Meanings of Nature-Derived Features in City Environments

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Introduction

My background is in landscape architecture, specifically the environmental and technical aspects of urban design such as the construction of streets and the management of stormwater. At this late stage in my career, I would like to advance in the other side of design: the human side. Urban features that are derived from nature — street trees and stormwater management features — intrude into modern cities' social realm, which is an odd thing to do; their meanings to people need to be explained. Symbolic meanings are abstract concepts such as virtue or justice; they are important to people because they shape people's understanding of the world and motivate their actions.[1] My purpose is to understand the world that modern society has actually been building, not to advocate any particular agenda. My focus is on the ordinary types of urban environments where most people live, not on special civic places where symbolic purpose is already well documented. My specific study of street trees has been facilitated by street trees' design consistency and stability over time; the study is now complete and its conclusions seem secure. Concepts developed for understanding street trees have been helpful footholds into the study of stormwater management, but stormwater features are diverse and still evolving, so my conclusions about them are as yet uncertain.

Meanings' Emergence in Environment

To support the idea that symbolic meanings do exist in mundane urban environments and to guide their interpretation, this research adapts a model developed by psychoanalysts originally to understand and treat people's internally generated experiences.

In people's internal experiences, memories and imaginings generate images, which have various types of visual qualities such as high-low, living-non-living, active-still, open-enclosed, orderly-chaotic, and clean-dirty. Qualities like these have practical importance; they hold information relevant to people's personal and social knowledge, protection, and interaction. So the images are symbolic; through them the mind, usually unconsciously, assembles feelings and urges. We might try to express their meanings with applicable concepts such as hope and fairness, but the concepts are abstract, so the images communicate them more immediately and completely than could conscious verbal expression.[2]

This paper posits that the various types of visual qualities that occur in internally generated images occur also in externally perceived objects, and that they activate the same mechanisms that constellate images with feelings, images, and concepts. People always and automatically scan the environment for qualities like these; they recognize their practical importance intuitively and immediately. So in urban environments, objects with relevant visual qualities are symbolic. Their role as symbols having specific meanings is co-produced by the objects' qualities and the

[1] Foster 1994, Jung 1994, Lakoff and Johnson 1980
[2] Goodwyn 2012 and 2020

psychological response of the people who encounter them; it emerges from the interaction between the object and the people.[3]

The specific kinds of features studied in this research are cultural objects; they are adopted and produced by the city's people and institutions. Anthropologists argue that symbolic meanings in cultural objects are inevitable and ubiquitous, whether or not the people who produce and use them are consciously aware of it. Each object's specific meanings can vary with the meanings of other nearby objects, with which it makes a combined symbolic system (Spillman 2002). Over time culturally symbolic objects evolve; they tend to become more differentiated and specialized, and to grow together into coherent symbolic systems which are consistent with social norms.[4]

This study identified the meanings of urban street trees and stormwater management features by interpreting them subjectively, in the manner practiced by anthropologists.[5] In this case the interpretive approach was facilitated by several specific advantages. My study focuses on only certain types of objects in their cultural contexts, not the entire culture the way anthropological studies do. I was already very familiar with my objects'' physical parameters and functional relationships before this study began; I did not need to interview informants to obtain basic factual knowledge. My analysis of them was bounded and guided by the theory of symbolic co-production; the theory focused my analysis on qualities previously identified in the human sciences as symbolically meaningful. In present-day urban environments meanings were interpreted in firsthand observations by noting relevant qualities and potentially corresponding meanings. In the features' historic evolution, meanings were interpreted from historical descriptions of each stage's features' physical qualities and cultural contexts; over time progressive symbolic differentiation, specialization, and assembly into coherent systems was noted.

Street Trees

Street trees are arranged with built street infrastructure; together the infrastructure and the trees make a single functional and symbolic unit. The two started their evolutions separately; this discussion starts with the infrastructure.

Modern street infrastructure evolved out of the conditions of medieval streets. Medieval streets were without articulated form except for a central gutter. In them pedestrians mingled with wagons, animals, animal dung, and butchery waste. Typical human beings must have considered these conditions chaotic and repellent.[6]

In the late seventeenth century, after London's Great Fire, the city was redeveloping and growing; various districts used street improvements, among other things, to compete for growth and prestige. At the same time municipal institutions were becoming more organized. Under a series of city ordinances, pedestrian sidewalks were set apart from cartways with smooth pavements and bollard outlines. On the socially defined and protected sidewalk, social interactions could be humanely personal and intuitive; in such a space behavioral norms shape personal identities and relationships. Messy disorder remained in the cartways, which retained their rough pavements and central gutters. Symbolically, this new differentiation defined the special status of the city's

