Shaping Time in the City: A Cultural History of Concrete Modernity in Montreal, 1903-2015

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Abstract

This project looks at the mediating role of concrete in Montreal, treating the material as a vector through which particular cultural forms, aspirational politics, desires, and memory have been consistently negotiated and reified in the city over the last century. In Quebec, the material's liminal position is particularly acute: once the material embodiment of modernization, it is now synonymous in the province with overpass collapses, organized crime, and collusion between the provincial government and the construction industry.

My dissertation research involves a comparative analysis of three sites in Montreal: Silo no. 5, the Turcot Exchange, and the Olympic Stadium, all of which represented, at the time of their construction, particular visions of modernity and progress, and all of which have since been abandoned or fallen into disrepair. Through an analysis of the changing representations of these concrete sites in news media, photography, installation art, performance, television, and film, my project foregrounds the important and mutually constitutive role that concrete and more traditional media technologies have played in constructing visions of modernity and urbanity whose legacy we continue to negotiate in the present. These case studies are preceded by an introduction that lays out the wider context of Quebec's historical and contemporary relationship to concrete, as well as a first chapter that outlines the broader developments in the cultural history of concrete internationally, in particular its fundamental role in early articulations modernist architecture.

This research works to historicize the contemporary moral panic around the material of modernity in Montreal, as well as to contextualize and illustrate how concrete has come to take on the significant symbolic connotations that it has in the province today. Though this in-depth analysis of the semantic economy of concrete in Quebec, my dissertation research illustrates the important and often overlooked medial qualities of the built environment more generally, informed by a structuring tension between utopic articulations of the future and the cultural and architectural residues of the past.

Résumé

Ce projet se penche sur le rôle médiateur du béton à Montréal, traitant le matériau comme un vecteur à travers lequel des formes culturelles, des politiques ambitieuses, des désirs et des mémoires ont été systématiquement négociés et réifiés dans la ville au cours du siècle dernier. Au Québec, la position liminale du matériau le place dans une situation critique: alors qu'il a déjà été l'incarnation matérielle de la modernisation, il est maintenant synonyme d'effondrement de viaduc, de crime organisé et de collusion entre le gouvernement provincial et le secteur de la construction.

Ma thèse de doctorat consiste en une analyse comparative de trois sites montréalais: le silo n° 5, l'échangeur Turcot et le Stade olympique, chacun d'entre eux représentant, au temps de leur construction, des visions spécifiques de la modernité et du progrès, et qui, depuis, ont été abandonnés ou sont tombés en désuétude. Grâce à une analyse de l'évolution des représentations de ces sites bétonnés dans les actualités, la photographie, l'art d'installation et de performance,

la télévision et le cinéma, mon projet met de l'avant le rôle important et mutuellement constitutif du béton et des technologies médiatiques traditionnelles. Celles-ci ont pris part à la construction de visions de la modernité et de l'urbanité dont l'héritage continue à être négocié en ce moment. Ces études de cas sont précédés d'une introduction qui expose le contexte plus large de la relation historique et contemporaine du Québec au béton, ainsi qu'un premier chapitre qui décrit les développements plus larges de l'histoire culturelle du béton à l'échelle internationale, tout particulièrement son rôle fondamental dans les premières articulations de l'architecture moderniste.

D'une part, cette recherche historicise la panique morale contemporaine autour du matériau de la modernité à Montréal, et, d'autre part, contextualise et illustre les manières dont le béton a acquis d'importantes connotations symboliques au Québec. Grâce à cette analyse en profondeur de l'économie sémantique du béton au Québec, ma thèse de doctorat illustre les qualités médiatrices – importantes, mais souvent négligées – de l'environnement urbain, informées par une tension structurante entre les articulations utopiques du futur et les résidus culturels et architecturaux du passé.

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I want to thank all of my friends for helping me maintain a level of sanity throughout this experience. I won't name names out of fear that I will forget someone, but if you are reading this, chances are you are one of them. I cannot imagine the last three years without any of you. I also want to thank Marc, for making this last year of writing a happy one.

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Finally, at the risk of sounding sentimental, I'd like to thank Montreal, the city that I called home for sixteen years and whose potholed streets inspired this work.

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Introduction

Despite a noble pedigree stretching back to Classical antiquity, concrete is today most often associated with the problems of modernity: the environmental degradation wrought by industrialization; the decrepit infrastructure of the welfare state; the slum-like housing projects of the "concrete jungle;" and an amnesiac modernist architecture hostile to history and sentiment. We may add, to this, the cement industry's poor environmental record and its association with an increasingly unsustainable car-culture. The association between reinforced concrete and the utopic, almost mythic revolutionary powers attributed to it following its invention in the late nineteenth century has eroded to the point where, in the contemporary imagination, concrete (and its sometime-synonym, cement[1]) looms large as the cold and lifeless material of "squat Soviet-style blocks full of bureaucrats" (Kingwell, 2008: 4), the crumbling skin of the city that signals a deeper urban decay. All of this is despite what Croft (2004) describes as concrete's recent "rehabilitation" (8) as industrial chic, characterized by the wider reclamation of post-industrial buildings as high-end domestic spaces.

Reasons for today's general antipathy towards concrete are wide and varied. As Forty (2012) suggests, "an element of revulsion seems to be a permanent, structural feature of the material" (10). Similarly, Mark Kingwell (2008) proposes that concrete is the "material people love to hate, for reasons lodged often in

[1] While they are used interchangeably in much of the literature, it would be useful here to clarify the main distinctions between concrete and its constituent element, cement. Essentially, cement is a powder made from calcined lime and clay that, along with water, becomes the binding paste in the creation of concrete, along with a mixture of aggregates such as crushed stone, gravel, or sand. this is given a higher tensile strength in reinforced concrete through the addition of metal rebar.

conventional disregard and a prejudice for more 'natural' materials" (4). But concrete is 'natural': despite its industrialization over the past century and a half, in its most basic combination of limestone, water, clay, fire, and human labour, concrete is elemental. It is only the human effort needed in its alchemy, and later in its mass synthesis and production, that distinguishes it from more 'traditional' or 'pure' materials such as wood and stone. In this way, concrete belongs to the "Promethean Project" of modernity, described by Maria Kaika (2005) as "the historical geographical process that started with industrialization and urbanization and aimed at taming and controlling nature through technology, human labor, and capital investment" (5). This understanding of concrete in opposition to an untouched, pre-industrial nature is exacerbated by the industry's poor environmental record,[2] and accounts for much contemporary hostility towards the material.

