ESCAPING WIND: Form Pensile City on South Bridge Through the Wind

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Abstract. By reorganising the wind to form a pensile city so that more sociological and Technological wind towers can be infiltrated and offered to people to escape is the ultimate goal of my project. Guattari said "The problem of ecosophy is the problem of the production of human existence itself in a new historical context". [1] The problem of ecosophy is the problem of the production of human existence itself in a new historical context. Ecology is inseparable from historical civilisation, and behind every environmental problem there is a human social problem. Edinburgh, the capital of Scotland, has been 'notorious' for its environment, despite its growing status and the size of the city. The History of Scotland refers to Edinburgh's Old Town as a "cramped and fetid district", and "the smoke from the numerous charcoal fires and the stench from the countless pieces of rubbish thrown away by people gave Edinburgh the nickname 'Auld Reekie'. This was the most obvious problem of the old city of Edinburgh, and the source of the desire of those who lived in it to escape. 18th century urban expansion gave the rich a chance to escape to the new city, but those who remained continued to live miserably in the old city. Along with the environmental and ecological problems came the social problem of the lack of public space. Although there are many differences between the New Town and the Old Town in terms of planning structure and architectural form, wind is a common element throughout the New Town and the Old Town, but it is also present in different vehicles that travel through the city. For example, in a relatively closed and small space like the Old City, there are few opportunities for people to communicate with each other by sight or face-to-face, but sound, as a carrier of wind, can be a low-cost but efficient medium of communication, allowing people to communicate with others through their own windows, play music, etc. Wind can also leave traces on stones and other materials, for example, in this ancient city made of stone. In the old city, for example, the stones are weathered by the wind and the rain to create a more permeable weathered stone, which gives the plants a good environment to grow, as can be seen in the contrast between the new city and the old. So the wind transmits the past and the present in Edinburgh, connecting different spaces, different classes of people, becoming a common memory for the old and the new city, and still innovating. Therefore, wind is not only a medium, but this thesis will investigate its instrumentation and use it as a methodology for design solutions, exploring the relationship between public space and wind penetration. Pensile city and flight line were developed by Piranesi and Gilles Deleuze. Pensile city refers to the layering of buildings and infrastructure to allow the landscape to permeate the city, flight line offers a way and a route for people to release their desires and seek a more comfortable public space by promoting them, which is also applicable to the city of Edinburgh. The methodology I hope to use to form a pensile city in Edinburgh and thereby infiltrate more public space in response to the desire to escape from urban sprawl, seeks to find a way to regenerate the city of Edinburgh and achieve a sustainable urban development. Finally, the project is being tested at south bridge.

Keywords: Edinburgh new visualization; Pensile urbanism; Parasituation; Thick and thin space; Gesture.

1. Introduction

Looking down on the general plan of Edinburgh, Edinburgh Castle divides the city into north and south, the crowdedness of the old city contrasting with the orderliness of the new. The decision to build the New Town was taken as early as the 18th century, when Edinburgh decided to build a suitable modern layout in the new suburbs north of Edinburgh Castle because the old city walls were already overcrowded with inhabitants and the outdated urban structure was no longer suitable for the
professional and merchant class living there, and to avoid many of the wealthy and powerful moving to London. As the various stages of urban expansion developed, the rich moved north from their former cramped and enclosed places to the wide new town, yet the poor continued to live in the old town, but they still had the desire to escape. So Edinburgh's mechanical city expansion did not solve the fundamental problems created by the old city.

In order to comprehend the interactions between ecosystems, the mechanophore and the social and individual Universes of reference, we must learn to think ‘transversally’. [2] The South Bridge is a physical medium that connects the old city with the new. When the South Bridge was first built, it was intended to connect the old city to the new and thus to facilitate the expansion and development of the city as a whole, but as it was used, water leaked from the inside of the bridge and, because the underground vaults were so confined, the wind stayed in the space and could not carry the wetness away. Eventually the underground vaults of the South Bridge were abandoned and thus affected the surrounding building space, which made the already narrow and closed space of the old town even worse. On the other hand, this area is densely populated, mostly efficient residential and commercial, with a lack of public space, while the desire for views and air pollution cannot be ignored. Therefore it is of greater importance for this area to integrate the circulation of wind and to give people a more comfortable experience of public space.

