This Thesis is **GARBAGE**
Rethinking waste, empowering communities, experimenting with informality for an unsettling future.

by

Nicholas Andrew Potovszky, B.Sc. Architecture and Architectural Engineering, Budapest University of Technology and Economics, 2009

A design Thesis Project presented to Ryerson University in partial fulfilment of the requirements for the degree of Master of Architecture

Toronto, Ontario, Canada, 2011

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Master of Architecture Program, Ryerson University Department of Architectural Science, 2011

Abstract

In order to counter contemporary threats to the security of contemporary societies radical experimentation into new ways of living is needed. Taking inspiration from the global phenomenon of informal cities and their unique relationship with waste materials and spaces, this thesis proposes alternative ways of approaching community development in Affluent World cities. It envisions a development paradigm that incorporates user control in the design and construction of housing and other community infrastructure, encouraging the scavenging of materials and the re-appropriation of underused land. In line with the successful development practices now being carried out in informal settlements around the world, this bottom-up approach to development has surprising and encouraging implications for the practice of architecture and the quality of the built environment. Far from a dystopian view of society, this thesis presents an approach to building resilience into cities in a manner that does not shy away from the most pressing problems of today.
Acknowledgements

There are a number of people whose contributions to this thesis were invaluable and who I would like to take this opportunity to acknowledge. First and foremost, I would like to thank my supervisor and mentor, Dr. Mark Gorgolewski. Mark’s seemingly endless knowledge of his field and wealth of connections and ideas have radically changed the way I see what I do. His patience and trust in my sometimes frustrating way of doing things allowed me to follow my nose and uncover ideas that I might never have found otherwise. He exposed me to a wide range of writers and thinkers who I would never have discovered alone and who ultimately had a tremendous impact on my work. Finally, he supported and encouraged me to travel to Portugal and Cuba. These experiences greatly enriched the work that is contained in this thesis but also allowed me to make life-changing discoveries and connections in two of the world’s most beautiful and fascinating countries.

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Under the Supervision of
DR. MARK GORGOLEWSKI
General Introduction

Every Friday night, throughout the year, a small group of young Torontonians descends on the dumpsters and garbage bins in the back alleys of the city, looking for food. They do so not out of hunger but as a political and charitable act. They are participants in a loose-knit international movement known as Food Not Bombs which acknowledges that, in a world where there is sufficient food available to feed everyone, hunger is the result of corporate and government priorities that value profit for the few over fair distribution to the majority. As such, these young activists can be found spending their Friday nights digging through smelly piles of refuse, looking for items of food that have been discarded because they are no longer easily marketable even though they are entirely edible. In an hour or two of dumpster diving a surprising amount of food can be collected from behind grocery stores and restaurants. Over the following day, it is used in the preparation of free meals for anyone who is hungry.

This simple activity, the kind of thing that practically anyone can get involved in, highlights the fascinating relationship between many of the Affluent World’s most disturbing social ills. Perhaps never before in the history of humanity has such an abundance of goods been available to a society like that of Toronto. And yet, even there, people go hungry, children go to school with empty bellies, people eat poorly and feel out of control of their own health. In the meantime, patterns of waste continue—waste resulting from over consumption and waste as the by-product of an aggressive corporate culture of profit over practicality. Useful things are trucked away at enormous cost to fill distant landfills. The cheapness of these things that makes them so easy to dispose of often results from the true cost of it being offloaded on distant producers or natural environments—people and places that enjoy none of the political or economic protection that those in the Affluent World do. And so the disparities between the Majority World and the Affluent World continue to grow. In this curious paradigm of waste and profit over equality and justice, few seem to benefit. Yet, as the Food Not Bombs movement demonstrates, the gradual reversal of this paradigm is something that anyone can take action to effect.

This dominant and disturbing economic paradigm of waste manifests itself in many more parts of the world economies than just the food system, and its effects have brought even Affluent World societies to a frightening tipping point. After food, the most important need that must be fulfilled for each human being is shelter. And in the design and provision of the

Figure 0.1. Dumpster diving with Food Not Bombs in Toronto. The simple act of reappropriating waste and using it to empower disenfranchised people is a basic premise of this thesis. Photo by the Author.
built environments that all people need, waste and injustice have established themselves as norms. A remarkable abundance of things and spaces are squandered because of corporate and government priorities that favour profit for the few over the well-being of the many. This paradigm, a direct analog to that of the food system has far reaching implications for global economies and environmental systems. But like the food system, there are abundant cases of everyday people acting in simple ways to fulfil their own needs and reverse the ills of the system at the same time.

Today, in cities around the world, people seek out the materials and spaces that have been discarded by the affluent and seek ways to make use of them to fulfil their needs and the needs of their communities. They collect garbage and scraps of building materials, inhabit forgotten or peripheral spaces and begin the process of city building in absence of formal development mechanisms. Their goals and aspirations often revolve around immediate needs but, through their actions they subvert the very systems that marginalize the majority to the advantage of the minority.

This thesis explores the ways in which people use informal building practices to resist the paradigm of waste and profit for the few in order to create a more just and resilient way of living and developing. Chapter 1 attempts to summarize some of the reasons why the Affluent World needs to pay more attention to the way things are done in the Majority World. It highlights the possibility of collapse of current paradigms and stresses the importance of experimenting with new ways of thinking about and developing cities for a highly uncertain future.

Chapter 2 investigates informal settlement development around the world. It looks at the 1 Billion strong population of urban dwellers who, like the Food Not Bombs scavengers, take the scattered leftovers of an aggressive and often senseless economic system and try to turn them into homes and communities when homelessness is the only other alternative. While informal cities around the world are most commonly classified as ‘slums’ Chapter 2 points out the remarkable fact that these places are frequently the sites of exciting upward mobility for millions of disenfranchised people. For the remainder of the thesis, therefore, Informal settlements are adopted as a model for development of Affluent World cities—or parts of them—as a response to a highly unsettling future.

Informal settlement development has a remarkable relationship with wasted things. Chapter 3 points out that if waste is to be viewed as a resource for future development, as it is in much of the Majority world, then the Affluent World is very fortunate indeed. A half-century of radical wasting has provided the Affluent World with a first-class stockpile of wasted stuff just waiting for reuse. Chapter 3 looks broadly at materiality and proposes that, while waste is inevitable, a remarkable amount of stuff that currently sits unused, can have its lifespan extended through creative use in building projects. It investigates ways that wasted and scavenged materials could be put to use in such projects in the Affluent World, and in Toronto in particular.

Chapter 4 demonstrates the remarkable potential found in the wasted spaces and
opportunities in Toronto’s tower neighbourhoods. It identifies these neighbourhoods as a site for the kind of intervention that this thesis is ultimately leading up to, one which uses a support paradigm rather than a provider paradigm in order to take advantage of people’s inherent talents and allow them a role in the process of resilient city building.

In Chapter 5 a number of relevant case studies are identified and explored. These projects, taken from around the world, serve as the main inspiration for the final part of the thesis. They each address many of the problems and ideas explored earlier in the thesis and point the way toward a design intervention that addresses wasted space and wasted things in a city like Toronto.

Chapter 6 sketches out a vision for the Toronto’s tower neighbourhoods which focuses on reprogramming their wasted space. It suggests a framework into which a semi-informal pattern of development could begin to emerge providing the benefits of informal settlement development: gradual development, user-participation, material re-use and flexibility of spaces.

This Thesis is Garbage. It celebrates the unsightly, the dirty, the things that Affluent World societies have long turned a blind eye to—things that are inconvenient to the dominant paradigms of the Affluent World. Celebrating them is necessarily a subversion of certain paradigms. But there is an inherent and irresistible beauty in these things. Whether they be a bale of plastic pop bottles used to build an insulating wall or a city of squatters organizing to defend their right to a more secure and comfortable lifestyle, these inconvenient things offer opportunities to uncover more resilient ways of living. Put aside your revulsion and see what the messy world of waste has to offer.
1. Context and Challenges

1.0 Introduction

This thesis proposes that waste be re-imagined as a potential resource base of the future and that a model of semi-informal development, inspired by informal settlements of the Majority World, may be an ideal means of making use of that base in a responsible manner. These informal settlements, known variously as Third World slums, squatter cities, arrival cities and many other names demonstrate a remarkable capacity to make do in conditions that would be viewed as catastrophic in much of the Affluent World. As this chapter seeks to cast light on, such conditions appear poised to root themselves as the norm in much of the Affluent world. This thesis therefore asserts that the time has come for people to begin experimenting with ways of building and living that are vastly different from those that have been conventional in the past half-Century. For many, this view may seem contentious and irreverent, an angry reaction to big issues that are out of the scope of the field of architecture. But the ideas presented here evolved in response to deep and informed concerns around wholly believable projections of the future of the ways of life in the Affluent World. These ideas are meant to provoke, but not to offend. To some, they will appear to be inappropriate for the time and place that they have been proposed for. But the issues that they aim to address are very real and very much in need of sober attention. This section takes a broad look at trends that suggest that the sort of broad-stroked, experimental approach to architectural thinking presented here is necessary and appropriate. It outlines the need for affordable solutions to creating resilient societies, institutions and cities; systems that can absorb the shocks of a changing and uncertain world, without requiring the massive resource base that current ways of living in the Affluent World demand.

1.1 Challenges to Affluent World Paradigms

Put frankly, things do not look good for industrialized civilization, and those with a vested interest in the paradigms of the Affluent World. If today’s foremost futurists, climate scientists, social scientists and other experts are to be believed, we may be living in one of the most pivotal and volatile periods in human history. It is easy to dismiss this as the same sort of rhetoric that has unnerved and alarmed futurists and thinkers throughout history. But as the

Figure 1.1. An unfinished highway overpass in Piñar del Río Province, Cuba. The special period in Cuba, during the 1990s, saw many of the economic conditions predicted for the Affluent World in coming decades. Major infrastructure projects were abandoned and a new economy characterized by resource scarcity became the norm. Photo by the Author.
human population of the world slips past 7 billion people (CBC, 2011), humanity finds itself in a completely unprecedented situation. Bill McKibben, one of the pioneering journalists writing about climate change issues has boldly proclaimed in his latest book that planet Earth has changed so drastically that it is now appropriate to suggest that it is now a strangely familiar but wholly different world. It is a place where catastrophic climate change, biodiversity loss, ecological instability and insecurity for huge swaths of human population are no longer a matter of concern for the sake of future generations. They are the realities of life right now. In this new world, the natural systems on which people rely are unlikely to be as favourably aligned to our survival as they were on the old planet (McKibben, 2010). The eminent biologist Edward O. Wilson agrees, noting that the massive biodiversity loss that is now underway around the world directly affects these natural systems (Wilson, 2002). Biodiversity loss is conversely a symptom of the failing of these systems. Humanity can no longer view itself as outside or above the many complex and fragile cycles and systems of life and climate that exist on our planet. But humanity is only beginning to understand the implications of this, and this newfound understanding comes with the realization of that the damage done to these systems is already unnervingly severe.

Meanwhile the Canadian ethnobotanist and explorer Wade Davis, is attempting to bring to light the loss of much of humanity’s cultural diversity. Analogous to biodiversity, this wealth of cultural responses has the potential to provide the stuff from which humanity may find the solutions to living in harmony with a changing world (Davis, 2009). As many of the world’s languages, myths and ways of understanding humanity’s place in nature are forgotten, the wealth of potential responses to crisis, new and old, is greatly diminished. Again, as humanity finds itself in need of alternative thinking, it is discovering quickly how much novelty has been squandered.

Climate scientists give increasingly bleak projections of the consequences of rising global temperature and warn that we are far off track from reducing our greenhouse gas emissions to anything close to healthy rates (Lynas, 2007). James Lovelock—who harbours unpopular but substantiated views on the future of humanity—has projected that global climate change, exacerbated by various other factors may well lead to the reduction of human population to around 1 billion people by the end of the 21st century (Lovelock, 2009). Canadian archaeologist Ronald Wright agrees that that number would be reasonable given a reliance on human and animal labour following a hypothetical end to oil supplies and a failure to find a sufficient energy alternative (Wright, 2004). Such a precipitous drop in human population would amount to an unprecedented cultural and humanitarian crisis, which would undoubtedly be accompanied by human suffering of a scale hitherto unseen in history.

Meanwhile, we can find Jane Jacobs, the beloved and widely trusted urbanist and philosopher, devoting her final book to the very real possibility of our civilization sinking into a dark age (Jacobs, 2004). Jacobs’ warning stem from a concern about shifts in values and trend in many of Western institutions. They do not take into account the possibly greater challenges
of global climate change, pressures of overpopulation, etc. Nevertheless, they highlight an apparent fragility of the systems on which the Affluent World relies. It seems that even in the absence of environmental pressures there would be a real need for changes in the way societies of the Affluent World operate. The varied findings of these acclaimed scholars are disturbing and demand response. They suggest that threats to the most cherished institutions and accomplishments as a species are under imminent threat, often by the very operations that sustain them.

Talk of peak oil, peak soil, resource exhaustion and global energy shortages seems only to make the picture bleaker. Industrial society has long existed within a paradigm of constant growth. For the first time in history, this paradigm seems to be confronting the limits of Planet Earth to support it. Faced with such an outlook, it seems to be a good time to begin questioning what can be done to fundamentally change life in the Affluent World. Fortunately, at a time of great need for ideas, there is a wealth of interesting, albeit hotly debated suggestions as to what can be done.

1.2 Homer-Dixon’s Five Factors and Their Consequences

Much of the debate over the future has become polarized in recent years between two opposing camps. There are those who believe that progress, as it has commonly been understood in the modern era, will be sufficient to solve the pressing social, political, economic and environmental problems of the coming decades, while allowing paradigms of growth to continue without upset. Opposing them, there is an increasingly vocal camp, that believes certain factors may not allow industrial societies to continue to grow as they have. Five of these factors are described by the writer and sociologist Thomas Homer-Dixon, one of the key influences on this thesis. They include 1. population imbalances, 2. energy shortages, 3. environmental damage, 4. climate change and 5. income gaps (Homer-Dixon, 2006, p.281). Each of them is explored extensively in his work and will be addressed to some degree by this project.

Energy shortages, however, deserve a special brief discussion here. Homer-Dixon and others are concerned with peak-oil leading to the end of cheap fossil fuels and a dearth of alternatives to take its place. For the purposes of this thesis it is important to point out that the end of cheap energy will also spell the end of many cheap materials. So energy intensive is the production of so many of the materials that we use in conventional construction that spikes in energy prices will certainly lead to spikes in material costs. In many cases, rising energy costs may mean that it will no longer be financially sensible to extract or manufacture many building materials. Rises in energy prices due to fossil fuel scarcity are coinciding with scarcities of other materials as well. There are a number of scholars who have written about material scarcity and there is now good reason to believe that, even if there were abundant cheap energy to extract these materials, they would become increasingly difficult to access anyway (Krautkraemer, 2005). This discussion of scarcity should really come as no surprise.
Many societies and segments of societies, particularly those in the Majority World have been faced with crippling resource shortages for decades. It is reasonable to assume that the Affluent World, in the absence of the resource base that it currently enjoys, may begin to resemble these resource-poor parts of the majority world.

Homer-Dixon (1999, 2006) suggests that his Five Factors have the capacity to generate violence, poverty and human suffering by degrading the systems and institutions that we have put in place in order to mitigate that human suffering. This thesis makes a general assumption that Homer-Dixon is correct in his analysis of the problems surrounding these factors and their consequences. While it acknowledges that market forces and technological solutions to major problems of the 21st Century can must necessarily be a part of the solution, it aims to explore alternatives that aim to break the cycles that have brought about many of these problems in the first place. Furthermore, like many of the members of the second abovementioned camp, the author believes that upheavals in social, economic and political norms provide opportunities for positive change. Violence and suffering are not the only options when business-as-usual fails.

Homer-Dixon’s Five Factors can be explored to create a rough picture of what economic, political, social and environmental conditions may be like in the near future. They can give hints as to what the world, in which architects of the near future must work, will look like. Consistent with the concept of catagenesis this picture provides as much hope as it does despair. This project aims to work toward a way of designing and building cities that respond to Homer-Dixon’s Five Factors and the consequences of those factors. What follows is a brief exploration of some of those consequences.

‘Population imbalances’ refers to the enormous increase in population seen through the 20th Century and projected to continue through most of the 21st. It also takes into account the demographic shifts that accompany this unprecedented growth. Population growth contributes to a simple increase in global ecological footprint, based on the increase in pure numbers of people putting ecological systems under pressure in order to survive. These pressures cast considerable doubt on the prospect of many of the world’s ecological systems having the resilience or capacity to continue to provide for such huge numbers. But while the environmental costs of population imbalances are huge and need to maintain a forward position in the consciousness of everyone—architects included—the social challenges are equally pressing. A massive shift of global population is occurring from rural areas to urban areas for a wide variety of reasons. While this shift may ultimately prove to be a good thing, it requires an enormous amount of investment in city infrastructure and a massive cultural shift for billions of people in order that they be able to adapt to urban ways of life. Furthermore, as population growth begins to slow, there will be a problematic ageing of the global population, already observed in the Affluent World, that will require more people to live off of the labours of less.

As a result, cities for the future, even in Affluent parts of the world, need to be ready for
increases in population led demographically by generally poor rural dwellers with skill sets that may well be incompatible with city life. They must be ready to absorb large families, with spatial needs for ageing dependants and growing youth. They must also be ready for the realities of an eventual population contraction—either the rapid and unpleasant sort envisioned by James Lovelock and others or a more controllable sort as has been observed in much of Europe and North America in recent decades.

As outlined above, energy shortages will translate into shortages of a wide range of other resources including many of the readily available materials that our built environment currently relies on. This will necessitate a radical rethinking of what is ‘useful’ and what goes to waste, a rethinking that appears to be well underway in the Affluent World and which is well established in the Majority World. Energy shortages will mean that many of the energy intensive ways that things are done in the Affluent World will have to change. As a result, car culture will almost certainly be scaled back and roads will empty out. Increasing pedestrianization will require a widespread re-evaluation of zoning and building codes to meet the needs of a new transportation paradigm. Space used for the storage of cars will be freed up for other uses and peripheral development of cities will, in many cases, begin to revert to more rural patterns of life. The need for intensification resulting from the difficulties of getting into and out of cities will likely make space that has traditionally been underused, highly valuable and new paradigms of high-density development are likely to emerge.

With energy shortages will come the need to conserve and slow down. People will need their buildings to be energy efficient but they may not have the energy intensive technological solutions to efficiency available to them anymore. Similarly, the longevity of materials may necessitate that they be used in far more robust and resilient building types than is conventional today. People will need good natural light and ventilation, not just because these things are healthy and fashionable, but because alternatives like all day lighting and air conditioning will be too energy intensive.

Conventional agriculture may well be found to be too expensive in a world of energy shortages and conventional flows of food may need to be supplemented by small-scale, intensive urban agriculture as is seen in much of the Majority World. Similarly, manufacturing on a variety of scales may need to move back to areas close to where people live.

Environmental damage will have effects on ecological systems that humans rely on as outlined above. In the Affluent World, and particularly North America, a leading cause of this damage has been the unsightly sprawl of cities and suburbs. In addition to the densification of cities outlined above, it will be important to differentiate between urban, rural and uninhabited space in order to mitigate the damage that has already been done to environmental systems and allow for natural regeneration. Rural dwelling needs to be truly rural and urban areas need to have clear boundaries so that they stop encroaching on healthy rural and uninhabited space and allow those two other types of space to have healthy ecological systems.

Environmental damage is also greatly affected by the amount of resources that are
extracted and they way they are extracted as well as the way they are ultimately used or wasted. As resources become scarcer it becomes economically viable to extract new resources that were previously too difficult and expensive to access. The processes used to get at these less-accessible resources are usually more environmentally invasive. The drive for ever-greater consumption, driven by the infinite growth paradigm of contemporary economics has also led to a tremendous amount of waste of all types of resources, few of which have anything but abject effects on environmental systems. Cities of the future need to develop better ways to conserve resources and divert waste streams, keeping discarded things in use for as long as possible.

The causes and effects of and necessary responses to climate change are similar to those of environmental damage. In addition, climate change is projected to produce increasing numbers of ‘climate refugees’—people displaced by increasing frequency and intensity of catastrophic climate events. As a result, cities will almost certainly need to absorb their fair share of these refugees, adding to the already massive influx of population due to other demographic factors. Cities will also be faced with an increasing uncertainty about what types of weather and weather events should be expected. Structures built to withstand certain weather events that have not been common in the past may be required in the future.

Finally, Homer-Dixon’s reference to income gaps raises the issue of the massive inequalities that exist between people of different social classes and between different parts of the world. Income gaps create bitterness and strife between groups of people and individuals and add fodder to many of the world’s conflicts, great and small. These gaps are rooted largely in the inability of contemporary economic systems to encourage income equality either within nations or between them. The economic systems that allow and encourage these income gaps to grow tend to be the same systems that allow the rampant overconsumption that in turn contributes to the other four of Homer-Dixon’s factors. As such, prudent responses to income gaps will include the provision of opportunity for alternative economic development including localized trade, home-based supplementary income and inclusive policy encouraging people to have ownership over their home and work.

1.3 Collapses of Complex Societies

The polarization of opinions on the future has deep historical roots and the two camps outlined above each have intellectual ancestors. Futurists and prophets have been obsessed with the possibility of catastrophe and collapse for all of recorded history. There have always been those who are confident in the status quo and those who suspect something rotten beneath the surface of the system they live in. The modern era has endured a continuous and often tiresome debate between those who have warned of Malthusian limits to growth and those who have pointed out that Malthus has been proven wrong time and again by human ingenuity. Malthus may have been wrong about the time and place of his predicted collapses but the general pattern that he predicted has been observed in numerous places and times.
While human ingenuity has a remarkable track record, some societies have regularly come up against problems that have proven themselves intractable (Diamond, 2006, Homer-Dixon, 2006). Empires, nations, societies and communities all collapse. Nothing lives forever and every complex human system eventually comes up against a point at which it must either evolve or be replaced by something else.

The concept of societal collapse has fascinated academics and thinkers for centuries. Throughout history great thinkers, architects amongst them, have been fascinated by the remains of past civilizations and have speculated on the causes of their demise. Today, this fascination has a greater urgency about it. It has become evident that the comforts and securities of Affluent World life are out of synch with realities found in other parts of the world. It is apparent now that this has little to do with anything inherent in the populations of the Affluent World and everything to do with factors external to their capacities. There is no assurance that Affluent World lifestyles can continue in the future as they have in the past. What is interesting about the current state of the discussion over societal collapse is the enormous popularity that the topic has garnered, not just by hot-headed, doomsday-predicting megalomaniacs but also by highly respected thinkers in myriad fields of study. Those who propose that major collapse in our society is highly probable now draw upon a vast body of supportive research from a wide range of fields. This research spells out the reality of what could happen to the Affluent World’s prized wealth and security if steps are not taken to avert disaster. Yet, considering the popularity of the topic, it is surprising that so many people seem unaware of what would be at stake if collapse were indeed to occur.

The interconnectivity of many of the systems that bring Affluent World residents security and comfort make them extremely prone to breakdowns. These breakdowns can take place in government, law enforcement, economies, social systems, food and goods distribution systems, energy distribution systems, security, etc. It is easy enough to see, as well, how breakdowns in any one of these areas of society could easily precipitate into breakdowns in others. They have occurred in other parts of the world, throughout history and they are rearing their heads again in the Affluent World. Homer-Dixon’s Five Factors are far from academic in the reach of their consequences. They threaten the banal fabric of Affluent World Society, the very foundations of the Industrialized Civilization.

The theory of collapse of complex societies, proposed by the American archaeologist Joseph Tainter (1988), provides insight into the types the complex dance of danger and opportunity that all societies engage in. Researchers have long wondered why some societies fail and have put forward a vast number of hypotheses hoping to answer that question. The dark ages and renaissances that follow these failures have also always been extremely popular courses of study. While there is never a single definitive reason as to why a certain civilization collapses, Tainter’s research has identified common trends running through practically all of history’s failed civilization experiments. Resource scarcity has frequently been identified as a culprit in the collapse of societies but Tainter’s work demonstrates that it is not enough to
suggest that any collapsed society simply ‘ran out’ of a certain resource. The reasons why resource shortages tend to creep up on complex societies has to do with a more subtle and interconnected range of factors. Key to the process, Tainter recognizes, is the fact that as societies grow, they tend to increase in complexity.

Complexity allows for the emergence of new ideas, technologies and social organizations, which, in turn, allow for growth. But complexity comes with a price tag. All societies require energy inputs in order to fuel their activities. These inputs come in the form of food energy, renewable fuels and non-renewable fuels; most importantly for contemporary societies, fossil fuels. All human activities require some energy input. But increasingly complex societies find themselves requiring larger and larger amounts of energy to fuel their activities. Some of this energy is used in order to harvest new energy. The relationship between increased complexity and the energy required to sustain that complexity, however, is not necessarily linear. As such, societies invariably find themselves facing decreasing Energy Returns on Investment (EROI) (Homer-Dixon, 2006).

Inevitably, in any society that fails to check its growth, there comes a time when simple maintenance of the society’s complexity ends up costing more than the society is able to harvest in energy. At this point societies will, at best, face a gradual decline in complexity. Often though, other factors than simple energy shortages conspire to produce much more dramatic and sustained collapses. Such was the case in the Western Roman Empire, where geological and climate crises as well as the aggression of opportunistic opponents eventually drove the empire to massive collapse. This was a highly complex and unpredictable process in its details, but as a general pattern, it has been documented in countless instances throughout history and across the world. Interestingly, it has been observed that more recent civilizations—that is those that tend to have technological advantages allowing them to use more energy for the maintenance of greater complexity—tend to collapse faster than those in the more distant past. Modern empires, for example, have been observed to peak and fall in a much shorter time period than ancient empires (Homer-Dixon, 2006, p. 126). If there is any kind of deterministic pattern in these trends, it spells bad news for those who hope for continued growth and expansion of today’s dominant “empire”—the nations of the Affluent World.