Related to this, concrete's ubiquity is another of the criticisms frequently leveled at the material; second only to water, concrete is the most consumed material in the world, with roughly three tonnes produced for every person on the planet each year (Forty 2012, inside front cover), a number that is only set to

[2] The cement industry is responsible for 5% of the world's $C0_2$ emissions. And while not directly responsible for it, because of its role in the construction of roads, bridges, and freeways, concrete is also linked to the pollution caused by the automobile industry, which contributes roughly 20% of the world's greenhouse gasses (CBC "Dispatches," 2011). Furthermore, as Forty (2013) points out, "Construction debris and demolition waste is estimated to contribute between 25 and 50 per cent of all municipal solid waste in Europe" (76). Concrete waste is not easily recycled and so usually ends up as landfill. In addition, the hard surfaces created by concrete contribute significantly to surface runoff and lead to soil erosion and water pollution; and finally, concrete dust generated by demolition or earthquakes is also a source of air pollution.

increase.[3] A global codimmodity, traded in much the same way as oil worldwide (Forty 2012, 101), and often blamed for a homogenization of local architecture through its widespread adoption by modernist architecture in the early to mid-twentieth century, concrete's history is nonetheless intrinsically bound up with particular national histories. Different countries lay claim to its invention,[4] and its particular associations shift significantly depending on the particular context, tracing generational as well as geopolitical affiliations. While it was associated during the early years of the twentieth century with its development and use in European engineering (in distinction to the United States' preference for steel), concrete became increasingly associated with the modernization of the Americas as the century progressed: as the Cuban writer Alejo Carpentier wrote in 1975, he and his contemporaries in Latin America "had an unusual destiny that would suffice, in and of itself, to distinguish them from Europeans: they were born, brought up, and they came of age in relation to reinforced concrete" (quoted in Gallo 2005, 169).

Despite Montreal's much-lauded old world, European charm, the city—from the industrial port that helped to establish Montreal as Canada's Metropolis in the early twentieth century, to the infamous "Underground City," to the spaghetti junctions connecting the island to its suburban *banlieus*—is overwhelmingly,

[3] 90% of the world's output now consumed by developing countries and emerging markets, creating revenues of over $250 billion a year for the world's cement makers (*The Economist* "Ready-mixed fortunes" 2013). Vaclav Smil (2013) illustrates this increasing demand for concrete through the example of China: "consumption of cement in the USA totalled about 4.56 Gt during the entire twentieth century – while China emplaced more cement (4.9 Gt) in new construction in just three years between 2008 and 2010, and in the three years between 2009 and 2011 it used even more, 5.5 Gt" (227).

[4] For example, while France has repeatedly claimed cement and reinforced concrete as a French invention (Forty 2012, 104), the first patent for Portland cement can be traced to the British bricklayer, Joseph Aspdin, in 1824.

explicitly concrete. Once a potent symbol of the future, and of the promises and optimism of Montreal's modernity, concrete since taken on contradictory associations, as older buildings and infrastructure reach the end of their lifespan, often prematurely, and begin to threaten the city with collapse, decay, and obsolescence. Several major incidents involving aging and badly maintained concrete infrastructure have reinforced a sense of danger and imminent disaster around the material, leading to headlines such as the national magazine *Macleans'* "Montreal is Falling Down" (Gohier 2011), and "Montreal is a Disaster" (Patriquin 2009), which featured a cover image of the city skyline at night with the text "Montreal Is A Corrupt, Crumbling, Mob-Ridden Disgrace" **(Figure 1).** In these articles, the metonymy of crumbling concrete is used to link larger societal issues in the province such as failing infrastructure, collusion in the construction industry, corrupt municipal politics, the Montreal mafia, and the vagaries of Quebec nationalism.

This public and media discourse has created a moral panic around concrete in Quebec, wherein the material has come to take on larger symbolic connotations and is popularly understood as a real or perceived threat to societal interests and values. This is not to say that the danger is only imaginary: as Cohen (2002) specifies, "[c]alling something a 'moral panic' does not imply that this something does not exist or happened at all and that reaction is based on fantasy, hysteria, delusion and illusion or being duped by the powerful" (vii). To describe the reaction to the state of Quebec's concrete in terms of a moral panic is not to negate the very real danger that aging concrete poses; overpass collapses and falling concrete

girders are not figments of the collective imagination. However, it is important to contextualize how this threat has come to be mediated and foregrounded in the province to stand in for wider-ranging societal anxieties around how the project of modernity is both remembered and problematized in Quebec. Approaching public and media reaction to concrete in terms of a moral panic allows for an articulation of the social and cultural dimensions of the effects of a material often subsumed by a purely techno-rational discourse.

As Adrian Forty (2006) suggests, "It would appear that the objections to concrete [are] the objections to modernity itself—concrete just happens to be a particularly ubiquitous and vivid symbol of modernity" (38). This more general association between concrete and modernity is heightened and made more complicated in the context of Quebec, where modernity—closely imbricated with the nationalist project—is popularly understood to have come relatively late and all at once.[5] With this enduring connection in mind, the goal of this study is to provide a cultural history of Montreal's concrete as a technology through which particular cultural forms, aspirational politics, desires, and memory have been communicated and made visible within a wider negotiation with modernity over the last century. We will deal, as well, with how these meanings have shifted over time.