2. Chasing Wind

2.1. Site Research

Edinburgh, the capital of Scotland, has been "notorious" for its environment, despite its growing status and size. The History of Scotland refers to Edinburgh's Old Town as a "cramped and fetid district", and "the smoke from the numerous charcoal fires and the stench from the countless pieces of rubbish thrown away by people gave Edinburgh the nickname 'old smoky'. This was the most obvious problem of Edinburgh's Old Town, and the source of the desire to escape from it, and the expansion of the city in the 18th century gave the rich a chance to escape to the New Town, but those who remained lived miserably in the Old Town. Southbridge in the Old Town is the most typical of these.

Connected to the North Bridge and the Royal Mile, South Bridge carried a large part of Edinburgh's traffic and was also a busy commercial area in the Old Town. The completion of the South Bridge has brought obvious benefits to Edinburgh, solving the need for transport, providing more jobs and living space, while the vaults underneath the bridge have provided a variety of public spaces and enriched the activities of the locals. However, in order to earn the cost of building the bridge, two rows of buildings were built on either side of the bridge to develop commercial and residential businesses, while many commercial activities were also carried out in the vaults under the bridge. Because the government was only thinking about maximising profit, it neglected the quality of the use of the space, which eventually led to the South Bridge not operating as expected, and with constant use, the interior of the bridge developed leaks and the walls of the underground vaults were filled with wetness, while at the same time, because the underground vaults were very confined, and the absence of wind, caused a constant The dislocation and fragmentation of the relationship between wind and wetness created a series of chain reactions that led to a qualitative change: the perennial wetness was a major drain on the health of the people who lived and worked in the vaults, and on the quality of living there. The lack of wind and the increasing wetness eventually led to the abandonment of the vaults underneath Southbridge, affecting the urban space and human behaviour. Even now, the environmental problems and the lack of public space in Nanqiao, located in the old city, are still the main reason why people have the desire to escape, due to its special location and urban function. Like a word which Guattari mentioned: ‘mechanophore’, ecosystem change does not just exist on its own, we should look beyond it and think about the nature of things and how it is connected to other things. So Louis kahn said "I say that it is in the inherent nature of things. The order of light, the order of
water, the order of wind in building a house, you will realize that it is not a collection of systems but something that is true to its nature.” [3]

This is why it is important to create a sociological and technological public space in Southbridge through the design of the project, a space where people can escape, which is also related to the reorganisation of the spatial order.

2.2. Where is the wind

The wind has become an integral part of the South Bridge. Firstly, it is an environmental issue, as the vaults underneath the bridge are closed off, preventing the internal wetness from being carried away, but the addition of wind improves this situation, and as a commercial area, the constant flow of traffic also causes serious space pollution in Southbridge, and the need for wind throughout the site cannot be ignored. But the accumulated dampness over the years is no longer just an environmental problem, the increasing wetness has changed the spatial structure of Southbridge. The initial design did not take into account the interaction between the buildings on the edge of the South Bridge and the vaults inside the South Bridge, allowing each to contribute to the other, but simply covered the outside of the bridge, another symptom of irrational urbanism: the life and interests of the aristocracy were taken into account, not the quality of life of the rest of the population. The spatial structure of the South Bridge has now changed, and this fragmentation has become even more pronounced in the buildings on both sides, with a clear boundary between the ground floor and the upper floors, which makes it difficult to develop commercial activities with specific spatial needs, and also results in the waste of vacant space on the upper floors. Space, linking the various elements together.

