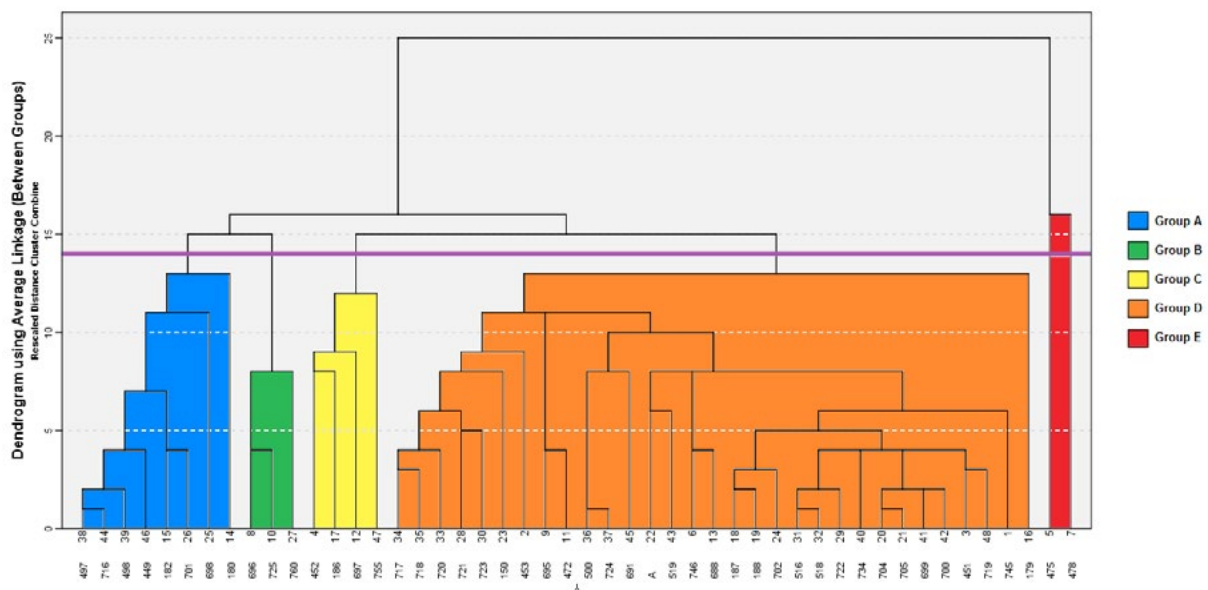


Figure 1. Dendrogram of vacant spaces in LOZ. Source: authors.

Afterwards, we used the vacant lands geodatabase to map the clusters, using ArcGIS 10. Figure 2 shows the spatial distribution of the clusters. The next section describes the main features of each cluster.

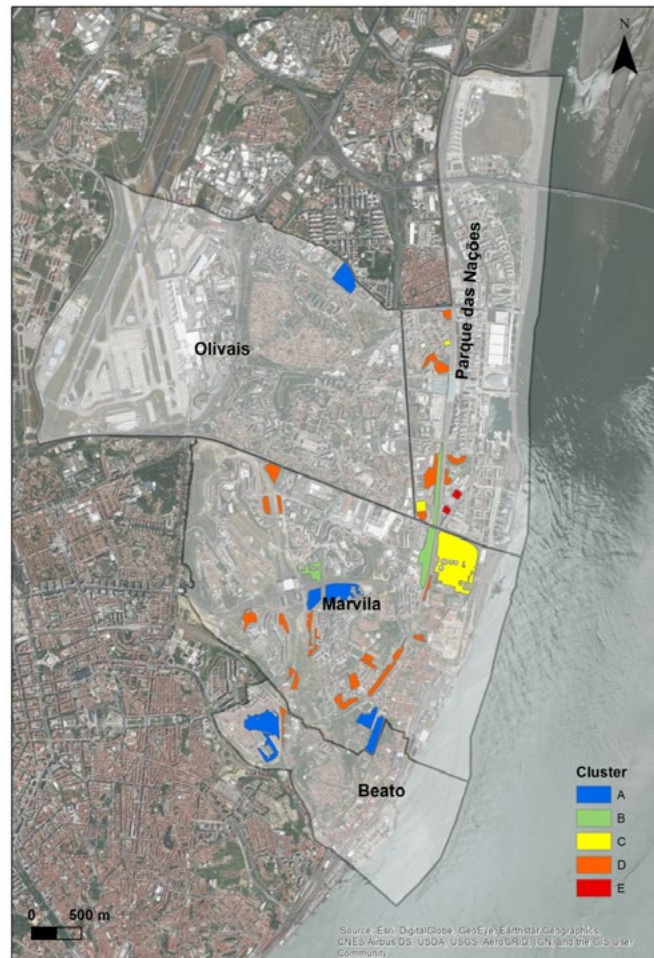


Figure 2. Clusters of vacant spaces in LOZ. Source: authors.