Joseph Tainter has been joined by a number of other scholars in bringing these findings to the broader public. Jared Diamond’s popular 2006 book Collapse examines the similarities between contemporary societies and those that have succumbed to the sorts of fates described by Tainter. Diamond’s work focuses largely on the environment as one of the conspiring forces, which hastened collapse in the societies that he examines. He gives a particularly bleak assessment as to the current state of mankind’s relationship to environmental systems around the world demonstrating how factors external to human action or inaction often conspire at inconvenient times.
Panarchy Theory: An ecological theory that may be applied to many types of complex systems. A hierarchy of cycles at many scales are fundamentally interconnected. Collapse in one cycle may be buffered by resilience in another. If adjacent cycles peak at the top of their growth phase simultaneously there exists a possibility of collapse resulting in much greater devastation. Collapse may be necessary for the emergence of new complexity, if devastating enough, can potentially result in the inability for complex systems to regenerate at all.

Figure 1.2 (above). Buzz Holling’s Adaptive Cycle represented in three dimensions. With an increase in connectedness and potential for new complexities, overall resilience of any system tends to decrease. As such, a collapse resulting in a decrease in connectedness and a reduced potential for new complexity allows for greater resilience. Adapted from The Upside of Down (Homer-Dixon, 2006). Redrawn by the author.

Figure 1.3 (below). Representation of Panarchy Theory. A hierarchy of cycles at many scales are interconnected in any complex system. Collapse in one cycle may be buffered by resilience in another. If adjacent cycles peak at the top of their growth phase simultaneously there is a possibility of collapse resulting in greater devastation. While collapse may be necessary for the emergence of new complexity, if devastating enough, it can potentially result in the inability for complex systems to regenerate at all. Image by the author.

Image by the author.
1.4 Ingenuity Gaps, Catagenesis and Experimentation

Perhaps the best treatment of the thinking on why societies fail and what it means for contemporary lifestyles can be found in the works of Thomas Homer-Dixon. Much of Homer-Dixon’s work consists of laying out the evidence suggesting that many modern societies are facing rapidly growing challenges. He dispels contemporary arguments that the threats imposed by climate change, global political instabilities and energy shortages are overblown. Rather, he suggests that like tectonic stresses building invisibly beneath the Earth’s surface, many of these and myriad other issues may conspire, resulting in major shocks to our current economic, socio-political and environmental systems (2006). His concept of the Ingenuity Gap (2001) is a devastatingly simple way of explaining what is, however obvious, often difficult to observe owing to the seemingly stable state of contemporary society and economy. Increasing complexity and connectedness, for all the good it may do for people, requires increasing amounts of energy, creativity and, often, blind luck to maintain. There are times that required energy, creativity and luck are simply not available. Furthermore, Homer-Dixon’s quest to find out which people really understand how to address contemporary challenges dispels wishful thinking that someone out there has all the answers. In interviews with a number of international experts, Homer-Dixon finds a shocking lack of clarity as to how humanity or specific societies should proceed with solving major problems (2001). The point is not that societies need to give into the dangers that confront the parts of our civilization that they cherish most but rather that they must face them honestly and not invest too much energy into wishful thinking.

Homer-Dixon also discusses the difference between social and technological ingenuity and, in light of research that will be discussed later in this thesis, his conclusions are heartening. He proposes that social ingenuity may be even more important for addressing major challenges than technical ingenuity. The sustainability debate in recent decades has often focused on seeking technical quick fixes to environmental, social or economic problems. Homer-Dixon proposes that equal attention needs to be paid to experimentation with institutions and human value systems. In The Ingenuity Gap (2001), he writes:

It’s true that boosting ingenuity supply is often a sensible way to go… We’re very good at inventing things to free ourselves from constraints and to explore new possibilities for our lives. Whether it’s a matter of meeting our energy demand by inventing new types of fuel, feeding a still rapidly growing world population by boosting grain yields, stabilizing the international financial system by making available more information on countries’ finances, or stopping mass violence by setting up an international rapid-reaction force, we need to supply more and better ingenuity for more and better technologies and institutions …

But it’s essential that we not forget about the other side of our ingenuity gaps—about our soaring requirement for ingenuity. Partly because of our larger populations, rising wealth per capita, and more powerful technologies, and partly because of our hypercompetitive economic and social systems, we seem to be doing more of everything, over larger areas, faster than ever before. It’s as if we’ve got our collective foot slammed down on the world’s accelerator pedal. We need to think creatively about how we might slow things down, how we might ease up a bit on that pedal. I’m convinced that if we don’t—if we allow the complexity
and turbulence of the systems we've created to go on increasing, unchecked—these systems will sometimes fail catastrophically. In other words, nonlinearities will, at some point, slow down and simplify things for us, whether we like it or not.

There are reasons for hope on this score: things are already happening that may slow our skyrocketing need for ingenuity. Birth rates are falling around the world, which in time will bring our population growth to an end; people are coming up with ingenious technologies for lowering our consumption of natural resources, which will lessen the burden we are imposing on the planet’s environment; and there are some well-developed, albeit controversial, ideas for dampening the volatility of international capital flows. But one fundamental change that could slow things down gets far too little attention: change in our values and in our perception of ourselves.

This can be most clearly seen in our consumption habits. What we value as wealth and as the “good life” has an enormous effect on our need for ingenuity. People in poor countries quite reasonably want more material things—things that those of us in rich countries think are essential and take for granted, like refrigerators, electricity, and good clothes. But are sports utility vehicles, five bedroom houses, year-round air-conditioning, private summer cottages and vacations in the Caribbean also essential elements of the good life? Do they really make us that much happier? Probably not, yet most of us in rich countries aspire to these things, and when we get them we greatly increase our environmental burden, especially, for instance, our output of carbon dioxide. A shift to less material values in rich societies would help reduce our overall need for ingenuity to manage our relationship with our environment.

More profoundly, we need to rethink our most basic perceptions of ourselves. Our seemingly limitless ingenuity has convinced many of us that we can have everything we want, that all things are within our grasp and that we can separate ourselves from the essential foundations of life on the planet. But we really need to think less about what we want, and to remember instead our place in the broader scheme of things; to feel occasionally some awe before nature and to reintroduce some real humility and prudence into our collective consciousness. (Homer-Dixon, 2001, p.397-399)

If there is a single passage of all the literature that has been reviewed for this thesis that sums up its intended spirit, this is it. Self-perception can be a difficult thing to alter, both for societies and individuals. One of the central projects of the affluent world in the coming decades will be addressing the challenges outlined in the above passage. Architects may be able to play a profound role in altering societal and individual self-perception through the provision of spaces that foster alternative or redefined lifestyles.

Thomas Homer-Dixon appears to have little doubt that breakdowns will happen in many societies around the world. However, he proposes that these breakdowns and the time leading up to them may provide opportunities for radical shifts in global politics, lifestyles and attitudes that may allow humanity to reorganize its societies into more robust and resilient forms. Homer-Dixon’s most recent book The Upside of Down gives a name for this potential reorganization resulting from catastrophe. He calls it catagenesis, derived from the greek cata- meaning down and genesis meaning birth. It is an exciting proposition for those who are tired of fearing breakdowns and collapses but can’t shake the feeling that some very nasty things are happening in the world (Homer-Dixon, 2006). If societies are as likely, as Homer-Dixon proposes, to face catastrophe in the near future—in whatever form it ultimately takes—then they must be ready to take advantage of the opportunities that it opens for them.

Homer-Dixon’s concept of catagenesis is heavily influenced by the work of Canadian
ecologist Buzz Holling. Holling's work in studying various natural systems has led to a widely cited and influential model of complex systems. This model, illustrated as a closed loop in three-dimensional space, demonstrates the relationship between resilience, potential for new complexity and connectedness or interdependence of components of the system (see Figure 1.2). It has been widely applied to the understanding of the growth and collapse of many complex systems, both in the natural world and in the world of human design. Essentially, it demonstrates that the resilience of a system tends to diminish as its connectedness and complexity increase. Collapse, resulting in the loss of connectedness and complexity comes with an increase in resilience and potential for new complexity.

Holling's equally influential Panarchy Theory suggests that complex systems consist of a broad array of subsystems of various scales, moving through the same cycles of ebbing complexity, connectedness and resilience (see Figure 1.3). These subsystems’ cycles are nested into a hierarchy, which makes them intimately dependent on one another and affected by growth or collapse in adjacent cycles. If Holling's Panarchy Theory is an accurate model for how complex systems truly operate, then it indicates humanity's intimate reliance on the robustness of systems outside the realm of human design. Panarchy suggests that none of its components is independent of the rest. Thus, increasing complexity and connectedness in a number of adjacent cycles—say certain sectors of the economy, food production systems, etc.—puts the whole hierarchy in danger of collapse. It is interesting for the purposes of this thesis is that the downward trajectory of Holling’s ecological cycle opens up new capacity for complexity and connectedness and, as such, the possibility of reorganization into different—possibly improved—organizations. This is the essence of catagenesis and a strong reason for optimism in the face of seemingly insurmountable global problems.

Another author has recently explored ideas similar to Homer-Dixon’s catagenesis. The American journalist Rebecca Solnit's 2009 book, A Paradise Built in Hell, offers a surprising look at how people respond to catastrophe. Solnit’s work focuses mostly on natural disaster but her conclusions could easily be applied to catastrophe resulting from man-made phenomena. Solnit refutes the inevitability of hysteria, panic, looting and injustice in the aftermath of catastrophe. Rather, she observes, in a wide ranging historical study, that people just as often express the best social values, exhibiting altruism, spontaneous order and often outright joy in the face of disaster. One of the many lessons that can be learned from her work is that the collapse of economies, natural disaster, political instability and the many other challenges that may well be faced in the near future need not necessitate deterioration of precious social values. Perhaps a better understanding of how people have reacted to former catastrophes will allow people to take advantage of inevitable change and use it to create more equitable and resilient societies. The many challenges that face the Affluent World, and all of humanity can provide as much hope for positive reorganization as they do despair for the loss of cherished wealth and security. Solnit does not suggest that positive outcomes after disaster happen automatically but she contends that the potential for positive outcomes exists nonetheless.
An architect willing to take risks and ask tough questions can play an important role in preparing for *catagenesis*. Homer-Dixon stresses the importance of extensive experimentation in figuring out how we can respond when catastrophe strikes:

In our communities, towns and cities, we can use small-scale experiments to see what kinds of technologies, organizations, and procedures work best under different breakdown scenarios. How, for instance, will we move ourselves around, feed ourselves, and generate energy if our conventional ways of doing these things have been greatly disrupted? And how are we going to keep extremists from manipulating people who are suddenly scared and angry? We can experiment with ideas, too, because ideas powerfully shape our relationship with the natural world and with people around us. In a moment of contingency, the struggle over how we should frame our options and our future is really a battle of ideas. By experimenting with new ideas about politics, economics, and values, we’ll be better advocates of a coherent vision of the future and a plausible way of getting there—we’ll be stronger, more confident and less afraid.

Conventional economics is the dominant intellectual rationalization of today’s world order. As we’ve overextended the growth phase of our global adaptive cycle, this rationalization has become relentlessly more complex and rigid and progressively less tenable. Breakdown will, all at once, discredit this rationalization and create intellectual space for new ideas to flourish. But this space will be brutally competitive. We can boost the chances that humane alternatives will thrive by working them out in detail and disseminating them as widely as possible beforehand…Advance planning means we need to develop a wide range of scenarios and experiments with technologies, organizations, and ideas. (Homer-Dixon, 2006, p. 292-293)

Being a part of a movement of advance planning and experimentation is the goal of this thesis. Cultivating the best possible understanding of what the future is likely to look like can make a huge difference between useful experimentation and fruitless games.

### 1.5 Reflection on Architecture

This is an architectural thesis and as such, the reader might be wondering if reflections on societal collapse are misplaced or irrelevant to the practice of architecture. The author does not believe that they are. Architecture, it has been said is a means by which societies express themselves, their culture and their values. It would be amusing enough to explore how architecture might respond to a societal breakdown in the near or distant future. But one needs not speculate too much. There have been ample warnings by history as to what becomes of art and architecture in the wake of societal collapse. For example, following the collapse of the Western Roman Empire, Western Europe left very few traces of the sophisticated artistic and architectural culture that had characterized it through many centuries of Roman rule (Gombrich, 1978). This was not for a lack of ideas. Nor is it likely the case that simple resource shortages prevented Dark Age Europeans from continuing on the road of progress as they had for centuries. Rather, it seems that the ability for society to express itself in a lasting way requires the kinds of complexity that contemporary societies appear at risk of losing.

But architecture, at its best, can be more than a passive reflection on what is going on in the world. As a critical practice it can also be an agent for change. Perhaps by being honest about the fragility of civilization, and by trying to understand the many forces that result
in that fragility, architects can be better prepared to use their practice as a tool for guiding civilization away from catastrophic collapse and toward adaptive resilience. If this is the case, it is necessary to ask whether contemporary architectural practices are set up to promote the kind of change that humanity needs.

Architects are deeply tied up with the swings of markets, economies, political regimes and environmental flux. Like anyone, they may not be able to afford the assumption that the world in which they will be seeking work, in any number of decades, will be the same as the world of today. There is no way to predict what the future will hold but every person takes a stab at doing so, attempting to minimize the number of nasty surprises that await. Understanding and evaluating predictions of the future, however threatening they may be to professional norms, allows architects to adapt to paradigm shifts when they occur.

1.6 Performance and Efficiency

A common mode of thinking about how to address problems like Homer-Dixon’s Five Factors suggests that the current paradigm of economic growth need not change. The idea is that no one should be too hard on Affluent World residents for leading the most wildly consumptive lifestyles in the history of Planet Earth. Rather, Westernized society should rely on technology innovation and aggressive business practice to develop increasingly efficient and high-performance technologies that can allow them to live the way they are living now, more or less, while using ever-decreasing amounts of energy. The idea is an attractive one and its proponents have promoted it with great passion for years (Hawken, Lovins & Lovins, 2000, Friedman, 2008). But there are a number of reasons why we might do well to take it and its type with a grain of salt.

To start, the general public tend to have a relatively limited grasp of science, particularly physics, and therefore are often overly confident in the power of technology to solve problems. There is no doubt that technology has been able to continuously surprise even the most optimistic technophiles. The pace of change in human technological development over the twentieth and the beginning of the twenty-first centuries has been staggering. But there remain fundamental laws of physics that dictate that not everything is possible. The primary concern of the green-tech movement is the efficient production and consumption of energy. Increased efficiency is desirable but infinite efficiency is simply not allowed. There are limits to what is possible. Therefore when proponents of green technology advocate more energy efficient appliances, electronics, buildings, fuel-efficient cars, etc. it must be accepted that the trend toward higher energy efficiency can’t go on forever. There comes a point when developing more efficient things costs more energy than is saved by the efficiency produced. This is an illustration of diminishing returns on investment analogous to the diminishing returns on investment in societal complexity outlined in above.

Take the Olympic 100-metre dash as an illustration of the quest for better performance
of any technology. At the 2008 Summer Olympics in Beijing, Jamaican sprinter Usain Bolt surprised many by beating the previously held Olympic record in his event by a substantial margin. The excitement of competition is what likely keeps people interested in this rather boring sporting event in which people run in a straight line for about 10 seconds. But more than that, there has been a continuous tradition of progressively better times in the sport for all of its history. There is certainly a thrill in watching someone do something that has never been done before, even if to the naked eye the difference is barely noticeable.

But it should not be forgotten that an immense amount of time, energy and sometimes illegal drugs go into fine tuning a few human bodies to do something as trivial as running straight, really fast. The 100-metre dash is an interesting illustration of the world’s obsession with the concept of performance. The question is, where is this obsession taking people? Eventually there has to be an end to this progression of better and better sprinting times—obviously it is neither possible nor even desirable to run the hundred metre dash in zero seconds. Nor does it seem likely that any runner will be able to shave more than a few fractions of a second off the best time.

What is far more significant to the world of running is all-round stamina and general health of athletes. The ability for large portions of the population to be able to use their bodies to efficiently move themselves around seems a much more useful thing than the perfection of a few athletes around the world. The connection here with building is one of attitude. Architects need to ask how much good it is doing to celebrate the achievements of a select few high performance buildings or technologies when most of the world goes on performing poorly, as always. Perhaps sights are being set on goals of efficiency and performance at the expense of other important considerations. Would it be better to promote a balance between performance and accessibility to the general public?

There is an important school of thought to consider when examining the value of performance-driven development in any field. In the mid 1800s, the English economist William Stanley Jevons observed that despite increases in efficiency of coal use in English industry, the total consumption of coal in his country was continuing to rise. This apparent paradox has since been observed in a wide number of fields and places. It has been demonstrable in recent decades in the Affluent World where dramatic improvements to efficiency of our industries, transportation, appliances, etc., have not halted the rapid expansion of consumption of materials and energy. Thus better fuel efficiency in vehicles is correlated with increased per-capita fuel consumption; more efficient appliances and electronics correlate to increased per-capita electricity use. This paradox, commonly called Jevons’ Paradox, can be observed in all forms of consumption, material, energy and otherwise. While the champions of performance have attempted to diminish the importance of Jevons’ Paradox, a small but vocal group of economists, scientists and other thinkers, continue to challenge the supremacy of efficiency and performance in long-term considerations of waste and consumption (Herring & Sorrell

1 Famous, by the way, for the vast numbers of poor urban dwellers that it displaced, many of them now in the ranks of the 1 billion squatters discussed in Chapter 2.
2009). They warn of rebound effects, commonly observed cases of increased consumption despite increases in efficiency and performance. Whoever, on either side of this debate, ends up being right, there is no denying that humanity is consuming resources at faster and faster rates. It seems that technology leading to better performance alone is not the silver bullet that will solve our consumption problems.

Performance and efficiency may be better considered as part of a great cultural shift that needs to occur. This is a shift toward increased awareness of how much people actually consume and to what degree the various systems on which societies rely for survival can sustain that consumption. Experimentation with technological fixes for inefficient ways of doing things is important. But equally important is the recognition of just how much of our day-to-day consumption is frivolous and even detrimental to our happiness and well-being. This has already been summarized by Thomas Homer-Dixon, as quoted in above. But Homer-Dixon, in The Upside of Down, also puts efficiency in opposition to resilience, his suggested goal for human development (2006). Resilience—and sustainability for that matter—may well rely on high performance technologies and efficient use of materials and energy. But resilience is not synonymous with performance and efficiency. The challenges of the future are more complex than that.

Performance and efficiency are great goals for designers of the built environment, but to think that every problem can be designed away may be a mistake. Furthermore, great, intelligent design, of the type seen in the world’s best-performing buildings, may simply not be available to the billions who need it. Even in rich countries like Canada, few buildings get the time and care needed to create high-quality, high-performance buildings. It may therefore be preferable to design a built environment that performs well and remains durable through redundancy, rather than efficiency. Such a built environment could make up for the cost of its robust and redundant fabric by ensuring that the materials that make up that fabric are affordable and manageable to unskilled labourers—ideally the users of the buildings. Designers may also do well to stop thinking of a building as something that gets finished and will only degrade from then on. They can seek ways to leave space for users to cumulatively increase performance over time. Acknowledging that buildings change and evolve with users’ needs and as opportunities arise may require a simplification of forms and building techniques but does not rule out beauty.

By getting residents and users involved in the building process, designers can help to increase understanding about the way buildings work. High performance buildings and building components are useless if they are misused or abused. Lower performance buildings, on the other hand, can often be made to perform better if they are used intelligently by users conscious of how things work. Recognizing that the words construct, destruct and instruct all stem from the same root, the built fabric could be conceived as an entity in flux. It expands and contracts while its components are crafted, worn down by time and use, removed or renewed and in the process its residents come to better understand how these processes
carry themselves out. Healthy cities around the world frequently contain as much dereliction and decay as pristine freshness. But cycles of decay and renewal allow people to better understand their built fabric and better use their buildings.

Residents of such an environment could gradually learn to seal cracks and reinforce weaknesses. They could learn to open and close windows in order to control temperature and moisture as people have done throughout history. There would be mistakes and users who neglect the spaces that they occupy, without doubt. But ultimately people could be gradually introduced to an understanding of buildings as organic, changing entities. The knobs and meters that magically produce performance could be replaced by genuine understanding and human participation.

Figure 1.4. Dilapidated building along the Malecón, Havana Cuba. Construct, Destruct, Instruct. The dilapidated state of many of Cuba’s buildings provide insight into how buildings are put together and how they function. Is such dilapidation necessarily something that should be shied away from? Photo by the author.
2. Inspiration: The Remarkable Development of Informal Settlements

“The true founder of civil society was the first man who, having enclosed a piece of land, thought of saying, “This is mine,” and came across people simple enough to believe him. How many crimes, wars, murders, and how much misery and horror the human race might have been spared if someone had pulled up the stakes or filled in the ditch, and cried out to his fellows: “Beware of listening to this charlatan. You are lost if you forget that the fruits of the earth belong to all and that the earth itself belongs to no one.” (Jean-Jacques Rousseau, *Discourse on the origin of Inequality*, 1755. Quoted in Neuwirth, 2005, p. 285-286.)

2.0 Introduction

For their fascinating relationship with waste materials and space and their remarkable ability to develop in strenuous economic circumstances, the urban entities known variously as slums, squatter cities, shantytowns, arrival cities and myriad other terms, serve as the primary inspiration for this thesis. There are important lessons that can be learned from the world’s urban poor. Despite the many problems found in these informal settlements, it is becoming clear that, in all their permutations, they are rapidly becoming the dominant global model of urban development. In the realm of creative housing, and mixed-use development with limited resources the informal builder is the champion practitioner. In times of extreme economic, political and material uncertainties, affluent societies would do well to learn what they can from the billions of people worldwide who manage to survive and thrive on a fraction of the resource base that those in the affluent world command. The world of informal settlements, it seems, can no longer be considered a fringe issue. The ebbs and flows of these places have become driving forces of our predominantly urban world.

The world reeled at the beginning of the 21st century as writers such as Mike Davis and Robert Neuwirth began to reveal to armchair academics that the world population of squatters had topped 1 billion people (Neuwirth, 2005). These two authors, writing at approximately the same time, along with many others, were likely motivated by the publication of the *The Challenge of Slums*, a groundbreaking report on slum conditions around the world. It paints a global picture of the political, social, economic and material realities of life for the world’s urban poor. Published in 2003 by the United Nations Human Settlements Programme, its revelations were a surprising mix of seemingly insurmountable challenges and heartening...

Figure 2.1. Dwelling in Havana, Cuba. The improvised use of scavenged materials and incomplete state of construction is typical of Perhaps billions of dwellings around the world. Informal development, characterized by gradual collection of cheap or discarded materials and user-construction is becoming the global urban norm. Photo by the author.
The fact that approximately one in six people live in illegal, informal, and often highly dangerous conditions provides grounds for substantial pessimism about the prospects for any measure of global equality. And with some projections suggesting that the proportion is set to grow to two billion, a full half of the world’s urban dwellers¹, the world of slums has become an extremely hot topic for everyone, from economists to architects, who are seeking ways to promote development or ‘make a difference’.

Mike Davis in his 2006 book *Planet of Slums* writes bluntly about his projections for the 21st century city based on his study of slums around the world:

> The cities of the future, rather than being made out of glass and steel as envisioned by earlier generations of urbanists, are instead largely constructed out of crude brick, straw, recycled plastic, cement blocks, and scrap wood. Instead of cities of light soaring toward heaven, much of the twenty-first-century urban world squats in squalor, surrounded by pollution, excrement, and decay. Indeed, the one billion city-dwellers who inhabit postmodern slums might well look back with envy at the ruins of the sturdy mud homes of Çatal Hüyük in Anatolia, erected at the very dawn of city life nine thousand years ago. (Davis, 2006, p. 19)

This image of 21st century urbanization is less than heartening but there are good reasons for optimism in the face of such bleak projections. Faced with overcrowding, frequent shortages of necessities, oppressive violence and crippling poverty, many of these informal settlements make do admirably. Furthermore, Davis’ analysis makes light of an interesting material phenomenon. In a century where waste has become one of the few certainties in the world of construction (see chapter 3), the informal urban settlements of the world offer insight and encouragement that building with castaway materials can be an alternative to expensive, conventional ways of building. Because the rapidly growing cities of the Majority World face many of the challenges projected by cautious futurists for the future of the Affluent World these hopeful signs can help to inform a new way of thinking about the development of cities.

Journalist Doug Saunders sees the capacity for slum dwellers around the world to make the best of their often cruel and uncomfortable plight as an entirely natural process. Saunders differentiates between slums—stagnating and economically unsuccessful urban areas—and arrival cities, which are something different altogether. In *Arrival City* (2010), Saunders posits that humanity is witnessing the last great human migration, in which rural dwellers around the world are choosing an urban lifestyle, creating an overwhelmingly urban global paradigm. This process is extremely disruptive and has led to the scenes of terrifying squalor that are now all too familiar. But according to Saunders, it is also an affirmative and life-improving choice that provides opportunity and upward mobility for the billions who make it. For Saunders, rural lifestyles around the globe are bleak and hopeless. This rural paradigm leaves rural-dwellers unable to care for their families and encourage cycles of extreme poverty and social malady. New arrivals to cities often find themselves living in the sorts of squalid and unbearable

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¹ These numbers are referring to squatters, those living on illegally occupied land. The number of “urban poor”, however they are defined, is much higher.
conditions described by Neuwirth, Davis and others. But they tend to willingly embrace their plight because the arrival cities that they live in provide opportunities—jobs, connections and advancement. To Saunders then, the arrival cities of today, horrifying though they may be, are producing the empowered middle class citizens of tomorrow. They often remain poor and squalid because they are consistently being repopulated by poor rural-dwellers as previous arrivals ‘graduate’ to more established roles in the city. Arrival cities are therefore distinct from simple slums and should be embraced as inevitable and frequently desirable, however much discomfort comes along with them (Saunders, 2010).