[5] This refers to the "*rattrapage"* ("catching up") thesis of Quebec historiography: that Quebec, held back for decades by the Duplessis government during *La Grande noirceur,* or "Great Darkness"—a time of religious conservatism—was suddenly catapulted into modernity during the Quiet Revolution of the 1960s. While this has been roundly criticized in the intervening years as a massive oversimplification which will be further examined in subsequent chapters, it remains the dominant ideology for thinking about the history and relationship between Quebec modernity and nationalism.

Coulé dans le béton : Montreal's history, in concrete

In Quebec, concrete is colloquially invoked in the popular expression "*coulé dans le béton.*" Though literally translated as "poured in the concrete," the idiom is roughly analogous to describing something as "cast in stone" in English, and refers to something definitive and unchanging (Office québécois de la langue française 2011). Despite the expression's connotations of stasis and continuity, the meanings and associations of concrete in the province have shifted significantly over the last century, from the promise of progress to the spectre of decay and obsolescence, a shorthand to convey a host of intersecting ideas about the contemporary state of the province's infrastructure, polity and society.

Throughout this slow erosion, one thing has remained constant: cement's long association with scandal in Montreal. In 1909, Max Aitken, (Lord Beaverbrook himself, pre-knighthood), a young Montreal financier, started buying up Canada's floundering cement companies,[6] and consolidated several of them into one company—headquartered in Montreal—called Canada Cement, achieving a near-monopoly on the industry in Canada. Soon after, Aitken was publically accused of making off with millions of dollars from the company's treasury. The accusations of irregularities in the merger and securities fraud were picked up extensively in the international news of the time, and the affair quickly became known as the "Canada Cement Scandal." (Poitras 2008, 35). Despite this inauspicious debut, concrete

[6] Overproduction, the result of both technological revolution and the subsequent establishment of new companies to supply the infrastructure boom of the early 1900s in Canada, as well as high transportation costs meant that Canada's early cement producers had to reduce prices to the degree that it was difficult to turn a profit. This was further exacerbated by the financial panic of 1907 and the industrial recession it initiated (Ross and Smith 2011, 449).

nonetheless quickly became the medium through which Montreal's modernity was forged; not ex nihilo like that more famous example of concrete modernity and nationalism, Brasilia, but in successive stages over the last century.

Concrete silos and factories, built in the early years of the twentieth century, drastically altered the built landscape and labour practices, international flows of capital and goods, and the demographics of the city as people from rural areas arrived in Montreal looking for work. The postwar building boom of the late 1950s and 1960s represents the next era of concrete modernity in Montreal. This period, known today as the Quiet Revolution, was a time of great political and societal change in Quebec, characterized by a rupture with the supremacy of the Catholic Church, an increase in statist initiatives and the growth of the sovereigntist political movement. During these years, an unprecedented amount of concrete was poured: massive urban renewal plans in Montreal led to the destruction of thousands of dwellings; entire neighbourhoods were torn down and paved over in order to make room for widened boulevards and vaunting new freeway overpasses; the metro system and adjoining "Underground City" were dug out and fortified; and Brutalist megastructures, such as Place Bonaventure and Habitat '67, were created in the fevered run-up to the Universal Exposition of 1967, or Expo'67.

By the early 1970s, redevelopment in the form of concrete towers and highway infrastructure began to face a backlash from communities fed up with the disruptive effects on neighbourhoods that these structures entailed, a backlash fortified by a growing heritage movement that considered these developments

hugely destructive to the city's architectural history.[7] The considerable expense and construction initiated for the new international airport in Mirabel just outside of Montreal in 1975, followed closely by the Olympic stadium's construction in 1976 (which was only paid off in 2006, leading to its nickname "The Big Owe") played a major role in turning public opinion against these projects, realized almost exclusively in exposed, reinforced concrete.

Over the last decade and a half, as Montreal's concrete infrastructure ages and begins to decay, the material of modernity has taken on decidedly anti-modern connotations; more often than not, the city's concrete infrastructure is described in the press as a scourge to progress and development. On a near-daily basis, local news pieces unfailingly contain at least one reference to the city's "crumbling infrastructure" or "falling slabs of concrete."[8] While many of these incidents are relatively minor, the intensification of these concerns is usually traced back to the De la Concorde overpass collapse, which occurred in 2006 just north of Montreal, in Laval, killing five people and injuring six. Though it was the most lethal and disastrous overpass collapse in recent memory, it was not unprecedented: in 2000, the Boulevard du Souvenir overpass in Laval collapsed into the roadway, killing one driver and injuring two.

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[7] The most famous example illustrative of this shift occurred in 1973 with the destruction of the Van Horne Mansion, a classic downtown greystone which, after much public outcry after plans were announced to destroy it, was bulldozed in the middle of the night in order to make way for a 16-storey concrete highrise in its place. This event sparked the creation of the heritage conservation group Save Montreal, formed in the interest of protecting historically significant architecture.

[8] To mark the New Year in 2014, *The Montreal Gazette* published an opinion piece entitled "Resolutions for a Quebec free of fear and falling concrete" (Schryer 2014), following closely on the heels of a month of exhaustive coverage over closures to the Champlain Bridge—the busiest bridge in Canada—because of a crack in a concrete beam.

Built in 1970 over Quebec's Autoroute 19, the De la Concorde overpass was projected to last seventy years. After the accident, the press reported that several motorists had called police up to an hour before the collapse to report falling concrete and cracks appearing in the road; thirty minutes before it fell, an official from Quebec's Ministry of Transport inspected the overpass and concluded there was no immediate danger, keeping the road open ("Quebec calls inquiry into deadly overpass collapse," CBC News 2006). This event, which links defective concrete with managerial incompetence on the part of the province, signalled the moment when many Montrealers began to lose faith in the integrity of the city's roads, as well as in the public officials charged with maintaining them. A public inquiry, the Johnson Commission, was initiated to look into the collapse; it found that the decrepit state of Quebec's highway system was a result of "widespread negligence" and "generalized irresponsibility" on the part of the Transport Department, but criminal charges were never laid. In July of 2014, Quebec's Order of Engineers declared 11 out of 12 investigations opened in the wake of the De la Concorde collapse closed, arguing that it was impossible to prove negligence on the part of an engineer for a project completed nearly half a century ago (Muise 2014).[9]

Since the De la Concorde overpass collapse, there has been a string of similar infrastructure malfunctions and concrete fatalities: in 2008, a concrete slab fell from the ceiling of a St. Laurent parking garage, killing Mahamat Saleh Khazali; in 2009,

[9] Despite this, the Order's investigations have led to an official disciplinary complaint against engineer Tiona Sanogo, a retired Transports Québec employee linked to repairs conducted on the overpass in 1992, wherein he noticed that supporting steel bars were improperly installed but did not follow up, leading to accusations that of two violations of Quebec's Professional Code (Muise 2014).