The wind is invisible, but it is present in another way: it finds many vectors and uses them to express its presence. As Luce Irigaray says, we should reawaken our sense of touch to let people know they are alive and can feel the connection with nature. [4]

We should use all our senses to feel the wind: hearing, seeing and touching. Sound, stones, music, plants, indoor furniture, etc. can all be carriers of wind, and wind manifests itself in different ways on different carriers. For example, when sound becomes a carrier of wind, the sound can be carried further by the wind. Another example is when plants can sway with the wind, and dandelion seeds can be carried by the wind to grow further away. The contrast between the dryness of the space above the bridge and the wetness of the space below is most impressive when one is in the South Bridge and the vaults below it. The stone materials used for the construction of the bridge have developed many water stains and tiny holes after centuries of exposure to the elements, but they are dry and show no signs of plant growth; in contrast, underground, the walls are covered in water droplets and the pavement has become slippery due to the confinement of the space and the lack of wind circulation, an environment that has encouraged the growth of some moss plants. The conditions exhibited by these stone materials also reflect the conditions of the wind in these places, so that the carrier of the wind here is these stone materials. The wind connects human relationship, environment and human subjectivity transversally through different vectors, providing the necessary conditions for our next research.

3. Escaping

3.1. Pensile City

Firstly, in order to redesign the public space in Southbridge and in the Old Town to develop a new approach to urban regeneration, researching the history of the city of Edinburgh should be the first step to be taken. Only with a comprehensive understanding of the city's past can we better analyse the present and have the opportunity to propose ideas for the future. Looking at historical maps of Edinburgh, from 3000.b.c to the present, it is easy to see that because of the topography, designing transport became the most important part of the city, such as how to solve the height difference, how to connect two places, how to expand the city, etc.. This we can see roughly from some historical
plans. But when we look deeper into the plans of the city at different times, we see that as the city grew, Edinburgh began to be divided on more vertical and horizontal levels, including the renovation and extension of houses, the construction of bridges and closes. These elements are constantly overlaid and interwoven in the plan, much like the pensile city. By studying the map of 1850, South Bridge was built to connect the old town with the new one, just like a vital part of machine to bring great changes to the city, but at south bridge we can see more clearly that the urban space became more crowded, for example, the constant flow of traffic, especially during peak commuting hours, the noise that affects the inhabitants of the area, not to mention the exhaust fumes from the cars, and the addition of some blocks in areas with a high density of buildings, which makes the area particularly oppressive. It's as if the various elements come together here, but don't work well as a system. I wondered if we could get more space above and below ground if we could suspend some of the urban elements.

Piranesi thought that the pensile city is a double-faced concept: 'pensile' buildings and ' navigable' infrastructure, the first regarding architecture, the second urbanism. Between the two there is no hierarchy: architectural design is independent from urban planning. [5] That is to say, the city is divided into two layers, one for architecture and the other for infrastructure, but the buildings are not physically suspended in the air, as in the case of Rome when it was first founded, because of the topography, the buildings had to be built on the hills and the ground floor was used for transportation. The disjunction of infrastructure and architecture allows landscape to permeate the entire city," [6] says Vries. The disjunction of infrastructure and architecture allows landscape to permeate the entire city." This means that architecture and infrastructure are located on different levels of the city and the transition between them is the landscape. The landscape is not only the actual vegetation, but also the landscape that people can see.

Let's look at Edinburgh here, where the complex undulating topography gives the city the natural advantage of height differences to stratify buildings and infrastructure. In fact this has always been the case in Edinburgh and indeed in Northbridge. Throughout the city's history, Edinburgh has sought to add layers so that the landscape can permeate every part of the city.

In the past, due to a number of engineering problems, the inhabitants of Edinburgh were not able to suspend the entire city and had to build their houses on the ground, but this did not mean that people gave up the pursuit of views, as evidenced by Edinburgh Castle, which sits on the Castle Rock, above which one can see the whole of Edinburgh.