[3] Jelić et al. 2016; Schroeder 1992
[4] Foster 1994, Spillman 2002
[5] Geertz 1975
[6] Corporation of London 2005, Jørgensen 2008

pure social realm and marked a clear border between it and what was impure, dirty, and contemptible. The street had begun to be a symbol of social order.[7]

In the late 18th century, London's city dwellers were increasingly sensitive to hygiene and orderliness, while city authorities were increasingly shaping organized civic life. A new set of ordinances raised sidewalks above the cartway with curbs, with gutters at the bottom. Symbolically these changes added a moral dimension to the street's social meanings. People naturally sense vertical elevation as ascent in virtue and status (Goodwyn 2020, Meir et al. 2007, Ścigała and Indurkhya 2016). Although the curb's vertical dimension was small, it was perceptible; it elevated the sidewalk's virtuous social identity. The damp, dirty gutter at the edge of the cartway below was a warning of taboo. This arrangement was quickly adopted in other European cities.[8]

As to trees, Paris and other cities had started to experiment with antecedents of street trees in the 17th and 18th centuries. They set aside garden-like reserves at city edges, isolated from the squalor in the old medieval city streets, featuring tree-lined promenades for elite strolling. Symbolically, trees are living things with which people naturally sense likeness. Their ascending growth calls on people's intuitive recognition of height: trees rise to wider view, purposefulness, and long life. They symbolically elevated the gardens' elite society in virtue and status.[9]

In the early 19th century, Parisian officials introduced trees to functional city streets by experimenting with ways to uplift the city's old medieval streets. They joined ascending trees from French gardens with Britain's recently developed street infrastructure. The trees were placed in a limen between the social realms of the sidewalk and the cartway. By aligning with the infrastructure, trees symbolically participated in and reinforced the street's social order; their ascent overhead extolled the virtue of the sidewalk's pure social life. The Parisian symbolic synthesis was coherent and instantly understandable. It immediately drew international attention and adoption, especially when Haussmann demonstrated it in his large-scale redevelopment of Paris in the mid-19th century.[10]

The Parisian model endured a vivid test of its symbolic durability when automobiles suddenly arrived on street cartways. Toward the end of the 19th century cities' population and industry had been growing; horse traffic correspondingly intensified; abundant horse manure made cartways offensively filthy and smelly (Tarr 1971). The Parisian model's social symbolism was a moral defense from the foul atmosphere; demand for it grew ever larger in city streets. Then at the beginning of the twentieth century automobiles abruptly replaced horses and ended the manure. But the autos brought a new kind of inhumanity to the cartway: their drivers were enclosed, hidden, asocial, and speedy. Social interaction in the cartway was repulsively anonymous and dangerous. Through this transition the Parisian street model's physical form and social symbolism persisted; the cartway, whatever its contents, remained symbolically shunned; the humane sidewalk remained elevated and extolled. Anthropologists assert that a symbolic system that is stable over time reflects important, fundamental cultural meanings. The continuing perpetuation and dissemination of the modern street model confirmed its socially symbolic meaning and importance.[11]

Figure 1 summarizes the meanings found in this study for today's conventional streets and their trees The design differentiates the fundamental components of social order functionally and morally. The sidewalk enacts pure humane life; the cartway enacts contemptible, inhuman

[7] Douglas 1966, Gobel et al. 2015, Lawler et al. 2015, Stefani and De Marco 2019
[8] Corporation of London 2005, Horberg et al. 2009, Lawrence 2006, White 2010
[9] Meier et al. 2007, Schroeder 1992, Ścigała and Indurkhya 2016
[10] Johnston 2017, Lawrence 1988 and 2006
[11] AlAdawy et al. 2019, Dey and Turken 2016, Morris 2007, Nixon 2014, Winter 1993

anonymity. The curb's vertical dimension ranks the realms morally; the damp gutter at the bottom is a lurid warning of the taboo beyond. The limen separates the two realms; from it trees rise to extol the virtue of the pure social world. Although trees are derived from nature, in city streets their meanings are social. They extol the virtuous social realm, when a way has been found to define and order it.

