

# THE CONNECTIVITY BETWEEN THE BIOTIC AND THE FABRICATED

Anamaria-Claudia Csintalan



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## **Terminologies**

The terms below, establish the according methodology in which the terms are utilised within the report:

Nature:

A living habitat composed of biotic and abiotic organisms. A self-sufficient environment within a physical condition that establishes collective interactive processes. These processes highlight activities that correspond to organisms' interrelations and transformations which are emphasised through evolution, mutation, selection, and adaption. In natural environments, nature forms a predominating force by enabling to adapt and sustain itself through the emphasis of non-requiring homo sapiens responsiveness to thrive. Therefore, nature is not a fabricated construction but a system that establishes organic qualities where homo sapiens form an interactive subject in accordance with nature to enable the performance of harmonious environments.

Green spaces:

An area constructed through the concept of humanism which highlights that the man forms a predominating entity shaping the natural geological landscape. The functions and targets within this habitat predominate to sustain and satisfy the man through recreational and ornamental objectives. Therefore, the notation of spatial separation is emphasised within green spaces to highlight that the man, flora, and fauna are separate species. Consequently, greenspaces highlight that humans alter and impose an illusion of order and control upon the landscape.

Thus, the man becomes negligent of ecological considerations through limited knowledge of the natural processes within the biosphere.

#### Architects:

Individuals specialising in the design of structures through the emphasis of networking services and applications that constitute to produce a programme or a system. Therefore, one requires analysis of the environment through aspects of monetarization, organisation, and planning, whereby a formed design can lead to operation and application. The subjects require heightened knowledge and considerations of the design implications upon networking systems for example, abiotic subjects (like heat, light and energy) and biotic subjects (like homo sapiens, flora and fauna). The analysis of the relationships provides implications in the long-term life of the physical structure and the effect the structures have upon the encompassing environment. Consequently, the individual requires problem solving skills to provide solutions to matters of concern.

#### Designers:

Individuals specialising to assist, devise, modify and execute a design, a plan, a specification, or a system. The subjects require knowledge of the environment and the physical subject in relation to the wider interactive complex systems of the environment to predetermine concerns and measures of a setting. The individual corresponds with interdisciplinarity to form a prototype, a process or a product where one's skills in conceiving to fabricating, stimulates notions of problem solving.

#### Interdisciplinarity:

The process of the merging of the scientific field and architectural field, to enable cohesive measures into the process of supporting the habitats. The cooperative knowledge from ecologists, scientists, botanists and naturalists, in agreement with architects and designers provide a reflected contribution into the position that the man has upon the biosphere to reflect the power of the human in accordance with the environment. Therefore, the man can form a supportive agent to the environment to support the biological processes within a space and the living organisms.

#### Symbiosis:

The relationship between differing organisms within an environment, which is outlined through the ideology of the relations of differing species. The interactions between these species provide a notion of ecological dependencies. Therefore, the cohabitation of the entities suggests through reliance, notions of cooperation and competitiveness. These attributes can either support an organism or enable an aspect of disadvantage.

## **Introduction**

The narrative of the man-made and natural has been discussed throughout the centuries in architecture to outline the correspondence of interdisciplinarity. The cross-cultural boundaries of urbanism and architecture emphasise that nature has been utilised as a paradigm to depict historical routes which enhance humans' responsibility for the creation of harmonious settings. However, throughout the centuries the decline in public urban green spaces illustrate that through mass neglect and exploitation of natural landscapes, the human is depicted as having a dominate egocentric status. This has led to the loss of biodiversity. As a result, the Leeds City Council (2022) have introduced a Parks and Green Spaces Strategy scheme in aim to provide well managed public spaces for the community and wider ecosystem. Therefore, a case study onto the individuals' responsibilities in relation to the notion of biocentrism will aim to provide a comparison into the measures that the governmental authority and architects and ecologists utilise to protect and conserve environments. Consequently, the report will underline whether the subjected groups provide a cohesion between the natural and the man made.

The first section of the essay will focus to establish a case study analysing the Holbeck Community Park, which is located within the district of Leeds to investigate whether current governmental policies are serving to effectively form measures that tackle the challenges of the current environmental crisis, as well as provide measures that aim to connect humans with the natural urban

landscape. Policies within the past have suggested to provide limited security to the environment which has led to the implementation of the Parks and Green Spaces Strategy Scheme (Leeds City Council, 2022). The scheme aims to address measures for urban management within public spaces, which aim to protect the ecological communities and enable communal spaces for interactivity. The scheme underlines that the proposal will aim to encourage the interactivity of ecological communities and the local civilisation by focusing to enable urban greenspaces to form a “central asset” to a region (Leeds City Council, 2022). Therefore, the case study will further assess the relationship of the interventions within the landscape and the current ecological implications to address the efficiency of the scheme in relation to the wider complex systems. Consequently, the section will aim to underline the motives and contributions that the authoritative power contains in the management and alteration of public spaces.

The second section of the essay will provide a comparison of the measures two global architectural practices utilise to address the interconnectivity of architecture and ecology as mechanisms that aim to challenge environmental concerns and provide spatial unity, in relation to the individual’s symbiosis with nature. The common unity of art and science has been applied by designers, naturalists, and ecologists to provide feasible solutions to the harms produced as a result to the anthropocene. Therefore, the alteration of spaces being composed to function for ecology in opposition to humanism illustrates the significance of environmentalism. The correspondence of the interdisciplinarity highlights



notions where biocentrism becomes a focal philosophy that underlines that the human's coexistence within an environment can enable efficient measures for the preservation of habitats, in opposition to forming a destructive force. The section will uncover the case studies of the Bosco Verticale and the Barbican Conservatory to enhance that design can highlight spaces which provide a mirroring mechanism to the ecosystem. The research into the spatial interventions will address that interdisciplinarity provides practical environments whereby the concept of humanism enables habitat preservation. Therefore, the essay will aim to provide a comparative discussion regarding the motives of the expressed subjects to outline the human relationship with the environment.

## **Part 1-Case Study of the Holbeck Moore Park**

During an epoch of anthropocene extinction humanity's predominance of the geological environment has resulted in the mass exploitation of rich inhabitable land. A report established by the National Biodiversity Network suggested that increases in recent urban constructions led by net migration have resulted in the decline of 41 percent of Britain's local biodiverse habitats contrasted to the mid twentieth century (NBN, 2019). The deprivation of green spaces imposes concerns to current wildlife whereby since the Industrial Revolution, 56 percent of UK'S native species have declined (NBN, 2019). The statistical data conveys societal disconnection from the natural environment which highlights that humans are predominating natural spaces. The current epoch contradicts the natural history whereby the plants power was reflected through predominating the sphere preliminary to man and providing services for medicinal objectives (McHarg, 1992). However, in the current time, a contrary perspective is denoted in relation to the notion of humans inter-connectivity with the environment as the current epoch depicts humans' disconnected from the organic which is established within natural topographies that demonstrate nature forming a subordinate element in relation to the man. The mass explosiveness of landscapes has led to the dysfunction of the ecosystem, this is outlined through the distortion of natural biological processes which have led to nature being unable to sustain a rate of regeneration in comparison to the rate of humanitarian destruction to emphasise the expansion of environmental crisis. Therefore, can one say that in the current period, humans are becoming an agent of destruction? The destruction of wildlife serves to enhance that the

political systems support through enforcing topographical order a notion of political imperialism. This is reflected by the expansion of mass infrastructures within urban regions that aim to assist the man's gratification.

