

# THE SECOND & THIRD DISASTERS

Education in Post-Disaster Recovery in Rural Nepal

Maryia Sakharevich

## ABSTRACT

Education is widely recognized as a fundamental part of recovery process after a natural disaster. Psychologically, it provides a sense of normality by reintroducing a daily routine, helps children cope with the trauma of recovery and provides hope for a better future. Schools are also used as a means for communicating vital survival information. More importantly, education restores safety mechanisms for children which often collapse in the wake of a disaster, making children extremely vulnerable to exploitation. Experience shows that children who are out of school for prolonged periods of time are increasingly less likely to resume their studies, which becomes a tremendous obstacle for battling poverty. Despite this, a mere 2.7% of the total available humanitarian aid is allocated to education<sup>1</sup>.

This thesis specifically looks at Nepal in its recovery state after the 2015 earthquake, which devastated numerous regions across the nation, killed over 8000 people and destroyed or damaged 8300 schools, leaving almost one million children without a place to study. Nearly three years after the disaster, as basic infrastructure is being rebuilt, many children remain out of school. Parents fear for their children's safety in poorly constructed school buildings, are unable to afford the financial burdens of "free" public education or simply do not see the value in it, as quality of public education in Nepal is incredibly low.

Recognizing education as a backbone to recovery and sustainable development, this thesis explores the agency of architecture in providing incentives for parents to send their children to school throughout every phase of disaster recovery, ensuring that student attendance remains a constant. By analyzing a complex range of obstacles that are keeping children out of classrooms, the proposal becomes a dynamic link between four existing school facilities on the selected site. The design does not try to act as a school itself, rather it facilitates attendance at the schools already in place. Introduction of informal learning spaces promotes child and adult education, while a number of flexible public programs aim to integrate alternative education facilities into the daily life of the community. Together, they are designed to adapt to community's needs as it moves through different phases of recovery.

This work is rooted in two separate two-month-long visits to Nepal. Part of each trip was spent working with an international NGO (All Hands Volunteers) on six school construction projects in remote villages in Nuwakot and Sindhupalchok districts, providing opportunity for numerous conversations with local staff. This thesis is founded on these first-hand experiences and invaluable discussions.

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<sup>1</sup> UNESCO. "Aid to Education is Stagnating and Not Going to Countries Most in Need." *Global Education Monitoring Report*, 31 (May 2017). Accessed March 30, 2018. <http://unesdoc.unesco.org/images/0024/002495/249568e.pdf>

## Integrating Shelter and Services in Toronto's Moss Park

This past winter was particularly harsh and its ramifications were evident in the vulnerable homeless populations around Toronto. There is a shortage of accommodations in shelters especially in freezing temperatures and there is also a challenge of integrating people at risk and those from various backgrounds in society. One approach to meeting this challenge has been written by Ivan Illich in his book, *Tools for Conviviality*, where he defines “conviviality” as activities and tools that help individuals.<sup>1</sup> With the goal of helping the community and applying conviviality as a principle to actors in both natural and social realms of Moss Park in Toronto, the proposal involves redesigning the park and buildings as a series of different health care, extended learning, employment support, emergency shelter, and recreation facilities that integrate the exterior landscape as treatment, teaching, and recreation areas. In other words, the proposal links services with access to park space. This landscape is not only an important space for the homeless community, but also the rest of the neighborhood. The thesis proposes that the federal government relocates the current armoury, as it is an obsolete building, while acknowledging and maintaining the armoury's contribution to the community as an emergency shelter over the past two decades. This key contribution is translated into an inter-governmental and multi-service complex through the use of shared facilities, flexible spaces, topographic manipulations, and indoor-outdoor connections. Since the neighbourhood is an underserved area, the new design develops not just a new facility, but also one of interrelated services, which are multi-functional and completely integrated into the park because combining the different services destigmatizes them and allows them to be more a part of the public realm. This thesis proposes a new design for Moss Park through examining how “park buildings”, interconnected buildings and parks, can foster empowering relationships that create a supportive public realm.