Saunders sums up the functions of the arrival city and outlines some of the mechanisms that allow these squalid informal zones to become highly desirable and successful at dealing with the problems of poverty in the absence of massive aid or other top-down intervention:

Rather than dismissing these neighbourhoods as changeless entities or mere locations, we need to start seeing them as a set of functions. The first arrival-city function is the creation and maintenance of a network: a web of human relationships connecting village to arrival city to established city. These networks, aided by communications technology, money transfers and more traditional family and village relationships, provide a sense of protection and security (always of primary importance in the arrival city); they generate a sense of leadership and political representation; they give the arrival-city enclave a self-identity. Second, the arrival city functions as an entry mechanism. It not only takes people in, by providing cheap housing and assistance finding entry-level jobs (through the networks), but it also makes possible the next wave of arrivals in a process known as chain migration: the arrival city sends cash and provides basic lines of credit to the village, it arranges jobs and marriages across international boundaries and sets up schemes to circumvent immigration restrictions. Third, the arrival city functions as an urban establishment platform: it provides informal resources that allow the village migrant, after saving and becoming part of the network, to purchase a house (through credit and informal or legal deeds), to start a small business (through loans, buildings, relationships), to reach out to the larger city for higher education or to assume a position of political leadership. Fourth, the properly functioning arrival city provides a social-mobility path into either the middle class or the sustainable, permanently employed and propertied ranks of the upper working class. These paths into the “core city” are provided through housing values and legalization, business success, higher-education opportunities for migrants or their children, employment opportunities in the elite or “official” urban enterprises or even through simple physical connections to the city and upgrading of streets, plumbing, housing and transit, allowing the arrival city’s own rising real-estate values and the opportunities provided by sale or rental income, to create an exit path. It has become popular in scholarly and government circles to describe such functions, vaguely, as “social capital”. And that is, in short, what arrival cities are: repositories of social capital, machines for its creation and distribution. (Saunders, 2010, p. 20-21)

Davis’s description seems to miss part of the story. Squalor and misery may well be present, but in the absence of help from elsewhere, many of today’s slums are doing much more than “squatting in squalor”.

Squatting is the focus of the work of Robert Neuwirth. In Shadow Cities he does not use the term ‘arrival city’. His focus is on the non-legal occupation of land. In his investigations into global squatter cities—he lived for a number of months in squatter cities on four continents—he recorded much of the same phenomena as Saunders in Arrival City. This is not surprising.
The two authors are documenting the same places from different perspectives. Both authors also recognize the profound effect that the culture of squatting has had on contemporary cities, including those in the contemporary Affluent World. Mike Davis' use of the word 'slum' also refers to largely the same types of settlement as Neuwirth and Saunders. For the purpose of accuracy the term 'informal settlement' will be preferred over the other three terms unless the topic of discussion relates directly to the work of one of these three authors, in which case their preferred term will be substituted.

2.1 The Heritage of Informal Settlements in the Contemporary Affluent World

Squatter cities are an old phenomenon and one that has roots surprisingly close to home. Indeed, Neuwirth provides a fascinating account of squatting movements in the great cities of the United States. The stories that he recounts take place much closer to the present than most are likely to be comfortable believing. He goes further to highlight the importance of squatter movements in the development of the contemporary American culture around land ownership.

Canada’s cities also were also deeply influenced by squatter activity and informal development. ‘Shack towns’, owner-built shanty villages constructed at the periphery of Toronto in the decades leading up to the Great Depression were extremely common and have had a profound effect on the culture of home ownership in that city. The Canadian Geographer Richard Harris brought this fact to the public attention in his 1996 book Unplanned Suburbs. Harris’ analysis revealed that a style of informal housing development, not unlike that seen in the cities of the Majority World today, may have accounted for around a third of the city’s housing stock (Harris, 1996). This number has been revised by more recent work to be as high as half of Toronto’s housing (Saunders, 2010). According to Harris, the attractiveness of the shack-town, located at the city’s periphery, was so strong as to be one of the driving forces creating the largely suburban contemporary city.

Saunders outlines the extraordinary economic benefits that squatter-type settlements brought to cities like Toronto. Lacking restrictive zoning and providing flexibility and extensive community support, these ‘shack towns’ were incubators for creativity and, importantly, provided their residents a foothold in the real estate markets of the day.

Most of the eastern, northern, and western outskirts of the city were thickly encrusted with these self-built centres on mud roads without piped water or sewage; they covered the neighbourhoods known today as Etobicoke, York, the Junction, North York, East York, Davenport, Broadview and Coxwell. Such shack towns propelled the growth of Toronto in the decades before the Great Depression. And in many other North American cities, arrival cities materialized without permission in this Mumbai-style accretion of owner-built shack housing...

The outstanding feature of these settlements, aside from their spontaneous form and their haphazard appearance, was that virtually all of their residents owned the land their shacks stood on. Though the land had often been subdivided without approval by speculators who had bought plots of farmland or uncleared forest and sold slivers for perhaps $200 apiece,
Figure 2.2 (above). 'Shack towns' in Earls court on the outskirts of Toronto taken before the first world war. Courtesy of the City of Toronto Archives.

Figure 2.3 (below). A user-built shack on the Toronto Islands. Courtesy of the City of Toronto Archives.
governments and banks usually recognized the titles deeds. As we’ve seen throughout the
developing world, land ownership offers a clear path to social stability and often to middle
class vitality, as long as governments are willing to help.

What made North America in the late nineteenth and early twentieth century so different
from Europe—and so different from North America today—was the scale of home ownership
among the newly arrived poor. Blue collar workers, in both Canada and the United States
(and very likely in Australia), had rates of home ownership that were far higher than those
of any other social class... The drive to save and scrounge earnings, however small, to buy
a plot of land or put a down payment on a small home was almost a religion amongst the
rural-immigrant working classes of the time. Similar rates of lower-income home ownership
have been chronicled in Boston, Detroit, New Haven and Toronto. And the numbers were also
surprisingly high among blacks and women.

The result was an extremely high rate of upward social mobility—a trend that ended only
in the second half of the twentieth century, when cities became more zoned and regulated,
barriers to home ownership and property financing became more difficult, and the pathways
from lower- to middle-class status came to be defined by much harder to obtain forms of
higher education and loan capital. (Saunders, 2010, p. 159)

Depression era housing programs provided slum-upgrades of the type that are seen
today in the Majority World. Services were installed, streets paved and houses gradually
rebuilt and today there is little evidence that such informal development ever occurred. But
the evidence was not altogether removed. Today, many neighbourhoods in Toronto retain
an interesting air of haphazard planning. It is hard to call neighbourhoods like this beautiful
but they nevertheless exhibit a positive spirit of entrepreneurship, independence and modest
economic affluence. They also remain attractive to new immigrant communities, albeit ones
with far more financial freedoms than the typical arrival city resident in other parts of the world.

2.2 Medieval Development Tendencies

Robert Neuwirth proposes that the squatter city is fundamentally medieval in its social,
economic and developmental patterns. This proposal is not necessarily disparaging. While
one should be extremely cautious not to over-romanticize the connection between the world’s
contemporary informal settlements and the “true” medieval cities which have survived until
today, there is nevertheless hope in a loose comparison that these unplanned, informal
settlements may be on their way to developing into pleasant and lasting places. Medieval cities
are characterized by their human scale and organic development, informed by geography.
Like medieval hill towns, built for defensive purposes, 21st century squatter developments
often cling precariously to the unwanted spaces on hillsides and along creeks and rivers. The
results are urban forms characterized by constant surprises, accepting of the terrain on which
they are built because no one can afford to subdue that terrain.

In many European cities it was a common trend, toward the end of the Renaissance and
through to the 20th century, to cut grand avenues through more ancient medieval urban street
plans. These axes were seen to be rational and had many advantages for health, safety,
security and fashion in these cities but their grandness and monotony were not always as
pleasant as older parts of the city. In cities where this superimposition of new avenues took
place there is often a tangible difference in the atmosphere found between the old and the new. One feels a certain sense of relief when one steps from the grand and ordered “rational” avenues and boulevards—beautiful though they may be—into the more unpredictable and intimate streets which maintain their medieval plan. There, visitors and locals find surprises and attractive vistas at every turn. Life takes on a different pace as one is guided by the flow of streets laid out by the work of thousands of hands over an equal number of years. This is not meant to argue that squatter cities necessarily have the same aesthetic appeal found in the world’s beloved medieval cities. Rather, it is meant to question whether the aesthetic result of informal, gradual planning in the absence of paternalistic, centralized guidance, must necessarily result in unsafe, unpleasant cities.

2.3 Contemporary Case Study: Cova da Moura, Portugal

Residents of Cova da Moura complain that taxi drivers won’t even enter their neighbourhood to drop them off. Such is the stigma that surrounds this squatter enclave in the outskirts of Lisbon. Initially settled by squatters from former Portuguese colonies in the 1960s and 1970s, the small community of about six thousand people is Portugal’s most notorious slum. In recent years a spate of violent encounters between police and resident drug gangs has left the community with a serious image problem and many Portuguese appear to prefer to turn a blind eye to the problem, so difficult does it seem to be to solve.

The forces of modern development and the real-estate market certainly have a solution in store for the area. Cova da Moura stands as a last bastion of low-rise development in a sea of mid-rise modernist housing. Viewed from the air, it could almost be mistaken for a medieval hill town, an irregular grid of narrow streets and lanes lined with modest two and three storey homes. There are shops and other businesses at street level and the streets are filled with residents going about their daily business. Outside the clearly visible boundary of the neighbourhood, orderly mid-rise apartment blocks are ubiquitous and stand in stark contrast with the haphazardly planned, often crumbling buildings of Cova da Moura. Residents there don’t have legal ownership over the land that they inhabit and it is eyed greedily by politicians and developers. But there are no historical societies protecting the urban character of this quasi-medieval anomaly. Rather, Cova da Mourans have organized themselves, and with the help of a number of development programs and NGOs, they have proposed a different fate for their community. They suggest that they are able to develop the physical and social structures that they need for themselves and that allowing them to do so will encourage a healthier, prouder community to thrive at a lower cost to everyone.

By changing the image of the place, providing the predominantly young population with education and opportunities and breaking down the stigmas that surround their part of the city, locals suggest that they can develop into a vibrant and successful neighbourhood. The process will be slow, but about 20 years after the establishment of the remarkable Moinho da Juventude (Windmill of Youth), a community outreach and youth education organization,
Figure 2.4 (above). A bench made from scavenged materials in Cova da Moura, near Lisbon, Portugal. Photo by the author

Figure 2.5 (below). Decoration by local children on a staircase in Cova da Moura. Gradually implemented projects incorporating community participation have led to a surprising beautification of many public spaces in Portugal’s most notorious informal settlement. Photo by the author.
change is palpable. Aside from providing affordable kindergarten and youth education programs for local children—an enormous help to many parents who often commute for hours each day to get to low-paying jobs in the city—the organization has set up a hugely successful library, a number of community centres and a program to certify and promote local businesses. A number of hairdressing and restaurant businesses in Cova da Moura have benefited from the certification provided by Moinho da Juventude which requires them to meet industry standards in return for recognizable signage and promotion to the wider city. Drugs and organized crime remain a common and visible problem in the area. Visitors are warned not to take photos and to interact with locals carefully. But a strong sense of community pride has emerged in the area and crime rates appear to be falling in spite of the challenges posed by the current Portuguese debt crisis.

Architeturally, Cova da Moura is chaotic and individualistic. There are many established homes and buildings but few stand out as particularly attractive. Many buildings stand half-finished, waiting for the monetary or material resources needed to get projects underway again. Nonetheless, the neighbourhood’s scale has a certain charm, in contrast with its overly rational surroundings. A new kindergarten and headquarters for Moinho da Juventude have been constructed to fit into the existing urban fabric. They have incorporated a number of community participation projects in their construction and now stand as an extremely attractive architectural ensemble, a testament to what can be achieved with limited resources. There is little fanfare in building projects like these. Locals are well aware of the presence of their library, their community centres and their schools. Just having these spaces is a huge step in places that often go for decades without services and public space. The process of development of beautiful spaces is therefore slow and carried out on step-by-step basis. Beauty is very much in the eye of the beholder in places like Cova da Moura. Architects interested in being involved in such a process need to abandon their grand visions accept a degree of evolution in planning. Like all evolution this must take place at a slow pace—often painstakingly slow.

Like all squatter settlements, Cova da Moura’s relationship with space is extremely progressive. Wasted space is extremely rare and in the absence of zoning, the neighbourhood has evolved its way into a tense consensus over who owns what. Materials, too, are creatively employed. Very little goes to waste and people have a strong sense of what they need and what can be adapted to their needs. Each household has a small pile of collected materials—scrap of wood, old doors and windows, corrugated metal and plastic sheets—that await reuse in some future project. Around the neighbourhood one can see doors transformed into walls, houses with mismatched windows, rooftop shanties made from waste wood and plastic tarps. These creations are startling and unattractive, but the presence of more established homes, clad in traditional Portuguese azulejos, are a reminder that they are temporary measures that, given support and guidance, will evolve into more permanent and resilient building forms. In the process, their builders may develop a great understanding of how buildings work that can allow them to be active participants in the development of vibrant cities.
Consultation with building experts has been provided for local self-builders. There will be workshops held in the fall of 2011 to teach locals about earthquake-resistant building techniques, a topic considered extremely important in earthquake-prone Portugal. The Faculty of Architecture at the Technical University of Lisbon actively seeks ways to involve students in projects that deal with developing neighbourhoods like Cova da Moura and many others in the country. The phenomenon of squatting and self-building is becoming recognized as an important and necessary aspect of the development process in Portugal. Rather than resist this trend, architects and others are beginning to seek ways to guide it toward a safer and more culturally relevant place in mainstream society.

Architects do not have control over successes like Cova da Moura. But they serve an important role in education and empowerment of citizens and can help to find affordable ways to beautify such neighbourhoods. Piece by piece, neighbourhoods like Cova da Moura demonstrate that they are capable of providing for themselves. Professional intervention, therefore, must be done in a sensitive way to the needs and desires of locals.

2.4 Informal settlements and Waste

Perhaps most important to the scope of this project, informal settlements have a fascinating relationship with waste. Space and materials, which would often be overlooked in much of the Affluent World, are frequently put to excellent use in squatter cities. While many of these settlements are famous for their precarious locations on landslide-prone hillsides and near toxic landfills and rivers, they nevertheless must be admired for their creative use of tight and unwanted spaces.

Materials too are often put to ingenious use. While the architectural products of this new vernacular may be far from the standards of comfort that we set in the west, they are nonetheless commendable for their ability to turn garbage into liveable spaces. Much of the fragile, transient nature of the world’s millions of squatter home may come more from a fear of investing in permanent buildings due to the risk of eviction, than a lack of ability to build more permanently or more safely (Neuwirth, 2005). Furthermore, whatever materials are decided upon or available, they tend to be locally sourced, and are erected without heavy machinery using cheap local labour, which is usually provided by the homeowners themselves. The squatter cities of today are a testament to communities’ ability to take care of themselves when governments turn a blind eye or find themselves unable to help.

Avi Friedman, designer of the acclaimed Grow Home and Next Home projects (Appendix A: Additional Case Studies) was once invited to Tijuana, Mexico to lecture students about his experiences designing the grow home. In his book entitled The Grow Home he reflects on his experience of witnessing a local informal settlement regenerating after severe flooding a few months earlier:

It was my first encounter with extreme poverty, on an enormous scale. A washed-out bridge replaced by a log was crossed by a woman holding bags. Improvised wiring to nearby
poles connected the homes to the main electric line. Recycled tires were everywhere, used to hold back eroding soil or serving as front stairs to a home...The dwellings had been constructed out of different materials. Some had walls made out of planks of wood covered with tar paper. Others had roofs made from corrugated metal sheets. The main doors and windows had evidently been recycled. Near one house I saw a pile of old red bricks, waiting for reuse. Someone was building a new home out of concrete blocks near his wooden house. The whole area looked like a very sluggish yet active and giant building site. (Friedman, 2001, p. 128-129)

Friedman’s discovery highlights the resilient nature of the residents of this underdeveloped urban area. When disaster strikes in the Affluent World, people often sit and wait for governments and insurance companies to make things right. For most of the world though, and possibly for the future of the Affluent World as well, this aid may never come. Friedman does not romanticize the state of poor settlements like this one in Tijuana. But he illustrates, like many before him, that people tend to be resilient enough to flourish in the face of disaster. More than high-tech solutions that will solve contemporary urban problems once and for all, cities may need building practices and political elbow room that allow them to constantly adapt to a changing world. When materials are scarce or too expensive for disaster stricken, or just plain poor people, waste becomes a reasonable option. When conventional space is no longer available, that space which has been neglected or discarded by formal markets frequently harbours great potential. Chapter 3 looks at some of the ways that waste materials are put to use while Chapter 6 investigates wasted space as a potential sites for future projects incorporating informal development practices.

**2.5 Conventional Means of Addressing the Problems of Informal Settlements**

As Informal settlements are frequently viewed as ‘slums’ governments and other organizations are often found trying to address the problems of these types of urban development through heavy handed, top-down approaches. Typical amongst these approaches are government or developer-provided mass housing projects, which have frequently demonstrated themselves incapable of producing the same sorts of successes that organically developing, user-built ‘slums’ often foster. Saunders describes why these unfortunate failures have so frequently played out in literally all parts of the world:

One reason so many slum-rehabilitation plans fail is because they are based on moving people into what seems to be higher-quality housing while ignoring the larger function of the arrival city. The original slum houses in places like Karail, however squalid, offer the considerable benefit of being flexible: rooms and floors can be added as family needs change, and portions can be turned into shops or small industries to provide entrepreneurial income. They are also connected to networks of families, transportation routes and relationships that are crucial to building prosperity and permanence. In a serviced apartment block, however intelligently designed, this is often lost, and residents are reluctant to move into a home that is merely a house. (Saunders, 2010, p. 308)

In squatter settlements that have become generally accepted by their neighbours—in
Figure 2.6. Housing in Havana, Cuba. Informal settlements are better characterized by process than any inherent physical characteristics. They frequently make use of reclaimed or otherwise cheap materials and are in a constant state of flux. Photos by the author.
Figure 2.7. Images from the Neighbourhood of Earls court, Toronto, Canada. Is contemporary Toronto so different? Once one of North America’s most prominent ‘Shack Towns’ the neighbourhood still retains relics and the spirit of its days as an informal settlement. Around Toronto and particularly in backyards, the popularity of self-building and material salvaging are obvious. Photos by the Author.
other words, where the risk of eviction is no longer a primary concern—remarkable upward mobility is often observed. Sewers are gradually laid while water lines and other services are brought in. In the informal settlements of countries like Turkey and Brazil, Robert Neuwirth has observed impressive growth of economies and services. Both of these countries, despite rampant corruption, have political systems that lend a certain degree of confidence to squatters that they may feel secure in the tenure of their homes. As a result, residents of the favelas of Rio de Janeiro or the gecekonduş of Istanbul can be observed gradually upgrading and outfitting their homes and businesses. In Rio de Janeiro, for example, Neuwirth reports on having stayed in a squatter flat outfitted with expensive finishes and having a stunning view of the water likely unmatched by any legal apartment in the city (2005).

Neuwirth’s primary message is this:

When squatters feel secure in their homes, they build, invest, and prosper—and they don’t need a title to do so. Squatters in Brazil and Turkey have erected permanent buildings without title deeds. Squatters in India have created whole neighbourhoods while knowing that the land is not theirs. They have accepted the unofficial lines that divide one person’s home from another’s. They buy and sell and rent their buildings. They negotiate with each other over their future plans for their homes.

The medieval Jewish sage Rashi proclaimed that being (or what it means to be a human being—to act, to live, to do things, even the most mundane things, in this world) is essentially having a standpoint, a position, a base of operations. A massive number of people around the world have been denied that right. So they have seized land and build for themselves. With makeshift materials, they are building a future in a society that has always viewed them as people without a future. In this very concrete way they are asserting their own being.

We can learn from their example. The world’s squatters offer a different way of looking at land. Rather than treating it as an economic value, squatters live according to a more ancient notion: the idea that every person has a natural right, simply by virtue of being born, to have a home, a place, a location in the world. Their way of dealing with land offers the possibility of a more equitable city and a more just world. (Neuwirth, 2005, p. 21-22)

Mike Davis cautions his readers against being too optimistic about the self-help capacity of many of the world’s informal settlements. He points out that many of their residents have been further removed from security of tenure as not only do they not own the land that they live on, they don’t own the building that they live in either. A vast number of informal settlement dwellers are now tenants. So many early squatters and informal builders saw the potential for extra income in renting out their homes that landlordism and speculative development have become major industries in these places, disenfranchising millions even more than they already were. It seems that much of what Robert Neuwirth writes about is only the ideal\(^2\). Anti-communal, profit seeking speculative behaviour exists, it seems, in all strata of the world’s population. According to Davis, experts on informal settlements have long since given up hope that the squatter movement has the potential to solve major problems of migration and poverty through its self-help model of upward mobility alone.

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\(^2\) This isn’t meant in a disparaging sense. Ideals are something to be strived toward even if they are unachievable.
The squatter is still the major human symbol, whether as victim or hero, of the city. Yet ... the golden age of squatting—of free or low-cost occupation of peripheral urban land—was clearly over by 1990. Indeed, as early as 1984, a group of leading housing experts meeting in Bangkok warned that the “no cost occupation of land is a temporary phenomenon,” and that the “options of informal solutions [to the housing crisis] have been already reduced and will rapidly become more so” as “powerful and integrated private organizations” take control of urbanization at the periphery. “In their view, the formalization of transferable land titles (as distinct from security of tenure) was actually accelerating the process by which entrepreneurs who “circumvented or corrupted” the planning process were able to privatize squatting. (Davis, 2006, p. 90)

Saunders echoes the severity of this problem for the urban poor and rural-to-urban migrants. According to him, land acquisitions for such people are rarely possible through squatting. Legally or illegally a price almost always needs to be paid for urban land. This price can be surprisingly steep and the ability of new arrivals to cities to integrate themselves into supportive networks is extremely important if they are going to be able to find their way in the new urban world.

Despite its image, arrival-city housing is never free, or even cheap. The price of a square metre of land is very often higher in the slum than in a prosperous middle-class neighbourhood (but it is divided into far smaller parcels than would ever be allowed in better-off quarters). And slum-dwellers usually pay the highest prices for commodities like water and fuel, because they must be delivered by truck and are usually controlled by local oligopolies. Arrival is an expensive investment. (Saunders, 2010, p. 55)

As is the case with all societies, completely free markets appear to be a dubious solution to the world’s ‘slums’. Some kind of governance and intervention is needed to protect the poorest people. The question is, in places where governments have proven themselves unable to govern justly—where informal settlements are commonly ignored—where will this intervention come from?

### 2.6 Governance in Informal Settlements

Political disarray is common in places where pressures resulting from Thomas Homer-Dixon’s five factors have begun to take their toll. The top-heavy forms of government found around the world often find themselves incapable of functioning properly in times of economic crisis or other types of societal breakdowns. The world’s informal settlements have presented many remarkable cases of spontaneous or unofficial political organization in such times. They give an idea of how societies evolve when governments are no longer stable enough to rule justly and peacefully. Much of the population of today’s informal settlement is outside the care and jurisdiction of official governments as these governments seem to be simply unable to manage exploding populations and various other factors. The resulting socio-political order is often not of a type that those in the Affluent World would be comfortable with. Nevertheless, by being honest about what works and what doesn’t it may be possible to encourage beneficial types of political organization in instances when central governments find themselves unable
to govern.

A popular example of the difficulties around spontaneous governance can be found in Rio de Janeiro, Brazil. The *favelas* present moral questions to those used to the rule of official law and order. It is no secret that a number of drug gangs hold substantial sway over the goings on of the *favelas*. Police who enter a *favela* are treated with mistrust and hostility and recent years have witnessed a brutal war between gangs and the police. Partially as a result, Rio has become infamous as being one of the most dangerous and violent cities in the world. This is not the place to pass judgement on who is right and wrong in this conflict but it may be fair to say that Rio’s drug gangs have filled a void left by the absence of conventional forms of government. According to Robert Neuwirth, the unofficial rulers of Rio’s *favelas* provide a kind of security that the government has not. It may be based on ruthless violence and highly damaging business but it also may be better than nothing. Recent years have seen a number of instances of gangs in Latin America speaking out and demanding recognition from governments which, to be fair, often have reputations as being as ruthless, violent and unjust as any gang (BBC, 2010). As is the case with informal economies (See Chapter 4), unofficial or alternative politics should not be ruled out as means to much greater social resilience.

For Doug Saunders, the issue of ensuring order is more about providing resources and access to conventional politics than asserting control in informal settlements:

> Brazil, with its hundreds of high-population slums still controlled by narco-gangs, also offers a cautionary tale. Its governments spent decades trying to prevent, remove, isolate or ignore the arrival city, and its inevitable dynamics bit back: if left to its own devices, and deprived of access to the larger political system, the arrival city will generate a defensive politics of its own. In Brazil, it took the form of the drug gang. In Mumbai, it is Hindu nationalism. In the arrival cities of Europe, Islamic extremism. The arrival city wants to be normal, wants to be included. If it is given the resources to do so, it will flourish; without them, it is likely to explode. (Saunders, 2010, p. 75)

Governments, corporate enterprise, delinquent citizens and countless others have been vilified as the reasons why cities around the world have been ‘blighted’ by the development of ‘slums’. But the violence and injustice inflicted upon residents of informal settlements everywhere is unacceptable, regardless of who has instigated it. Ultimately, cutting key players out of the development process and the debate surrounding the future of informal settlement alienates potential benefactors and creates bitterness. Nabeel Hamdi’s numerous publications about development in areas of urban poverty shed light on alternatives to centralized governance which allow for democratic and independent development. What has worked in successful informal settlements around the world is the gradual introduction of co-operative social enterprise and governance. Participatory processes in developing programs and policy that create positive change may be slow and messy. But they are essential to the development of structures that take advantage of the enormous intellectual and physical resources found amongst the people living in informal settlements. Hamdi discusses and
promotes the development of co-operative structures or, as he calls them, mutualizations. These emergent forms of governance have demonstrated promising alternatives to centralized governance, naïve anarchy or organized crime as models for keeping order (Hamdi, 2004).