### **The relationship between the man and the environment**

A study conducted by the Natural History Museum (2020) found that 50.7 percent of Britain's biodiversity has been destroyed due to intensive agriculture and growth of industrial industries. Evidence through geographical time emphasises that the vast expansion of the urban fabrics and the increase of transportation routes within the region of Leeds highlights that industrialization has led to the influx of the growing working population into the city centre, which required a demand of work and residentially. The vast technological change from hand skilled occupations to mechanised machineries led to the expansion of factories, evident in the images below surrounding the natural river streams and transportation networks. The expansion of urban fabrics supported the shift of an agrarian economy to a manufacturing economy which provided prosperity to Leeds and national localities by improving mass production and trade (Hudson, 2002). Therefore, the reduction of natural environments within the east and western regions served the political systems to provide control over the mass population and enabled an illusion of order. As a result, the construction industries have been utilised as devices for economic growth. The landscape architect, McHarg (1992) critiques urbanised regions for being focused on the gross national product by emphasising that the economic agency does not provide the evidence of an "environment's success". McHarg (1992) underlines that urban regions are composed on economic objectivities

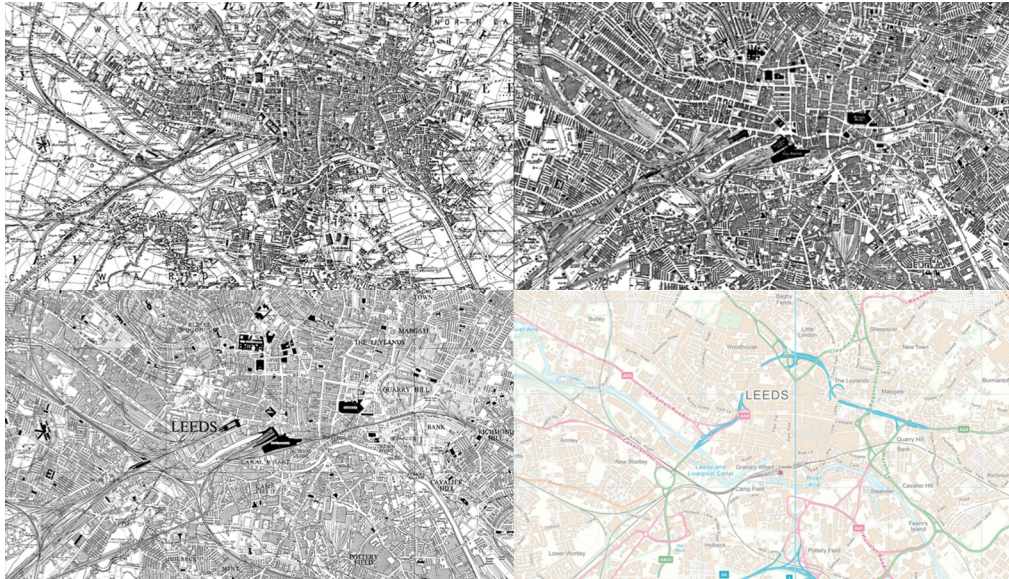


Fig 1. A long-term map from the 1800's to the current time expressing the evolution of urban Leeds in relation to the expansion of urban regions and the reduction of green spaces.

which encourage the primary notion that humanised “commodity” has become a centralised basis to the deprivation of the “biophysical”. Thus, the destruction of topographies highlights that the desires of advancement in rationality and action have led to the weakening of the agency of nature.

The notion that humans contain a focal objective of fulfilling personal motives is enforced through the 17th century philosopher Benedictus de Spinoza, which refers to the term “conatus”, a Latin term to suggest that impulse and inclination are ways in which individuals contain a desire to increase power. Spinoza (2018) utilises the term “conatus” repetitively within his book *Ethics*, to justify that humanitarian consciousness equates with the nature of desire by underlining that reality is constructed from the synthesis of modes relying on self-preservation. Modes of preservation are evident within natural systems of the biosphere. Spinoza (2018) says that humans are in control by the same causalities that different elements are affected by. This is whereby the process in understanding the “laws of nature” can provide connotations to human objectives (Spinoza, 2018). For example, plant systems contain a competitiveness for resources for survival which is alike the humanitarian goals within the anthropocene where actions are directions by modes of substances inclined to provide a reality of self-preservation. Spinoza (2018) underlines that the act in striving to advantage self, will increase one’s power of virtue which forms an approach that neglects one dominance over the other. Therefore, although one acts in ways to benefit the self, the expansion of power is depicted to become a threatening mechanism. In relation to the topographies of Holbeck, the landscapes are dominated by fabricated areas composed of transportation links and infrastructures. The landscape demonstrates the humans’

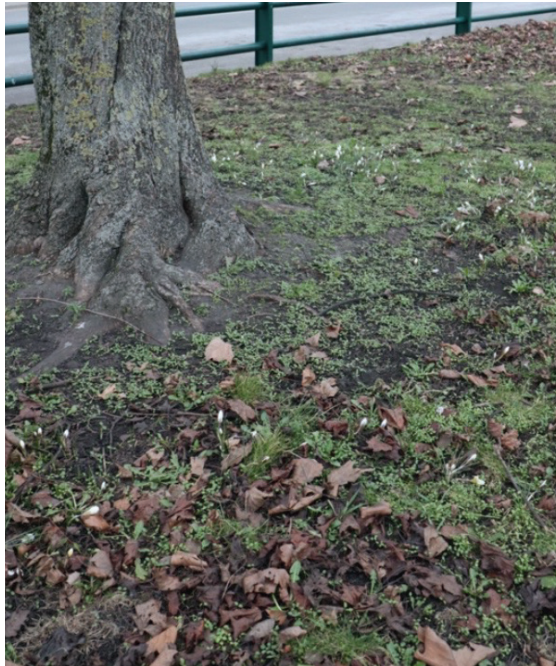


Fig 2. An observation into the plants competitiveness for sunlight (in Leeds) between a tree and the oppositional flora species subjected under the tree to enhance the organisms challenge for self-preservation.

implementation of the illusion of urban geometry which alike Spinoza, highlights that the authority proposes modes of preservation through humanitarian destruction and environmental disconnection.

Spinoza (2018) underlines that a system contains notions of self-preservation which are determined by notions of “good” and “evil”, which labels derive from the metaphysics of religion. The genesis provides fundamental understandings into the formation of values regarding the human’s relationship with the environment. This is emphasised through the quotation:

“upon every fowl of the air, upon all that moveth upon the earth, and upon all the fishes of the sea; into your hand are they delivered” (Bible, 1997).

The subdivision created by the hierarchy chain emphasises that the man forms a supreme distinct status enabling stewardship over the subjected organisms, by forming a ruling agent. This ideology rejects the notion that nature forms a sacred kinship with humans as the greater power of the man upon ecological mechanisms suggests that the man’s aspirations contain an aggressive mechanism for destruction and consumption. The power of the man upon the organisms within the ecosystem highlights that the human can form a predator to the biosphere by inflicting harm with the mere moral duty of self-preservation. This provides a link to the Spinoza’s “conatus” doctrine whereby Christianity depicts the human as striving to protect the self, thus loosing connectivity with the environment (Spinoza, 2018). Therefore, the forthcoming case studies will

underline the relationship humans have with the environment through the analysis of the humans' implications in regard to the formation of habitats.