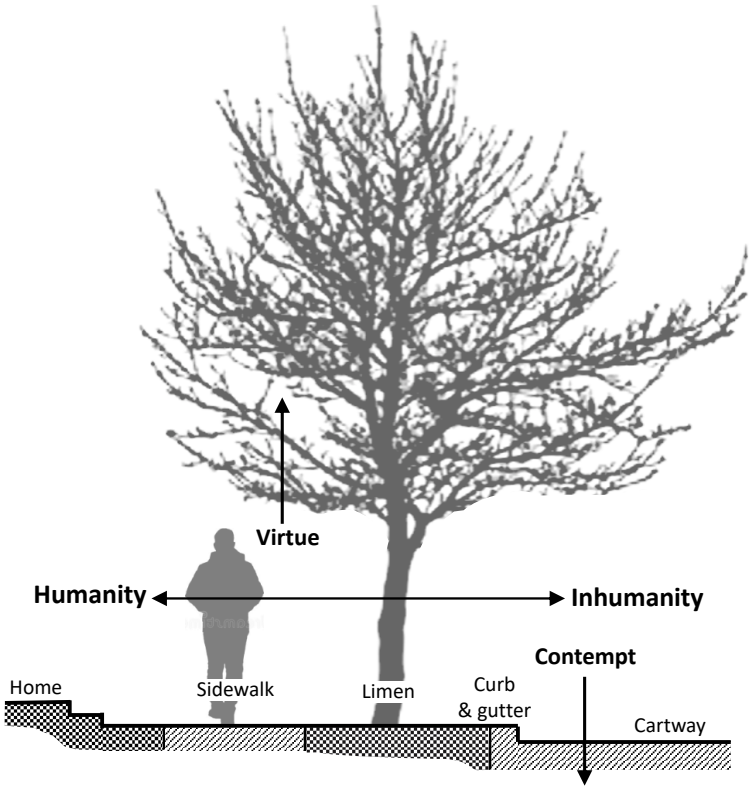

Figure 1. Summary of symbolic meanings in conventional streets and street trees.

Alternative interpretations of street trees' meanings were considered, but discarded. One was nature's psychological restoration: nature experience tends to counteract city stress (Kaplan and Kaplan 1998). Although city trees are derived from nature, their restorative relief is not their defining meaning in city streets, where they are aligned with urban social functions; they reinforce the city's social norms and purposes, not divert away from them. Another hypothesis was the 'world tree', which symbolically unites heaven and earth. A cosmic sense is not present in city streets, where trees are aligned with and participate in the city's social realm, not a larger cosmic concept.[12]

Stormwater Management Features

Although urban stormwater is derived from natural rainfall analogous to the way street trees are derived from nature, water is physically and symbolically a different kind of subject. Water is a substance, not an object. It is mobile, dynamic, variable, and vulnerable to pollution and disorder; its presence is in some circumstances refreshing, in others threatening (Ferguson 1998). Its urban management features are still evolving, and interpretation of their meanings to date is correspondingly uncertain.

[12] Baghos 2022

Modern stormwater management features evolved out of the conditions of medieval cities, where the presence and activity of naturally occurring rainfall were physically unarticulated and socially disruptive. Roof runoff spouted chaotically down on pedestrians. Runoff washed down streets, mingling with organic wastes and associated with disease.

Beginning in the mid-nineteenth century, amid the growth of modern cities and their institutions, municipal authorities imposed control on rainwater drainage, first in large cities like London, Paris, and New York. They drained rainwater away in buried sewer pipes (Melosi 1999). Enclosed downspouts and drainage grates directed surface water everywhere into the sewers. The system broke urban stormwater away from naturally falling rainwater and separated it from human perception and city life. It directed people's relationships away from natural process and onto impersonal institutions. Symbolically, it made city life exclusively technological and institutional.

In the 1960s, stormwater control basins began to be added around the perimeters of built-up areas and their sewers, to protect outside watersheds from urban-generated flooding and pollution. At the same time, natural areas or 'green spaces' were preserved outside the built-up areas. Symbolically the city (the realm of human society) was treated as the inherent source of pollution and floodwater, while nature outside was pure and precious. The term 'low-impact development' appropriately describes this socially minimizing frame of mind.

At the beginning of the 21st century, stormwater management features began to be added within built-up urban areas, articulating the presence and activity of rainwater within the urban 'source area' where people live.[13] Open roof scuppers and rain chains follow rainwater's natural earthward fall. 'Rain gardens' line city streets and plazas; rainwater's path into them is marked with distinctive construction details. Some of them are supplemented by artistic images of fish and rainfall, symbolically connecting local rain water with larger regional watersheds and ecosystems. The term 'green infrastructure' (GI) appropriately describes the frame of mind represented in this new symbolic system[14].