We have come to recognize the importance of emergence theory, of the relationship between designed structures and emergent ones, in reshaping our thoughts also on governance. We have begun to invent novel forms or civic engagement where government cooperates with, rather than serves, its citizens, moving from provider to enabler, much as it has learnt to do with the market. New forms of mutual engagement are emerging everywhere, based on participation and social entrepreneurship which is finding its way into the body politic of governance … Once again it is not either/or. (Hamdi, 2004, p. 107)

As with their physical forms, the institutional structure of informal settlements is often surprising. The ability of people to develop necessary political structures where they are needed is a testament to the inherently resilient structure of these urban areas. As in their spatial planning, solutions to organizational planning tend to be found through gradual, additive and adaptive processes and prove to be surprisingly adequate. In the absence of intensive design and top-down planning, people tend to find their way. When institutional or physical structures do need design, they should be designed in such a way as to not hinder the natural potential for adaptation and emergence. Co-operation and the desire for a better life seem to be the most powerful tools in generating upward mobility.

2.7 Poverty and Dignity in Informal Settlements

An interesting aspect of Robert Neuwirth’s study of the world’s informal settlements is the light he casts on squatters’ self-perception. In one of the most memorable passages of Shadow Cities, Neuwirth reveals a fascinating attitude held by many residents of Kibera, Nairobi’s massive slum and one of the most desperately impoverished urban areas in the world. When asked how they perceive white people, many of his interviewees used the same word: dirty. Considering the shocking way of life found in Kibera—the open sewers, overused public toilets, and garbage-paved streets—this is a revelation. While the poverty found in Kibera is certainly nothing to be inspired by, the optimistic and proud spirit of even a minority of its residents certainly is. They prove that you don’t need expensive possessions to maintain your self-esteem. The fact that many of the people of Kibera take the time to iron their clothes, sweep their dirt floors and tidy their lives to the best of their abilities provides hope that a world in which the Affluent World finds itself poorer and in more uncertain times, people may not necessarily resort to apathy.

Neuwirth reports similar attitudes in informal settlements around the world. Perhaps he is being selective in which residents he reports on but he claims that there exists a common trend. Residents of the world’s informal settlements often want to stay where they are. Residents are well aware of the freedoms that they have compared to those living in traditional patterns of land ownership. Many people do own their homes and slow and humble as progress may be, are empowered by being able to make their own decisions. Attitudes like this can be found in
poor places around the world. Material wealth, it seems, is not the only thing desired by the world’s poor.

Doug Saunders’ analysis of upward mobility in arrival cities dispels common outside views that these places are particularly destitute. According to Saunders, they tend to appear poorer than they really are because of the constant influx of new rural-to-urban migrants from the poor countryside. There is an apparent paradox playing out as the numbers of these migrants increases. On one hand, individuals in successful arrival cities are able to connect to the wider established city over time and gradually find means to move their way up the economic ladder. On the other, the whole arrival city appears to become poorer and more destitute over time as numbers of poor migrants increase. According to Saunders, this creates a lot of confusion about the sorts of intervention that is needed by these new residents.

This paradox has created a sense among outsiders that the city’s immigrant districts are poorer or more desperate than they really are, which leads to a misunderstanding of the forms of government investment they really need—a serious policy problem in many migrant-based cities around the world. Rather than getting the tools of ownership, education, security, business creation and connection to the wider economy, they are too often treated as destitute places that need non-solutions such as social workers, public-housing blocks and urban-planned redevelopments.

Yet it is clear to anyone who visits them that these neighbourhoods are not on a downward spiral, but rather are becoming platforms for personal, family and village transformation. (Saunders, 2010, p. 82)

Once governing bodies have recognized the type of investments that help and these investments are put in place it seems that arrival cities begin to settle into the patterns of permanence and civic pride that Neuwirth witnessed in more established squatter cities. From then, as Nabeel Hamdi suggests, governing bodies need to identify when to step back and do nothing (2004). Mike Davis observes the surprising processes of renewal in Los Angeles amongst Mexican and Salvadorean migrants. Once the arrival city is granted its legitimacy, it begins to settle into a place where people want to stay and the apparent downward spiral of the place into destitution, as observed by Saunders, is broken:

Tired, sad little homes undergo miraculous revivifications: their peeling facades repainted, sagging roofs and porches rebuilt, and yellowing lawns replanted in cacti and azaleas. Cumulatively the sweat equity of 75,000 or so Mexican and Salvadorean homeowners has become an unexcelled constructive force (the opposite of white flight) working to restore the debilitated neighbourhoods to trim respectability … they also have a genius for transforming dead urban spaces into convivial social spaces. (Davis, 2000, quoted in Saunders, 2010, p. 83)

Ownership, education, security, business creation and connection to the wider economy. These are not the sorts of things that architects can provide in sweeping gestures. But each one benefits from well-designed, flexible, and affordable space. The most important architectural lesson to be learned from these processes is that the new urban norm—call
them slums, squatter cities or arrival cities—cannot afford sweeping large-scale changes. They may desperately need design, but they need it a little at a time, as resources become available. It is important to note that the dignity and pride found in these places coincides with a per capita ecological footprint that tends to be vastly smaller than that of the Affluent World. Celebrating the success of these places and emulating it in the Affluent World may be key to ensuring that these small-footprint lifestyles don’t eventually evolve into more damaging ones.

2.8 Reflections on the Informal Economy

The planet we live on is finite. Therefore growth must eventually come to an end. However much people may not like to think about it, the case is fairly simple. Nothing grows forever. In light of the overwhelming evidence that human population growth has been contributing to most global ecological ills, humanity should all have gotten on with the project of figuring out what happens after growth long ago (Meadows, et al., 2005). But there appears to be a deeply rooted human affinity to the concept of growth. Perhaps the problem stems from the fact that the economic systems of the past few centuries have all been deeply reliant on growth. Could the Affluent World be like a child who, wanting to live by its own rules, is suddenly confronted with adult responsibility and prudence? The analogy to the need for our societies to end their “adolescence” has been made numerous times and has great power. But adulthood doesn’t necessarily imply the end of growth. The human body certainly stops growing at a certain age, but its impact, its complexity can continue to increase long into old age. Economies can also continue to exert tremendous pressure on natural systems long after certain measures of growth show them in stable or declining states. More than simply letting economies slip into a period of negative growth, a conscious retooling of economies is needed.

Economists faced with the problem of growth are quick to point out that a stable-state or shrinking economy would be a very unhappy place for most people. Ultimately, the end of global economic growth means the end of affluence—or dreams of affluence—for many people. In a world where around a billion people are currently malnourished (McKibben, 2010) and billions more live in abject poverty, a step backward in affluence could be fatal to a large portion of humanity.

It has become clear to many, therefore, that a central project for global civilization in the 21st century should be the redistribution of wealth. The time when certain individuals can be many hundreds of times more wealth than the global average may very well need to end. Many authors in recent years tried their hand at beginning to outline how a global economic shift of this magnitude may be achieved (Homer-Dixon, 2010, McKibben, 2010, Patel, 2010, etc.). The American journalist Bill McKibben, one of the earliest proponents and most successful of instigators of climate change action, has been an important figure in tracking international movements toward more equitable and environmentally sustainable lifestyles. His 2006 book, Deep Economy, highlights the fortunate fact that restructuring economies to be more equitable and less damaging to environmental systems tends to result in happier populations.
for local vendors has been set up. Photo by the author.

Allowing this type of enterprise to operate has been key to the relative success of the Cuban local economy in times of extreme hardship. In an unplanned way the streets of Cuba have organically begun to revert back to ancient patterns of urban form with shops, enterprise and light manufacturing lining the city’s streets in full view of passers by. Photo by the author.
and increased resilience to the uncertainties of the modern world. McKibben is a proponent of renewable energy and “green” technology but identifies that there is impotence in the ability of conventional political systems around the world in implementing them. He therefore focuses on the importance of local, self-sufficient economies in reshaping the political landscape of international politics. Where federal governments may find themselves unable to act fast enough on pressing issues like climate change, local movements have had great successes in reducing their carbon footprint, distributing local food and establishing supportive economic networks. In the process, McKibben suggests that these communities have greatly increased their resilience to global economic and political shocks. Best of all, members of these movements tend to find themselves less isolated and more happy (McKibben, 2007).

Much of Bill McKibben’s work focuses on small community based economic systems. It lends weight to the idea that economies of scale are not the exclusive means to better profits. This is because, as McKibben makes clear, there is more to be gained from human work than simple monetary profits. So much of the work that people do has real value that can’t be accounted for through traditional economic measurements like GDP. A similar concept is commonly promoted by environmentalists trying to figure out the “value” of natural systems threatened by human activities. They generally find this value to be many times greater than the whole official economy (Hawken, Lovins & Lovins, 2000).

Writer and activist Sharon Astyk writes about what she calls the “real economy”—the enormous amounts of work done by people that does not get included in measurements like GDP (Astyk, 2008). This economy includes black market dealings but also includes things like volunteerism, household work and care giving for one’s children, family or neighbours. She discusses the work of Teodor Shanin whose research indicates “the modern formal economy needs only about a quarter of the global workforce” (Astyk, 2008, p. 57). If this is the case, what is everyone else on earth doing?

Astyk suggests that a recognition of the immense value of all the work done by those working outside the formal economy could help societies come to terms with increasingly unstable economic systems and help to create resilience against shocks in those systems. Discussing the work of economic scholars promoting this thought, she writes:

[The] call is to stabilize the whole economy by expanding the unofficial economy and by removing some of the most delicate and essential elements of our security from the vulnerable space of growth capitalism. Now, this is quite the opposite of what we’ve been trained to believe. Our culture has pressed us to believe that security is monetary, rather than communal or biological, and that a stable economy is created by prioritizing the smaller formal economy over the larger informal one. But in fact, both Logsdon and Shanin argue, it is the unofficial economy that offers us stability, that keeps us alive and meets many of our basic needs, and the expansion of the formal economy ought to be our priority.

...This is both important and radical for several reasons. The first is that it can relieve some of our fears about the future. That is, the end of our conventional jobs and the life we’ve been living need not be the end of the world. I don’t want to romanticize what an economic or energy crisis will look like. But it is possible to live partly or even wholly within the unofficial economy, and to function well there. If we begin now to reinforce our connections to the
informal economy, to reduce our reliance on our jobs and our investments, and to strengthen our investment in our gardens and our neighbors, we can soften economic blows. The real economy is by its very nature, more robust than the formal economy less vulnerable to short-term change (Astyk, 2008, p.60).

In Arrival City, Doug Saunders elaborates on just how pervasive the informal economy has become. Despite the various instabilities that participation in the informal economy can give to people, he proposes that it is one of the primary driving forces of the global rural-to-urban shift. Discussing the economies of arrival cities around the world, he writes:

The meaning of a "job" has changed dramatically ... Until the economic crises of the 1980s, the cities of the developing world were dominated by an elite core of lifelong jobs backed by a few low-pay service jobs. Now, this world has exploded into small constellations of permanent employees dwarfed by a galaxy of informal work: small, unlicensed shops or street-vending sites, services, including domestic work and transportation, or short-term work in building and small manufacturing. The informal economy, previously considered a parasitic irrelevance on the edge of the "main" industrial economy, now represents a quarter of all jobs in post-communist countries, a third in North Africa, half in Latin America, 70 per cent in India and more than 90 per cent in the poorest African countries. It is a form of labour that is often less secure, and which offers none of the social-security benefits or long-term guarantees of industrial work—but, to its immense benefit, it is a form of work that is available to almost everyone who comes to the city. On the whole, it appears that the informal, self employed economy, even though it is more chaotic and often untaxed, is providing better livelihoods for rural migrants than the old lifetime-job economy. Self-employment, the starting-point of the arrival city, has become the global norm. (Saunders, 2010, p. 41)

Hamdi (2004) echoes Saunders’ assertion that it is no longer appropriate to view informal economic activity as on the fringe or anomalous. Rather, he has long since sought ways, in his own practice, to legitimize it and to encourage people to take advantage of its inherent strengths. Hamdi also points out that much of this informal economic activity is based around the home in the Majority World and is, furthermore, carried out by women. All of this activity contributes to a sort of trickle-up effect, empowering elements of society that have traditionally been marginalized and enabling them to take part in, and compete with, the formal, established structures. The hope is that, in addition to raising these elements of society out of the worst kind of abject poverty, the sorts of small scale, resilient economic networks that McKibben discusses will be established.

There is no way of knowing if a shift to small and decentralized economic structures will contribute to a sufficient cultural shift to address problems like Thomas Homer-Dixon’s Five Factors. What is sure though, is that small though the formal economy may be in comparison to the value of informal and natural systems, it has proven itself capable of enormous environmental harm and human suffering. Since the collapse of the Soviet Union and the gradual shift of communist China toward a freer market system, western capitalism has been celebrated as the final solution to world economic problems. But while many economists celebrate the continued upward trend of economies around the world, at least until recently,
many others have noticed that trend accompanying a growing disparity between rich and poor. It is a well-documented fact that inequality between rich and poor has been growing for some time. Thomas Homer-Dixon discusses the trend extensively in *The Upside of Down*. He points out that even though wages amongst the world’s poor are rising at a faster rate than those amongst the world’s rich, the gap between rich and poor will nonetheless continue to widen for a long time due to the enormous disparity in income size currently existing (Homer-Dixon, 2006, p. 189-191). The Great Recession of recent years has left the world’s richest people richer than ever and many poor people puzzled as to what to do with an economic system that appears to simply not work.

And the economic norms of the formal economy are not even ideal for citizens of the Affluent World. Homer-Dixon writes extensively about the economic status quo’s inability to adapt to change, often resulting in misery for the majority.

Taken as a whole, modern capitalism’s system of rules, institutions and language is formidably resistant to change… It creates chronic economic insecurity for workers. Companies can choose to invest their profits wherever they want, or not at all, and workers know that their jobs and well-being hinge on their employers’ investment decisions. The system also tends to pit workers in different firms against each other, which makes it harder for them to organize to protect their collective interests. And even if people outside our society’s economic elites want to make fundamental changes to the economic system, they don’t really have the power to do so. Although everyone’s political rights are formally the same in capitalist democracy—we all have the right to vote and organize ourselves politically, for instance—in practice people’s ability to change things vary greatly. The defenders of the economic status quo can marshal an overwhelming onslaught of attacks and ridicule against anyone who dares to publicly challenge capitalism’s logic…

For the vast majority of us who sell our labour in the marketplace, our economic security and relative powerlessness impel us to play by the rules. And in capitalist democracy, playing by the rules means not starting fights over big issues like our society’s highly skewed distribution of wealth and power. Instead, it means focussing on achieving short-term material gains—such as bettering our contacts with employers. (Homer-Dixon, 2001, p. 217)

It is the top-down nature of the contemporary formal economy that makes it so hard to criticize and change. Because decision making and policy are dictated by relatively few people, economic rules end up too rigid to adapt to change and address big problems. For many years, it seemed that the lack of flexibility and the various social and environmental ills that came with this ‘trickle-down’ economic paradigm could be justified by the comforts that it brought to large portions of society. Now, it appears that even that advantage has been lost.

It seems that in order to promote resilience and global equality the architecture of the near future must seek ways to foster the possibility of increased independence of local economies. Spaces must be highly flexible in order to accommodate local entrepreneurship, local manufacturing, food production and commerce. The values of mixed-use developments have been touted for decades, but new architecture must do more than simply provide space for shopping and office work. Light industry must be present and close to the workers who support it. As was the case through much of history, people may well need space to make their
own clothing, shoes, furniture and to grow their own food.

In Havana, where conditions that approximate peak oil have been experienced for years, these small, informal micro-industries can be seen everywhere. People sit at the sides of the road hammering old bolts and nails for resale. Men fix old shoes using antique, pedal-powered sewing machines while people sell lunchtime snacks from their living room windows to passers-by on the street. These are not signs of stagnation and misery. They are simply responses to the necessities of a new era in Cuban independence. Facing economic isolation and severe energy crises, Cubans resolved to limit their participation in the exploitative globalized economy and, instead, to focus on intensifying local and resilient economic systems.

The architecture of Cuba’s cities provides space for this everyday improvisation as do the rugged streets and crumbling buildings of similar places around the world. Space for this kind of resilient enterprise was not designed into the urban fabric of these places but certain patterns like permeable street frontage, narrow, human-scaled streets, low-rise, high-density residential development and many other mainstays of successful cities throughout history have helped. Architects and urban designers can learn lessons from these places and learn to design cities, neighbourhoods and buildings that at the very least will not discourage this type of enterprise. In addition architects can seek ways to make this type of resilient built form and the resilient economies and lifestyles that exist within it fashionable again.

Architects can be instrumental in promoting a more modest lifestyle. One of the hardest challenges of promoting more resilience and egalitarian economies will be convincing citizens of the Affluent World that having less stuff doesn’t necessarily mean being less happy or less comfortable. Small, residences can be energy efficient, easy to maintain and affordable. Co-operative housing communal sharing of resources allow groups to weather economic shocks by relying on each other in times of need. Designing these things well will make them more attractive to users.

People fear having less. But many people simply have too much. Income gaps are an enormous hurdle that must be overcome on the road to resilience. There are so many ways to do so and the reasons for doing them are mostly simple and obvious. To quote Astyk again:

This was one of the great arguments about slavery and about the end of the British Empire—the naysayers said, “it will hurt us financially to do this,” And yes, that was true. Not stealing from other people, not enslaving them makes the people who had been slaving and stealing less rich. But some things you do because they are right, not because they are expedient. (Astyk, 2008. p 72)

Is the Affluent World so different from the slave-owning or imperial powers of past eras? And can it afford to be less rich? It appears that it can indeed, and that many people would benefit if it were. As Cicero said, “Fiat Justitia, Ruat Caelum”. Do justice and let the skies fall. When it comes to economies in the 21st century, everyone stands to benefit.
2.9 The Peculiar Case of Cuba

It may be argued that the types of urban development outlined by Neuwirth, Davis, Saunders, Hamdi and others is relevant only in certain types of countries. In countries with strong central governments, social programs and building regulation traditions, the physical structure of squatter or arrival cities, found most often in the Majority World, do not manifest themselves. At least one country in the world demonstrates that the above analysis is not accurate. Cuba is a poor country but one with an highly developed social and political realm. Famous for its social programs, its bureaucracy—including strict laws around building—and its commitment to housing and other human rights, it has nevertheless developed a particular culture of informal building and community organization from which a lot can be learned. This informal culture is strongly reminiscent of the tendencies of informal settlements found around the world. It has developed in an economic climate that is a good approximation of what is in store for other countries in a world where Thomas Homer-Dixon’s five factors begin to overwhelm social, political and economic norms.

Cuba is perhaps the best demonstration of the fact that the need for the trickle-up type of development, seen in the world’s successful informal settlements, can just as frequently stem from Homer-Dixonian collapse as it does from a paucity of social programs or regulations. It is a country that, despite the best intentions and an established legal framework prioritizing top-down development, has found it best to have government take the role of supporter rather than provider in housing and community infrastructure. Governments can write whatever they want into law but when resources dry up and energy runs out, expensive government services become impossible to implement. At this point, people need to provide for themselves and hope that governments will support them as best they can.

Following the Cuban Revolution, the communist government intended to provide adequate housing for all citizens of the country. New policies saw to it that the slums and squatter settlements of Cuban cities were dismantled and further such developments were widely discouraged. In the subsequent decades, however, the government was unable to keep pace of growing demand for housing and many found themselves in substandard and overcrowded housing conditions. In order to alleviate the lack of space, a new form of informal development began to develop inside, on top of and around many of Cuba’s buildings.

Cuban Colonial architecture was found to be particularly adaptable to this type of additive development. It is characterized by high ceiling heights of as much as five meters, as well as extremely spacious interiors. These airy spaces were intended to encourage ventilation and provide space for the hot Caribbean air to circulate, rising away from occupants and being vented outside. This tradition, combined with the richness and robust construction—generally brick—of the colonial buildings in Cuba’s major cities, provided a unique opportunity for residents to build informally in order to meet their needs. Rooftops in Cuba’s cities are ubiquitously built upon, colonial era-porticos, terraces, and courtyards and balconies are enclosed and become new rooms. Makeshift lofts known as *barbacoas* built into the upper
parts of the high colonial rooms often form entire apartments for use by extended family or friends. In Havana, these user-built additions and alterations have evolved into one of Latin America’s largest and most complex shantytowns. But it would be possible to miss its presence entirely when strolling the streets of that city as it has developed away from the street. All the same, the entire city has been irreversibly altered and reorganized based on these necessity-driven alterations.

The *barbacoa* has become common in cities like Havana where residents have divided floors and greatly increased usable floor area in these buildings. It is now a popular culture icon, an uncomfortable necessity to be sure, but also a symbol of resilience and creativity with which all Cubans can identify. The term *barbacoa*, literally meaning barbecue, refers to the raised nature of these makeshift additions. The tradition has extended to a dramatic reshaping and repurposing of much of the country’s interior space, all in the absence of regulation, supervision, and usually in the absence of professional designers or planners of any kind.

These extremely creative redresses of severe dwelling shortages, frequently constructed from scraps of wood and hand mixed concrete, are typical of the resourcefulness of the Cuban people. In this unique economic and political climate, material shortages have been a reality for years and people are often left to their own devices to solve problems of repair and construction. The Cuban answer to the global phenomenon of slums and informal development are rarely seen as beautiful, but they demonstrate that housing problems can be solved by untrained individuals using less than ideal material palettes. Safety concerns with these types of structure are very real. Partial or complete building collapses occur frequently in neighbourhoods where *barbacoas* and rooftop shacks are common, due to the added loads that these constructions apply to the tired walls of the original buildings. All the same, the Cuban experience remains a testament to the power of human imagination and the resilience that is possible in cities.

There are a few lessons to be learned from these Cuban creations. Kevin Lynch writes in *Wasting Away* that,

> …ruined aqueducts of Rome were closed in to make squatters’ dwellings. A heap of old rubbish from the Great Fire, which encumbered eight and a half acres of central London for half a century, was shipped as fill to create the new Russian city of St. Petersburg. One advantage of living in any ruined city is its concentrated wealth of material, as well as the half-built spaces it affords. (Lynch, 1990, p. 83)

While cities like Havana may never have been abandoned, they nevertheless demonstrate while these structure have obvious formal similarities with ‘barbecues’ the term has more sinister connotations. Besides the fact that they raise residents up to the hot and muggy tops of the rooms that they occupy and discourage circulation—thereby ‘roasting’ residents—they are also frequently places where deadly fires break out due to the dry, old wood that is often used in their construction. The Cuban flair for creatively using wasted space and materials should be celebrated for its capacity to empower individuals when they lack the most basic access to resources that the Affluent World takes for granted. But this creativity comes at the cost of danger to life and property—a reality whose importance must not be underestimated.
what Lynch is talking about here. They also demonstrate the importance of what Tatjana Schneider and Jeremy Till call 'slack space', a key ingredient in the production of flexible and adaptable architecture (Schneider & Till, 2007, Till, 2010). A perfectly efficient use of space would never have allowed Cubans to build for themselves as much as they have. Rather, the inefficient use of over-designed masonry walls and oversized interiors have provided space for many who needed it desperately. The conditions in the *barbacoas* and other makeshift building alterations are far from ideal, but they are better than homelessness. And while much of the city’s architectural heritage has been damaged by this spatial reorganization, new urban forms have emerged which are no less legitimate and fascinating than older versions of the city. Many of these structures, owing to their simple construction, could be easily removed if ever there were more prosperous times in Cuba’s future when residents might want to restore these old buildings to something like their original state.

Cubans have also made extremely good use of the ‘slack space’ between buildings and in underused fringe areas around the city. Here, facing starvation after an almost total collapse of trade with the Soviet Union, residents of Cuba’s cities began to plant edible crops introduce intensive agriculture into the city. This agriculture was not technologically intensive; fuel was extremely scarce and the chemical inputs that the country was used were no longer importable. It was instead labour and time intensive. People planted in parks and yards, on government land and on private balconies. Recognizing that conventional economic measures would not be enough to mitigate the effects of the new economic conditions facing the country, the government began to support the efforts of the new class of urban farmers. Public policy was adjusted to allow this ‘ruralization’ of Cuban cities and partnerships were sought with universities and international aid organizations and NGOs to ensure that farmers and gardeners had access to information and resources for setting up an agricultural paradigm that had been forgotten for forty years. Within a few years, Cubans were eating better than they had in the previous era of industrial agriculture. Like their building informal building practices, the urban agriculture movement, out of necessity, allowed Cubans to provide for themselves what conventional government and economy could not. The Cuban government has since been widely praised for its realistic and supportive response to this natural tendency for people to band together and solve their own problems.

For all its political, social and economic problems, Cuba is widely regarded as one of the most progressive countries in the world in balancing its development standards with its ecological footprint. For Cubans, the creativity that led to this success was a matter of sheer necessity, rather than intelligent foresight. This small country in the Caribbean offers a compelling vision of what the cities of the future may look like and how they may develop in the absence of many inputs.
system of ‘supports’ for the city’s residents. Photo by the Author.

Figure 2.11 (below). Balcony in Havana, Cuba. The colonial buildings of Havana provide an undesigned system of ‘supports’ for the city’s residents. Photo by the author.
Figure 2.12. Barbacoa structures in Havana, Cuba. In a country where squatter developments have been discouraged and government housing programs have failed to provide for the population, a culture of informal housing development has arisen which takes advantage of the country’s spacious colonial architecture. The Cuban experience teaches important lessons about the importance of flexibility and the robustness of buildings in creating resilience. The *barbacoa* phenomenon has become an accepted—and often celebrated—part of the urban landscape. Images sourced from http://barbacoas.org/ and http://vocescubanas.com/
2.10 An Architectural Response to Informal Building: El Arquitecto de la Comunidad

By 1994, when the Special Period in Cuba was at its peak the Cuban government had long since fallen behind in its promises of housing for all. In response, Cubans were forced to be resourceful in finding new housing solutions. In most cases this consisted of extended families sharing housing resources and constructing makeshift additions or repartitioning space to suit new needs. A number of spatial solutions became popular in cities throughout the country (See Section 5.9). Each of these solutions and many others tended to create dangerous or unhealthy living conditions. New floors and structures built into or onto existing buildings often compromised structures and led to dramatic increases in building collapses in older neighbourhoods. Barbacoas and expansion into courtyards and tenement corridors decreased or eliminated natural light and air circulation. All of this is to say nothing of the damage done to historic façades and interiors. All the same, these improvised solutions grew out of a desperate necessity for new housing stock and allowed a degree of breathing space for households in need of additional space.