As the city grew and engineering skills improved, Edinburgh began to make a conscious effort to create more vertical layers.

It is not only the housing that has been transformed, Edinburgh has also significantly increased its infrastructure of bridges and closes to create more space to integrate the landscape into the city.

So could Southbridge become a pensile city? The spatial conditions of the South Bridge itself offer the possibility of a pensile. When the South Bridge was first built, it was designed to meet the needs of traffic, but it also divided the site into several heights, and 19 arches were built underneath the bridge, which in time became the logistical space for the businesses on both sides of the building, a refugee shelter and housing for some homeless people. It is easy to see that during the development of the site, bridges, arches, houses and additions have appeared, and that these infrastructures have worked together, but at the same time problems have arisen: traffic jams, underground vaults closed, air pollution, water, wind, noise, etc. At the same time the desire of the people to solve these problems cannot be ignored. The penetration of the landscape is the aim of pensile city, but here in Southbridge the landscape does not only refer to the ecology, but also represents a public space for people to escape.

Vries mentioned “With respect to architectural form the components are fragmentation and complexity, while their interaction is articulated on a third level, that of informal in-between space. Together, these features compose flight lines that express longings for spaces around the corner and beyond the frame.” [7] The term "flight line" was first mentioned by Gilles Defeuzie in his book "A Thousand Plateaus". He originally meant a widespread phenomenon in society. Here, vries relates it
to the pensile city, and I think of the flight line as more of a glue for the spatial fragments, as Vires says, the different parts of the urban architecture are linked together in an informal in-between space, more like the different components of the building are reorganised in space through the orientation of the flight line A new order is achieved. Southbridge itself has many forms of spatial fragments, and what we are trying to do is to reconnect them to form a new system that works together.

3.2. Wind instrument

In the course of our design research, we discovered that the clarinet, a wind instrument that works with the body of the instrument through various shapes and materials, its working methodology was a great inspiration for us to use the characteristics of the wind to connect the various parts. In DP1, we have continued this logic with the development of our wind methodology, forming a working system of FABB in Southbridge, which has resolved the environmental issues to some extent. However, the conflict with the outer buildings is still not well resolved. So in DRP, the wind tower was therefore chosen as a tool to reconnect the fragments of the Southbridge space, taking advantage of people's desire to escape to re-route them. "Landscape offers the escape that architecture shapes"[8] This is why the wind towers have created the pensile city of Southbridge, which is not only an important tool for the integration of space, but this also allows for the infiltration of more landscapes (public spaces).

3.3. Forest Order

From the current state of the site research, the use of wind (wind towers) to reorganise the spatial order is key to the formation of a new public space in South Bridge. Emanuele Coccia mentioned that they don't have hands with which to shape the world, yet it would be hard to find more capable agents when it comes to the construction of forms. [9] Nature makes the world, and everything can be found in nature. From this essence of communication, the various ways of reflecting our inner thoughts can be called gesture, so we investigated the Caledonian forest as a metaphor for our design, hoping to explore the relationship between wind and the spatial order of the building through the relationship between wind and forest. Thousands of years ago there were few trees and little biodiversity in Calendonian forest, but as time progressed the forest became lush and began to take on elements such as branches and leaves, and as the humidity continued to increase, mosses were drawing in nutrients and growing. The forest becomes more and more elemental and at the same time the wind changes, so I wanted to capture the change of wind in the forest to find the different spatial patterns of the forest that correspond to different periods. The relationship between 'machinic ecology', Pensile urbanism, and the 'mechanosphere' is explored through the study of how the various parts of the forest work together to create such stable ecosystems.