Group A – This group includes large vacant lots (more than 2 ha), which may be fenced or not. The relief of the terrain is usually mixed with some parts rugged and others flat. They usually have trees and the soil is mostly covered with vegetation, except in small parts that are covered with pavement. When these spaces are open, they are sometimes populated with animals belonging to humans. We have witnessed dogs and even horses and goats in some of them. Due to the presence of trees and large open spaces with vegetation, birds are often sighted. The greater part of these spaces, most likely due to the dense vegetation, shows no trace of human regular use. In result, the dominant sounds of the soundscape are birdsong and the wind.

Group B – This small group includes one medium sized (1.4 ha) and two large vacant lots (more than 2 ha) with flat terrain covered with (more than 1 ha) dirt, situated near train tracks or roads. Due to being covered with dirt there are no signs of animal or human appropriation. The soundscape is dominated by the sounds of the train or cars passing by.

Group C – This group includes vacant lots with medium or large dimensions (more than 1 ha) that have mixed types of terrain, i.e. they are covered with pavement in some parts and dirt and vegetation in others. They may be fenced or not. Some of these spaces show

one particular trace of human occupation that is not found in other spaces: graffiti, parking, or they are being used as a depot for a construction site.

Group D – This is the largest group and it comprises 31 of the 49 vacant lots in our sample. These are vacant spaces with a dimension between 0.3 and 2 ha. Most of them are completely covered with vegetation, or at least partially covered with vegetation. They are usually near residential or non-residential buildings, and roads. Most show some sign of human occupation, but they are very diverse. Soundscapes often contain a mix of songbird, wind and anthrophonies from the vicinity.

Group E – This small group includes two small fenced vacant spaces (less than 1 ha) completely covered with pavement in a dense urban zone (Parque das Nações). They show no sign of human utilization neither of non-human appropriation. Their soundscapes are dominated by the sounds of nearby streets: people, cars, construction work, among others.

4.2. Sounding Vacant Spaces

After classifying the vacant spaces according to morphology, vicinity, and traces of human occupation, we proceeded to analyze their soundscapes. We conducted 5 minute audio recordings in 21 vacant lots belonging to different clusters, which in total amount to 105 minutes of recordings. Our analysis consisted in classifying the sounds in the various recordings of each cluster according to the presence and intensity of geophonies, biophonies and anthrophonies. We defined three levels of intensity of sounds related to their temporality: strong, when the sound is persistent throughout the recording; moderate, which means the sound occurs more than once in periods of less than 60 seconds; and weak, which means the type of sound does not occur or only occurs once during a period of less than 30 seconds. Due to the similarities of the soundscapes in some of the groups we identified in the cluster analysis, we reduced them to three groups in terms of soundscapes. Table 2 describes their distribution per cluster and group and Figure 3 shows the spatial distribution of each group.

We summarize the characteristics of each group below.

Table 2. Presence and intensity of geophonies, biophonies and anthrophonies per cluster and group.

| Cluster | Geophonies | Biophonies | Anthrophonies | Group |
|---------|------------|------------|---------------|-------|
| A | Strong | Strong | Weak | 1 |
| B | Weak | Weak | Strong | 3 |
| C | Moderate | Moderate | Moderate | 2 |
| D | Moderate | Moderate | Moderate | 2 |
| E | Weak | Weak | Strong | 3 |