An investigation into the Holbeck Moore Park, enables considerations that establish the authority's contribution into the application of environmental conservational policies within the urban setting. The scheme imposes through the management of public spaces tactics that aim to emphasise biodiversity net gain. Nevertheless, the case study suggests limited evidence to support the long-term productivity of the environment (Leeds City Council, 2020). Firstly, the scheme proposes that urban environments require ecological consciousness of selective vegetation to support and protect the current local fauna species (Leeds City Council, 2020). A report conducted by RSPB (2016) suggested that since the 1930's, 97 percent of UK's grasslands composed of rich pollinating plants have been destroyed, which have contributed to the extinction of native fauna species. The extensive loss of biodiversity has enabled the government to impose the replacement of seasonal bedding plantations with selective horticulture to vitalize the importance of monitoring habitats (Leeds City Council, 2020). This is evident in the site, in the rows of Narcissus species around the perimeters of the park. The orientation of the species into the external parameter emphasises the commodification of native wild species for the expansion of local biodiversity (The Wildlife Trusts, n.d.). The uses of the flora's species are to become an integral part in the district supporting the local wildlife through permitting adaptive harmonious environments for the expansion of the population of local





Fig 3. Flora species within the external perimeter of the park emphasise to form a decorative embellishment to the individual's transitioning past.

predators and pollinators required by the native food web. The beddings have not been managed to propose that the species encapsulates the environment. However, a close observation into the flora zones propose that the beddings contain additional topsoil implemented in areas to further suggest that species are not wild of the site but have been inserted. The landscape architect, McHarg (1922) underlines that biocentrism is the ethical concept that living organisms are required to be perceived as equal entities. Spinoza (2018) refers to this notion through highlighting that ecological organisms have the

“equal right to live and blossom and to reach their own individual forms of unfolding and self-realization within the larger self-realization”.

Therefore, the relationship of the human with the organic enables the environment to adapt and evolve to suggest that the biotic contains an equal status to inhabit spaces. This perspective is explored through the ecological kinship between organisms within urban settings which provide a focalisation onto the ideology of egalitarianism. An observation onto the biodiversity within the setting provides understandings into the functionality of the scheme upon the local ecological producers and consumers.

A personal experiment has been conducted to provide an understanding into the local ecological interactions within the site, to investigate the efficiency of the scheme onto the re-establishment of biodiversity. The flora zones have been analysed through the comparison of four samples of quadrants along differing

A graph presenting the distribution of the biodiversity along the quadrant, which was positioned along the selective bedding plantation (which contained small sections of grass areas).

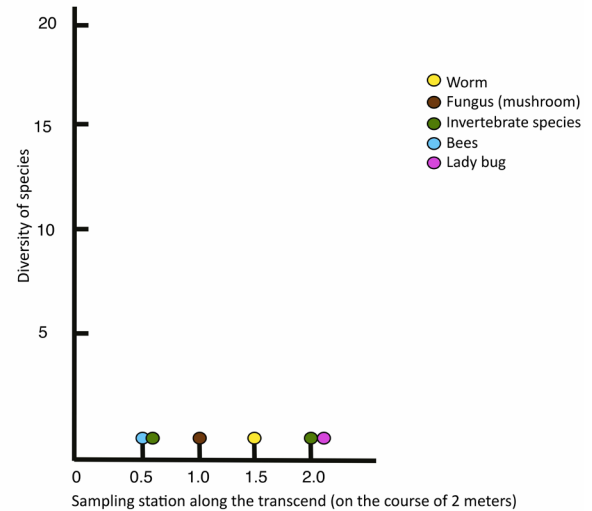
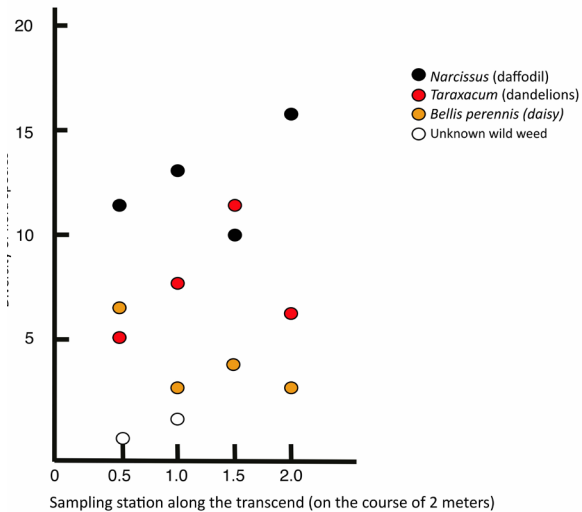


Fig 4. Personal sampling experiment that has been conducted using a quadrant to investigate the interactivity of the species within the divergent spaces.

intervals of the unmanaged beddings, to provide a comparative pattern of the distribution of local species.

The results showed that although the spaces supported adaptive environments for the flora species, the choice of flora species limited the diversity of invertebrate organisms. The uses of one major flora species for example, narcissus in conjunction to the natural weeds (like the dandelions and daisies) restricts the affinity for the attraction of differing invertebrates suggesting to not provide an ecologically-informed habitat in comparison to diversity of natural pollinators. The results suggest that in the zones with an expansion of narcissus floras there was no correlation with the expansion of insectile species. The organisms are exhibited within the data in an irregular pattern to emphasise that the environment enables the network of limited communities. For example, in the zones with a higher distribution of narcissus plants in comparison to the lower distribution of narcissus plants, both divergent spaces contain a correlation of the sighting of invertebrate species to justify that quantity of plantations did not affect the behaviour of the organisms. In addition, the differing weeds within the site did not provide a correlation to the distribution of species. This is emphasised as both of the quadrants with the *Taraxacum* and *Bellis Perrenis* provided no pattern of differentiation. Therefore, the selectivity of the plant enhances that the site proposes to limit species desirability's through the restriction of differing organisms. The reduced quantity of diverse organisms further suggests that the site restricts the local food chain through providing limited support to the consumers thus, enhancing the reduction of the local biomass.



Fig 5. The encapsulation of the local native wild species.

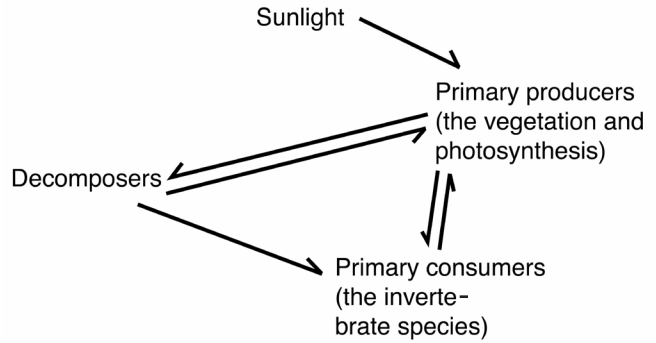


Fig 6. The interrelationship of the organisms within the food chain of the site.

An atmosphere of competitiveness is emphasised within the proposed site whereby the reduction of wildflowers enabled the expansion of narcissus plants. This provides an understanding to Spinoza's philosophies of preservation as the narcissus plants are subjected to compete for topographical expansion (Spinoza, 2018). The soil beds enhance attributes of harmonious ecological systems through the reliance of the differing biodiversity within the food chain which highlight to reflect the co-dependency between species for the production of inputs and outputs of resources required by the organisms within the biosphere.