These trends played themselves out against a background of crippling resource shortages and economic hardships. By 1994, they were so well established in the country that the Cuban NGO, Habitat-Cuba, seeing the dangers inherent in the country’s new vernacular, was compelled to identify and implement a reasonable solution. Drawing on community development traditions in other parts of Latin America, the organization aimed to encourage safe building practices and intelligent material use. The result was the Arquitecto de la Comunidad (Community Architect) program. It was intended to provide architectural consultation to self-builders and households that needed to expand or alter existing buildings. Users of these services paid for them on a basis determined by their ability to pay. The program set aside aesthetics for functionalism, safety and efficiency and developed a highly effective system of consultation that insisted on participation from all members of the household in question. Deliverables were often in the form of drawings and directions intended for the non-professional builder. Projects were understood to take time and be undertaken in a step-by-step fashion as building materials and time for work became available.

Habitat Cuba’s model was not unique and similar programs are now working well in a number of countries. In Latin America in particular, Arquitecto de la Comunidad and similar programs are run by NGOs and government bodies. These programs are similar in intention and operation to the Community Development Corporations and Community Design Centres (CDCs) in the United States. They are characterized by decentralization, participation and an acknowledgement of the advantages of small and gradual development. Unfortunately for Cuba, the success of the Arquitecto de la Comunidad program under Habitat-Cuba was short-lived. By 2001, a few years after the program was awarded a best practices recognition at the Second United Nations Conference on Human Settlements, the program was taken
over by the Cuban Ministry of Housing. According to Coyula, this move was likely made due to the Cuban government’s preference for centralized power structures. Under the Ministry of Housing’s mandate, the program does not seem to have been as successful as it was in the 1990s.

The encouragement of self building by programs like Habitat-Cuba has been widely criticised by those who are more closely aligned with traditional roads of architectural production. In a personal communication, Cuban architect and Historian Mario Coyula lamented the loss of much of the country’s built heritage to makeshift alterations by residents. According to Coyula, more recent incarnations of the *Arquitecto de la Comunidad* program were not diligent enough in encouraging that building projects be done correctly. Indeed he pointed out the fact that very few architects are now employed under the program. Safety and efficiency have won out over heritage and aesthetics. Coyula believes that these different considerations need not be mutually exclusive. What is happening though, according to him, is that the lack of aesthetic consideration by the program is leaving residents in a position where they feel compelled to ornament and decorate in the absence of professional guidance. At first glance, this may seem reasonable, but Coyula worries that it is causing a deterioration of taste amongst the population. Loud colours and inconsiderate forms have deeply scarred the traditional fabric of the city (Coyula, Personal Communication, May, 2011).

For others, the situation appears more simple. The Cuban self-building tradition is borne out of necessity, according to Guillermo, a *casa particular* (private guest house) manager in rural Cuba. He has worked on a number of self-build projects in his community with the assistance of the local *Arquitecto de la Comunidad* service. For him the argument about aesthetics and heritage is strictly academic. People need new space for their families or for income generation. For most people, there is simply no option besides designing and constructing it themselves.

The experience of the *Arquitecto de la Comunidad* program in Cuba offers a number of lessons. In the past few decades, Cuba has experienced a close approximation to the types of material shortages that may be in store for much of the Affluent World. A strong, centralized government and a cultural tradition of community support networks almost certainly played a key role in maintaining political stability and keeping the peace in times of extreme shortages. Beyond that though, it appears that decentralized, community based decision-making was the driving force that allowed development to continue. Architects played an important role in housing and community development, but they did so in a far less heavy-handed way than people may be used to in the Affluent World. The *Arquitecto de la Comunidad* program provided architectural service that insisted on small steps and user involvement. Its more recent incarnation, under the ministry of housing, also seems to have lessons to offer. It is enough to provide engineered drawings that are focused on safety and efficiency. But it appears that architects, even in resource starved Cuba, are able to contribute so much more if they are willing to participate in the give and take nature of economies of scarcity and if they
are able to market their expertise as a valuable service. Success in this regard seems to rely on controlling the classic architect’s ego. In an age when many young architects feel frustrated that they are unable to practice in a meaningful way, this could be a breath of fresh air.

If the Affluent World were to accept a greater degree of informality in the development of cities, as this thesis proposes, architects could find meaningful ways of using their skills to guide that development through models of practice similar to Arquitecto de la Cominidat. This would require a tremendous and possibly painful re-examination of the role of the architect but could also allow the profession to evolve with the times so that it could continue to be a truly humanistic profession.

2.11 Contemporary Approaches to Dealing with Informal Settlements

In the 1980s an approach to development known as ‘Sites and Services' became popular amongst governments in much of the Majority World. There was a growing sense of awareness that mass housing was not working and that many rural-to-urban migrants preferred informally developed neighbourhoods. Governments were also finding themselves increasingly unable to afford mass housing projects. Informal settlements worked well in a lot of ways, but it was becoming increasingly clear that they were extremely expensive to service after they were built. ‘Sites and Services was an attempt to meet the desires of squatters halfway, taking advantage of their penchant for creating dynamic and resilient cities.

‘Sites and Services' programs saw governments paying for serviced and titled plots of land, usually with a standard-sized foundation or other minimal structure included. New arrivals were able to purchase this land at a relatively low cost and construct dwellings as they would in other, parts of the city where it would not be legal to do so. The provided foundation, however ensured that these structures had a stable foundation and that space was divided in an equal way and in reasonably priced parcels. Doug Saunders describes the economic workings of a contemporary project of this type in Bogotá, Colombia:

Rural migrants will be provided with serviced and fully owned foundations, at prices similar to what they were paying for bare patches of non-legal land in places remote from the city. The owners of the land, in return, will be paid nominal prices for their farm fields but will be given housing plots that they can sell or use, so they can participate in any increase in land value. It is somewhat less money than they’d make by developing the land themselves, but it exposes them to less risk. The state pays the up-front cost of development, but will recoup it by participating in the land-value increase by building shopping, commercial and housing facilities on some of the land. As a result, a better quality of arrival city, one that is capable of growing into a thriving high-access centre with its own middle class, is built using the proceeds from its own future success. (Saunders, 2010, p. 308)

The sites and services concept is an acknowledgment of the power of informal and non-legal types of urban development to create real upward mobility. The idea here is that people want and need to build for themselves and will do so, regardless of what services are put in place for them. Why not then allow them to create their own infill but maintain a degree of
Figure 2.13. Aranya housing at different stages of completion, Indore, India. One of the most famous examples of ‘sites and services’ development. Above: some of the sanitary cores provided to each dwelling are visible along with some of the earlier dwellings to be built. Below: houses at further stages of completion and showing a variety of formal characteristics. Images sourced from https://archnet.org.
order by providing appropriately scaled and well constructed support structures. It has its roots in the work of the Dutch Architect N. John Habraken who, in the 1960s and 70s was seeking ways to incorporate user control into housing production. Habraken’s work was closely in line with the Dutch Structuralist tradition. It differentiated between support and infill—structures provided by government that provide necessary services and the user-defined additions to these that allowed residents direct control over design and construction of their own homes. Habraken’s own vision of hyper-urban versions of this type of development was only ever realized to a limited extent.

In a way, Habraken was attempting to design what, in Cuba, was already present in colonial buildings with high ceilings and flat roofs. In Cuban cities, people were fortunate enough to have buildings that worked reasonably well as support structures. They also, however received support from government as outlined above. Nabeel Hamdi, in his book *Housing Without Houses* 1991 outlines the difference between the provider paradigm—in which governments provide citizens with a finished product, say a housing project—and the support paradigm. But he notes that the support paradigm can be achieved through more than the construction of physical structures, as Habraken advocated and as the sites and services model put into effect around the world. Another architect, John Turner of the UK, agreed with Habraken that support was necessary. But in Habraken’s opinion, it need not be physical support. Rather governments should adapt policy to the needs of people interested in having control over their own environments. Turner developed his theories on how best to provide—or in this case support—housing while working in development projects in the informal settlements of Peru in the 1970s. In turn, his ideas had an enormous influence on Latin America and the culture around supportive government that developed there may have been instrumental in preparing a climate in which Cuba could survive the economic hardships of the 1990s and develop something like a sustainable development model.

### 2.12 Informal Settlements as Responses to Homer-Dixon’s Five Factors

Population imbalances, energy shortages, environmental damage, climate change and income gaps. By necessity alone, residents of informal settlements around the world, in the myriad ways that they live, actively participate in an experiment that addresses all five of Thomas Homer-Dixon’s factors contributing to societal collapse. In a number of ways, the world’s informal settlements may already be providing solutions to humanity’s most pressing problems.

Largely on their own, informal settlements have been able to absorb the massive influx of rural-to-urban migrants. It has been said that the population time bomb has been diffused by the shift from a rural to urban lifestyle as the global dwelling paradigm (Brand, 2006). Urban dwellers tend to have less incentive to have children and more access to education about family planning. In cities, women tend to have many more opportunities for engagement in the economy in cities. It has been widely recognized that the empowerment of women plays a key
role in controlling population growth and encouraging development.

Secondly, energy and resources tend to be better spent in the world’s informal settlements than in most other types of urban communities. Though usually dictated by necessity alone, practices of building and consumption in arrival cities, squatter cities and the like encourage frugal lifestyles and compact dwellings. Informal settlement dwellers make do with less and therefore put less strain on energy and resource supply networks than more affluent urban dwellers. Their high density living patterns similarly optimize the use of space, causing much less environmental destruction than more formal types of development otherwise would. Walkability and the prevalence of human labour in so many aspects of life—commonly fuelled by fossil fuels in more affluent parts of the world—allow informal settlement dwellers to live with lower carbon footprints than Affluent World residents.

Finally, while informal settlements around the world are symbols of income inequality and the enormous social-political problems associated with it, the intensity of the problem as it has manifested itself worldwide has begun to give rise to new solutions for social and economic integration for residents of these types of settlements. Co-operative and participatory economic planning practices in informal settlements have encouraged a type of development that provides hope that the best aspects of life in these parts of cities—the community support networks, modest gains in affluence, the sense of civic pride—can be maintained as people move into more comfortable, middle-class roles in the city.

The study of slums, squatter cities and arrival cities forces Affluent World residents to re-examine their fundamental beliefs about property, and what it means to be wealthy. For that alone, it is a valuable undertaking. As Thomas-Homer Dixon and others have repeatedly stressed, those in the Affluent World desperately need to seek inspiration for new ways of living wherever possible. Urban development in the Affluent World which is based, however loosely, on models of informal development may help them to discover ways of designing, building and living that have less ecological impact, use materials more creatively and foster more resilient economies and social structures. At the same time, they may be able to uncover solutions for the ever-growing numbers of squatters and slum dwellers in the world. The hope is that by pursuing this type of development, Affluent World residents can uncover ways to meet partway with the billions of desperately poor people in cities around the world as people around the world work toward equality.
3. Materials and Methods

In her new place ... Nina now lives in a small house of about 50 square meters, built with a small loan equivalent to about US$300 that she had secured from the government’s new community credit bank, and which she had designed with the help of Patama Roonrakwit. She had used most of her loan to buy materials, windows and doorframes, a few ornamental balustrades to enclose her terrace, but mostly to construct a reinforced concrete frame, which she was now filling in, with the help of friends and family... In the middle of the house, concrete steps, roughly cast and unfinished, disappear to some unknown future through the roof slabs. Outside, back and front, there are pots, buckets, plywood, corrugated sheets, plastic sheeting, hosepipes, baskets, clothes lines, brooms, bits of scaffolding and scavenged ironware and dogs in kennels made of boxwood – nothing goes to waste. (Hamdi, 2004, p.33)

3.0 Introduction

Cued by the remarkable relationship between the global phenomenon of informal settlements and the waste materials that they are frequently built from, this section aims to investigate the use of waste and scavengeable materials in the production of architecture for resilient communities. The appeal of this topic stemmed from an irresistibly poetic concept. Over-consumption and radical waste of resources have been primary drivers in the establishment of contemporary non-resilient cities and ways of life. The paradigm of consumption, which has become dominant in the Affluent World since the middle of the 20th Century, has left a legacy of waste and instability. This waste and instability is found in social, political, economic realms and in the physical structures of cities. In addition, this paradigm has also created a legacy of increasing inequalities; unimaginable global poverty contrasted with a small portion of the world’s population who live in wasteful decadence. What if the Affluent World’s legacy of waste were revisited, if means of putting it to good use were sought in order to build much needed resilience and stability into cities? Could the by-products of a century of wastefulness become the fuel for a new paradigm: one that encourages the intelligent use of materials and resources to address the needs of communities seeking a more equitable and resilient lifestyle? This section will draw together the various strands of thought that suggest that not only is such a poetic approach to waste possible, it may well be necessary from now on. It sets the stage for the material choices contained in the design component of this thesis, which attempts to illustrate what a world that treats waste differently could look like.

Figure 3.1. Old doors used as walls in the construction of a new house in Cova da Moura, Portugal. In cold climates, materials like these can be put to good use in a variety of interior and finishing roles.

Photo by the author.
3.1 Background

The dream of using common trash as an input into housing and community development is already an old one. In 1975 the architectural critic Martin Pawley published a book called *Garbage Housing* that proposed using waste as a building material for low-cost housing. His analysis of political social and design trends of his time led to the remarkable proposal that common waste materials—particularly product packaging—be designed for secondary use as building materials, complete with instructions as to how to assemble them. He even suggested that governments legislate the requirement that products be designed for secondary use. The idea was influential in the 1970s and *Garbage Housing* even outlines an extensive research project undertaken by Pawley with the financial support of Salvador Allende’s Chilean government. But Allende’s vision for Chile was soon overthrown and the world that Pawley’s idea was born into soon changed. Energy crises, fears of material shortages and widespread social unrest were largely forgotten with the new economics of the 1980s. Ultimately, the garbage housing concept never caught on. All the same, up to his death in 2008, Pawley continued to advocate for the idea and it remains influential today.

In *Garbage Housing* Martin Pawley carefully analysed the economics, politics and social realities of the housing crisis around the world at the time. His recognition that waste materials were already commonly and creatively used in many contemporary vernacular traditions was a clever insight into an often-overlooked urban reality. But his analysis of this 20th century vernacular was limited to a few key areas of the world. In particular, he investigated the building habits of the residents of Rapa Nui who, in the absence of many common building materials had developed a remarkable tradition of housing made from used oil drums. Pawley then went on to recount the story of the WOBO prototype house developed by N. John Habraken\(^1\) for the Heineken company. The WOBO (WOrld BOttle) system was conceived by Alfred Heineken after he noticed the large quantities of his company’s bottles littering the beaches of the Caribbean island of Curáçao. Heineken realized that glass bottles—durable, high strength objects in themselves—could be used as load bearing building blocks to construct housing for the poor of the Dutch colony. His idea was that locals could collect the bottles littering their beaches and use them in the construction of their own houses. Through this process, a valuable, durable material with a high embodied energy would be easily used for something that was desperately needed by locals. Residents could shoulder costs of constructing housing but they would be willing to take on this extra burden in order to have ownership of their homes and affordable materials to build them from (Pawley, 1975).

Heineken commissioned Habraken developed a prototype bottle that could be mortared into a wall construction like a standard brick and a small test structure was built on Heineken’s own estate but, for a number of reasons, the concept was never taken any further. For one thing, Habraken’s brick-like bottles were stout and boxy and, though they were well shaped

\(^1\) Incidentally, Habraken is the same architect who proposed the ‘supports’ concept of designing for user participation and choice (See Chapter 2). The principal influence on the formal aspects of this thesis also had an enormous role in bringing the concept of using waste as a building material to Western attention.
Figure 3.2. Images of N.J. Habraken’s WoBo house concept. Images sourced from [http://colorcubic.com/2010/03/25/heineken-wobo-bricks/](http://colorcubic.com/2010/03/25/heineken-wobo-bricks/)
for shipping, they didn't appeal to the Heineken marketing team. It was thought that these bottles did not convey the look that the company wanted its product to have. Branding and advertising trumped a genuinely progressive social idea.

This reveals a fundamental problem with Pawley's Garbage Housing proposal. The concept has generated ample interest across generations of designers. But in addition to the other issues of standardization, political support, shifts in consumer culture, etc. that it would necessitate, it ultimately relies on corporate altruism in order to work. And corporations are not, by their nature, able to take steps to contribute to problems if there is any risk to their bottom line (Bakan, 2004). Pawley hoped that government intervention or clever marketing would be able to make up for the potential damages that could occur to a product's image by altering its packaging to give it a secondary use. He also hoped that designers would be able to find a happy medium between attractive packaging and functional packaging. Such hopes were never realized. Furthermore, Pawley's Garbage Housing concept is problematic in its inflexibility toward the use of waste from various sources. It necessitates a certain amount of material from a particular product, but solutions for integration with other products or even conventional building materials are not part of the proposal. Garbage housing as a concept appears confined to the world of academia.

But the story doesn't end there. In the Affluent World, it would be easy enough to dismiss his effort of more than thirty years as one of those ideas that, however clever it was, simply wasn't meant to fly. But the Affluent World is a funny place where it is often easy to forget to look beyond one's nose. Garbage Housing, far from being a clever but forgotten dream of some academics from the seventies, is becoming the international norm. There is now a global movement of citizen builders who take unwanted materials at minimal cost and transform them into the building blocks of community. They do so out of raw necessity rather than research papers and clever designs. The movement is carried out in all countries of the world, under the radar of planning bodies and building codes, in a manner that takes as many forms as the countless locales where it is practiced. In short, it is the material reality of the world's 1 billion slum and squatter city dwellers, a group who are rapidly becoming the urban majority.

In 1997 Pawley wrote a short piece in the Architects' Journal reiterating his support for the Garbage Housing concept around 25 years after Garbage Housing was published (Pawley, 2007). It claimed that mainstream recycling networks were not working and that the original social and environmental pressures that had spawned the Garbage Housing concept had only been exacerbated by the intervening years. More than a decade after that, in Canada at least, mainstream recycling is seen as an established urban success story and diverting countless tons of landfill every day. Increasing scarcity of resources has made waste a viable source of a wide range of raw materials. Conventional recycling has become immensely profitable. But questions remain about the energy and financial costs of the system here and in other parts of the world. Pawley's perception might have been as keen in 1997 as it was in 1975.
3.2 The What and Where of Wasted Things

However hard residents of the Affluent World may try to hide it, they throw away a lot. And in a way, it's a good thing they do. Of course, the rapid pace of consumption that characterizes Affluent World economies contributes to unsustainable rates of energy and material exploitation, land use and pollution. Consumption has, for decades, far outpaced need and the result has been massive waste. When resources become scarce, waste becomes a resource. This has been observed all through history and all around the world but the necessity has yet to force the Affluent World to embrace the phenomenon. All the same, the twenty-first century will be very different from the twentieth. The age of cheap resources will almost certainly end and the age of reuse of less-than-ideal materials will dawn. But, as this section aims to show, that's no reason to be alarmed. Viewing waste as a resource is a practice with many advantages. The use of waste as materials for the built environment may offer a means of lowering building costs and empowering communities.

The acclaimed urban planner, Kevin Lynch chose to write his final book about humanity's relationship with the concept of waste. Wasting Away (1990) is filled with simple insights about a topic that many see as thoroughly uninteresting. But by writing about them at a time when waste was in the spotlight in the Affluent World, Lynch exposed a world of opportunity for a society that had wasted its way into a major crisis. Consider this passage in which he discusses a little noticed North American tradition that with the problem of excessive consumption in a surprisingly low-key way:

For all its defects...the rural dump plays a different social role than its urban counterpart. The latter is an industrial process, managed by specialists. The rural dump on the contrary, is open to any citizen. Here, one legitimately renounces rights and responsibilities for one's own things and legitimately acquires rights in the useful things renounced by others. One can loiter and meet a neighbor without stigma of idleness. It is a social exchange as well as an object exchange, and some aficionados will drop by twice a day to spot new additions or to hear new gossip. In urban areas, similar exchanges are conducted in "garage" or "yard" sales where low-value used articles are passed from one hand to another. The social exchange, whether or not between familiar neighbors, can also be a pleasure. Accompanied by relaxed price bargaining, the articles, unusable perhaps even for the buyer, are kept in circulation. (Lynch, 1990, p. 60)

Such idyllic and relaxed talk about waste things can be a reminder that garbage is only revolting because people choose to think of it as such. Waste things in the Affluent World are surrounded by stigma and shame. But this is only part of the story. Like people in all societies, Affluent World residents tend to love a bargain and are happy to scavenge if the stigma around discarded things can be lifted.

Waste, particularly as it interests architects, must be addressed in its socio-political and socio-economic context. It is not something that can simply be done away with through recycling programs or clever engineering. Architects or other professionals dealing with waste, however it may be defined, need to accept that simply reducing it is not necessarily
a desirable outcome (Lynch, 1990). Rather, one must attempt to understand the causes and consequences of a society’s wasteful habits and begin to view waste as an integral part of the cycles of life. Waste is something that must be done, but it should be done well. Key to doing it well is the attempt to keep wasted things in circulation.

There is a good deal of evidence to support the idea that the Western World is sitting on a massive surplus of unused goods. In the 2008 anthology of essays on Toronto’s relationship with water, *HTO*, Richard Anderson makes that clear. In an essay entitled “The dustbins of history: Waste disposal in Toronto’s ravines and valleys”, the York University-based geographer published an interesting map. It roughly locates hundreds of historical dumpsites across the city (Anderson, 2008, fig. 5). While these dumpsites are concentrated around the city’s ravines it is their density that makes this map surprising. Toronto, it seems, is built on garbage. Considering this, one begins to understand why archaeologists seeking lost settlements often look for unusual mounds of earth or middens that appear out of place in the landscape; the process of urban consumption and disposal literally shifts landscapes.

The love-hate relationship with garbage and the attention paid to its disposal since the boom years of the post-war era has highlighted a massive squandering of useful stuff that continues to this day. Western societies have faced huge problems with finding sites to

Figure 3.3. Approximate location of historic dump sites in Toronto. Adapted from Anderson, 2008, fig. 5. Redrawn by the author
dispose of its trash for decades. Toronto ran out of space to officially dump garbage on its own territory in the early 1980s and has since been seeking dumping grounds farther and farther afield. For most of the first decade of the 2000s the city shipped garbage to landfill sites in Michigan, exploiting the slumped economy of that rust belt state. A crisis struck late in the decade when Michigan authorities decided that enough was enough and Toronto was left without a suitable dumpsite. While a happy solution was eventually found—Toronto’s waste is now being diverted to a new, high-tech dumpsite near London, Ontario—there is growing concern that the price paid for disposal of often perfectly useful stuff is far from sustainable.

3.3 How Much Waste?

Whether or not affluent societies end up finding uses for their abundant waste, it is important to recognize just how much waste they are currently not even trying to make use of. It may be comforting to some that if they were to ever face the end of supplies of certain materials they are at least sitting on a mountain of wasted or underused stuff that could be repurposed if necessary. Following the 2008 economic slump, the Canadian philosopher John Raulston Saul took the opportunity to update his book The Collapse of Globalism. In his new chapter he made a telling observation:

Suddenly, with the economic collapse, trade has shrunk radically in almost every sector, all around the world. In 2008-2009 countries were struck by shrinkages of between 10 and 50 percent. This ought to be so dramatic as to be revolutionary. Yet no one is faced with a lack of clothes or computers or cars or any sort of machinery or food. They may be suffering from a lack of jobs or of income to buy goods. There may be a failure to distribute goods fairly. But there is no lack of goods.

Why? Because for decades we have had a large surplus of goods in the west. And those few large markets where there is a need for more goods—China and India in particular—the international market is not and will not become fully international … our economic systems are designed to work on the basis of competition and a constant improvement in technology. But these two factors can only do their job in an open market if there is some level of scarcity. In other words, the fatal flaw in globalization has always been that it advanced an eighteenth to nineteenth century market concept based on growing real demand—that is, overall scarcity—that no longer applied. In the name of progress, the believers were advancing a reused version of the old concept of permanent growth…

What happens when you continue to push for unneeded trade? First, you may convert consumers into speculators. They can take it or leave it in the most profound sense. That is, it’s not that this competition offers them a choice but that they simply don’t need these goods at all. A real surplus removes real need. Second, you drive prices down below the production costs of a middle class, educated civilization. You then fall in to a false moral position that asserts that the consumer’s principal right is to buy cheaper goods. And you can argue that they are cheap because of competition from cheap labour—which is in reality only a secondary factor. They are cheap principally because of the surplus. By ignoring this reality we are left with the argument that it is all right for the wages of the lower third or half of society to go down because the goods they buy are cheaper than ever. They don’t need much income. This is the Walmart spiral. If you put all this together you have a global economic theory flying the flag of a peculiar sort of wealth creation that ends up pushing cheaper goods as an excuse for lower wages which means wealth reduction. (Saul, 2005, p. 295-296)
Saul’s opinions may have their fair share of detractors. His economic conclusions are included here only to illustrate how Affluent World patterns of consumption can affect much more than pollution at dump sites or the politics of rich countries. What is of particular interest here is Saul’s opinion that we are sitting on a massive surplus of goods. These goods may not be building materials per se—although there seems to be a surplus of those as well—but that’s no problem if unconventional approaches to building materials are developed. If they want to, people can build with a lot more than is commonly believed. This has been demonstrated around the world.

Affluent World municipalities, including the city of Toronto pride themselves on the central strategy that they employ to help alleviate the crippling costs of disposal. That strategy is waste reduction, and it comes in a few environmentally dubious forms. First and foremost, since the end of the Second World War, and particularly since the birth of the environmental movement and the energy crises of the 1970s, many municipalities have adopted increasingly complex recycling programs. Metals have long been understood to be easily recycled and those used in consumer products and packaging are often relatively easy to sort and reprocess into raw materials for reuse. Residents were encouraged to separate newsprint for recycling at least as early as the beginning of the 1970s in Toronto and huge amounts of paper have since been diverted from landfill. Various plastics have been more difficult to recycle as their chemical composition can vary greatly. Nonetheless, a wide variety of plastics are now recyclable in many western municipalities. You may have noticed the little recycling symbol with a number on it on the bottom of the packaging that your lunch comes in. These denote the composition of the plastic so that it can be sorted and recycled with minimum impurities. It is difficult to imagine the mountain of bureaucracy that must have had to be conquered in order to get such a user-friendly system in place and enforced so that people could feel good about recycling without having to actually do too much work.