Léa Guilbeault was killed by a slab of concrete that fell eighteen stories from a downtown hotel while she dined at the restaurant below.[10] Less tragic but still spectacular events followed, such as the collapse in 2011 of a section of the Ville Marie tunnel, and the 2012 fall of a slab of concrete measuring approximately 8 by 12 metres from the roof of the Olympic Stadium's underground parking facility. From late 2013 to early 2014, the sudden appearance of a giant sinkhole on St-Catherine Street, daily closures to the Champlain Bridge because of a crack in one of its girders, and a chunk of "cosmetic" concrete falling from the Henri-Bourassa Avenue overpass[11] all helped to maintain a constant state of anxiety around the safety of the city's infrastructure, and led to a pervasive feeling that Montrealers were under siege by the city's concrete.

In explanations to the press about why Quebec's concrete has fared so badly, Saeed Mirza, a McGill University civil engineering professor often interviewed after such incidents, describes how the city's building boom of the 1960s and 1970s, with its overenthusiasm and rushed construction for major events like Expo 67 and the 1976 Summer Olympics, led to poor design choices and the use of inferior, overly permeable concrete: "During the lead up to Expo 67 (when Montreal hosted the World's Fair), a lot of our infrastructure was built in a hurry…We've been seeing lots of evidence of that lately with damage on the Champlain Bridge, the Turcot Interchange and overpasses everywhere" (Curtis and Ravensbergen 2014). In

[10]This event finally prompted Quebec's Régie du bâtiment to announce, in March 2013, long-awaited changes to the province's building safety code ("Making Montreal buildings safer: The legacy of Léa Guilbeault" *The Montreal Gazette*, March 18, 2013).
[11] This incident damaged several cars and prompted Transport Quebec to announce that they will be inspecting 200 structures in Montreal ("Falling 'cosmetic' concrete," CTV News 2014).

subsequent years, he continues, Quebec cut back on maintenance of infrastructure, allowing the concrete to deteriorate even faster.

The connection between these seemingly disparate issues—concrete, collusion, corruption, and poor planning—was made explicit in the bilingual play *Sexy Béton* ("Sexy Concrete"), created and performed in Montreal from 2009 to 2011 by the documentary theatre company Porte Parole. The play was a testament to the significance of the De la Concorde collapse and the unanswered questions it raised, even after the Johnson Public Inquiry Commission delivered its findings in 2007. The unlikely juxtaposition of the title, "sexy" with "*béton*," was taken from a column published in *La Presse* wherein the journalist lamented that issues surrounding infrastructure in the province were just not "sexy" enough to galvanize voters; in creating a narrative interweaving themes of political corruption and mafia involvement in the construction industry, Porte Parole attempted to address this lack of interest from the public. Highlighting the fact that the two major overpass collapses involved bridges named, respectively, Memory (Souvenir) and Harmony (Concorde), playwright Annabel Soutar implicitly linked the collapse to more systemic issues in the province. Here it is clear how the imagery of concrete in the province brings up broader issues about the state of contemporary society, as Soutar remembers asking herself "Is it possible that something broader than an overpass in Laval is crumbling in Quebec?" (Soutar 2011).

In a final example of the strong associations between crumbling concrete and politics in Quebec, it's significant that, in 2012, the local press dubbed the (now resigned) leader of the provincial sovereigntist Parti Québécois, and then-Premier of

the province, Pauline Marois, "*la dame de béton*," or the "Concrete Lady" (Laporte, 2012). Inspired by the nickname often given to Margaret Thatcher—the "Iron Lady"—the title was originally meant as a compliment to the beleaguered leader, a nod to her ability to stand firm in the face of significant criticism and challenges to her leadership (Laporte 2012). Unsurprisingly however, given both the state of the province's concrete and Marois' declining popularity, it did not take long for detractors to come up with the adjusted honorific "the Crumbling Concrete Lady" (Macpherson 2012) **(Figure 2)**. The new title proved prescient, as Marois' party (which had held a minority leadership since 2012), was defeated by the Liberals in April 2014, after calling an early election in an attempt to gain a majority government. Defeated in her own riding, Marois stepped down as PQ leader shortly thereafter.

These associations—between concrete, politics, danger, and failure—have been compounded in recent years by longstanding concerns about ties between the construction industry and the city's organized crime, as well as suspicious party financing for political parties awarding lucrative public works projects. Reports dating back to 2004 have raised concerns over Montreal's "closed" construction market, where the same firms were consistently awarded contracts, stating that the cost of construction was therefore inflated by upwards of 30 to 40% (Banerjee and Levesque 2012). After resisting public pressure for years, Liberal Premier Jean Charest finally conceded, in October of 2011, to hold a public inquiry into the management of public construction contracts and party financing (Séguin 2011). The Commission of Inquiry on the Awarding and Management of Public Contracts in

the Construction Industry, or The Charbonneau Commission as it is popularly known, had full powers to look into corruption in Quebec's construction industry from 1996 until 2011, and examined billions of dollars in public-sector contracts awarded by the province, municipalities and public entities such as Hydro-Québec under the leadership of two Parti Québécois premiers, Lucien Bouchard and Bernard Landry, as well as that of Charest himself. The Commission's mandate was in three parts: to examine the existence of schemes and, where appropriate, to paint a portrait of activities involving collusion and corruption in the provision and management of public contracts in the construction industry (including private organizations, government enterprises and municipalities) and to include any links with the financing of political parties; to paint a picture of possible organized crime infiltration in the construction industry; and to examine possible solutions and make recommendations establishing measures to identify, reduce and prevent collusion and corruption in awarding and managing public contracts in the construction industry (Charbonneau et al. 2014, 2).