However, an analysis of the proximity between points of element of divergent environments such as the cultivated land and the fabricated areas emphasise that the orientation of the plants disregard the complexity of natural green spaces. By planting the species into the external perimeter of the greenspace, which is adjacent to the circulation routes, this reflects that nature forms a model of decoration to the human visual interactivity. McHarg (1992) underlines that selective planning of urban spaces form a systemized world by the human in opposition to ecology. This is whereby the fragmentation of ecological spaces disregard the natural biosphere. The maintenance of the vegetation within selective areas demonstrates that nature has become domesticated and tamed within confined zones to reflect that nature forms the man's companion and loses the notion of wildness. Therefore, to some extent this implies a notion of the creation of unequal environments as the man contains dominance over the subordinate elements. The Cambridge English Dictionary (2023) emphasises

that wildness is defined as: “the quality of living or growing independently of people, in natural conditions and with natural characteristics”. In this perspective, the definition of wildness is portrayed within a protective enclosure of natural ecological state, where limited supervision and the interactivity of the humans through presence and control, stresses a self-reliant environment. However, the site supports and contradicts this perspective as the order of the species within the external environment encourages the loss of naturalism. Laszlo Moholy-Nagy who has been encountered through the book from the Bauhaus to Ecohaus emphasised that human greed could enhance that habitats lose the notion of “naturalism” (Anker, 2010). Anker (2010) stresses that naturalism is exposed as an environment composed for organisms therefore, the aspects of the “geometric” perform outlooks for the human “amusement” (Anker, 2010). This may suggest that the scheme disregards the mutual notion of habitation where the landscape becomes subjected to socially conditioned principles which appear to enable nature to evolve but undercover ecological control.

In addition, the proposal imposes conditioned environments through the ambition of implementing tree plantations (Leeds City Council, 2022). In the current matter, the Office for Health Improvement and Disparities (2022) estimated that each year 36,000 urban deaths are led by exposure to emissions particulates stressing a major humanitarian concern. McDonald, A.G et al (2007) conducted research through GIS techniques which analysed a model

for land cover and field surveys to investigate pollution rates. The experiment concluded that by increasing tree covers by over ten percent, an environment can reduce pollution rates by almost ten percent (McDonald, A.G et al, 2007). Therefore, the implementation of vegetation within the urban space proposes to form a canopy surface for the absorption of atmospheric pollutants. The Leeds City Council (2022) have emphasised that the contribution in the plantation of 50 hectares of woodland every year will aim to support the climate emergency and provide fauna connectivity. However, the case study provides no evidence of policy application within the targeted site emphasising that the ambition is very inaccurate. This suggests that environmental policies are not strong schemes into the protection of the wildlife, through limiting individual's responsibilities. An analysis of the Leeds biodiversity requirements underlines that since 2020 the authoritative duty remains on the focalisation of the redistribution of local invertebrate species for example, the local tree sparrows, the local kite and invertebrates, which have recently declined in Holbeck as a result to the mass gentrification within the district (Leeds City Council, 2020). However, due to providing no support through tree plantations and limited support to the distribution of diverse native species, the scheme provokes concerns for the long term.

The notion of consumerism is identified within the case study where proposed spaces form controlled environments targeted to the man. The allocation and distribution of the park interventions in relation to the green spaces enhance



political order of urban planning. The distinct navigation from natural vegetation to the public circulation routes composed of concrete impose to classify spaces and control the public's behaviour. Although, the spaces serve to provide accessible cultural cohesion through environments enabling social responsiveness, the spaces rehearse civic rules. The circulation routes form dictated environments that impose dynamic movement within subjected areas. The proposal addresses that the management of parks will provide quality spaces that reduce anti-social conduct (Leeds City Council, 2020). Regarding the history of the region, in 2014 Holbeck formed the first red light zone that legitimised the objectification of sexual offences within the locality. The radical approach of legitimisation maintained and sustained antisocial behaviour evidenced through the expansion of drug offences and violent offences within the region (Taking Chances Inside Britain's Legal Red-Light District, 2016). The conclusions of the research conducted by C.A.B.E Space (2005) demonstrated that the improved maintenance of public green environments reduces the rate of antisocial incidences thus, the policy aims to encourage through spatial management a device for the control of moral conduct. The simultaneous configuration of the fabricated environments and natural spaces are based on the cultural beliefs and behavioural standards which impose political domination. This is whereby spaces enforce the control of the civilisation through junctions of unity within the circulation routes that enable to limited dialogue and restrict individuals to remain at a state of rest. Therefore, to some extent the urban spaces encourage the conatus doctrine (Spinoza, 2018). This



Fig 7. Poor positioning of flora species forms man-made circulation routes emphasising the rejection of the dictated circulation.

is emphasised though the management of the interventions which encourage to maintain community protection through restricting individual's aggressive behaviours.

Furthermore, the interventions within the landscape such as the play areas and circulation routes, are utilised as devices that expose human-made artifacts due to being formed through the notion of human inhabitation. The recreational environment within the skateboarding facility contains elements composed of descending forms which provoke movement through notions of transference and transitioning through the association of the relationship of the body to a space. Spinoza (2018) highlights that an element in motion moves until it is determined by "another to rest". Thus, this suggests that physical interludes provide the relation to the way in which a body is influenced by other components within the environment. In the case of the park, the structures express the physical nature of the body through the individual's interactivity with the elements. The transitioning elements are composed of fabricated concrete and vegetation which enhance a juxtaposition to the organic, to expose that the spaces are designed for the cultural cohesion of the social capital in opposition to the ecological. This is reflected upon the limitations imposed upon the wildlife as the spaces reduce ecological interactivity to highlight through McHarg (1992) that when spaces are conceived through goal-directed processes, individuals neglect nature culture symbiosis. This is highlighted as the interventions do not only control the humans behaviour but also restrict the ecological behaviour of the organisms.



Fig 8. Dictated order of urban planning imposing spatial zones of interactivity.

In conclusion, the case study of the Holbeck Moore Park establishes that urban green spaces form fabricated environments targeted to the human in opposition to the ecologically sustained environment. This is emphasised through the scheme whereby the soil beddings of the flora species are utilised as a decoration, which restricts the diversity of wildlife species as suggested in the findings of the experiment. The study highlighted that the limited diversity of both flora and fauna species suggests that the scheme do not support the potential threats that the species are subjected to proposing ecological concerns due to the mass gentrification. Therefore, the application of the environmental scheme forms a device in which the authority permits ecological order and social order within the environment as the interventions within the site support to emphasise that the authority utilise public spaces as devices for control. Consequently, the segregation of the fabricated and the natural reflects that the current schemes do not support ecological cohesion, to highlight that the man forms a supreme agent of topographical disruption.

## **Part 2- The relationship between design and ecology**

Furthermore, the challenges of understanding urban systems are emphasised through the interdisciplinary sectors of arts and science, which enhance measures led by the consequences of the anthropocene. The Government Office for Science (2021) highlighted that from 2011 to 2019 the UK's urban populations have increased by 6.2 percent as a result to migration patterns altering from the rural areas to the urban city. This has resulted to the demand of constructions to expand by 30.5 percent (The Office for National Statistics, 2021). In a time of climatic challenges, the distribution of the population into the urban districts emphasise that the urban environment underlines complex systems encouraging patterns of consumption and production. The systemic overload of spatial temporal processes evidenced through the inter-corresponding arrangements of infrastructures, transportation networks and natural spaces within the urban city provide input and outputs of energies which result to alteration of the activities within the biosphere. Thus, the shared responsibilities of designers and ecologist enable research and understandings into individuals' relationships with the biophysical.