On the topic of recycling, it is interesting to note that the trend in the city of Toronto has been toward ever-decreasing citizen involvement in the recycling project. One used to have to at least sort their recycled trash into metals, plastics, paper, etc. In many parts of Europe this is common and apparently also satisfactory. In relatively high-density towns and cities one is rarely far from the local collection bins, which are helpfully labelled with what they can take and what they can’t. In Toronto, the system of user sorting has been replaced by a system in which all one’s recyclables go into a single bin to be sorted later, presumably by expensive machines and unionized labourers. As a reward for their efforts, municipalities like the city of Toronto are now able to report impressive numbers indicating dramatic reductions in waste going to landfill. Given their questionable recent history of filling holes in the ground with potentially useful stuff, this is a remarkable shift.

But should Torontonians and citizens of comparable cities be so sure that they are really reducing the amount of goods and materials that are wasted? Research into the self storage industry undertaken by the author over the summer of 2010 led to an interesting observation that
suggests otherwise (Potovszky, 2010). The self storage industry—which, by the way, remains a predominantly North American phenomenon—characterized by those faceless sheds and tacky signage that pop up along highways and in industrial parks, is actually a relatively new phenomenon in the world. About one in ten American households currently rent self storage space and about one in four have done so in the past. Yet society somehow managed to survive without anything of the sort prior to a few decades ago. What is interesting is that the industry had its advent in the 1970s, right as North America was desperately seeking ways to divert waste going to landfills. Since then, it has been one of the fastest growing economic sectors in the United States, producing its first billion square feet of rentable storage space in about 25 years and its second billion square feet in just 10 years. The industry now owns more than three times the area of Manhattan Island under, often air conditioned and heated. Much of the time that space is filled with unwanted things (Self Storage Association, 2007).

Self storage space is distinctly different from landfill space in that much of what is stored is intended for future use. But according to the Self Storage Demand Report 2007 a full 15% of users claim that they are paying to store items that they no longer want or have a use for (Self Storage Association, 2007). Those are just the people who aren’t deluding themselves about how much they really need the old refrigerator or that box of shoes. There is no doubt that self storage performs an important function in an increasingly mobile and anonymous society. Nevertheless, there is good reason to believe that much of the growth that has been observed in this very peculiar industry is the result of simple over consumption, and over consumption must eventually lead to excess waste. There is really so much stuff that people can eat, wear, utilize or play with.

Self storage can also be seen as an extension of the suburban attic or garage, where north Americans have stowed away untold tons of potentially useful stuff. Bill McKibben reports in Deep Economy that the average American house size has grown by almost 100% since 1970 while the number of people making up the average household has fallen (McKibben, 2007).

It seems that much of what Affluent World residents would have thrown away in the recent decades has simply been piling up in the corners of their oversized, energy-hogging homes. Whatever they can’t fit there is now often conveniently be tucked away in the more than 50 000 conveniently located self storage facilities that can be found in the United States and Canada. Perhaps when if the resource streams that Affluent World residents are used to ever dry up, they will find themselves endowed with an abundance of materials neatly packed away and ready for use. They will only need to figure out useful things to do with them.

3.4 Waste as the Resource of the Future

The landfills of today may become the resource mines of tomorrow. While digging through the garbage of our ancestors is hardly an appealing image for most residents of the Affluent World, it is and always has been a lucrative practice in many places. For many in the Affluent World, the recent documentary film entitled Manufactured Landscapes (Baichwal, 2007) was a
first glimpse into the lives of people who make a living from tediously and meticulously picking apart other people’s trash and sorting it into useful components. The film depicted workers in China where much of the electronics waste produced by the Affluent World is being shipped for recycling. Images such as these reveal a seemingly perverse world of international trade, made possible by low energy prices and exploitative political arrangements. In this world, poorer places are burdened with the refuse of richer ones. But it should be remembered that the recipients of all this garbage often accept it based on its inherent value. When resources are scarce, waste always becomes valuable.

Traditionally, people interested in profiting off of waste didn’t wait to have it shipped to them. Recall another recent film, Slumdog Millionaire, in which children are depicted combing through the dumps of exploding mega-cities, looking for scraps with some value. Cruel and unrewarding as this lifestyle may seem to those in the Affluent World, it is a simple necessity in many parts of the world where jobs are scarce and where demand for resources is strong. The trouble with children combing through garbage has more to do with the way that garbage is managed and the stigma that society surrounds it with. What if people were began to see their refuse as having value down the road? Could scavenging become something that people could do safely and as a means to move their way up in society? Could they do it without pity and revulsion from the society that surrounds them? As Kevin Lynch suggests: “managing trash is inevitably labour intensive. Raising its status is a key to managing it well” (Lynch, 1990 p.186).

The possibility of making a profit off of waste products has been around for centuries. Lynch writes extensively about the history of rag pickers and junk traders. This tradition has been continuous, an industry that has been highly profitable.

Like construction, junk was an immigrant opportunity, a trade one could enter with little capital and on which one could build an empire. Fortunes could be made, but it required mobility, careful sorting, quick wit and good memory—an ability to find hidden links between need and a source. It is a free market with little systematic data or official regulation, carried on in cash and often in evasion of taxes. (Lynch, 1990, p. 66)

This trade of waste, dripping with poetic overtones, has been has been a source of inspiration for writers and philosophers throughout the industrial era and probably long before. It is not just of interest for the environmental and economic lessons that it teaches. There are lessons to be learned about the power of waste as a tool of social transformation as well. Stewart E. Perry’s 1998 book Collecting Garbage traces the history of a 20th century waste collector’s co-operative. It demonstrates the power of co-operative organization in eliminating stigma around the idea of looking for profit in waste. Perry’s study offers insight into the world of low-status work in the Affluent World. But beyond that, it is proof that value is available in the world of waste for those willing to organize, seek it out and reap its benefits.

Ultimately, today’s waste, whether scavenged from the curb side or from the landfill, may have its status raised by pure necessity. The novelist and urban planning critic James Howard
Kunstler recently wrote a novel that explores a fictional small town in post-collapse America. Residents of Kunstler’s Union Grove have developed an interesting relationship with waste in the absence of the interconnected economies that exist today. Kunstler’s description of the town’s “General Supply” would almost certainly amuse waste-philes like Kevin Lynch:

“In a world that had become a salvage operation, the general supply evolved into Union Grove’s leading industry. When every last useful thing in town had been stripped from the Kmart and the United Auto, the CVS drugstore, and other trading establishments of the bygone national chain-store economy, daily life became a perpetual flea market centered on the old town dump, which had been capped over in the 1990s. The general was run at first as a public cooperative, under the illusion that the ongoing catastrophes would ebb and normality would return. But the flu and the bombing of Washington put an end to that illusion, and the general eventually came under the management of Wayne Karp and his gang of former motorheads.” (Kunstler, 2004, p. 28)

James Howard Kunstler has long been a vocal opponent to North American development into a civilization based around rapid consumption and waste. Ultimately, his work has been focused on the squandering of resources; resources as diverse as fossil fuels and urban planning traditions. A proponent of very specific urban planning and architectural philosophies, particularly that of the New Urbanists in the United States, some of his views on the future of American cities have been criticized as reactionary and dystopian, but the severity of the change that he predicts the current North American urban paradigm is supported by a vast and growing body of scholarship. It is therefore interesting that when he decided to turn to fiction in order to attempt to bring his message to a wider audience, he ended up depicting a world that is equally as full of comedy as tragedy. Union Grove is peopled by a medley of believably imperfect survivors of peak oil and the end of the globalized economy. They are characters who rarely get exactly what they want but who nonetheless manage to live in relative comfort. At the centre of their economic lives is the town dump, where the carelessly wasted resources of the twentieth and early twenty-first centuries are uncovered, sorted and repurposed.

Kunstler’s fictional garbage-dump-turned-general-store has likely been scoffed at by those who see the material resources of our planet as being inexhaustible, if such people would even have read the book. But it raises some interesting questions about what our contingency plans for building are if Homer-Dixonian breakdowns are indeed inevitable. As has been demonstrated, many of the useful materials that residents of Union Grove are digging in the dirt could actually be found in their attics and self storage lockers. What Kunstler is ultimately writing about is keeping useful things in circulation—an obvious idea in the Majority World but something that might take some getting used to in the Affluent World.
3.5 What Can Be Used?
Many types of commonly discarded, scavengeable or low-value materials have been commonly reused in building projects throughout history. There is nothing new about material reuse. In fact, the reuse of building components from obsolete buildings dates back thousands of years. The stone capitals of San Marco in Venice were looted from overseas. The stones of much of Renaissance Rome were taken from the monuments of classical Rome (Tung, 2001). It has probably only been in the brief years of affluence, in a few countries in a single century that energy prices for the manufacture of new building materials have been cheap enough to allow obsolete buildings to be viewed as garbage. Twentieth century architects have also created a tradition of buildings that are extremely difficult to disassemble into reusable parts.

At a scale smaller than buildings and large building components, reuse has also always been extremely common. Furniture and other interior design elements, made from discarded materials, for example is common throughout the world and is now becoming extremely fashionable in the Affluent World. Materials from demolished buildings, for example, are now so prized by artists, designers, and builders that they have become more valuable than new materials. The quality of timber used in many old buildings around the world was much finer than anything produced new today. As a result, people are willing to pay handsomely for much of what we as architects might have hoped would be available for free. A recent conversation with one of Toronto’s many dealers in reclaimed architectural wood, Martin Scott of Forever Interiors, revealed the high cost of sourcing, sorting, storing and reworking this prized material (Scott, personal communication, September, 2010). That, combined with the fact that this builder pays Affluent World wages to his workers ensures that his product is surprisingly expensive, especially considering that it may have gone to landfill otherwise. Considering also that many Affluent World residents are more than willing to pay high prices for this newly fashionable material, there is little hope that any regular supply of high quality architectural materials will be available to architects seeking to use them.

Many more waste material types are now used under normal economic conditions. Recycling programs are becoming as common in the Majority World as they are in the Affluent World and all sorts of materials are now regularly collected and recycled into useable raw materials. Less energy intensive reuse of material has been prevalent in all parts of the world.

There is therefore a distinction that needs to be made between waste materials that are commonly reused in conventional economic cycles and those that are commonly discarded and readily available for unconventional collection and reuse. It is only those that are commonly discarded that may be found in regular supply for scavengers and untrained collectors of materials with potential value. Economic changes and shifts in energy prices may mean that certain commonly reused materials become more commonly discarded again. For example, there may come a time that the energy costs of recycling materials like construction-grade metals make the practice prohibitive and more direct reuse may be favoured, but for the
This shift between commonly discarded and commonly reused hinges largely on the composition of the material in question. Many materials are difficult or damaging to recycle into new raw materials due to their contamination with impurities, compound material nature or other reasons. These materials may be recyclable in the conventional economy but require a certain combination of technology, affordability of energy and labour and demand for their recycled end-products in order for them to be profitably recycled. If these elements of profitability are changed, the material may well become outcast from conventional recycling streams and simply become waste.

Many easily reused materials currently go to landfill as well for reasons of design and affordability of new materials. They include building components like timber beams and bricks, which can, in theory at least, be easily taken apart and reassembled in new constructions. These materials are also prone to a shift into more conventional economic recycling and reuse streams when forces of supply and demand act. This has already been observed in the reclaimed architectural materials industry as outlined above.

All this is not to say that a more intelligent way of dealing with materials should be sought, regardless of how they are currently treated by conventional economic systems. Buildings or products made to last a longer time, even if their components are easily recycled, are still more desirable than those which are quickly discarded. But certain types of waste materials, tend to be no more accessible than new materials and thus give no advantages to scavengers willing to take a risk using them.

3.6 Scavengeable Materials and the Superuse Concept

It is the things that still make their way en masse to landfills and dumps that should be eyed as the materials with the potential to drive down building costs, empower self-builders and decrease environmental degradation. There is a tradition of making use of this stuff in architecture. Gaudí and Jujol made extensive use of broken ceramics to create decorative surfaces and artists throughout the 20th century took notice of the fascination that people had with old junk and used it for aesthetic purposes, often to the delight of their audiences. More recently there has been a flowering of interest in experimentation with using waste materials as construction materials. Architects and designers have had success employing various and commonly encountered scavengeable or waste materials as cladding, flooring, finishes and décor.

The Dutch architecture firm 2012 Architekten, for example, have tried to create an online catalogue of creative uses of a wide variety of common waste materials. Their philosophy, known as Superuse, is that by making use of local waste materials, architects and designers can reduce environmental stress in a number of ways. First and foremost, less material is sent to landfill. Energy expenditures are also saved on the reprocessing of recyclable materials. One
of their strongest focuses though is cutting down on the transportation costs—both energetic and financial—of moving materials from their point of manufacture to their site of construction or manufacture (van Hinte, 2007). This concept, known as ‘superuse’ is admirable but the resulting projects are somewhat disappointing. They provoke discussion and thought but very few appear to be viable for any kind of comfortable human inhabitation.

The laws of thermodynamics make the use of waste or scavenged materials as building materials somewhat difficult. Just as energy converts in just one direction, from useful to useless, impurities, wear and tear and other complexities ensure that materials also tend to become harder and harder to use. Large inputs of energy can change this and this is why conventional recycling processes are so expensive and energy intensive. The trouble with so much waste material is that it is mixed and dirty and its composition is often difficult to determine. It is therefore difficult to employ for any purpose requiring regularity and predictability. It also rarely fits together with other material, so dissimilar are consumer products designed to be for marketing purposes. There are therefore, despite the hopes of Superuse enthusiasts, few simple ways to combine garbage to create livable space. Superusers should be commended for their clever re-use ideas but each of these ideas requires enormous energy inputs. In this case, these energy inputs tend to be in the form of time and expertise of the designers. This is not an environmental problem, but it means that these ideas have limited potential for widespread agency. What if there were a means accept the high-entropy nature of waste materials and exploit it for some purpose, reusing materials in a reasonably low-energy way? What implications could this have for building?

3.7 Bale Wall Systems

One interesting construction technology may have the potential to revolutionize the way we use waste materials as building materials. Straw bale construction has become popular in recent years owing to its relative ease of construction, potential durability and unique structural qualities that make it highly flexible and surprisingly fire-resistant. Furthermore, it enjoys perhaps the best cost to insulation value ratios of any building insulator. Straw itself is a waste material which, in many parts of the world, is simply burned releasing unnecessary amounts of greenhouse gasses into the atmosphere and contributing to global climate change. In situations where it is burned, its use as a building material could conceivably be environmentally advantageous. It is therefore a highly reasonable technology that can be employed to help reduce our reliance on energy intensive building materials.

Straw bale buildings have become increasingly popular in many parts of the world in recent years. Homeowners have been attracted to its high insulation value to cost ratio. Its popularity remains confined to rural areas, however. While the slow pace of change in what is accepted by building codes has prevented straw bale buildings from entering many cities, there are other problems with the technology. Primarily, straw bale walls tend to be thicker than conventional wall construction. In urban areas, where every square inch of floor space can be
valuable to developers, straw bale walls may be seen as a waste of space. People are also nervous about a technology that may require regular maintenance—deterioration of plaster and paint finishes can result in dampness, rot and structural failure—and which generally suits only low-rise developments. That said, there is evidence that straw bale technology may well be moving toward being acceptable in urban areas.

Straw bale builder, Ben Polley of Havenst Homes, employs partially load-bearing straw bale walls in his projects, which can reach up to three stories in height. He refers to this as a hybrid system, utilizing a timber frame as means to erecting a weather-protecting roof before introducing the bales. However, in this system the bales are more than just infill, they ultimately take on a structural role in conjunction with the timber frame. He also utilizes wall thicknesses of only fourteen inches, a reasonable thickness for urban wall construction (personal communication, Oct-Nov, 2010). Polley’s work is also remarkably precise and even, lacking the often irregular and uneven finishes commonly found in straw bale buildings. It is easy to imagine it being employed in higher-density residential developments. There may be some space lost compared to conventional construction techniques in this hypothetical straw bale development, but straw bale offers a number of other urban advantages, including excellent sound insulation, fire protection as well as ease of alteration and demolition.

Straw bale building technology may hold great potential for the reuse of other types of waste and scavengeable materials. At least one architect, Doug Eichelberger of Montana, has experimented with using paper and plastics, compressed into bales and impregnated with plaster in precisely the same way as a straw bale wall is built. These materials, when shredded and baled, approximate the strong, fibrous nature of straw that makes straw bales strong and flexible while allowing for large amounts of insulating air to be present in the structure, although the insulation value of these constructions may be somewhat lower than straw. Paper is an interesting choice for use in this type of construction as the process of paper recycling was long criticized as being more environmentally detrimental than simply making new paper. While new recycling technology seems to have solved this problem in recent years—owing largely to increases in the cost of new paper pulp—there remains an abundance of paper products that are extremely difficult to recycle. These include composite packaging that contains layers of plastics and metals and various types of wax paper. These materials can technically be recycled but they require complex and energy-intensive technology to do so, technology that is only available in a few affluent parts of the world. The trouble with recycling all materials is that an efficient system relies on a relative uniformity of material type. It has rarely been in the interest of corporate manufacturers of goods and packaging to co-operate with other manufacturers in order to establish standards that benefit recycling systems. The paradigm of the past half century has rather been to encourage people to simply throw things out. For this reason, despite recent advances in recycling technology around the world, bale-able materials appear to be in no danger of becoming scarce.

If this technology were proven to be safe, durable and a better use of paper, plastics
Figure 3.4. Doug Eichelberger Demonstrates how to construct an insulated structure from plastic bottles. The structure which is eventually plastered over in much the same way as a straw bale construction provides strength, permanence and, like straw bale buildings, is relatively easy for people to build for themselves. Eichelberger has built similar structures with bales of paper and has even experimented with plastic bottle foundations which he says can last for decades without creep or frost damage. Photos courtesy of Doug Eichelberger, Montana.
and other reasonably fibrous materials than recycling them is, then a relatively cheap and abundant building material could be made available. It would be advantageous for use in self-help building projects due to its combination of insulation and structural qualities. Straw bale construction has proven itself for over a century as a reasonably simple construction technology that communities can come together to erect without specialized construction expertise. Lowering labour costs by employing volunteers and future residents in the construction project is a key way to lower costs.

Doug Eichelberger, in a personal correspondence has expressed great hope for his paper bale wall technology. He has constructed a number of simple buildings on his ranch in Montana which have stood without structural problems for 16 years. He has also tested his constructions for fire, finding them able to maintain their structural integrity for up to 4 hours. He reports that the building inspector classified his shop/barn, built from paper bales as non-combustible. (personal communication, Nov. 8, 2010) He has also served as a consultant on at least one inhabited paper bale house, a ski cabin built by one Rich Messr in the mountains of Colorado (Drummey, 2009).

All this raises the question of how much else could be shredded, baled and employed in a bale wall construction system. Used clothing can be reused as clothing for a lot longer than most Affluent World residents care to admit but ultimately it will be worn out beyond reasonable usefulness as clothing. Leftover and used carpets, textiles, plastics upholstery and the like could all be potentially used in this kind of system, rerouting huge amounts of waste and providing cheap and high-performance insulating materials. At least one house has been built from old carpet tiles and experiments with dozens of material types are becoming increasingly popular both amongst professionals and in academic settings (Bahamón, 2010).

3.8 Other Materials and the Realities of Construction

The point of this discussion is not to suggest that there is anything inherently problematic about using new materials—although the possibility is very real that many of them may not be available indefinitely. Materials must rather be given as long and useful a life as possible in order to help reduce human pressures on natural resources, both in terms of raw materials and the energy that it takes to turn them into useable goods. The reuse of waste materials in buildings is one way of increasing the useful lives of materials, encapsulating them in a durable structural role. By converting these materials to low-complexity bales, there is a greater potential of them being reused again at the end of the building’s lifespan. All of this is about lengthening of lifespans that, in recent decades, have been drastically shortened in order to fuel an aggressive economic machine based on ever-increasing consumption. Materials cannot be used forever. Things break down inevitably. But useful lifespans can be

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2 Because bale walls vary greatly depending on who builds them and the way they are built, fire ratings are difficult to apply to them. Tests done on different bale wall constructions usually find them to have excellent capacity to continue to bear loads in the case of fire. Eichelberger’s results here are significantly better than than what most straw bale walls are capable of withstanding. More common numbers are in the range of sixty to ninety minute fire ratings (Steen, et al., 1994)
Figure 3.5. Creative use of concrete blocks. Examples from Cuba. Drawn by the author.
greatly extended beyond what is considered normal today in the Affluent World.

Outside of wall constructions, there are numerous possibilities for the use of scavengeable and waste materials in construction. The vast majority of them require more time and labour than conventional building materials but provide the advantages of cost-saving, sweat-equity and waste diversion.

Windows and doors are relatively easy to find as they are commonly upgraded and reasonably easy to salvage from demolition projects. While many available windows and doors may perform poorly due to being technologically obsolete—single-glazed windows, for example, are easy to come by but provide little insulation value—imaginative reuse could feasibly make them work in high-performance building. Single-glazed windows could be incorporated into a double-leaf configuration of the type common in buildings until the advent of double-glazing. Where such constructions are not possible, they can be incorporated into sun-spaces, greenhouses, unheated corridors and other places where insulation is not of primary importance. There are also many opportunities for using old windows and doors in the designs of building interiors.

Myriad types of bricks, and building blocks are available from over-ordering at construction sites or after demolition. They can be used in cladding and load-bearing wall construction when in good condition. If they are damaged or unattractive, they can easily be employed as clean fill or in rubble trench-type foundations. As basement spaces are more and more frequently pointed out as being unhealthy for human occupation, such types of rubble foundations may once again become popular where cheap materials are need to bring a foundation to below the frost line but where water-tightness is no longer an issue. These highly durable materials can also be employed in a wide variety of landscaping and decorative applications. The modularity of bricks and other building blocks makes them ideal for creative, user-friendly designs of fences, balustrades and other semi-enclosing constructions.

It can be difficult to re-use lumber products as conventional building usually requires very specific cut lengths that likely won’t match the needs of new projects. All the same, having a space for storing and sorting timber can help make scavenged pieces available if and when they are needed. Lumber also has numerous applications in interior design and in decoration. With a bit of patience and creativity, plywood and lumber cut-offs can make attractive flooring patterns and the short ends of cut pieces can be utilized in furniture, finishes and decoration. Wood products are also commonly found in the form of discarded furniture. While much furniture today is constructed from cheap composite boards that have little durability, a discerning eye and a bit of imagination can nonetheless find many uses for much of what is available. If untreated, wood is also an excellent fuel source.

Most types of metals are now considered to be highly valuable but scraps are not difficult to come by and can be put to use in a number of ways. Large sheets and other types of pieces can be used as cladding or flashing while smaller scraps can be used as reinforcements in masonry or bale-type constructions. Old tires, while having an enormous amount of embodied
carbon, are extremely abundant and easy to salvage. They are remarkably strong and are commonly used in the creation of rammed-earth walls and as various types of retaining constructions. They have also been experimented with as cladding and can be transformed into many types of furniture and landscaping elements.

It seems unlikely that many new buildings could be constructed from entirely scavenged materials. That is not necessarily the point. New materials will likely be used even in extreme scenarios of economic collapse. But when hard times strike, being able to substitute for certain materials that have become unavailable will be important in maintaining a pace of development in cities.

3.9 Lessons

There is an abundance of scavengeable materials that can be used in building projects in order to reduce costs and increase user engagement in the building process. In times of great economic uncertainty discarded, wasted, and unconventional materials often become the only reliably sourceable material types. The trouble is that many of these materials will be regularly snapped up by conventional recycling systems, reclaimed materials industries and other waste collectors. Scavengers and builders with alternative materials are therefore in competition with in the conventional economy. In order to compete successfully, a number of changes are necessary in the way design, construction and the acquisition of materials are considered.

First and foremost, material acquisition in a project designed around scavenging of materials will be slow. It will require gradual combing of cities and human habitat for useful things. Storage space where found materials can be protected and sorted is greatly needed but more than that, people must become stewards of these materials to ensure that they are used when opportunity arises so that they don’t simply get buried under new acquisitions. Anyone who has ever tried to keep a closet or storage locker organized, its contents accessible, should know the challenge that this will pose. As has been the case for all of history, people will once again need to gain an understanding of how their built environment is put together in order to be able to see opportunity in collected materials. They will need to slow down and manage their possessions. Construction techniques will necessitate more time being spent by more people. All of these things are possible and may be extremely beneficial to a society that is chronically rushed, overworked and earning enough to make over consumption an economic possibility.

Intelligent material use will require expert consultation, community support networks, and, likely, a system of information exchange that will allow rapid dissemination of ideas for found materials. The Dutch architecture firm 2012 Architekten have already attempted to set up such a network internationally with their Superuse concept. The Superuse website allows users to post brief descriptions and photos of clever uses of waste materials in the hopes of encouraging others to see their own waste as a potential resource (www.superuse.org). Websites like
freecycle.com and craigslist.org take another approach, creating an online equivalent to the rural dump described by Kevin Lynch (1990). The power of internet technology to connect people with good, empowering ideas has been demonstrated in many fields, notably in the development of urban and peri-urban agriculture in the Majority World. People who have access to an Internet connection now have access to a wealth of ideas, discussion forums and online resources that can help them overcome intellectual barriers to getting their projects done. Self-builders from scavenged materials will require similar access. However, in the absence of high-tech communications, a large amount of connectivity is possible if traditional community structures are allowed to form. In the informal settlements of the Majority World, community organizations and co-operatives have been shown to have a remarkable power to connect people to the information or other people that they need in a low-tech environment. Encouraging connectivity, communication and co-operation will be the key to making projects, like the one proposed in this thesis, work.
4. Site: The Underused Spaces of Toronto’s Tower Neighbourhoods

Again and again, we find that such wasteful cracks, joints, gores and margins are favourable places for change. (Lynch, 1990, p.152-153)

Arrival cities are built on the logic of the bootstrap: as a rural outsider without a real urban income, you cannot possibly afford to live in the city, but in order to escape being a rural outsider, you must first have a place to live in the city. This paradox has two solutions. First, you rely on your network of fellow villagers to find you a temporary berth in the city. Then, you organize and find a way to set up a house at a fraction of urban cost, by seeking out the property that is least desired or largely abandoned by urbanites, places that are too remote or inaccessible or ill served by transport and utilities, or those that are, for geographic or climatic or health reasons, considered uninhabitable: the cliffsides of Rio de Janeiro and Caracas, the sewage-filled lagoons of east Asia, the verges of garbage dumps and railway tracks and international airports, the fetid riverside floodplains of many, many cities. (Saunders, 2010 p. 53)

4.0 Introduction

In Toronto, each type of fringe area described above by Doug Saunders as the default locations of global arrival cities has its occupants as well. Granted, in Toronto dwellings in these sorts of waste spaces are usually limited to the humble tents of individual wanderers or, occasionally, larger collectives of these people; the tent cities and shantytowns that are springing up around North America much as they did in the early parts of the 20th Century (McKinley, 2009).