In Quebec, the Charbonneau Commission, government corruption, and collusion between the construction industry and organized crime are all united through concrete. The material connects news photographs of crumbling overpasses and bridges with images drawn from Hollywood movies of mafia hitmen disposing of their victims with concrete shoes at the bottom of a lake.[12] This connection between organized crime and concrete is not hyperbolic in Quebec,

[12] Or "cement suits" in the case of the discovery of the concrete-encased body pulled out of Lake Ontario by Toronto Police in 2010, which was widely speculated to be the body of missing Montreal mafia kingpin Paolo Renda (the body was later identified as Quang Lu) (CityNews Toronto 2010).

where the "Montreal Mafia", led by the Rizzuto family, has been involved in the construction industry since at least the 1960s[13]. In fact, as a recent *Montreal Gazette* article pointed out, Nicolo Rizzuto's (the former patriarch of the Rizzuto family) first occupation when he arrived in Montreal from Italy in the mid-1950s was listed as a "*contracteur en ciment*," or cement contractor (Gyulai, 2014).

The Charbonneau Commission has only strengthened the associations between concrete and organized crime in Montreal. In September of 2012, former FBI agent Joseph Pistone told the Charbonneau Commission how the mafia operated by gaining control of construction labour unions, as well as by having a stake in raw materials companies such as cement and steel suppliers, as a way to squeeze out legitimate companies from municipal bids, as well as to maximize profit from awarded contracts. In February of 2013, construction scion, alleged mafia bagman and key witness in the Charbonneau Commission Nicolo Milioto made headlines when it was reported that his nickname "Mr. Sidewalk" came not only from his unfailing ability to snag municipal sidewalk contracts, but also from allegedly threatening to bury a city worker in concrete (Banerjee 2013). Testimonies such as these have led to a popular perception—voiced in many online comment sections of

[13]Rizzuto's contracting company, Grand Royal Asphalt Paving, was responsible for many municipal contracts in the city since the 1960s, including work for Expo 67 (Gyulai 2014).

local newspapers[14]—that the quality of cement in Montreal is similarly suspect, corrupted by its association with graft and organized crime.[15]

Allegations and investigations initiated by the Charbonneau Commission led to the resignation of three Quebec mayors over the course of less than a year.[16] Originally scheduled to present its findings by October 2013, the Commission has asked for two extensions, with the report now scheduled for release in November 2015. As a result of these delays and the expense involved (the Charbonneau Commission had a budget in excess of $1 million a month at its peak), the Commission itself has recently come under fire by some as yet another example of poor management and wasteful spending in the province (Macpherson 2014).

Research Question

My dissertation is predicated on Abbas's (1997) assertion that "[t]he built space of the city not only evokes financial progress and the spatial appropriations of power but also gives us cultural residues, dreams of the future, as well and

[14] For example, in the comments section of a *National Post* article "That's the way the city crumbles" from 2011, commenter Micheal T writes, "Just like everything in Quebec, the construction industry and the inspectors are corrupt" (Hamilton 2011a); in another article from the same paper in the same year entitled "What does the future hold for Montreal's fallen Olympic Stadium?", commenter Broke writes "If this structure is built out of concrete, it will destroy itself in another 30 years. Just like Quebec bridges and parking garages. Nobody has to do anything" (Hamilton 2011b).
[15] In another recent example from *The Montreal Gazette*, police raided the offices of Garnier construction, and its subcontracted companies Saramac and Schokbéton, after it was alleged that the sister of a top Quebec Liberal Party fundraiser received prefabricated concrete that were apparently destined to be part of the AMT's (Agence métropolitaine de transport) rail line from Mascouche to Montreal, so that she could build a patio around her swimming pool. (Magder 2014).
[16] Gerald Tremblay and Michael Applebaum of Montreal and Gilles Vaillancourt of Laval all resigned under allegations of corruption and arrest charges for fraud and breach of trust. (Perreaux and Peritz 2013); Tremblay resigned in November of 2012 amid a host of corruption and collusion allegations, from campaign spending fraud to mafia kickbacks ("Montreal mayor's party got kickbacks, contractor says," CBC News 2012); and interim-mayor Appelbaum resigned in June 2013 after his arrest on 14 charges stemming from two real estate deals in the west-end borough of Côte-des-Neiges—Notre-Dame-de-Grâce (Woods and Sher 2013).

intimations of resistance" (79-80). Concrete—omnipresent through its use in high-rises, factories, sidewalks, roads, and monuments—is here understood as the prime (and often overlooked) material through which these cultural forms have been reified and communicated over the last century. As such, the current study foregrounds concrete as not only the material of modernity, but also as a "medium, through which all sorts of ideas, some of them architectural, have been communicated" (Forty 2012, 10). With this understanding in mind, this project asks how the material, symbolic, political and discursive constructions of concrete have both formed by, and given form to, articulations of Montreal's (crumbling) modernity, as well as that of Quebec more generally, over the last century.

Thinking of concrete as a medium entails a wider understanding of architecture as itself a form of communication over time and space. As Mark Wigley (2001) maintains, in reference to Le Corbusier's famous statement, "*Architecture is in the telephone and the Parthenon*," it is not

> that the telephone is now to be thought of as a beautiful object available for appropriation by the detached eye. Rather, the Parthenon has to be thought of as a system of communication like the telephone. And the telephone has to be thought of as a means of production of space like the Parthenon (27-28).

As a means of the production of space and a system of communication, architecture has been profoundly affected by unprecedented growth of concrete construction over the last century. As Rubén Gallo (2005) describes, much in the manner that "cameras, typewriters, and radio broadcasting introduced mechanical

mediation into visual textual, and aural representation, cement…mechanized the language of architecture" (170).