Because we could not capture the wind directly, we used forest elements such as branches, leaves and moss to simulate the relationship between the thickness of the plants in the forest at different times of the year, and then used spray to simulate the wind, thus producing a map of the wind patterns on the back panel. From the results, different plant relationships produce different concentrations and forms of pigment: the thicker the pigment, the stronger the wind, and vice versa. The correspondence with the plants is that the thicker the pigment the sparser the plants and the more detailed and lighter the spatial pattern produced in the forest; the lighter the pigment the denser the plants, the less wind can pass through and the heavier the spatial pattern produced in the forest. The distribution of different concentrations of pigment also reflects the variety of spatial order in the forest, from centripetal to punctuated scattering. Through the images, we can see that as the forest grows, the small spaces in the forest increase as the number of branches, mosses and other elements increases, and the final rendering contrasts with the initial images. Through the representation of the wind, the self-spatial restructuring of the forest has given me great inspiration to use the forest as gesture to help me think about the relationship of spatial order in the Southbridge site, thus forming the prototype of a new public space.
3.4. Space Order

The space under the South Bridge and the space above the bridge are both highly efficient government structures, which exist for the betterment of the public, and their spatial forms are mostly homogeneous, and homogeneous space has always been the core issue of modernism, which reminds me of Louis Kahn's servant space and served space. Rather than simply accepting the idea of homogeneous space, Louis Kahn, after studying and reflecting on the international style of architecture, boldly broke with homogeneous space. Louis Kahn discovered a new way of dividing space within the geometric order of the structure, and in doing so he established a theory of space that 'serves' and 'is served'. Simply put, the effect of a single homogeneous space cannot meet the functional needs of reality, and there is a category of spatial properties that provide functional services to other spaces that need to be separated from the homogeneous space, which he called 'service' space, and the type of space that is provided with services is called 'served' space. The space being served is called the "served" space. "The structure should be equipped with facilities that meet the electromechanical requirements of the room and space," says Louis Kahn. As in the salk institution designed by Louis Kahn, a thin space for equipment on a separate floor provides the entire building with the air circulation system required for the biology laboratories and the different public spaces servant space and served space are not confined to the building space, they can be structures, infrastructure, furniture, etc. The same kind of space form was found in Baghdad, where the relationship between servant space and served space has been redesigned in response to the needs of the community in single-family housing. [10] This spatial design logic helped me to refine my methodology, using wind towers and a series of servant space and served space generated by the Caledonian forest to reorganize the spatial order of the South Bridge to form FABB agencies, forming a pensile city at the South Bridge. This transversal design provides a place for people to escape, thus balancing human relationship, environment and human subjectivity.

4. Success in Escaping

4.1. FABB Agencies

FABB Agencies is a specific approach to form pensile city in Southbridge. A proper FABB can improve the environmental and ecological problems within the site while changing the spatial organisation and human relations of the users. It is a system that works in Southbridge and eventually extends to the whole of Edinburgh's Old Town, exploring a new approach to urban regeneration.

Southbridge is an important transport node linking Edinburgh's Old Town to the New Town and, as summarised in the previous chapters, the problems of Southbridge can be divided into two aspects. The first is an environmental issue and the second is a social issue, so how to improve both aspects within the site was central to the design of FABB. Firstly, I wanted to bring the wind into the interior of the South Bridge, blowing away the dampness and acting as a link between the inside and the outside of the bridge. The wind tower solves this problem and brings sunlight underground, providing better physical conditions for the plants to grow. The wind not only directs the movement of water vapour but also acts as a medium to transmit information, so we wanted to use the wind as a medium to transmit sound and music to connect people, to attract the neighbourhood, to provide an escaping space for them to come in.

We have therefore defined FABB as follows: Factory refers to the rehearsal rooms and workshops; Amenity refers to the underground concert hall, improvisation area and music-related pavilions; Bed refers to the performers' lounge area and music restaurant; Butt refers to an environmental system designed to address the issues of wind, light and water, including wind towers and some service spaces. Butt refers to an environmental system designed to address wind, light and water issues, including wind towers and service spaces.