Saunders notes that arrival cities in many Affluent World cities are often harder to see than in the Majority World since they tend to develop within existing, formally developed parts of the city. In Toronto, as in many other Affluent World cities, new arrivals often settle in the many tower neighbourhoods—isolated relics of modernist planning that have long since been shunned by the established middle class. Much of the unexpected social and economic organization that characterizes arrival cities around the world have begun in these tower neighbourhoods but their physical infrastructure and ownership structures make informal self-building—the expression and fulfilment of one’s spatial needs—an impossible task for most residents. Rather, spatial reorganization has taken place by tremendous overcrowding of the small apartments in these developments. Frequently built with one or two bedrooms, many of these apartments are now utilized by large extended families who require different and flexible

Figure 4.1 A completely empty parking lot at the heart of a tower neighbourhood in Toronto. This particular lot is owned by a local church and is rarely used. There is an abundance of street parking in the area. Such spaces have the scale of pleasant squares but are cut off from locals by ubiquitous chain link fence. Photo by the author.
spatial organizations. And yet, these neighbourhoods tend to be full of space. Their buildings are usually surrounded by parking lots, many of which are half—or completely—empty for much of the day. Their grounds are planted with grass or stands of evergreens that no one can use. They are fenced off from public space so that no one could use them, even if they wanted to.

This thesis could be designed for a thousand wasted spaces in the city of Toronto. It could imagine new settlements in the city’s under-used ravines, backyards, railway lines, and industrial areas. Instead though, it recognizes the unique forces at play in the remarkable tower neighbourhoods in Toronto. They are vibrant but overcrowded and frustrated communities. But as this project will show, in places where lack of space is on everyone’s mind, there’s actually plenty of space to go around. In order to illustrate the kinds of spatial opportunities that are present in Toronto’s tower neighbourhoods, a careful examination of a particular—and in many ways typical—tower neighbourhood is undertaken in the following sections.

4.1 Case Study: A Personal Encounter with a Tower Neighbourhood

Stepping off the bus and strolling up an asphalt pedestrian path on a bright and snow-covered day in January, I find myself in a lively but unfamiliar environment. Snowballs whiz through the air as children, their faces as diverse as the colours of the rainbow, engage in what seems to be civil war in Munchkin Land. Screams and laughter fill the air. I look at my clock and realize that school has just been let out. These children, many of them strangers to the bitterly cold climate, have likely been pent up for most of the day watching the perfect snowfall settle. At the end of the pedestrian path, I find myself in a small park. At its periphery stand the patient guardians of these bright-eyed children. Many of them wear the bright saris, hijabs and other traditional clothing of their native countries under bulky coats and toques. They move awkwardly in the snow boots and winter gear that comically compliment their colourful garments. They are parents and grandparents of these scores of young children, unsure about and possibly uncomfortable in the environment that they now find themselves but comforted by the joyful cries of their children.

Up another path, lined with chain-link fence, I find a steady stream of men and women heading toward the neighbourhood shopping centre. Inside the atmosphere is full of life. People, young and old, sit at tables in the small food court and enjoy the warmth of the indoors. The place has an air of a lively square, surrounded by small shops and food markets. It looks superficially like a standard North American shopping mall, one that has yet to have the standard dated decor of decades past replaced. But the buzz of the place suggests that a somewhat different social dynamic exists in this area.

A few months later, I am back on a warm evening in the early summer. The activities here have changed with the season but the vibrancy and intensity of the place is the same. The smells of South Asian cuisine hang in the air and people are everywhere. In some places, four generations of a family sit together in the crowded park while the youngest children dash
Figure 4.2. The Thorncliffe Park Community Bazaar, a weekly event featuring a small food and clothing market demonstrates a desire for more local, small-scale commerce and community events in Toronto’s tower neighbourhoods. This photo shows a flyer for the event posted on the community notice board. Other flyers included advertisements for clothing and jewellery makers and merchants and locally provided services. Photo by the author.
amongst them. Along one side of the same small park described above stands a row of tables where people—mostly women—are selling food, fresh fruits and vegetables, clothing and jewellery. This tiny marketplace is here thanks to the local Women’s Committee a multicultural group of local women intent on transforming their tiny park to accommodate the needs of local families. Each Friday, they set up tables and tents to create a humble but lively market atmosphere. The micro-enterprise that takes place here is as much about socializing and connecting than it is about revenue generation. All the same, the neighbourhood seems to love it.

Women in exotic dress laugh and chat while their children whiz around on bicycles. In neighbourhoods like this there are many things missing, but the vitality and opportunity are not amongst them.

4.2 The Illusory Poverty of Toronto’s Tower Neighbourhoods

The above description is a snapshot of Thorncliffe Park, located to the northeast of Toronto’s downtown core. One of Canada’s most remarkable urban communities, Thorncliffe Park has been the focus of intense media attention for its unusual mixture of immigrant poverty and successful social programming. This collection of high-rise apartment towers overlooking the Don Valley Parkway is easily accessible but rarely visited. It is one of the most visible and studied of Toronto’s many tower neighbourhoods, dating from the post-war period that witnessed the rebirth of Toronto as one of North America’s most high-density high-rise friendly cities. Thorncliffe Park is unique but shares many features with other tower neighbourhoods in the city.

In Arrival City (2010) journalist Doug Saunders describes Thorncliffe Park as a tentative success story and a model for arrival cities around the world. His take is that the neighbourhood’s progress in organizing and bringing attention to itself has enabled it to put in place an extensive network of supports for the many new immigrants who arrive there. Saunders proposes that arrival cities—those urban fringe communities that provide space for the world’s billions of rural-to-urban migrants—appear poor because those who establish themselves in their new urban homes and achieve some measure of upward mobility tend to move out, making space for new rural poor. The explanation is enlightening when considering a predominantly low-income neighbourhood like Thorncliffe Park. There is no argument that neighbourhoods like this are predominantly seen as transition neighbourhoods. They provide space for the above-average sized families who often arrive to Canada with little knowledge of that country’s language, customs and economy. But few new arrivals choose these neighbourhoods as permanent homes. Once established in the local job market and comfortable with the new way of life, they frequently choose to move to other—generally low-rise—neighbourhoods. As they leave they are replaced by new, generally poor migrants.

So the poverty apparent in places like Toronto’s tower neighbourhoods has little to do with the inability of residents to improve their lot in life. Saunders makes the distinction between an
Figure 4.3. Colourful dress of residents of a Toronto tower neighbourhood. Residents of these highly diverse and dynamic communities often have little connection to the customs and culture of Canada. Photos by the author.
arrival city and a slum. While the two may look similar, one is emphatically not an urban failure. Instead, despite the often extreme challenges that accompany living in one, arrival cities tend to be centres of enormous opportunity and creativity.

This is not to belittle the challenges of living in an arrival city, even one as successful as Thorncliffe Park. Thorncliffe residents and residents of similar tower neighbourhoods complain of severe overcrowding and lack of public facilities. Children who have few places to go and safely play may be innocent enough playing soccer in the corridors of the community’s high rises or riding bikes in parking lots, but their frustrations increase as they grow older and these frustrations can lead to anger and resentment toward their adopted city. Thorncliffe Park Public School provides an enormous challenge for planners and city officials. Not only is it still inadequate, even after having devoured much of what was formerly schoolyard, it also poses the problem of what could be done with it a few decades down the road if demographics shift. It is an anomalous building, the largest of its kind in North America and completely out of step with almost all other schools in the city. Like everything in Thorncliffe Park, it appears to sit strangely on its site, disproportionate with its surroundings, inadequate but far from simple to fix. The situation is similar in comparable neighbourhoods throughout the city.

Racial tensions are also prevalent in these neighbourhoods, despite a concerted effort in the media and through local organizations to celebrate and promote a constructive multiculturalism. At Thorncliffe Park, the commendable success that has transformed an inflexible modernist housing estate into an international success story may be is far from a done deal. Tower neighbourhoods around the city walk a fine line between order and chaos.

4.3 Case Study: Spatial Opportunities in Thorncliffe Park

But instead of stores and commercial activity, the space between buildings is covered in either pavement or grass and separated by fences. Still, there are people walking around everywhere, and the area doesn’t have the dead-zone feel you might associate with tower-in-the-park design. Imagine if the fences were taken down and the areas between the buildings were animated somehow. (MiCallef, 2010, p. 231)

Like so many Toronto neighbourhoods, Thorncliffe Park is a neighbourhood of high-rise apartment blocks. A number of monolithic buildings characterize the area, surrounded by vast swaths of underused grass and parking lots. These are almost all located outside the ring formed by Thorncliffe Park Drive and Overlea Blvd. Inside this ring, at the heart of the neighbourhood, a more compact and human-scaled built form is dominant. Here, the apartment blocks are limited to around six or seven stories and a collection of churches, community centres, public and commercial buildings break the monotony of the residential buildings.

At the centre of this part of the neighbourhood is a small and leafy park, unremarkable for anything besides its incredible energy and popularity amongst locals. Adjacent is the massive public school. The school is said to be the largest elementary school in North America with
around 1900 students—a testament to the unusually young population compared to Canadian averages. The presence of such a young population is a key ingredient in the character of this neighbourhood. These young people ensure that it is a youthful, energetic and impressionable community.

North of Thorncliffe Park Public School is a sprawling shopping centre surrounded by an underused parking lot and easy to mistake as a typical relic of car-obsessed North America. But this mall has an unusual energy about it. It is easily accessed by any of the residents of Thorncliffe Park who can arrive there on foot via a network of pedestrian paths that crisscross the centre of neighbourhood. It therefore connects to the pedestrianized centre of the neighbourhood in a much more organic and friendly way than is usual. And indeed, where many malls of its era can today be found in a state of poor repair, this one has a busy, lively atmosphere inside it, despite the fact that it lacks any of the expensive fittings that have been lavished on larger and more popular malls in recent years. Against the odds, it seems, this under-designed and flexible space has adapted to the needs of a community that has yet to embrace the car-crazed culture of other Toronto suburbs.

Along a pedestrian path leading up to the southeast entrance to the mall, from the park, one can see colourfully dressed men and women pushing grocery carts and hauling heavily loaded shopping bags back to their nearby homes, children in tow. The surroundings here are bleak, a chain link fence separates the path from a barracks-like row of portables to the north, used to house classrooms that won’t fit into the school proper, and an underused series of parking lots to the south. And yet, the simple presence of people, using this artery for their everyday needs, animates and liven what might in any other community seem to be an unpleasant or even dangerous area. This pedestrian path, connecting the area’s main commercial centre with the pleasant park seems the ideal spot to begin some kind of urban intervention. It may be, despite its narrowness, one of the area’s most important ‘streets’. If one rejects the private ownership of the land bordering it, one can immediately start to see possibilities of urban intervention. What if this ‘street’ were lined somehow with small shops and enterprises? What if it could be lined with the proximate and personable windows of pleasant town homes rather than anonymous and distant windows of the surrounding apartment blocks? The narrowness of path seems of little import in making it a pleasant space. Many important streets the world over are as narrow as this path or narrower and maintain a lively street life. The key here would be keeping car traffic off of such a narrow artery, no great challenge given that cars currently don’t operate here anyway.

Starting from this new Main Street, one can imagine a whole network of streets and squares branching out into the spaces between surrounding buildings. The central portion of this neighbourhood contains very little green space, practically none of which is accessible to the public aside from the park. But the scale of the parking lots and the scattered patches of grass and trees, while currently bisected by chain link fence and filled with cars, approximate the size of pleasant squares and intimate parks. The existing park itself is extremely well
used, but on closer inspection, the corners and edges of this park are vacant. It seems that no one wants to be too close to the sad chain link and the dreary parking lots behind it. Again, could lining this space in low-rise built form re-define and enhance this park’s periphery? This park may be perceived as an unremarkable space (Porter, 2010) but what is really missing here? There are fine trees, and despite the intensity of its use, there are plenty of spaces for a whole family to settle down on a summer evening with a picnic blanket or to get a small game of pick-up soccer going. Recent improvements by the city have seen the instalment of benches, playground equipment and a wading pool for young children—standard fare to be sure, but obviously greatly appreciated. It seems then that what is really missing is an attractive boundary, an upgrade on the chain link that blights the entire neighbourhood. But in a place that needs space, why not let this boundary be a building?

Outside the horseshoe of Thorncliffe Park Drive the buildings are much bigger and the spaces between them much less personable. As such, the spaces surrounding these buildings, where they are accessible at all, are much less frequented. Perhaps they could be transformed into productive gardens helping to feed the neighbourhood and providing gainful and meaningful employment to many of its residents. What would be lost in this kind of transformation besides grass, a few trees and the tangible sense of waste? In other parts of the world, such large amounts of unused space would be unthinkable.

4.4 Wasted Space and Opportunity around the City

Such imaginative thinking can be applied to many parts of contemporary cities that contain underused, unpleasant and unproductive space. There has been a lot of attention paid to Toronto’s tower neighbourhoods and many talented architects, planners and thinkers have put forward thoughtful proposals that address their many problems. Lack of programming between these tower buildings is a primary concern amongst these proposals and most tower neighbourhoods have so much space available that they have begun to be seen as ideal areas for urban agriculture experiments and infill building (E.R.A. Architects, 2008). It is interesting to note that in recent years there have been substantial gains made in crime prevention and social programming leading to substantial increases in resident satisfaction in certain tower neighbourhoods in Toronto (Silverwood, 2011). These gains are credited to strong community organization and new community infrastructure, put in place after extensive community consulting and input. They happen with the co-operation, participation and financial support of property managers and local governments. There is a change in attitude occurring around these neighbourhoods with both residents and outsiders beginning to accept that sweeping changes may not be necessary, but that gradual, small-scale change can lead to a sort of chain reaction of resident empowerment and achievable ideas.

Many tower neighbourhoods in Toronto have achieved a measure of success in increased quality of life and resident satisfaction through taking advantage of community resources. But tower neighbourhoods are not the only prevalent areas containing wasted space. Throughout

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Figure 4.4. The creativity of populations in Toronto’s tower neighbourhoods is contained by artificial boundaries and constraints. Photos by the author
the city, 20th Century development practices have left countless fringe areas that may now offer breathing space for gradual and positive development. Imagine an underused Toronto park. What if the chain link fence separating an underused grass field from a railway corridor were replaced with a row of attractive houses? The park would be better defined, the housing could be attractively sited and very little space may in the end be lost for recreational purposes. Toronto is filled with many such parks, particularly in its suburbs. Or consider the city’s extensive network of laneways it’s forgotten roadside right-of-ways, uncountable other fringe areas. In a recent 4th year design studio run at the Department of Architecture at Ryerson University, students were asked to seek out waste spaces and consider programming for them that could give back to their communities. They uncovered surprising possibilities in extremely compact spaces. Almost none of them would have been allowable by current zoning and building code standards but many may have provided valuable community assets. In a part of the world where land use has never been optimized for anything besides profitability in a system of low-density suburban development, the sky is the limit when it comes to possibilities for waste-space reuse.

Allowance for the development of such underused or waste spaces would require a gargantuan shift in the current paradigm around land ownership, zoning, health and safety, etc. But in many parts of the world, such spaces would be occupied by force and out of necessity. Who would lose from the re-appropriation or inhabitation of these spaces? And if they were to be developed at a minimum cost, using support structures and resident labour, in association with consulting architects and engineers, how much could be gained?

A tower neighbourhood’s highly organized and packaged planning looks little like the disorganized, ramshackle arrival cities of other parts of the world. It is not an informal settlement by any stretch of the imagination. But it frequently is a true arrival city, a source, as Doug Saunders describes them, of social capital. Today locals thrive on the human energy poured into their social programs and their attempts to make multiculturalism work. Imagine what could happen if the physical space of these neighbourhoods reflected the bottom-up piecemeal approach to development that has already been seen in the social realm. Perhaps then their residents would see these neighbourhoods more as a home, instead of a stopping point on a journey toward a new home. Perhaps they would choose to maintain the best parts of their current lifestyles: walking to their shopping mall and inhabiting compact apartments.

As informal development in arrival cities around the world is slowly accepted as legitimate means to development, perhaps it is time to allow tower neighbourhoods to break the mould of their 20th Century architecture and planning and enter an era of resilience and democracy built on the abundant creative energy that characterize them.

Figure 4.5 (opposite page, above). Aerial image of a Toronto tower neighbourhood showing an enormous amount of under-used space. Google Maps satellite image.

Figure 4.6 (opposite page, below). Coverage map of a Toronto tower neighbourhood. Dark grey represents unused flat roof space. Light grey represents Paved surface for cars. Many of these parking lots are half—or in a few cases, completely—empty. Drawn by the Author.
Figure 4.7. Diagram of the potential for new built form to redefine wasted space in a Toronto tower neighbourhood into more attractive streets and squares. Details about the individual components of this radical re-appropriation of space can be found in Chapter 6. Drawings by the author
5. Relevant Case Studies

The following case studies outline interesting projects that have had a major impact on the final design component of this project.

5.1 Aranya Township - Indore, India

The housing scheme designed by Indian Architect B.V. Doshi for this new neighbourhood in India was part of the proposal that won the Aga Khan Award for Architecture in 1995. The idea was to provide a cost effective means to house 40 000 impoverished residents within a larger mixed income community. Rather than design a single architectural or urban object to be constructed all at once, the designers decided to make use of the creativity and labour of new residents to design and construct much of the housing stock. As such, the project drew on the extensive tradition of Indian squatter developments in which the country’s poor, despite crippling poverty, often exhibit surprising willpower to create a home from minimal space and material resources.

Doshi’s proposal provides a central sanitary core for residents around which they can build infinitely varying houses that suit the needs of growing families. The result is a highly organic building process that allows for resident participation in design, material acquisition and construction. The colourful and internationally acclaimed result is an attractive, mixed income neighbourhood that acknowledges that community building is a gradual process and that the best architecture evolves through the ages.

At Aranya houses are able to develop into a number of different sizes and configurations based on household need. The urban plan also calls for integration into the larger city through mixed-use zones as well as the gradual development of common areas where community interaction can take place.

Despite being published and praised in dozens of international periodicals, as well as winning the Aga Khan Award, the Aranya scheme has been criticized. Its intention to bring together people of different incomes appears to have failed outright. It appears that those in greatest need of Aranya’s innovation, the extremely impoverished, were not able to find their place in the development. This has happened in a number of similar projects which aim at

Figure 5.1. Interior of one of the Elemental homes, Iquique, Chile. Note the unfinished floors and walls. Residents were provided with incomplete buildings and encouraged to finish them on their own. The project has been a means for upward mobility for many families at a minimal cost to governing bodies. Photo sourced from: http://www.spatialagency.net/database/elemental
Figure 5.2. Diagram illustrating the gradual development of homes at Aranya Township. Residents were provided with foundations and service cores consisting of a small kitchen and washroom and were allowed to build for themselves as resources became available to them. Drawings by the author.
Figure 5.3. Aranya Township. Various built façades show the range of variability available to residents. Images sourced from https://archnet.org.
Figure 5.4. A celebration of a drawing? Despite numerous awards and critical acclaim, critics have noted that Aranya has failed to deliver on many of its promises. Below right a town centre with various amenities are visible in early plans from the architects. Below left satellite imagery from December 3, 2009 shows much of these amenities unbuilt more than a decade after residency. Drawings sourced from https://archnet.org. Satellite photo courtesy of Google Maps.
innovation in housing the urban poor. These projects are often spoiled as higher classes snap up the opportunity to live in innovative schemes at extremely affordable prices. It’s unfortunate but understandable that this should happen. People often look at themselves as being poor or in need, regardless of how many poorer people may be on the economic ladder below them.

In the case of the Aranya development, it seems that much of the hype about the project stems from extensive and very beautiful photography of model units and drawings of the various permutations of the site and its buildings rather than any serious inquiry into the lives of people who have moved into the project. In *Planet of Slums* author Mike Davis discusses the project and the larger program of slum renewal implemented in Indore, where Aranya is located. Another writer on slums, Gita Verma, is the source from which he in turn draws his information. Verma appears to loathe the vast international fame that has come to Aranya’s designers and is quoted in Davis’ book saying:

> The truth about Aranya, however, is that its winning elements simply do not exist on the ground. There is no town centre, no flowing pedestrian greens, and no 40,000 poor people living there. These exist only in the literature on Aranya and for more than a decade we have been celebrating a drawing, as design idea, that we are not sure will work because it has not yet been tested. (Davis, 2006, p. 79)

In a world where slum rehabilitation has become a big business of big ideas, it is hard to know what should ultimately be taken out of projects like the Aranya Township. The architect’s intentions seem good, as do those of the various project stakeholders and initiators. And yet something in the nature of the project apparently doesn’t fit into the complex web that is contemporary Indian society. Aranya is a project that exemplifies the spirit of experimentation deemed so necessary by authors like Thomas Homer-Dixon for the finding of valid solutions to the problems of the future (or in the case of India, the problems of the immediate present). Probably the best lesson to take from the project, whether it is ultimately a great success or a miserable failure, is that this experimentation must remain ongoing. We should celebrate success after it has been proven and not become too excited about any solution to a problem.

### 5.2 Grow Home – Montreal, Canada

I walked through the house units with homeowners, listening to their explanations, and I frequently heard them expressing their own design ideas. They wondered aloud about what they could have done as the architect: arranged the layout of the bathroom differently, added more storage space, reshaped the stairs in an alternative configuration. Some would pull out a pen to illustrate their plans with a quick sketch. I realized that buyers’ knowledge about the design of their homes and their participation in the process cannot be marginalized. As I was trained as an architect to provide design services, I had some difficulty embracing the idea of buyer as designer. But I was certain about one aspect: More choice had to be given to the home-buyers before they moved in. Extending to them a single layout does no justice to their intelligence or their dreams. (Friedman, 2001, p. 108)

The Grow Home project emerged from McGill University in the early 1990s. The project
aimed to provide low-cost housing to new homeowners by giving them just the bare necessities in a house and the option to expand in the future. In this way, the cost of building was partially diverted to the planning and labour of the owner in the future. The concept that a home should be a work in progress and need not be finished down to the last details to be inhabitable is still a fringe idea in much of the Affluent World but one that gives power to many developing parts of the world. The basic ideas of the project have since been incorporated into approximately 10,000 units in and around Montréal.

Avi Friedman, the architect of the Grow Home, wrote an entire book about the Grow Home concept that outlines the philosophy of the project and the processes by which it came to be realized many times over (Friedman, 2001). This book has been invaluable for understanding the processes of engaging the public in design and construction and changing the culture of housing from one in which you purchase a finished product into one that you engage in a lifelong process of building a home and community. In the book, Friedman discusses a number of other projects, which he has undertaken since the Grow Home. These have, in some cases, been even more radical in their flexibility and reliance on resident labour to add to and change the building to their needs.

The Grow Home itself consists of a narrow fronted, two-storey townhouse intended for use in a variety of neighbourhood configurations. The narrow frontage (approximately 4.3m wide) was decided on after careful investigation into the costs of services and other municipal costs in the city of Montréal. It was also deemed appropriate as it allows for floor plans without any intermediate load bearing partitions. The ground floor of the project contained an eat-in kitchen (dining rooms were omitted due to lack of space in the small floor plan), a bathroom and a living room. A large number of variations of this layout were proposed and subsequently

Figure 5.5 (left). The original Grow Home test house on the McGill University campus. From Friedman, 2001.

Figure 5.6 (right). Early Grow Home developer’s advertisement demonstrates the enormous cost-savings benefits of involving residents in finishing their own homes. From Friedman, 2001
Figure 5.7 (above) Study models of the Grow Home show alterable features in green. Grow Home interiors are highly flexible and allow residents to take a lot of the building and design process into their own hands. Drawings by the Author

Figure 5.8 (below). Various plans show a few permutations made available by various Grow Home developers. Images from Friedman, 2001.
adopted by private developers of Grow Home projects. The second floor of the house was intended to have no partitions at the time of occupancy. It was meant to serve as a large, open concept bedroom but could easily be divided into two bedrooms or various other configurations of space. Basements were constructed in a large number of private Grow Home developments and were subsequently partitioned and furnished in many ways.

Friedman has pointed out that the small size of the Grow home and its configuration as a row house (sharing two walls with neighbouring units) creates a much more energy efficient unit than standard North American detached homes. Ultimately though, the intentions of the grow home were to allow people (primarily young families) the possibility to own a home at a cost that would be comparable to renting in the same location. The concept was wildly successful and people bought into these projects with great excitement, often more than happy to sacrifice space, a degree of privacy (compared to North American norms) and luxurious finishes for the freedom of home ownership. It will be interesting to see what the legacy of this project is in 30 or 40 (or more) years. Will the grow home be viewed by posterity as just another cheap and disposable building type or will it be seen as a project which re-examined value and values, changing in small but significant ways, how societies house their populations.

5.3 Elemental, Iquique, Chile

Elemental is an unusual hybrid practice consisting of a partnership between the architect Alejandro Aravena, the Chilean Oil Company COPEC and the Catholic University of Santiago. Self-described as a ‘Do-Tank’ its most celebrated project was its first, a housing development in Iquique, a port city in northern Chile. The project’s mandate was to develop a low-cost initiative to house about 100 squatter families on the same piece of land that they had been occupying. The catch was that it needed to provide this housing using the standard 7 500 USD subsidy given by the government to cover land, construction and infrastructure costs. Due to the location of the previous squatter settlement, a site which was close to the city centre and which was far more expensive than the usual suburban sites used for similar projects, Elemental was forced to get creative with what they would offer the residents.