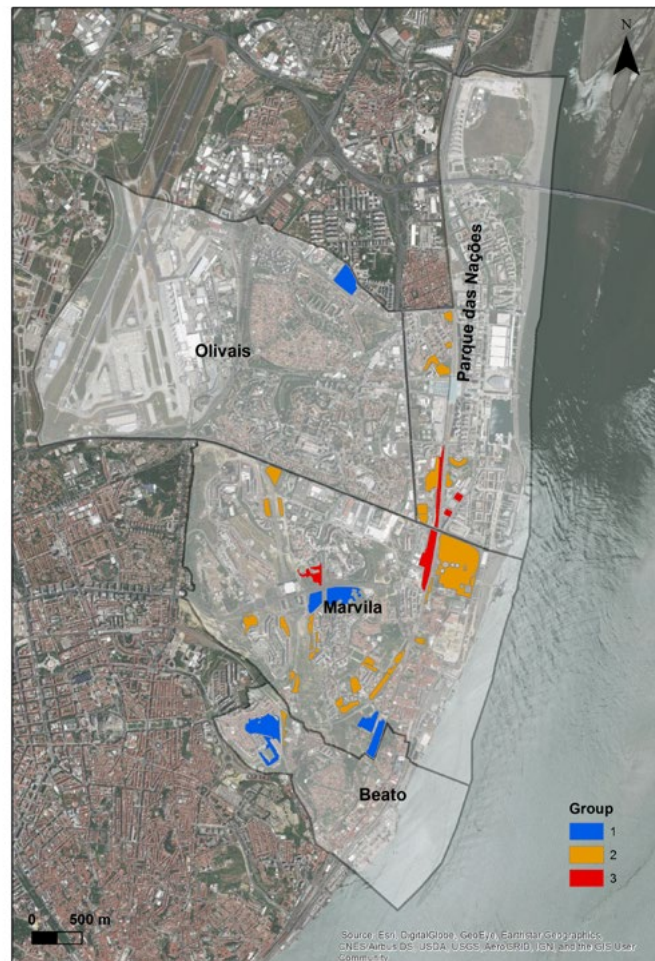


Figure 3. Groups of vacant spaces in LOZ. Source: authors.

Group 1 – Almost natural

This group matches Group A from the morphological and positional cluster analysis. Due to the large size of these lots, which are in some cases fenced, much of their territory is far away from areas of human activity. In addition, these lands often have trees, shrubs, and large fields of herbaceous and gramineous vegetation which cater to birds, mammals and arthropods who find food, shelter or nesting spaces in them. For these reasons, the soundscapes of these vacant lands are filled with biophonies and geophonies. Birdsong dominates the soundscape, but the hi-fi quality of its sounds allows us to hear the wind clearly, as well as our own shoes stepping on the vegetation or the rocks and sand of trails. Although urban vacant lands do not exactly ‘return to nature’, as Nassauer and Raskin (2014) have argued, these lands are occupied by ecologies of non-human life that make them sound almost natural. The sounds are often low volume, so these soundscape tend to be quiet and soothing.

Group 2 – Mixed

This group unites clusters C and D. They are in general medium sized lands that are close to residential or non-residential buildings, and roads or rail tracks. For this reason, their soundscapes are a mix of geophonies, biophonies and anthrophonies. The field recordings of these spaces contain the most varied sounds, but they are organized differently in terms of acoustical space. Anthrophonies come mostly from the surroundings of vacant lands: the noise from a construction site, tires and horns from cars on the road, people on the streets, children at a school's play yard, ambulance sirens, a plane flying by, or a train passing by. Sometimes, biophonies also come from outside the vacant lot, when urban public or private spaces contain animals. For instance, we can hear a chicken that was in a backyard in Parque das Nações in one of the recordings. More commonly, we can hear songbird that come from nearby trees on the street. From the vacant lands themselves, songbird and the sound of the wind are the mostly audible. As these sound sources are closer, they are also clear in the recordings. As the volume of the sounds that come from the vicinity is sometimes high, they mask most of the sounds that emerge from the contact between our bodies and the space. These soundscapes are either lo-fi or hi-fi, depending on the period of the day because the level of human activity on the vicinity changes. Likewise, the volume of these soundscapes is subject to great changes. Given that this group encompasses most of the vacant lots (35 out of the 48 we visited), this can be said to be the most characteristic soundscape of urban vacant lands in LEZ.

Group 3 – Least Resistance

This group merges clusters B and E. These are lands which, because their ground is covered with dirt or pavement, do have not much vegetation or other resources that cater to humans or animals. For these reasons, these spaces are generally empty and therefore actually somewhat silent. As places with no sound sources and also no elements to provide resonance or acoustic impedance, the sounds we can hear in these lots are the sounds from the vicinity. Thence, these spaces can be seen as a kind of sonic heterotopia, as their soundscapes are a mix of sounds coming from different places: roads, playgrounds, parks, streets, houses. In each of these lands, we can hear a specific ensemble of sounds that originate from two or three very distinct sources, some of each are not often heard together.

5. Final remarks and next steps

The results of our study highlight the agency of non-human elements in the creation of urban soundscapes. As we have seen, vacant lands with different morphologies and situations generate distinct soundscapes in which geophonies, biophonies, and anthrophonies play different roles. Soundscapes from this perspective have a material composition

(Matless 2005): the morphology of vacant lands not only provides geophonies as the wind shakes grass, branches and leaves, but also cater to animals that provide biophonies.

By listening to, classifying, recording, and mapping the sounds of vacant lands in LEZ, we have heard an urban soundscape that defies common conceptions of the urban sonic environment (LaBelle 2010, Wissmann 2014). Biophonies and geophonies make themselves heard as much as, and sometimes more than anthroponies.

The next step of our investigation is to extend the study to other areas of Lisbon municipality, and Guimarães, a medium sized city with a diffuse urbanization. We will apply the same methodology to these spaces. After this, we will georeference the field recordings to generate a map of the soundscapes of vacant lands in Lisbon and Guimarães. This map will be made available to the scientific community and general public. In addition, we are preparing a public exhibition on vacant lands of Lisbon and Guimarães which will present the soundscapes map, some field recordings, and other studies currently ongoing in project NoVOID on the variegated uses of vacant lands in Lisbon.

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