Next I will explain FABB agencies in terms of four different scales: body, building, set and TLML. For the body scale, the focus is on the human experience of spatial scale, allowing people to
communicate with nature through architectural tectonic and material; for the building scale, the focus is on how wind towers operate within the site, both environmentally and socially; for the set scale, the focus is on how FABB agencies are a system that works together in Southbridge, providing a public space for people to escape. The set scale focuses on how the FABB agencies work together as a system in Southbridge to provide a public space for people to escape; the TLML scale focuses on urban regeneration and sustainable urban development in the context of the old city.

Drama Theater acts as Factory focusing on the logistics organisation. wind as enzyme in the organs breaks the boundaries between the organ and bridge system and integrate the chimneys with vaults to form theater. Being at the lowest point of the south bridge, theater needs to integrate logistical functions and public transport needs from cowgate to south bridge. It is also the wettest location, so how to improve ventilation and create a pleasant environment with vaults is a practical problem to be solved by the wind organ.

Music studio is also located near cowgate, but it is close to Blair Street. Similarly, after the rehearsal hall, the office and the musical instrument store are hung up, a grey space is formed between them. The wind tower has holes in these gaps. Near the holes the wind frequently comes in and out, and wetness gathers here, which provides an opportunity for plants to grow. Gradually, plants will spread from here to the whole space. This building and Cowgate are located in a low-lying area, and the rainy climate in Edinburgh makes it easy to form waterlogging here, which makes the street environment muddy. Plants may be able to use wetness and turn threats into vitality. Because the roots of plants have the function of fixing soil and preventing soil erosion, the plants themselves will also absorb water. A flower shop is set up in ground floor. The working area of the flower shop is not confined indoors, but spread to the outdoors. Around the flower shop, there are ditches and pools for water storage, which provide water for plants to grow. The muddy cowgate has become a beautiful and vibrant bridge because of the flower shop.

By breaking the vertical boundaries, the heterotopic wind tower, with its flora and fauna and its own characteristics, not only ameliorates the problems of the South Bridge, which is damp, enclosed and without natural light, but also acts as a vehicle for the exchange of music between people in different spaces. In this way, the South Bridge and the spaces on either side of it are no longer merely in physical contact, but are linked together by the heterotopic Wind Tower.

The wind tower is surrounded by many entertainment venues: restaurants, bars, etc., but the original entertainment program may not be able to satisfy people's needs. It is therefore possible to use the site as it is to design it in such a way as to maximise the resources already available on the site. As the main audience is the people who come to the concerts and the performers who are preparing to take a break. So I used the wind towers to form large and small music restaurants, music bars and lounges, here the pensile city is formed, allowing more plants and sunlight to enter the building. Using sound to draw people in and guide their escape routes.

I wanted people to be able to experience the different spaces by walking through them, while connecting them through sound, enjoying and participating in these moments of leisure. The staircase around the wind tower is therefore designed to allow users to reach any corner of the site. In contrast to a conventional staircase, the interior of the wind tower is set up with a view and the wind itself brings an additional experience to the walk. At the same time, the different spatial properties at different heights offer different leisure experiences: up to the top terrace to enjoy the view and down to the ground floor restaurant to experience the life style of the people of the past.

The wind towers are an important means of solving the environmental problems of the site: on the one hand, they break the vertical constraints and bring sunlight into the enclosed interior of the South Bridge; on the other hand, the wind from the towers removes the water vapour from the interior and improves the internal air environment.

We do not consider the water vapour inside to be superfluous, it is just in the wrong place. We have chosen to install a water pipe in the middle of the double wall that forms the wind tower to collect the water inside and filter it to water the plants inside the wind tower. At the same time the plants themselves purify the air, thus further enhancing the experience of use.
Thus, the wind tower, the water and the plants form a closed-loop environmental system.