While the changes that concrete introduced to architectural forms and typologies make up an important component of the medium's history, it is also true that concrete is not limited to the confines of architecture. Since its rediscovery in the nineteenth century, concrete been positioned at the complicated nexus of sometimes complementary, but often competing agendas between architects, entrepreneurs, engineers, urban developers, and municipal authorities. As such, it has figured as a key node through which these intersecting fields negotiate and articulate their disciplinary boundaries.

Urban concrete is often understood as antithetical to communication in the city. Unlike the heroic towers of metal skyscrapers such as the Eiffel Tower or Empire State building, whose spires have been used for radio and television broadcasting for decades, concrete megastructures and infrastructure are more often blamed for blocking wireless internet signals, creating dead zones that challenge digital communications. However, as the most common material of the built urban environment, concrete plays a key role in our experience of the city itself as a type of media, whose "networks transmit information (telephone, radio, television) or energy (water supply, electricity, highway), [and therefore] all represent forms of information" (Kittler 1996, 718). The simultaneity and coexistence of these networks, in the modern era, is made possible and given material significance by the concrete infrastructure of hydroelectric plants, sewers, bridges, and data centres used to house computer systems and telecommunications.

As a media of communication, concrete plays a constitutive role in the articulation of the city as a process of metabolic circulatory flows and socio-natural networks wherein 'raw' material is transformed and thus transforms human labour and society (Swyngedouw 2006). Though normally dismissed as simply the backbone, the raw materiality, that enables more complex technological processes and informational flows (thus reiterating the Cartesian split between the body and the mind; 'dumb' matter and the transcendent spirit), concrete is best understood as an ambiguous, "hybrid" (Latour, 1993) media which operates between the poles of nature/culture while also calling their original separation into question. This understanding of the fusing of the social and the natural as a result of modern urban development, often articulated in terms of Haraway's "cyborg" (1991) or Latour's "hybrid" is, as Swyngedouw points out, somewhat paradoxical as it seeks to undermine modernist systems of purification that consider culture and nature as a priori distinct ontological realms while also reaffirming the distinction through the implication of "a process of 'dirty' mixing, an ambiguous fusion of things that can be ontologically separated and 'purified'" (113). Concrete, through its mixing of the human and the non-human, its connotations of the primordial and the synthetic, simultaneously stone and liquid, speaks to this "always already" of urban heterogeneity and its co-constitution with an invention of nature.

Concrete, with its simultaneous aspirations to permanence and susceptibility to premature decay, must be understood as a medium that not only alters our understanding of built urban space, but one that, fundamentally and unpredictably, alters the relationship between space and time in the city, introducing new rhythms

of production, circulation, accumulation, and dissolution. As such, it functions to productively muddy what Harold Innis describes as a given society's "bias of communication" (2006), which distinguishes between media that are inherently space-binding (lightweight media such as the newspaper that unite people over great distances, but are ephemeral and thus not ideal for communication over history) and time-binding media (durable and generally immobile technologies such as architecture, which, because of their durability, are ideal at communication over time but not over great distances). Concrete infrastructure links massive distances over short periods of time, and promises almost instantaneous communication; however, in its relative durability, concrete buildings and infrastructure are also able to communicate through history. This tension—between unprecedented speed and slow erosion, between movement and stasis—undergirds and informs the way in which concrete communicates. The nature of this communication in Montreal, what is transmitted through and with concrete, and how this comes to be altered through the passing of time, is the subject of this study.

While an understanding of concrete as a medium of modernity is predicated on the material's universalizing pretensions, this study foregrounds the notion that the particularities of concrete as a medium—that is, what and how it communicates over time—are contingent on the particularities of history and geopolitics. As a result, unlike studies such as Forty's (2012) and others (Koren 2012; Simonnet 2005; Smil 2013) that foreground the material as a global phenomenon, this study interrogates the mediating role of concrete in Montreal in particular as a vector through which cultural forms, aspirational politics, desires, and memory are

consistently renegotiated and reified. Quebec, a nation that has in many ways bulwarked its claims to nationhood and independence through its concrete infrastructure, presents a particularly rich abundance of examples for the analysis of the material's similarly ambiguous and dynamic heritage.

Concrete and Time

Concrete, like stone or other long-lasting architectural materials, partakes in the relative *longue durée* of architecture as a communications medium, what Vincent Scully has described as the "continuing dialogue between generations that creates an environment across time." (quoted in Kingwell 2008, 19). Of course, as the case of Montreal makes clear, concrete is not impervious to the ravages of time; despite its early promulgation as a permanent solution to decay and obsolescence, the last century has shown that concrete does in fact age, sometimes spectacularly. Reactions to aging concrete are quite distinct from those accorded to historically more "noble" materials such as stone, wood, and brick, which tend to accrue greater admiration over time, their marks of age described in terms of a respectable patina. In contrast, aging reinforced concrete is more often than not described in terms of a crisis of infrastructure or urban decay: its unsettling hairline fractures and splotchy water infiltration likened to a "concrete cancer." The violent protrusion of rusty rebar[17] bones through porous concrete skin evokes a violent and anthropomorphic deterioration quite unlike the quiet contemplation of the ruins immortalized by Piranesi in the eighteenth century.

[17] "Rebar" refers to the steel reinforcing rod in concrete.

Furthermore, concrete's breakdown over time is often unpredictable and incomplete; despite a badly weathered surface, a reinforced concrete structure put up decades ago is often too expensive to raze completely, requiring a controlled demolition and explosives. As a result, it is often more cost-effective to repurpose concrete megastructures for new needs and users vastly different from those the building was originally conceived for. These structures thus function as "residual media" on the urban landscape, what Acland (2007), drawing on Raymond Williams's configuration of dominant, residual, and emergent media, describes as "effectively formed in the past, but … still active in the cultural process, not only and often not at all as an element of the past, but as an effective element of the present" (xxi). Because of the massive scale of many of these undertakings, such concrete retrofittings are often the subject of much municipal handwringing and public reflection over what sort of needs and community such a building should address; as such, they function as a type of cultural touchstone for contemporary debates about the relationship between society and the built environment.