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<sup>1</sup> Ivan Illich, *Tools for Conviviality*, edited. Ruth Nanda Anshen (New York: Harper & Row, 1973), 11.

## **Engaging Mycelium**

*explorations of a cultivated architecture*

Parshan Fatehi

### **Abstract**

This thesis presents a material investigation into understanding the architectural value of a biologically grown, fungal-based fabrication method. By utilizing the natural growth patterns of fungi, this matter-generating process challenges traditional means of production. This low input, low impact material practice is cyclical, where at the end of the material's useful life, it can return to the earth's carbon cycle.

Over the last decade, a handful of designers have displayed great interest in biofabricating with mycelium— the vegetative structure of fungi. Philip Ross, Maurizio Montalti, and the founders of Ecovative are pioneers in this crossover field of design and cultivation; growing fabric, packaging, bricks, and common objects. Despite gaining recognition, this evolving material practice lacks development within design literature. With no standard accepted protocols yet to follow, this thesis initiates an intimate dialogue with fungi through tactile, process-based, material-driven experimentation. At the intersection of architecture and biology, this work is actively guided by a microorganism, therefore inherently alternating scales from nano to macro. This research aims to: offer insight into designing with fungi as living collaborators, learn the characteristics of the material, and recognize the challenges and potentialities of material applications for the purpose of architecture.

An experimentation process has been conducted in multiple stages. The first stage is the initial interaction with fungi: testing a variety of substrates and growth techniques for basic form creation and evaluation. The next phase focuses on optimizing a growth method to achieve an accurate representation of the material's technical and experiential qualities. Subsequently, a series of tests were conducted, with the common goal of reaching a homogenous distribution of mycelium growth. Using optimal growth conditions, a variety of everyday objects were designed and grown by experimenting with different casting and curing methods. These techniques were further examined through the design and growth of a modular, multi-configurational, multi-scalar assembly unit. Additionally, the scale of the prototype was explored through a dimensional study, with the objective of determining a correlation between the growth time, drying time, and size of specimens. Samples grown for this study were subjected to compression testing to better understand the technical properties of the material, and to further define the challenges and opportunities of a fungal-based future in design. The intention of this multi-stage material investigation is knowledge acquisition through an instinctual and tactile engagement by cultivating artifacts and material experiences.

on [re]building downtown: design framework for the core area

**Abstract**

Rapid condominium development in Toronto is consuming large areas of the ground plane in prominent corridors of the downtown core. This is the most popular development practice for Mixed-Use land use in Toronto. It is designed to maximize land values, turning these areas into commodified spaces for retail and chain stores. Therefore, while rapid condominium development effectively provides much needed housing, it only supports public space as a space of consumption. This produces a social conflict with the needs of the residents above. An increasing population density in combination with a decreasing public space results in a lack of dedicated amenities for active recreation as well as diminished outlets for citizen expression.

*On [Re]building Downtown* is referring to *On Building Downtown* -- a report with design guidelines for the core area presented to the City of Toronto Planning Board in 1974. During this period, mayor David Crombie pushed to reform a rapidly developing Toronto towards a more socially responsible built environment.

In similar light, this thesis proposes a new design framework in favour of improving the social life of urbanites by addressing the challenges of Toronto's rapidly transforming public realm. This framework focuses on carving out designated spaces from condominium developments along high density corridors, framing the communication between buildings, and facilitating public engagement at multiple scales: the Core, the Street, the Room, and the Object. The resulting design introduces a new form of ground plane that considers activity and identity while giving purpose to public space by responding to surrounding density.