Anker (2010) highlights that designers and ecologists require ecological consciousness of the ecosystem to understand the interconnectedness of the living chain. The process of understanding ecological reasonings enhances through the focal philosophy of humanism a device for environmental preservation. Moholy-Nagy addresses that designers require to become “space

natives”, which is the process in which one requires to become encapsulated by ecological ethics, to enhance that feasible solutions are based onto the consciousness of the wider “evolutionary fitness and living conditions within complex communities” (Anker, 2010). Therefore, Anker’s (2010) philosophies emphasise that ecological systems are reliant on one other for self-sufficiency to maintain the propositions of harmonious settings. Furthermore, the alliance of architecture is further emphasised by McHarg (1992) which stresses that designers and ecologists can utilise ecological understandings of the natural laws of the environment for measures to preserve it. McHarg (1992) underlines that one requires to treat nature:

“as an ally and a friend, who ways must be understood whose counsel must be respected”

to emphasise that designers ought to alter their perception of art and science as separate entities but require to form cooperative systems. This notion is emphasised by Spinoza (2018) whereby the process of one connecting with the environment through understanding the notion of the “natural laws” of a habitat can enhance notions of preservation. Therefore, the emphasis of ecological consciousness, highlights that designers and ecologists can serve to form a paradigm to encourage measures for nature conservation and rewilding.

### **An investigation into the Bosco Verticale**

Firstly, the Bosco Verticale is a residential tower established in Porta Nuova district of Milan, Italy which instigates a measure in which architecture and ecology synthesise to supply practical design measures for the expansion of urban reforestation and the mitigation of urban pollution (Stefano Boeri Architects, n.d.). The architect Stefano Boeri constructed two high-rise towers which contain vertically load bearing properties that support cantilevered botanical terraces. The exterior envelopes provide habitats to over 20,000 botanical species, which are composed of a selected mixture of 800 species of trees and 5,000 species of shrubs which heightens to reduce the concept of urban land expansion through the vertical construction. The terraces enable common spaces for social interactivity whereby the intersecting environments composed of thresholds form a transition between encounter and reconciliation (Stefano Boeri Architects, n.d.). This is evidenced through the glazed openings within the terraces which form a connectivity from the private residents' domains to the external environment. The selective plantations aim to attract fauna species to the centralised urban region and enhance to ecologically connect the residents to the external environment to provide a dual functionality to the proposed communities. Therefore, the project forms a complex knitted chain system through the cooperation of the biophysical and design.





Figure 9. The residential towers of the Bosco Verticale.

To begin with, the cantilevered balcony of the Bosco Verticale enables the synthesis of architecture and ecology through emphasising functional habitats to the ecological communities. The prefabrication of concrete containers which follow the skeleton of the balustrade of the building form raised mediums that supply adequate volumes of space for the insertion of selective topsoil required by the selective choice of shrubs and vegetation species within the terraces (Giacomello, and Valagussa, 2020). The varying depths of the mediums range of 0.5 m to 1m deep volumes which emphasise that the design of the balustrading forms ecological considerations to the diversity of lengths of the flora root systems within the external vessels (Giacomello and Valagussa 2020). The trees have been preliminary precultured before insertion into the containers to provide analysis onto the root systems which enhance that the research restricted the entanglement of twisted roots, in aim to enable conserved conditions before the insertion of the plants into the containers (Giacomello and Valagussa, 2020). In addition, a waterproofing membrane coexists with the architecture and the ecological organism which aim to provide a safeguarding mechanism to the roots systems from damaging (Giacomello and Valagussa, 2020). Thus, the consciousness of the synthesis of the structural mechanisms and the materiality implemented to support the roots encourage to maintain controlled adaptive conditions for the performance of the species to unify design as an equal system to the organic.

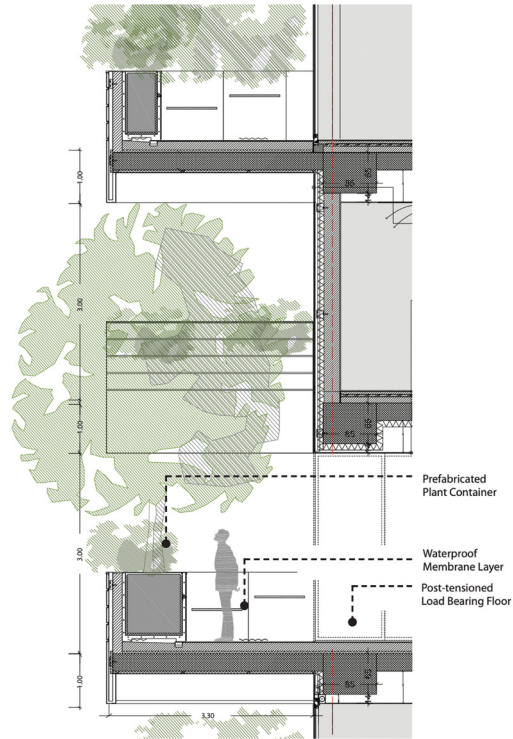


Fig 10. Section into the terrace of the Bosco Verticale expressing the relation of residents to the engineered prefabricated containers.

The stated considerations support McHarg's (1992) philosophy of the astronaut capsule theory. Firstly, prior to the ecological consciousness, McHarg (1992) states that anthropocentric values of power and superiority over the nature require to be rejected, which is evident in the Bosco Verticale through the design of the mediums which form an expansion to the analysis of the scale life cycle of root systems. McHarg (1992) underlines that an astronaut's major objective within a setting is focalised onto survival by learning from the surrounding processes to provide a space capsule alike the ecosystem. Therefore, a space capsule requires inputs and outputs of resources like oxygen, nutrients, and waste for the man to withstand actively in the environment. This concept is alike a designer which require to comprehend with its environment and its role within the wider complex system to enable a self-sustained capsule for the botanical species. The considerations of the conditions within the structure enhance active environments which enable adequate root expansion for the absorption of nutrients and water which form essential elements in aiding the process of photosynthesis. Therefore, the fabricated structures are adapted to support the organisms competitiveness to resources, to emphasise that containers mimic the natural process of the biosphere by forming a capsule of ecological states alike the earth's soil mass.

In addition, extensive research has been conducted upon the terraces to predetermine the load that the mediums could sustain to withstand the unforeseen environmental conditions found within the complex environment.

The ecologists and architects directed load capacity tests upon the structures to predetermine the effects of the wind force upon the tree plantations (Giacomello and Valagussa, 2020). By providing scale model examinations into the exterior local environment through the emphasis of the real-life scale wind of 65mph, the tests provided a source of measure into how design can contribute to sustain an anchoring mechanism to the botanical plantations (Giacomello and Valagussa, 2020). The reimagination of the wind force enhanced that natural phenomena composed by humans, can form complex conditions found within the environmental that minimizes habitat destructions.

McHarg (1992) emphasises that through vast ecological consciousness nature can be understood as an interactive dynamic process. Therefore, alike Spinoza (2018) the natural laws of the environment, provide designers opportunities and restrictions to the design measures. This is emphasised through the research which supported the orientation of the tree plantations within selected areas of the perimeter. For example, the limited expansion conditions within the upper levels where directed by the wind which altered the functional growth of the tree plantations thus, the selected trees with small diameters were planted onto the lower levels (Giacomello and Valagussa, 2020). Thus, by understanding the relationships of the external factors upon the plantations growth, it enabled the architects to produce containers with specialized mediums for the selected plants. The design scheme of the tree plantations required further additional supporting mechanisms after the research suggesting alike McHarg (1992) that nature should

be viewed as a complex and flexible system. The tree plantations contain temporary anchoring systems composed of textile belts and steel welded nets orientated around the surplus of the root ball which provide vertical stability to the species (Giacomello and Valagussa, 2020). Thus, the research conducted upon provided vital understandings onto the contributions of the design upon the preservation of the space capsule, established by McHarg (1992).