Thinking through the erosion of concrete creates a new model for imagining the role of memory in the city, a role often described narrowly in terms of Pierre Nora's (1989) distinct *lieux des memoires*, or in terms of sites of intentional commemoration such as memorials and monuments. Here, I propose that the memory of place is not solely to be found in the buildings and sites connected to historic events, but is also evocatively linked through the texture of the city's surface, the rhythms of its various chronologies and (dis)continuities imprinted on its changing skin. It is only in the slow break-down and decay of this surface that

concrete, almost invisible in its ubiquity, begins to assert itself on conscious perception, in what Martin Heidegger (1962) characterizes as the move from the ready-to-hand (an object made invisible by its utility) to the present-at-hand, and its attendant capability to "announce the environment afresh" (105). The very process of decay makes concrete an evocative object; a site of embedded memory that is released in partial, often contradictory ways.

Given the long-established role and significance of memory discourse in the contested province/nation of Quebec, the visibility of aging concrete in Montreal provides is especially compelling, as its decay functions as a physical, omnipresent reminder of the past within the present. The burden of memory—an imperative to remember historical struggles as a way of defining and preserving a minority culture under threat from American and Anglo-Canadian hegemony—is frequently invoked in Quebecois culture, made perhaps most explicit through the motto on the provincial license plate, "*Je me souviens*"—I remember. The visibility of concrete's entropy foregrounds the ambivalent and contested memory of the national project in the present, which despite two failed referenda on Quebec sovereignty,[18] remains a going concern. Given this background, Montreal provides a fitting laboratory for the study of concrete as a type of palimpsest, registering the city's changing iterations and investments in particular futures.

[18] The two Quebec referenda on sovereignty took place in 1980 and 1995; in the former, the "No" vote (those voting against sovereignty) won by a wider margin of 59.56%, while in the latter, the "No" side squeaked by with only 50.58% of the vote.

Methodology

My research uses a case study methodology as a way to chart the shifting stakes and discourses surrounding concrete and modernity in Montreal over the last century. The cases to be analyzed are Silo No. 5, a grain elevator built in 1910, the Turcot Interchange, completed in 1967, and the Olympic Park, built for the 1976 Games. As case studies, each site represents different eras and concerns in the history of concrete construction, infrastructure design and urban planning in Montreal and Quebec. As they all stand today in various states of obsolescence, under review as to how they should be variously redesigned, retrofitted, or redeveloped, they reveal the evolution of thinking about urban space in Montreal, as well as the inherent biases of the present in its assignation of value to the past.

In all of the discussions and consultations around their redevelopment, the materiality of the structures as concrete is figured and mobilized in a multitude of different, often contradictory ways; as such, these debates help to illuminate how our built environment is assigned and conveys meaning, and how this meaning comes to be altered through time. Through an analysis of the changing representations of these concrete sites in news media, photography, installation art, performance, television, and film, my project foregrounds the important and mutually constitutive role that concrete and more traditional media technologies have played in constructing visions of modernity and urbanity whose legacy we continue to negotiate in the present.

Chapter Outline

Chapter 1: Histories

This chapter sets out the wider cultural history of modern concrete's development as the most common construction material over the last century in order to contextualize the Montreal case studies that follow. This includes the development of Portland cement and reinforced concrete, as well as their use and promulgation in patented building systems and the printed press in both the United States and Europe during the early twentieth century. Further to this, concrete's imbrication with early articulations of modernism and an emphasis on asceticism and abstention from ornament, as well as a focus on concrete's monolithic potential are discussed as foundational to formulations of what come to be thought of as the material's correct and incorrect use. These materialist articulations, I contend, are intricately bound up with a contemporaneous hostility to history and the idea of architectural "traces" as part of a wider revolutionary project of radical built obsolescence. In the period after World War II, the ideological associations of concrete architecture came increasingly to be tied to the creation of new public infrastructure and social housing in the Americas as well as the USSR. As a result of this, as well as concrete's use in Brutalist architecture, this chapter shows how contemporary concrete architecture has increasingly been tied to the supposed failures of the welfare state and the modernist project more generally. Concrete's early advertisement as a "permanent" material, as well as its much-reported inability to ruin are explored in order to contextualize contemporary revulsion to

aging concrete, as well as a concomitant, potentially reactive "ruinophilia" for the ruins of industrialism.

Chapter 2: Concrete Foundations: Silo no. 5

As the last of the original silos of the industrial port which helped establish Montreal as the largest grain-handling port in the world by 1921 (Gilliland 2001, 94), Silo no. 5 is representative of Montreal's first wave of industrialization and modernization, marking the moment that the city became the metropolis of Canada, and its entry into international trade routes. This structure, the oldest parts of which were constructed between 1903 and 1906, along with its now-demolished contemporaries Silos no. 1 and 2, represents the first contact Montrealers would have had with large-scale concrete construction, which was largely unwelcome, as the silos blocked the view of the St-Lawrence River from the city. Over the years, the Silos, abandoned since 1994, have taken on a variety of connotations, from a beacon of modernism praised by the likes of Le Corbusier, to an industrial eyesore, to an obsolete monstrosity, and most recently, to its current value as a heritage monument suitable for the revitalization of the post-industrial port. This chapter probes the changing meaning of the Silo over the last century, and asks how its representation in everything from early postcards to contemporary artistic installations has shaped public perception and, to varying degrees, consecrated its concrete so that it has come to be considered suitable for rehabilitation as an international landmark.