## Coffee Houses and Arcades: A Forensic Inquiry into the Myths of Modernity

Two founding myths of modernity, British Coffee houses and Parisian Arcades, have both been described as stages for the public display of private persons. The former was a “micro-stage where visitors could enact their chosen personalities”<sup>1</sup> and the latter, a promenade for the bourgeoisie to “display itself to the world.”<sup>2</sup> Central to these two spaces of appearance are two objects of inquiry: fashion and architecture. By forensically reconstructing these objects, the myths of the Coffee House and the Arcade are put to the test. In the first, the egalitarian ideal claimed by the Coffee House is pitted against reality, where architecture and fashion conspire to produce new lines of exclusion. In the second, the aesthetic character of the Arcade as phantasmagoria is dissected, and again architecture and fashion are charged as conspirators in producing the politically debilitating dream state.

Coffee House interiors dissolved social hierarchies, leaving space for fashion to emerge as a primary vehicle of power. A study of 17<sup>th</sup> century British interiors crossed with a forensic reconstruction of coincident fashions reveals the transfer of power from space to fashion. This transfer of power led to fashion-based forms of exclusion. Literal lines of exclusion are identified in the silhouette of a cuff or an overcoat. It is in these “trivial” sartorial nuances that power embedded itself.

Arcade architecture and its coincident fashions both framed modernity in the images of earlier epochs. Arcades cited Ancient, and Gothic architecture, while coincident fashions cited the Elizabethan age. At the same time, a number of technological innovations were emerging in architecture and fashion. These include gas lighting, iron construction, mechanical looms, and new sartorial forms. This coupling, of citation and innovation, past and future, represents the principal aesthetic quality of the phantasmagoria. The phantasmagoria created a false sense of progress and consequentially hindered concerted political action. A forensic reconstruction of arcade architecture and fashion unearths the material properties of these time-transcendent citations, premature innovations, and the phantasmagoria produced by their coupling.

While centering on the problematic, this thesis recognizes these relationships are dialectical, and exist as problem *and* potential. In the Coffee House, potential laid in the new opportunity to make oneself uniquely visible in the public realm. In the Arcades the potential laid in their ability to reveal alternate temporalities and, paradoxically, provide the necessary shock to spark concerted political action.

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<sup>1</sup> Christoph Grafe, *Cafés and Bars: The Architecture of Public Display* (New York: Routledge, 2007), 28.

<sup>2</sup> Johann Friedrich Geist, *Arcades, The History of a Building Type*, (Cambridge: MIT Press, 1983), 114.

Coding A Biophilic Core:  
Digital Design Tools for Toronto's Avian Habitat Networks

J Cameron Parkin

This research develops a methodology for computationally sensing, illustrating, and utilizing avian-focused patch networks to locate and inform ecological interventions in dense urban settings. These interventions are designed to extend the range of regional avian ecosystems, promoting beneficial urbanite-fauna interaction, often referred to as biophilia. This research is in response to Toronto's rapid densification, where in recent years, there has been a major increase of residential and mixed-use development in the downtown and central waterfront areas. Literature shows that as populations move to urban centers, there is a need for people to have access to thriving, biodiverse green space to foster mental health and environmental responsibility. At the same time, experts in landscape architecture and urbanism critique existing approaches to providing green space in cities, which often lead to sterile, ornamental lawns that limit urban biodiversity. To move beyond this approach, experts call for more dynamic and complex strategies in urban ecology.

As a response, this work explores computational methods of modeling networks and habitats that are borrowed from landscape ecology, graph theory, and parametric architecture, in the pursuit of a design methodology that thrives amidst the complexity and dynamic nature of urban and ecological systems. The resulting body of work involves simulating two dimensional and three-dimensional agent movement within patch networks, populating these networks with bird sighting data, and using this information to locate and inform a variety of intervention typologies. The work generated in this thesis is broken into three parts, with each part exploring a progressively smaller piece of urban fabric. The first part maps patch networks and suggests interventions in Toronto's downtown and central waterfront, the second part explores how these interventions affect bird movement in the three-dimensional fabric of CityPlace and Fort York, and the final part composes an artificial habitat that attracts local bird species and acts as a biophilic amenity for urbanites in CityPlace's Canoe Landing Park.