Furthermore, the terraces accommodate controlled conditions through the design of the differing ceiling heights which permit the adequate expansion of flora species. The botanists conducted a longitudinal study over the course of three years to determine the choice of the selected botanical species (Giacomello and Valagussa, 2020). The vegetation was pre-cultured in a nursery where the external conditions were conducted alike the conditions found within the microclimate. The ecological considerations of the weather of Milan which highlight cool winters and warm summers, predetermined the three major botanical species: oak, ivy and ferns (Giacomello and Valagussa, 2020). As the research was later conducted onsite, it enabled the researchers to observe the progress of development upon the species in relation to the building structure, to enhance measures which informed the distribution and selectivity of species. The results suggested that diverse species were planted onto the major central facades of the east and south elevations due to the orientation of the sun which enabled adequate natural quality of sunlight within a day period. Therefore, the research formed a “constructional model”, into the consciousness of the biophysical (McHarg, 1992). In the book, *On the Origin. of the Species*, Darwin (2012) has established to alter



Fig 11. Diagram expressing the orientation of the tree plantations in relation to the north, east, south, and west facades of the building, whereby the long-term tests of the wind phenomenon and species selectivity enabled the position of the proposed areas of the site.

the term “natural selection” to “survival of the fittest” to place attention that spaces provide the evolutionary characteristics for the survival of matter. McHarg (1992) stresses through philosophies derived from Darwin that architectural measures and ecological understandings enables habitats that provide the notion of ecological fitness. In the case of the Bosco Verticale, the differing ceiling heights of the terraces enable the potential of the maximum growth and expansion of selective planation. The strongest species which endured the trails where utilised as the major flora communities in the terraces (Giacomello and Valagussa, 2020). Therefore, the process of enabling adaptive environments derived from the understandings of the man-made and the organic to enhance that the design assisted to enable thriving ecological conditions.

Moreover, the vegetation within the terraces provides connectivity between the fabricated and the natural through a passive strategy which enables ecology to form a protective mechanism from high solar exposure. The external vegetation decreases the temperature of the two high-rise structures by approximately three degrees Celsius (AIPH, n.d.). The ratio of trees leaves provide shading qualities that enable the natural process of photosynthesis to absorb water and realise water vapour as a cooling system known as evapotranspiration (Hesslerová et al, 2019). Therefore, the natural process of the vegetation supplies a supportive mechanism into the maintenance of the internal conditions of the building. In terms of the larger social context, the uses of vegetation further provide a support to humans through enhancing that the vegetation can reduce the consumption of artificial cooling systems which provide an economic assistance



to the residents of the building. Therefore, the synthesis of the nature and the fabricated controls atmospheric conditions and provides an environmentally sustainable strategy.

Spinoza (2018) underlines that finite elements are determined by the relation of one and other, where composites of the elements rely on the capacity to affect or to be affected. The analogy of one's power in relation to another is emphasised in the maintenance of the capacity of the entanglement of positions through the presence of the vegetation. This is whereby the notion of equilibrium is emphasised through Moholy-Nagy philosophies that highlight that designers require to adopt analytical skills in working in harmony with nature to enable harmonic settings (Anker, 2010). The arcadian dream has enforced many architects and designers into the notion of environmental harmony (Anker, 2010). The historical dichotomy of nature is depicted through the romantic movement in art, literature, and science through the organic framework of nature being established as connoting symbolisms of an idealized benevolent mother (Anker, 2010). This is whereby nature is illustrated to form a provider and nurturer. Moholy-Nagy principles emphasise that by understanding the processes of nature, a design focalises on functionalism which provides satisfactions to humans as well (Anker, 2010). The site proposes through uncovering the biological performance of the tree's species a environmentally friendly strategy to the residents. Therefore, Darwin's philosophies emphasise alike Spinoza that the developmental process of species is affected by one's nature of being (Anker, 2010).

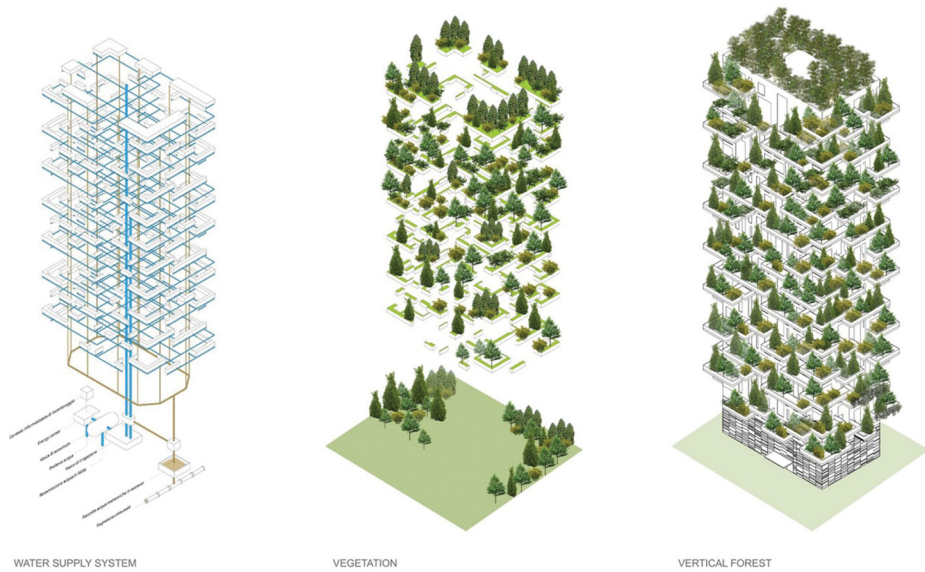


Fig 12. The orientation of the staggered terraces proposes areas of vegetation which form a guarding element to the external building facades.



Fig 13. The terraces provide cohesive environments to the ecological communities and the residents of the apartments.

In conclusion, the Bosco Verticale heightens that the vegetation becomes a system working in correspondence with the architecture to underline that the interference of the disciplines form an essential mechanism to enable controlled habitats for the diverse botanical species. This highlights that without the implications of the interdisciplinarity the habitats would perish thus, enhancing that the presence of unity forms a vital element in the plant's survival. The structure of the balustrading works in predisposition between the built structure and the natural elements which provide a functional setting to the flora species. The Bosco Verticale emphasises that through understanding the natural processes required by the vegetation as well as the external environment of the native species, the structural design assists to the survival of the plants to enhance ecological productivity. This has been evidenced through the diverse experimental research conducted upon the botanical species which support that the vegetation does not form an ornamentation alike governmental urban settings, as the contributions providing measures that enhance ecological performance. The site has provided habitats to more than 1,600 of invertebrates, thus underlining that the cohesion of the organic and the man-made contributes as a device for the repopulation of wildlife species (Stefano Boeri Architects, n.d.) Therefore, the rejection of humanitarian individualism, enables the plant and the human to work as cohesive forces. This is emphasised through McHarg (1992) which highlights that when one can design with nature, the modification of environments can form regenerative force.

### **An investigation into the Barbican Conservatory**

Furthermore, the Barbican Conservatory is located in central London, and will form a supplementary approach in which architecture and ecology enable the regeneration and reimagination of a devastated deserted landscape into a dynamic living system (Orazi, 2020). During 1964, the City of London Corporation proposed a competition with the objective to restore the Barbican zone, a region highly destroyed by the consequences of the Second World War (Orazi, 2020). The war highlighted the exploitation of humanitarian power through the uses of natural resources which conclusively altered the natural geology of the landscape by assisting to form topographical degradation. Therefore, due to the magnitude of the humanistic ruins, the council had introduced the Town and Country Planning Act (1947) to permit the redevelopment of the subjected environment. The architects Chamberlin, Powell & Bon, won the competition and proposed a new scheme aiming through brutalist architecture a device attracting gentrification into the district (Orazi, 2020). During, the primary planning stages of the Barbican estate, the Conservatory was intended to form a commercial amenity located in-between the residential estate and the commercial arts centre (Orazi, 2020). The formation of the greenhouse within the centre of the estate proposed to stimulate interactivity as the major amenity produced a central cultural landmark into the area.