Acknowledging that these squatter families had already accrued a degree of confidence with constructing and altering their own homes, Elemental chose to concentrate the available funding into providing a cheap and robust framework structure containing a basic dwelling with a bathroom, kitchen and necessary services. Residents would then be able to ‘complete’ their home using their own labour and as resources became available.

The severe and regular structures provided to residents upon initial occupancy contained little in the way of comforts or luxury. Everything in the design was stripped down to the basics. Photos from the early stages of occupancy show walls of exposed concrete blocks, exposed timber joists and rough carpentry, kitchen sinks in the middle of bare rooms. But these stark and almost prison-like interiors along with the rigid and geometric exteriors were soon softened

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Figure 5.9. Diagram illustrating the gradual development of homes at Elemental in Iquique, Chile. Residents were provided with minimally finished and fully serviced homes and were allowed to complete them as resources became available. Drawings by the author.
and brightened by the labours of the residents. Gaps in the buildings were filled in with a variety of materials. Walls were punctured by an eclectic assortment of mismatched windows and doors. Residents chose their own colour schemes and installed attractive finishes as they were able.

Within a few years of initial residency home values in the project had risen to 20,000 USD, an incredible indication of the potential for value creation through small and incremental change.

The Elemental housing project at Iquique is not a particularly beautiful collection of houses in the conventional sense. Its value to architectural thought lies in its progressive social stance far more than its aesthetic one. All the same, the ever evolving houses at Iquique are immensely beautiful in the way they express the talents and aspirations of their residents. More than that though, they effectively integrate their residents into the discourse around and the practice of urban development and urban design. The aesthetic results may be impoverished and naïve but they are honest and don’t make pretences about the nature of the residents and the city. This is a poor neighbourhood of poor people. Pretending otherwise will help no one.

Figure 5.10. Exterior view of Elemental, Iquique, Chile showing homes at various stages of completion. Image sourced from http://www.spatialagency.net/database/elemental
5.4 Quartiers Modernes Fruges - Pessac, Bordeaux

Exposed by Philippe Boudon's now classic study entitled *Lived-In Architecture*, the strange life of Le Corbusier's early housing estate near Pessac, Bordeaux in France highlights the benefits of highly flexible design and gradual additions and alterations. Whether Le Corbusier suspected that his compact, white boxes would be formally and ornamentally altered almost beyond recognition—or whether he would have approved—is anyone's guess. What is fascinating here is that, intended or not, a number of characteristics of Le Corbusier's design contributed to a largely positive experience of user building in the 40 years after its 'completion'.

At Pessac, Le Corbusier applied flat roofs, open-plan interiors, compact services and minimal ornamentation in order to create a one of the earliest examples of his *Machines à Habiter*. Soon after their occupation, these structures began to be altered and added to by their residents. By the 1970s, Phillipe Boudon and his team of researchers had recognized the importance of the strange development in (sub)urban form in understanding the needs of people and their perceptions of the built environment.

What is clear from Boudon's text is that the flexibility inherent in the houses at Quartiers Modernes Fruges has provided many opportunities for residents to add value and personality and customization to their own homes in a gradual and affordable way. The residents of Pessac are far from a wealthy elite, and yet many of them express great satisfaction in being able to shape their environments to suit their dreams and needs.

Some of the physical features that have allowed this unusual and informal experiment in user-building include the ubiquitous flat roof, a long and narrow plan that eliminates the need for interior load bearing structure and thus allows for maximum flexibility of interior partitions and the simplicity of structure and finishes that allow simple and cheap alterations and additions. The flat roofs of the houses at Pessac are classic examples of what Jeremy Till and Tatjana Schneider have called Slack Space (Schneider and Till, 2007). Le Corbusier's many designs, despite often being perceived as inflexible are actually full of these sorts of spaces: flat roofs, terraces, *pilotied* ground floors. Any of these spaces allow users to fill them in and open them up again as need or desire dictate. The Quartiers Modernes Fruges were unintended precursors to the Supports and Infill-type buildings used to apply the burden of housing costs over lengthened periods of time and to allow flexibility for changes in family structure.
6. Intervention: A New Vision for Informality in Tower Neighbourhoods

6.0 Introduction

People who live in parks tend to be on the fringe of society. Park benches, gardens, unnoticed shrubs and soft lawns offer respite to drifters, squatters, travellers, vagrants, runaways: the homeless and disenfranchised. In Toronto’s tower neighbourhoods, classic examples of the ‘tower in the park’ style of planning, residents also find themselves on the fringe of society. These are not parks, really. But their residents often find themselves isolated from the larger circles of society: un-noticed, un-assimilated and without the means to begin climbing the economic ladder. Despite these challenges, many of these neighbourhoods have become vital, proud communities that, in their activities and culture, resemble functioning, resilient urban neighbourhood. Physically though, they lack many of the common features found in resilient cities. Their buildings and the spaces between them change at a glacial pace. Their residents have few opportunities to set up and experiment with new enterprise. Unlike in other parts of the city, residents have very limited opportunity to remodel or add to their homes as their needs change. Nor can they plant a productive garden or set up a home workshop to produce necessities for themselves as a buffer for hard times or even as a healthy pastime. The design component of this project, envisions the gradual introduction of some of these missing elements to tower neighbourhoods. It assumes a lot about the residents of these neighbourhood and their desires—community consultation has, as yet, not been undertaken—and is therefore an exploration of what could be, rather than what should be.

This intervention imagines a simple, flexible and entirely feasible framework into which people can construct homes and community infrastructure using materials as they become available. Based loosely on the ‘Supports’ concept put forward by architect N. J. Habraken in 1962, the idea is nothing new and has manifested itself in a variety of ways in cities around the world (Habraken, 1972, Hamdi, 2010), most notably in the form of the ‘sites and services’ development model described in Chapter 2. In places where such development models have been utilized to address the needs of arrival cities, building regulations and quality control are much less stringent than they are in Canada. Scavenged materials are widely used in

Figure 6.1. Schematic view of the proposed intervention. Drawing by the author.
the absence of building codes and warmer climates mean that user-built buildings in these countries are often easier to erect, while maintaining adequate interior climate for residents. This chapter explores what this type of project would need to look like in order to be viable in a particular Canadian context, what kinds of changes would need to be made in the norms of designing and building in Canada, but also what positive benefits could be gleaned from such a radical shift in the way housing and communities are conceived and constructed. The proposed intervention is an acknowledgment that step-by-step development using scarce and intermittent material and financial resources has become the global norm. As such, it seeks ways to allow space for gradual material collection and proposes building typologies that encourage the use of waste and easily scavenged materials in construction.

6.1 Building types

Descriptions of materiality and form found herein are not meant to be prescriptive. They rather offer a range of possibilities that are consistent with the spirit of user participation in construction and waste or alternative material use. If the proposed intervention were to be filled with standardized and similar housing solutions, its urban design features would hopefully be sufficient to make it an attractive intervention in a tower neighbourhood. If it were to become a highly mixed collection of disparate building types and techniques, then all the better. Diversity in cities, like in ecosystems, is a primary indicator of resilience.

The form and materiality of the proposed built form are the result of a logical process of selection for appropriateness given a number of constraints. This section discusses the typology of the proposed housing stock, the primary feature and objective of the project. In the words of the Cuban architect Mario Coyula-Cowley, “housing is the second most important human need after food and amounts for the larg[est] part of the urban environment” (2000).

Other building types, including a community centres, workshops, offices, restaurants, etc. are intended to be inserted into the framework buildings proposed and may require different material realities.

The shape of the support structure encourages the development of long and narrow town homes of up to four storeys in height. Avi Friedman, in his documentation of the development of the Grow Home project in Montréal outlines the reasons for choosing such a typology when seeking ways to lower housing costs. They include the minimization of development fees and taxes on real estate—as before the home is even built—which are usually based on the width of a plot where it touches a street (Friedman, 2001). In any urban situation, development costs are likely to follow a similar logic as, regardless of whether it is central governments, private companies or some other organization—co-operatives, etc.—someone ultimately has to pay for the cost of building a street and its services. Around the world, and for the entire history of the modern city, this long and narrow configuration can be found wherever designers have sought ways to minimize costs.

Building coverage too, seems to be optimized at a certain ground plan size and number of
stories. This project is informed by a number of case studies that encourage user construction through a 'supports' approach to providing housing. Surprisingly, across vast stretches of space and time, housing built in this way—intentionally or unintentionally—tends to take on similar sizes and proportions. Therefore it is easy to find houses of around four to five meters in width and around twelve to fifteen meters in length in countries as varied as Canada, India, France and Chile (see Chapter 5). They frequently start with one to two stories and usually are either extended in length by the addition of living quarters at the front or back or the addition of storeys above the original ones.

The intervention begins with a robust support structure forming the ground floor of the proposed homes and other building types. This ground floor structure may be constructed from a number of materials. A large amount of structural redundancy allows the upper levels to be constructed from whatever materials might be available to the resident. Thus the ground floor walls are massive and heavy. They may be constructed from rammed earth—either freestanding or in a tire-wall, as is commonly employed in Earthship construction—concrete block, reinforced concrete or common brick. However, they are not continuous and contain a series of load bearing arches or lintels that allow portions of the wall to be punched out or filled in as activities in the ground floor space expand and contract.

The ground floor support structures are spanned with shallow masonry vaults and regular masonry arches, which allow residents to construct load bearing walls at a number of points along the length of the house. This provides the option of having a building that is pressed up against the street or set back to have a terrace at the front. The play of different façade depths along the street will create a lively streetscape with ample play of light and shadow. The use of masonry in the vaulting system provides a simple and durable weatherproofing system for the ground floor, which also has a high vapour resistance. It is also a proven, high-strength spanning solution that can be constructed without the need of steel reinforcements. If the ground floor is going to be used for residential purposes, these vaults can be insulated and weatherproofed without the need for a vapour barrier. On the interior of the ground floor, brick vaulting creates an attractive and fashionable space covering for restaurants, cafés, and shops and an easily maintained finish for other businesses. It can be plastered or even concealed with ease, using various types of drop ceilings. It would also be possible to use a reinforced concrete slab as a material to span the ground floor support structures. While this

1 Steel and other metals are avoided in this proposal for a number of reasons, except for where they are salvageable from common waste sources. Many commonly used metals have been identified as being at risk of becoming increasingly scarce in coming decades. Moreover, even if the material type remains in abundance, it is highly unlikely that the energy used to process these materials will be available at anything near the current prices that the economy is used to. Peak-oil and the instability of trade with energy producing parts of the world have already demonstrated their ability to make energy supply volatile. While it may be a long time before commonly used metals become completely inaccessible, the advent of peak oil means that prices may be poised to skyrocket. Compared to other material types metal extraction and processing also creates an enormous amount of waste. In many cases, the remnants of metals processing are extremely toxic and there are few ideas as to what to do with them. The toxic spill of aluminium tailings in Western Hungary in 2010 mad this painfully clear.
would be easy enough to use, it is a solution to spanning with a much higher embodied energy and has far less reuse potential than brick vaults.

Ground floor spaces inside these support structures are built at grade in order to encourage a healthy, permeable street frontage along the new streets and squares of the intervention. These spaces are easily adapted to small enterprises like shops, restaurants, cafés, bicycle repair shops, carpentry workshops, hairdressers, and an infinite number of others. They may also be used as small apartments for extra income generation or, in some cases, as garages. This intervention is predominantly designed for pedestrians and under the assumption that automobile traffic will be greatly reduced with the pressures of peak-oil and other economic changes in the near future. That said, these support structures take space from existing parking and should be able to provide parking during the transition phase away from the car-culture paradigm. As the ground floor units are filled in, their facades, fenestration, signage and solutions to insulation will gradually erase the monotony of the streetscape.

Owing to the narrowness of the proposed new streets, stairs to the first floor level are set back into the volume of the framework buildings. On sites where more space is available, stairs may project in front of these structures. The stairs are designed to be finished in a variety of materials as they become available. The position of the stairs from the street creates a gap between every, or ever other home ensuring that each room in these homes can have windows on two sides, a healthy arrangement encouraged by many architectural thinkers including Christopher Alexander in *A Pattern Language* (1977).

Above the ground floor, similarities in building type begin to disappear. While most of these buildings are intended to eventually become long and narrow town homes, their floor plans, heights, roof types, fenestration, ornamentation, etc. will eventually vary greatly. Due to the narrowness of the proposed streets, and compactness of the buildings many buildings may be equipped with a projecting beam and pulley system that can be used to hoist furniture and materials up from the street during construction, renovation or moving. The beam may project from the ridge purlin of a pitched roof or from the load bearing structure of a flat one. Fenestration will be aligned with this crane when it is employed. As such, a common street-facing façade may have a tall, large window or French door centred on it. Even if every home featured this same basic configuration of windows, the variety of building heights, colours, window types, etc., all left to the discretion of the resident, would provide an extremely lively streetscape.

The space on top of the ground floor framework buildings may well be not be built on for some time while residents seek resources to build and plan their homes. This space can be filled with planters or can be used as a productive space or used simply as storage until a building is ready to be constructed.
6.2 Materiality

Materially, the buildings of this intervention are illustrated as using a range of common material re-use ideas from various places around the world and from the imagination of the designer. Where new materials are used, preference is always given to those that have a high re-use potential, high durability to embodied energy ratio and little need for specialty labour (See Chapter 3).

Designing for flexibility and resilience requires robust and durable structures and these are integral to the intervention. Structural redundancy is important for providing the possibility of adding a floor or changing the function of a room as buildings expand and neighbourhoods intensify organically. In countries with mild climates, concrete or ceramic blocks, reinforced concrete as well as stone and earth are ubiquitous. They are cheap and readily available as well as reclaimable from older projects. They are also manageable for inexperienced builders. Straight walls made from some kind of block construction may well be the simplest type of construction, something that entire communities can comfortably participate in. Indeed, the very etymology of the word ‘construct’ refers to this simple action of ‘piling on’.

Outside of basement walls, block construction is rarely employed in Canadian building. The reasons for this are found partly in the tradition of using timber—as it is cheap, available locally and encouraged for political reasons—but also related to climate and thermal comfort demands. The simplicity of block-type construction is lost when builders have to incorporate insulation and weatherproofing to meet these demands. The harshness of the Canadian climate and the comfort demands of its people has resulted in the development of complex building systems that have become so ubiquitous as to be extremely hard to change. These building systems also tend to make buildings inaccessible and difficult to understand. They greatly decrease the possibility of non-expert intervention in the construction and evolution of a building throughout its lifecycle.

One promising technology that addresses Canadian insulation and thermal comfort requirements, while allowing for relative simplicity of construction and minimization of layering in walls, is straw bale construction. By stacking straw bales like large bricks and then impregnating them with a rigid plaster to a depth of a few centimetres, a strong, flexible and extremely well insulated wall construction can be built. Straw bale technology has now been widely studied and found to have excellent insulation capacity, strength—particularly in storms and earthquakes—and durability while providing excellent indoor air quality and thermal comfort (Steen, et al., 1994).

Straw itself is an agricultural waste material which is frequently found to be in surplus and which is available in large quantities and for relatively low cost. Many other fibrous materials have been experimented with in straw bale-like wall constructions. Thus shredded carpets, fabrics, paper, cardboard, packaging, plastics, upholstery, countless other fibrous plant materials and anything else with the rigid, flexible qualities of straw can potentially be baled and made into strong, insulating wall constructions. This makes the technology suitable for
Figure 6.2. Diagram showing the development of a typical support structure and its infill. At the ground floor the left building is converted into a residential unit while the right becomes a commercial space. The robust nature of the support structure is meant to provide a degree of redundancy as the nature of the infill to be constructed above it is undetermined. See section 6.2 and 6.3 for description.
a project like this intervention, where methods of building with scavengable materials are sought.

Concerns about the fire resistance and proneness to pests of bale wall constructions have been outlined in Chapter 3. Space is another concern with bale wall construction, as wall thicknesses tend to be somewhat greater in this type of construction than in conventional wall constructions. But thicker wall constructions tend to provide greater insulation and thermal mass possibilities as well as greater structural redundancy, all of which are extremely desirable features for resilient and flexible buildings. Given that this intervention intends to reanimate spaces that are already underused or wasted, the idea that thick wall constructions such as bale walls will be wasting valuable space seems to be a moot point. This intervention attempts to demonstrate that squabbling over every square centimetre of space not be that helpful in creating resilience or even affordability in the long run.

Bale walls also have the advantage of being flexible. They can easily be moulded into unusual shapes, curves, non-orthogonal corners and can accommodate openings of various sizes. This project seeks ways to incorporate reclaimed windows, doors and other architectural features that may otherwise be discarded as waste. These often don’t fit well into buildings built with higher precision components. Because bale walls are easy to work with and adjust—bales can be trimmed in length and gaps can be filled with loose material—they are ideal for oddly shaped windows, doors and other elements.

The use of bale walls suggests that most buildings built atop the framework structures will be finished with plaster, but many finishes and colours can be applied in order to personalize the exteriors of these buildings. However straw bale-type walls are not proposed as the sole wall type for this project. Other technologies, even those that are conventional in today’s construction environment may be suitable for certain buildings at certain times. Again, prescription is not the aim of this project. Ultimately this intervention is about providing opportunity for Toronto tower neighbourhood residents to have agency over their building needs. That they have access to resources providing ideas and encouragement for intelligent, responsible material selection is key to gradually making a shift to these material types.

6.3 Podium Buildings

Many of the existing buildings in the centre of the sample site for this intervention feature blank walls and uninhabited space that afford the opportunity to build support structures directly against. As such, in some places the support structures of this intervention become the podium-type buildings used to create a better-defined and more humane streetscape in many contemporary high-rise projects. In these cases, the support structures may become a sort of “back yard” for second floor apartments in the existing buildings, allowing some residents to expand their homes without physically moving to another part of the project. They may use these spaces as container gardens or build small greenhouses or, in time, create secondary or ‘granny’ flats or even whole town homes, leaving their existing apartment for
income generation or extended family. Ground floor spaces that are buried by this development can easily be adapted to storage areas for materials or food: a key component for a project that encourages scavenging and for a resilient city.

6.4 The Logic of the Low-Rise and The Intervention in the Distant Future

Reasonably high density development is an important key to creating resilient cities that can maximize the benefit of building infrastructure and ensure that most necessities are available close to home. This intervention’s support and infill structures limit building heights to a maximum of around four storeys. At the same time it appears to take up an enormous amount of land that could be used to provide other public amenities. In order to explain why this building typology was chosen over taller building types with smaller footprints, it is important to consider a few factors.

First and foremost, it is important to understand that the intervention’s objective is not to increase population density. Toronto tower neighbourhoods are already high-density developments. For example, Thorcliffe Park manages to pack about 30 000 people into an area originally designed for about half of that population. So, this intervention is about providing flexible space, into which people can expand and fulfil their needs. It provides the support structures onto which people can build flexible and customizable housing. It also provides slack space for spontaneity and small enterprise. It is about redefining space; taking usefully scaled, underused space and transforming it into attractive public space, defined by buildings.

The single-family row house has been selected as the basic model on which the intervention’s buildings would be developed. This house type combines the possibility of reasonably high-density development with the desirability of having control over one’s entire building. This control allows the resident to expand or alter their home to a certain extent without the need for extensive consultation with neighbours. In an age of redefinition for the word ‘family’ one can imagine these new homes supporting a variety of communal or co-housing arrangements.

Toronto’s tower neighbourhoods are already high-density, high-rise settlements. What is missing in them is a diversity of building types and tenures. The introduction of low-rise, medium-density housing can address this issue. But more than that, this building type may contribute greatly to the overall resilience of the neighbourhood. While the common wisdom in Toronto at the moment dictates that high-rise housing is needed to introduce density and preserve the character of the city’s older neighbourhoods, this model of development has more than its fair share of detractors. High rises are both energy intensive to build and maintain and are problematic in their increased exposure to harsh elements. They suffer from problems of high solar gain and weathering due high winds and driving rain at higher altitudes (Fowler, 2008). They take an enormous amount of energy, political capital, engineering expertise and monetary capital to get construction underway. It seems that in times of political instability and resource scarcity, this building type is far from ideal. And indeed, in parts of the world
Figure 6.2. Development of a typical podium around the base of a six-storey apartment building. See Section 6.4. for description.
where resource scarcity has become an acute problem, one sees the difficulties of building tall buildings manifest themselves. Low-rise housing, with its ability to adapt and be constructed in a more gradual manner seems to be the ideal solution to the uncertainties of the future.

Because this intervention is not designed to absorb very much increase in population, but rather, spread the existing population of tower neighbourhoods over more built form, the project has an alternative vision for the existing towers in the neighbourhood. First and foremost, overcrowding and inadequate apartment size remains one of the primary concerns in these neighbourhoods today. As the parts of the population are able to move into the intervention’s new buildings, remaining residents with large families will have the opportunity to take over vacated apartments and repurpose them for their needs.

Later, existing towers may be further altered. In times of energy shortages, elevator services may not be reliable and living in towers may become difficult. As such, as the population of the tower neighbourhood gradually spreads out, these towers may begin to be dismantled and repurposed. Their upper levels may become the food and water stores, and general storage spaces for the surrounding neighbourhood. Windows and doors may be removed and used in newer projects below. The heavy reinforced concrete structures of these towers may last for centuries but their use for the now established village could change dramatically. They may become slack space, like the abandoned structures of ancient Rome, waiting for the next influx of population to be put to use again. In established cities around the world, ruins like this are a common sight. Should places like Toronto’s tower neighbourhoods be afraid to have them in their midst? Or can they serve as a healthy reminder of that universal truth, that things never grow forever and that only through death can space be made for new life, that waste is a natural byproduct of change?
Figure 6.3. Renderings showing materiality of proposed intervention. See section 6.2 for details. See also foldouts.
Foldout 1.1. Ground floor plans of new buildings in the intervention. This plan shows the interior of the support structure demonstrating how it can be adapted to a wide variety of uses. Shown here are a small restaurant, a takeaway café, a bicycle repair shop, a hair salon and a number of units in under construction.
Foldout 1.2. First floor plans of new buildings in the intervention. This plan demonstrates the type of housing that the long, narrow support structures encourage and accommodate. The house to the far left has expanded to include a 'granny flat'. To the right of that, the unit is making use of some of its space to create a small garden. Note the incomplete nature of each unit. The intervention is never intended to be a finished ‘product’. Rather, it encourages gradual development and constant flux.
Foldout 1.3. Upper floor plans of new buildings in the intervention. This plan shows possible bedroom layouts. Note the range of materials and finishes that might be used. To encourage the use of scavenged materials necessitates a degree of messiness about the built form. However, a new aesthetic may begin to emerge if this messiness is embraced and the glossiness of more conventional architecture is seen less as being correct, and more as simply being one way of doing things among many.
Foldout 1.4. Rooftops of buildings: in the intervention, the intervention is a vision of what could be rather than what should be. Its forms and material choices illustrate possibility and are not meant to be prescriptive. Here a variety of roof types are illustrated showing the range of needs and desires found in communities like Toronto’s tower neighbourhoods. The orange roof is a creation made from old car hoods fixed to a wooden frame. Again, it is important to note the incomplete and changing nature of the built form.
Conclusion

The reason most pre-industrial buildings in a given region of the country look like one another is a matter of economics, not aesthetics... Take the picture postcard country cottage... When it was built it was a marginal enterprise in every sense. It owned no land, but stood instead on the edge of a productive field against a useful road. It was built from waste or salvaged materials: straw gleanings for thatch and lathing, mud for mortar, dead trees for timber, broken barrels for windows, mud and cow dung beaten into a floor, field stones piled up for walls. Even the labour that built it was waste labour, time off rather than time on. (Pawley, 1981)

This excerpt from Martin Pawley’s brief piece on the meaning of vernacular in architecture, published thirty years ago in the RIBA Journal, perhaps best captures the spirit and intentions of this thesis. This project set out less to challenge aesthetics or propose solutions to environmental or social ills—although those things were obviously on the my mind through period that it took to and write—than it did to address what I perceived as a stark economic reality. It did so by investigating unconventional ways of thinking about building, designing and living, inspired by informal development around the world. For these different ways of doing architecture to be implemented a massive shift in values around economic norms, codes, laws and traditions will be required. A long-standing difficult debate will need to be continued. This debate will be frustrating but, I suspect, worthwhile.

The world of today is a frighteningly unstable and troubled place and alternatives to the way we build cities are badly needed. These alternatives may look something like the ones proposed here, incorporating a heavy reliance on the talents of ordinary people and a slower, more patient approach to dealing with the material realities of building. They may require a re-evaluation of architecture as a profession, re-imagining the architect as a consultant and guide rather than heroic creator. They may also demand a re-evaluation of the products of architecture themselves. Thus, works of architecture will begin to be seen as what they really are: inputs into an ever-changing, ever-evolving built environment—one created with the needs of people in mind—instead of completed, aesthetic objects. If we are to continue down this path, one of the key roles of the architect will be to ensure that a more user-focused approach to building can maintain reasonable safety and performance standards. Future work should consider how we can create a built environment that meets indoor climate and safety standards while using a more unpredictable palette of materials.

This Thesis is Garbage ultimately does not propose a solution to a certain problem. It remains a rather cursory discussion of the world of informal building and the re-appropriation of waste for the benefit of the disenfranchised. But hopefully it has the capacity to shake certainties and stir discussion. The stark realities that we face in the future, the factors that appear poised to implode our Affluent World comforts, need not lead to disaster and misery. The world of today is brimming with opportunity and resources for an emergence of new ways of building and living. These resources may be disguised as the things we are used to carelessly disposing of and turning a blind eye to—garbage, peripheral space or the lives of the disenfranchised. Look at these things again and you may see the seeds of a more just and agreeable world.

Figure 7.1. A fence in Alamar, near Havana, Cuba. This otherworldly creation is far more than a pile of garbage. It is durable, functional, redundant and, in a strange way, beautiful. It is also a creation born out of necessity, the ultimate illustration of a new urban vernacular. Architects and the general public can look on it in disgust or choose to see opportunity in a world where creations like this are rapidly becoming the norm.


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