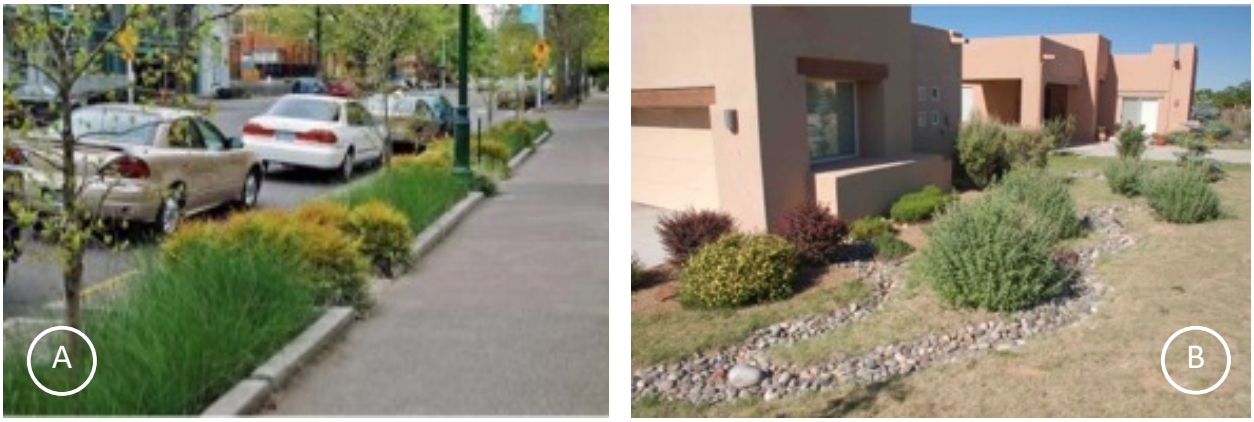

Figure 2. Green infrastructure: A) rain gardens capture street runoff; B) open swales follow water's flow path outward from roof scuppers with alluvial rocks

Many GI features are aligned with city architecture and infrastructure. These features symbolically participate in and reinforce social order, like street trees do in their streets. However there have been certain exceptions to GI's social agreeableness. Figure 3 contrasts a downspout that is

[13] Echols and Pennypacker 2015, Ferguson 2016b
[14] Herzog 1985; Thayer 1994

orderly in form and aligned with its architecture, with one that is chaotic and unaligned. The latter's disorderly form and display of naturally random dynamic rainwater disrupt social attention.

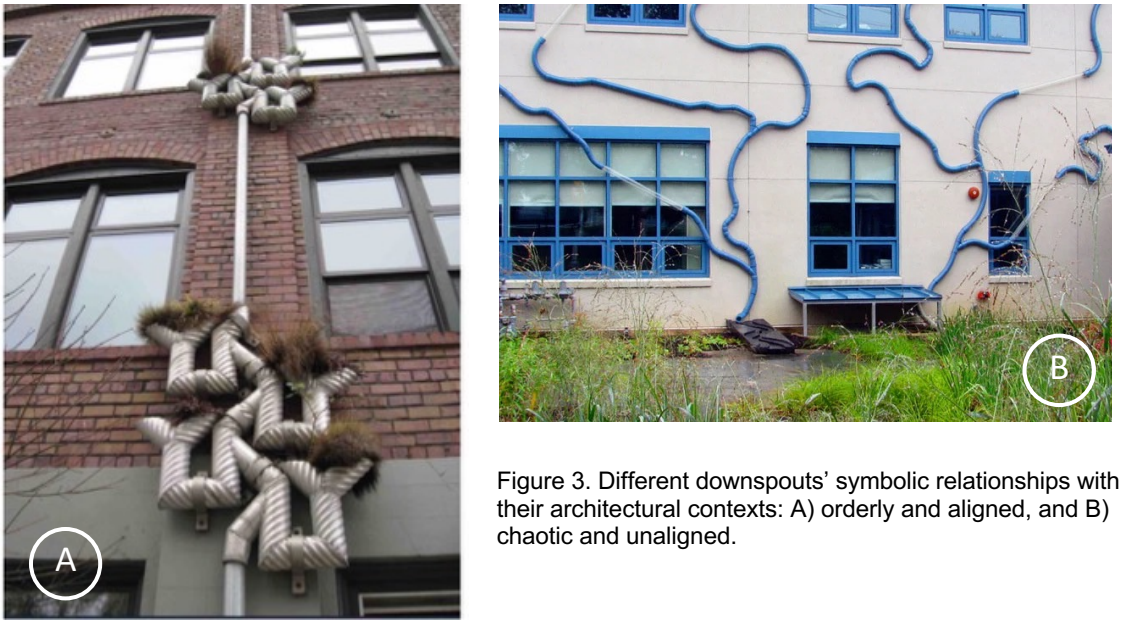

Figure 3. Different downspouts' symbolic relationships with their architectural contexts: A) orderly and aligned, and B) chaotic and unaligned.

Green infrastructure features are diverse in form and symbolic content. Interpretations of them are complicated by differences in regional climates, water systems, and urban legacies (Ferguson 2016a). In some cities their presence is resisted by city agencies' institutional culture, because their designs are not standardized, and their plants and soils are unpredictably dynamic. GI has not yet gone beyond social alignment to positively elevate or extol society and nature together; its moral position is largely passive and neutral. Philosophical skepticisms bristle about mankind's relationship with the natural realm. Stormwater management features continue to evolve In this time of cultural division and questioning.

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