4.2. Capricci

Among the theoretical histories of architecture is that of Giovanni Battista Piranesi, an Italian architect from the eighteenth century, whose engravings and some of his works on architectural monuments are known for their boldness and criticality. His central idea was that as heirs to the Etruscans, the Romans were logically the inheritors of an architectural tradition of which Greek architecture was only one branch, and that it was Rome that created the great empire. Piranesi’s creative spirit guided him in creating many of the buildings of the future, and his work is characterised by a lineage with the spirit of ancient Rome. It is easy to see his free, unrestrained creative style in his works, his unbridled imagination and the scale, detail and decoration of the monuments he portrayed.

‘The Imaginary Prisons’ is one of the etchings in Piranesi’s ‘Architecture and Perspective Part I’, published in Rome in 1943, and the prison is a static painting, but it seems to contain a number of Piranesi argues that it is in the nature of all things that one always needs to create something new out of something old. People need to experiment with innovation. [11] Piranesi chooses the former between the imaginary and the real, and this allows his work to find a specific balance.

Capricci seems to be a kind of transformation of Piranesi’s painting, capturing both the past and the present of the scene, archiving them together while leaving enough room for future scenes, [12] which helps us enter the final phase of Para-situation [Edinburgh].

Capricci I is a drawing of the view from the south bridge level. Bed-ramble pub is a vibrant subjectivity that gives the wind the opportunity to enter the building and participate in its story by highlighting the concrete masses of the façade and its unique architectural tectonic. At the same time it expresses how the wind tower system extends from the body scale to the building scale and in turn affects the whole neighbourhood, and the drawing looks at the future of the wind tower system in Southbridge by contrasting the past with the present, providing a public space where people can escape to create a new, vibrant ecosystem and social relationship.

In the past, the lack of properly designed downpipes in the residential buildings in Southbridge meant that many people living on the upper floors would pour faeces directly from their windows onto the ground, and the fact that Southbridge has always been a central area for traffic, with many horse-drawn carriages passing through, has contributed to the environmental degradation of the area. As you can see from the picture, the buildings and grounds with historical activity would have become dirty and worn, which is in contrast to the wind tower buildings that have been added now. The addition of the wind tower has improved the environmental problems and also added more public activities. The music restaurant and music bar inside the wind tower contrasts with the shops and chatting residents of the past, the wind tower gives more possibilities to the place, the past and the future exist at the same time, giving more room for fantasy in the future.

In the future of Southbridge, the wind tower, with its unique ecological circulation system, plants grow from the inside of the tower and spread step by step to the roofs of the surrounding buildings, where their photosynthesis and evaporation will bring a whole new ecosystem to Southbridge. At the same time the plants spread through the wind holes in the building façade (including the wind tower system itself with some air permeable tectonic) and affect the Tron Kirk across the street, where a large stepped terrace at the entrance to the church provides a good opportunity for plant growth. The spread of the plants will not only bring about a change in the ecosystem, but will also spread the musical activity in the wind tower system. The music spreads through the site by the wind, constantly influencing the relationships between people, plants and society.

Capricci II is more about the detail of the body scale, showing how the wind tower is linked to the music restaurant and the original old building, and how it functions here, using the wind to regulate the relationship between Human subjectivity; human relations; and the environment.

The wind tower is at the centre of the image, with a stone wall of the original building to the right, where past and present meet. A circular staircase rises up around the wind tower, and the carefully
designed handrail of the staircase can become an interactive device between people and the wind tower, where people can linger, enjoy music and beer while observing the inside of the wind tower, and even see the activity in other rooms through the window opposite the wind tower. The sound of the music restaurant is transmitted through the wind tower to other spaces, while the sound of other spaces is also transmitted through the wind tower. The interior design of the home continues the pensile city concept, with a double suspended dining table made of steel bars and wooden panels giving space for plants to penetrate and more space for people to move around on the floor, such as playing and dancing.

In the future, the plants inside the wind tower will spread into the interior with the windows that can be adjusted for airflow, and the grid of wooden strips in the ceiling of the dining room gives the plants more opportunities to grow along the ceiling and onto the furniture.