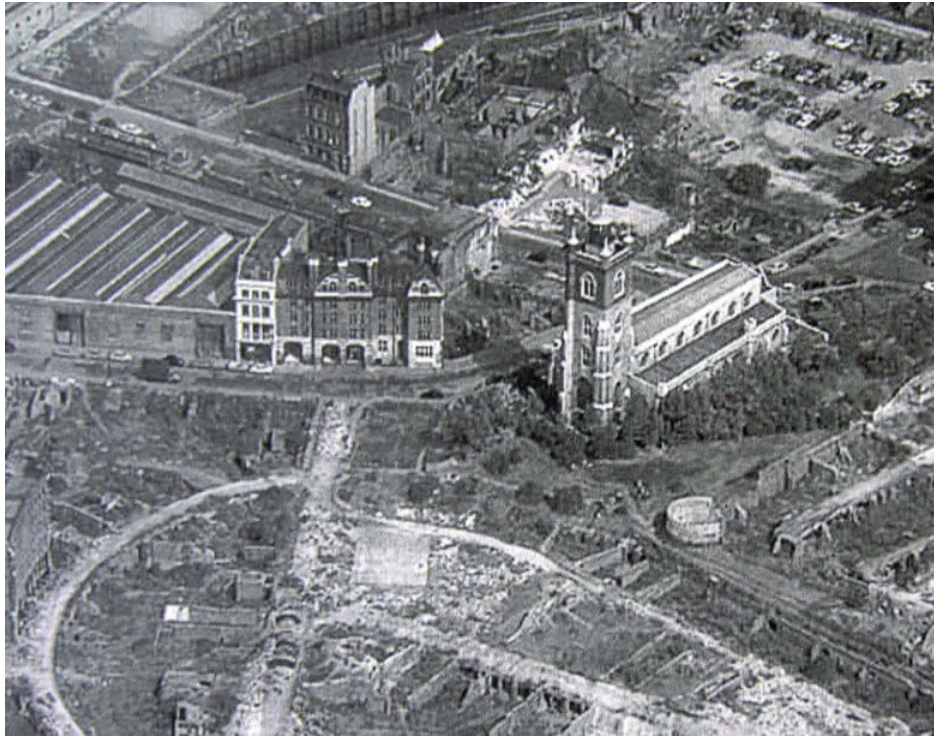


Figure 14. The Barbican zone devastated by the consequences of the second world war.

Firstly, within the current setting, the Conservatory serves to highlight the collaborative field of architecture and ecology through the design of the superstructure which forms a controlled microclimate to the botanical plants species. The superstructure forms a greenhouse composed of a sequence of mitred cladding system that surround the concrete brutalist fly tower. The facades form a distinct separative environment from the external and internal space though a structural mechanism composed of the vertical steel braced columns that support the above truss by the entrancing level. The structure contains dispersed steel purlins which perform to transmit load and enables volumes for the glazing panels that provide a protective device and enclosure of ecological states. Spinoza (2018) highlights through metaphysics that associate to the nature of being, a notion of spatial dualism to provide a revision of how the power of human can unify the relationship between substances to form a transformative device, as opposed to a destructive mechanism. This provides a contradictory theory to the conatus doctrine emphasising that modalities of positive relationships are only achieved through the rejection of the self-power. Spinoza (2018) utilises the monism theory to assert that there is one defining substance of which he titles “god or nature” which join all living and non-living matters. Spinoza (2018) perceives that the body and the mind are formed as oppositional properties of substances where a particular person is unable to immediately devise substances but obtain indirect understandings through modes and attributes. Thus, emphasising that modes are remakings of substances. Therefore, Spinoza (2018) highlights that a structure and habitat can be

perceived as unified elements. This is whereby architecture forms a continuance transmutation of nature to unify the boundaries between environments.

The cladding system forms a device in which substances such as the plantations of trees and shrubs within the greenhouse can be formulated through changing modes. The cladding system is composed of single glazed panels which provide a translucent obstruction that connects the interior and exterior space to enable the highest transmission of impending flow of natural solar energy required for the botanical species (Avanti Architects, 2020). Due to the changing exterior climate within England, the changing modes are further emphasised through the altering seasons of the external habitat which provide an altering input of solar energy. The exotic species derive from continents like Africa and South-America, which microclimates necessities preserved conditions (Barbican,n.d.). Many of the non-native species within the Conservatory have become endangered within their native microclimates due to the limitations within their native microclimates (Barbican, n.d). Therefore, the external cladding systems acts as a protective mechanism enabling to maintain the internal temperatures of the greenhouse at 11 degrees Celsius (Peronne, 2022) which assist the temperate conditions required by the 2000 species of horticulture. The species within the Conservatory are natively maintained within climates of cool states (Barbican, unknown). Therefore, the ecological considerations of the external microclimates propose a measure in which the cladding system forms an insulation layer to support plant seasonal growth.





Fig 15. The external perimeter of the Conservatory forms the connection between the brutalist concrete architecture and the lightweight glass facades.

Moholy-Nagy emphasises that to guarantee organic development ones requires to be “governed by the biological nature” by following the “biological rhythms” which are found within the environment (Anker, 2010). The process of learning from the ecological environment expresses that the architects provide a mirroring effect to the external microclimate to underline that the designers strengthened the ability to provide a reconciliation of the artificial and the natural. Therefore, the art which is portrayed as the superstructure is no longer a static element but one encouraging universal life through enabling dynamic processes of energies through the transcending material (Anker, 2010).

In accordance with the perspective stated above, the coexistence of architecture and ecology has also been emphasised through the internal circulation system of the Conservatory which further highlight notions of movement. Although the beddings highlight an illusion of humanistic order, the spaces provide considerations to the internal floras species. The subdivision between the vegetation and the circulation is conjoined through a series of linear brick tiles emphasising that the fabricated routes form a connective mechanism that guides the direction of the visitors within the Conservatory to enable an interrelatedness in the junctions of spaces. In addition to this, the textiles enable the soil beds to become elevated from the ground which is essential for the insertion of topsoil, natural fertilizers and fine bark required by the temperate plants (Barbican n.d.). The beds have been elevated to minimize soil

compaction to encourage adequate conditions that are essential for the species of high preservation such as the *Obetia ficifolia*, (Peronne, 2022). Therefore, the collaborations between architects and botanist expresses an awareness of the mineral waste within the habitat and enhance to protect the soil from the prior state of degeneration. By acknowledging the former dangers of the site, the architects and ecologists produced a procedure in which the soil characteristics encourage notions of preservation through moments of conditioning.

In relation to the book *Ethics*, Spinoza (2018) states that the power of the consciousness can affect the self and the body, where one can be affected by something that is no longer present through the emphasis of tactility. Through considering the past severe destructions upon the topography which limited the biotic and enhanced soil erosion, the current spaces composed of mineralized soils enforce a notion of irony between the present and the past. The soil mediums enable tactile forces where ecology and architecture serve to enable the changing modes within the soil. Therefore, can one view the process of monitoring a habitat not as a distinct raw material of knowledge but a complex procedure emphasising the control of environmental hazards. Therefore, to some extent the process in monitoring the mineral conditions of the soil forms a reflection to the contemplation of the past showing that ecology forms also an immersion of experience and complexity. The soil beds form a product of human activity that is parallel to the analogy of the natural development.