### 4.3. New Visualization

According to Guattarri's theory, it is through the singularity of individual subjectivity that the specificity of group subjectivity is promoted, so that the whole ecological difference and harmony can coexist and together form an atmosphere of sustainability. [13] So once FABB agencies have developed a system for regulating work in Southbridge, it will have to continue to be tested across the city to create more impact and change.

“The meaning of “archive”, comes to it from the Greek arkheion: initially means a house, a domicile, an address, the residence of the superior magistrates, the archons, those who commanded” [14] the city is an archive, it records the history of the city and in a way it guides us on how to enter it. To enter the city is to enter its order, we need to reorganise the archives and learn based on its past, and the wind tower system is a good way to find our way through this orderly system.

The wind tower system is a polycentric urban system, characterised by multiple levels and elements, each of which is relatively independent and interdependent within the city, a system in its own right, and a more complete system when multiple systems are operating together. Its impact on the city remains significant and diverse. In Edinburgh, the wind tower system is located in mixed residential and commercial areas, as in Southbridge, where the residential areas give the wind tower system its motivation and the commercial areas give it more potential. Such areas, as the most vibrant parts of the city, can better develop the wind tower system and contribute to the sustainable development of the city of Edinburgh. Form its new visualization.

### 5. Conclusion

This paper analyses the problems caused by Edinburgh’s urban expansion during the auld reekie period and uses the theory of the pensile city to build a new Edinburgh city based on a system of wind towers to address the environmental and social problems that arose.

Through our research on the South Bridge site, we found that the closure of the underground arches and the overloading of the bridge level traffic have led to serious environmental problems, the deterioration of the environment has also led to the fragmentation of space and social tensions, the need for public space and landscape cannot be ignored and wind has become an essential element of the site. In 'The Three Ecologies', Guattarri Felix suggests three different approaches to deal the current ecological issues: "a nascent subjectivity, constantly mutating socius and environment in the process of being reinvented." [15] And Vries mentioned that the infrastructure is not on the same level as the buildings, so much so that the landscape can permeate it. [16] The addition of landscape not only brings about ecological change but also balances the three relationships of Human subjectivity; human relations; and the environment. In the design process, I was inspired by the wind instrument, whose parts work in harmony to make beautiful music, so I designed the wind tower as a regulator for the South Bridge, regulating its wetness, space and people through the wind. The addition of the wind tower gives the South Bridge the possibility to become more of a pensile, it allows for more public space and landscaping to be incorporated. So we looked for the trajectory of the wind in the
calendonian forest, exploring a series of public spaces by re-organising the wind order, and finally re-organising the spatial order in Southbridge according to Louis Kahn’s theory of service to the space served, forming the Sociological and Technological wind tower.

Finally through FABB agencies a musically relevant system is formed in Southbridge, which together regulates the ecological environment and social relations in Southbridge. At the same time the city is always in operation, it is dynamic and therefore the wind tower system needs to be diffused into the city of Edinburgh, creating a sustainable eco-city. At the same time this could become the urban paradigm of the new Edinburgh. This is not just a natural ecology, it should also be a unique mechanical ecology, just as Southbridge is for Edinburgh.

6. Epilogue

With the appearance of four different types of chimneys above the South Bridge, the ecology of the South Bridge itself has changed: a musically themed space has become dominant, with music accompanying the purified air that spreads from the chimneys over the city.

It is important to note that the city is always in a state of flux. In the future, the city may not need a building of this scale with music as the dominant genre, perhaps the building next to the chimney will be demolished and rebuilt, and perhaps the city will need a new type of space. But this does not mean that the research and design we have done will be useless, we can still place chimneys in different locations in the city according to their characteristics, or we can even build different types of chimneys in the city according to their needs, and then design the buildings around them.

How about building a city that starts with building a chimney?

References

[6] Ibid. 50.
[7] Ibid. 51.
[8] Ibid. 51.