Ruskin (1885) argues that the interaction between human and nature forms an expression of human will and human faculty. Therefore, where one can enforce degradation, the reflection of the self can enable the architect to form a device for habitat restoration. The distribution of the species forms an interactive experience to the visitors of the Conservatory by enabling an educational amenity that attracts individuals' curiosity through the differing aesthetic to the organic biota. The botanical species stimulate the visual perspective to encourage botanical dialogue in the dualism of nature-culture. This is whereby the differing plants within the Conservatory propose to engage humans with the sharing of belief systems to stimulate the visitors to contain advanced feedback in relation to their local biodiversity. Thus, the notion of spatial preservation derived from the past is influential to the future.

Furthermore, the notion of regeneration is further emphasised through the effectivity of the soil mediums which enable a force that allow the expansion of vegetation to guide the visitor's direction within the upper level of the Conservatory. This is whereby springing vegetation among the circulatory system highlight the cooperation of the organic and the artificial. The distributed circulation routes that are composed of elevating steel staircases permit the natural vegetation to entangle to the railings by forming a system where the solid elements express the coexistence with the living biota through enabling the plants to multiply in a combustion and interrelation of nodes. The stems coexist with the adjacent circulation to highlight that the structures and the plant form an



Fig 16 & 17. Photographs of the insertion of tree plants into the Conservatory with the uses of a crane.

organ that enables the living biota to expand in the direction of light. Therefore, the shoots of the biota form a rhythm directed by its relation to the solid which provide an anchoring mechanism.

In addition, the unity of nature and architecture is also emphasised through the morphological development of the flora species upon the concrete superstructure. The Conservatory highlights the process of the natural uncontrolled growth of the species through the spatial interactivity of the elements encapsulating a primitive state of wildness. The spaces emphasise that the plants contain an authority within the habitat which is portrayed through the sprouts which transform and adopt onto the artificial surfaces to dominate the space. Therefore, the concept of wilderness provides considerations into how fragments of life take over open voids to limit pressures of control aided by the man. This is further supported by the organisation of the interior plantations which take a spontaneous orientation to enhance that the botanical species become independent and adapt to expand within the proposed spaces. The spontaneous distribution of the plants species within the Conservatory further mimics the natural processes within the natural environment, which highlights that the internal space enables effective biological attributes.

In urban settings the concept of naturalism is evident to take free-flowing growth within environments containing limited human's interactivity. These characteristics are exposed in uninhabited areas of a city where derelict land,



Fig 18. Internal view into the Conservatory enabling springing plants to encompass the fabricated environments.

abandoned buildings and cracks within the asphalt enable the power of ecological process to take place. The naturalists and philosopher Ruskin (1885) uses the term “ruins” to express the relationship and delicacy of architecture in conjunction to the forces of the nature through the emphasis of

“There is not a cluster of weeds growing in any cranny of ruin which has not a beauty in all respects nearly equal, and, in some, immeasurably superior, to that of the most elaborate sculpture of its stones” (Ruskin, 1885).

The relationships of the solid elements working in harmony with the organic elements highlight that Ruskin perceived that nature should be respected as highly as a manufactured artificial substance. The connectivity of nature and the structure is highlighted through the Conservatory where complex foldings reveal the changing modes of time alike ruins that are tangible expressions of the time. Therefore, although ruins are expressions of a wound on a decaying building, the growth of plantations onto the facades of the Conservatory evidence that architecture enables expressions of life. Thus, the time enabled the botanical plants to inhabit and take over the previous wounds of the past. Ruskin (1885) underlines that the process of decay and overgrowing should be respected through the moderate harmonious power of the old and the new, which is evidenced in the Conservatory through the simultaneous conditions of the artificial and natural.





Fig 19. A view of the unity of the vegetation and the circulation routes.

Consequently, the Conservatory provides an unfixed status to the ecological species, where the contrary of the living and non-living solid elements enables understandings onto the relationship of the architecture and natural portrayed as dual inter-corresponding forces. The interventions within the Conservatory form reliant mechanisms to the vegetation species which provide a supportive device to the plants to encourage thriving settings for development. The superstructure of the building in addition to the circulation system highlight notions in which the power of human diminishes, and biocentrism enables a connective relationship between modes of substances (Spinoza, 2018). Therefore, the design provides developmental characteristics to the botanical vegetation and encourage societal change through the synthesis of the past and the present. Consequently, the Conservatory enables an environment where the notion of preservation unifies the boundaries between the natural and the fabricated to provide cohesive spaces for ecology and the visitors.



Fig 20. A view into the process of wild weeds encapsulating the facades of an uninhabited church in Leeds.



Fig 21. A comparison to the internal springing plants within the Conservatory which enhance the power of the organic against the artificial.

## **Conclusion**

In conclusion, the case study of the Parks and Green Spaces Strategy Scheme has underlined that current environmental regional policies provide ineffective measures which limit to challenge ecological diversity. The man's contributions to the order of the topography expresses that greenspaces form fabricated environments where the governmental implication to urban planning disregards the complexity of the environment. This notion is emphasised through the topographical exploitation of the surrounding landscape of Holbeck, which assists the man's gratification as a device justifying humanitarian desires through modes of societal preservation. The case study of the Holbeck park underlines that the authoritative motifs rely onto landscape domination. This was reflected upon the selectivity and order of the vegetation of plant species and the orientation within the landscape, which highlighted that the authority can control the power of the agency of nature to restrict ecological kinships. Furthermore, an analysis into the community interventions highlighted that the landscape further proposes interventions which aim to restrict the locals moral conduct to emphasise that the government motives become centralised on the dominance of the societal behaviour. Therefore, as the interventions within the landscape restrict the dualism between the man-made and the organic, public green spaces are predominantly proposed to segregate positions of interactivity. Therefore, as the imposed policies disregard the longitudinal effects upon the ecology, the current environmental policies require further attention and ecological research.

Furthermore, the analysis of the Bosco Verticale and the Barbican Conservatory aided to assist that ecology and design can form a mechanism which supports to preserve natural environments in opposition to enabling nature to form a separate entity. This is emphasised through the application of science as a utensil that stimulates environmental functionality which has been stressed in the analysis of the Bosco Verticale. The interdisciplinarity contained informed knowledge of the microclimate conditions required by the targeted species, which enable a device for long-term habitat efficiency. By rejecting the notion of individualism, the spaces propose to enable a regenerative force to encourage local biodiversity and cohesive communal environments between the artificial and the man-made. In comparison to the investigation of the Barbican Conservatory, the Conservatory explores the cohabitation of the organic and the fabricated through a state which enables the plantations to contain a state of wildness which is emphasised through natural landscapes. The rejection of the notions in which nature becomes a subordinate mechanism highlight that the construction of habitats through the notion of humanism can enable understanding into the relationship of the equilibrated statuses within the space. The interventions within the landscape provide a supportive device which enable the synthesis between the past and the present of the site. This is emphasised through the monitorization of the internal conditions within the space which provides an irony to the history of the site that neglected one's supportive relationship with the environment. The

process of restricting environmental hazards has been emphasised through the ecological contributions which provide security and protection to the species. This enhances through Spinoza's (2018) ideas, that the man's determination and power through the process of causality, conveys that the interdisciplinaries encourage fit environments to the ecological communities for the management and preservation of habitats. Therefore, the studied spaces emphasise that the unification between the organic and fabricated establish an entanglement of the cross-cultural beliefs in spatial functionality. Thus, the motifs of architects and designers enhance notions of environmental biocentrism, in aim to support the evolution of the environment and encourage humans to connect with the environment as harmonic forces.



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