Chapter 3: Concrete Honeymoon: The Turcot Interchange

The "Turcot" as it is unaffectionately known to rush-hour commuters, is a stacked freeway hub that links traffic flowing North-South and East-West through Autoroutes 15, 20, and 720. Like so much of the city's transportation infrastructure, the Turcot was built in anticipation of Expo 1967. The now-badly decaying structure represents the era in Montreal's concrete modernity subsequent to the early industrialism of the silo: the postwar building boom of the late 1950s and 1960s. Much of the anxiety around the Turcot today is articulated as concerns around the state of the concrete, which is crumbling in many areas. While plans were announced to rebuild the interchange in 2007, they have been stalled several times due to controversy over the redesign and expense. The project has also been slowed and complicated due to investigations by the Charbonneau Commission into some of the bidding firms, and is now set for completion in 2020.

The era of the Turcot's construction marks the pinnacle of Quebec's love of concrete megastructures: during the 1960s, new concrete infrastructure and high-rises sprung up at an unprecedented rate in downtown Montreal, while concrete highways were created to move commuters from the core to the peripheries. While the Turcot was once an iconic symbol of a bold new Quebecois perspective and confidence, it has since become associated with the post-industrial "anxious landscape" (Picon 2000) of the present, a marker not of progress but of entropy. This chapter explores the utopic vision immortalized in the Turcot's vaunting concrete, as well as the ways in which the anxiety generated by technological ruins

such as the interchange function differently from the nostalgia elicited by industrial ruins such as Silo no. 5.

Chapter 4: Concrete Hangover: The Olympic Park

Montreal's Olympic Park is perhaps the city's most controversial concrete structure out of the three case studies, and has been since well before construction began in 1972 for the summer Games of 1976. Designed by French architect Roger Taillibert, the park includes the 56,000-seat stadium, the tower, the swimming pool, and the Velodrome, converted in 1992 into the Montreal Biodome. Described today in popular media as a "concrete wasteland" (Hamilton, 2011), the material of the stadium has come to symbolize both physical danger (after several high-profile concrete collapses) as well as the wider failure of the stadium to generate revenue. Nicknamed "The Big Owe" because of a skyrocketing price tag that took three decades to pay off, the Régie des installations olympiques (RIO) announced in the summer of 2011 that it is appointing an advisory committee to hold public consultations into the park's immediate and long-term future. Concrete has been positioned as both the primary obstacle for the Park's physical and social integration into the neighbouring community, as well as a challenge to its hypothetical destruction, which because of the sheer amount of reinforced concrete, would be very costly.

This chapter will explore the history of the site, as the choice to build the stadium out of concrete—as well as Mayor Jean Drapeau choice of architect—was problematized before construction even began. Throughout the long and

contentious process of the stadium's construction both before and after the Games, its concrete gradually took on increasingly negative associations, linked to the perceived megalomania of the mayor, the chauvinism of its French architect, managerial incompetence, and a loss of optimism in Montreal around the large-scale redevelopment of the city. While often discussed in terms of the future, the stadium is marked by a contradictory nostalgia for the knowable failures of the past, from the loss of the Expos baseball team in 2004, to the ongoing saga of its malfunctioning retractable roof. Because of the challenges posed by the actual concrete of the site, the Olympic Park presents an especially compelling case study in terms of how the present is forced to reckon with the remains of the past.

CHAPTER 1: HISTORIES

A Brief History of Concrete

As Peter Collins noted in 1959, most discourses on concrete (including the present) begin with "a standard—one might say ritual—phrase" (19), wherein the writer evokes concrete's use as far back as antiquity: for example, in the dome of the Pantheon. This is not to imply that such a distinguished materialist heritage is not important; the problem with these prologues is that they tend to subsume discussions of concrete's modern applications within a vague narrative of either progress or decline (depending on the author's perspective), without adequately acknowledging the vastly different uses, scale and significance that concrete holds in the present. Furthermore, in attempting to furnish the material with a prestigious lineage, such accounts tend to reinforce received opinion that the study of modern concrete is somehow inadequate or insignificant in its own right. This, despite the fact that it is really in the modern era, from the development and standardization of Portland cement (or OPC for 'Ordinary Portland Cement') and then reinforced concrete in the mid-nineteenth to early twentieth century, that concrete begins its contentious reign as the world's most popular, and most divisive, building material.

During the eighteenth and nineteenth centuries, locally-sourced natural cements, produced by mining and burning naturally occurring mixtures of limestone and clay, were widely used, primarily in masonry and plastering. The development of Portland cement—now the standard ingredient in the manufacture of modern concrete—is traced back to 1824, when Joseph Aspdin, a bricklayer and mason from Leeds, took out a British patent on a new type of cement, so named because of its

resemblance, when set, to the prestigious limestone found in Portland, England. Despite its status today as the industry standard in the fabrication of concrete, the Portland cement industry took a long time to flourish, partly because of the popularity of natural cements, which, though not as hard or rigid as Portland cement and widely variable in terms of quality and consistency, were easier to manufacture and distribute. The eventual success of Portland cement is variously attributed today to the standardization of its quality, its innate hydraulicity (that is, its ability to set in water, a considerably important factor in many large-scale engineering works such as canals and bridges), and its suitability, given its longer set time and higher rigidity and strength, to the manufacture of concrete, an industry that itself took on a new significance after the discovery of reinforced concrete twenty years after the development of Portland cement.

Similar to the speculative and haphazard discovery of artificial hydraulic cements decades earlier, the invention and subsequent development of reinforced concrete was the domain not of architects but of engineers, industrialists, general contractors and entrepreneurs. The parentage of today's ferroconcrete is somewhat contentious: William Wilkinson took out a British patent in 1854 for concrete given a higher tensile strength using iron rods (Sutherland 2001, 67); *ferciment* made an appearance in France in 1855 with Joseph-Louis Lambot's concrete boat, followed soon after by a patent by his fellow Frenchman, gardener Joseph Monier, in 1867, for iron-reinforced troughs for horticulture (Charley 2004, 195). However, it was not until reinforced concrete's wider application in industrial construction through

proprietary building systems in the late nineteenth century that the still-experimental technique began to be widely used in architecture.

Two of these early methods were particularly influential: that of Belgian/French engineer and contractor François Hennebique, first patented in 1892, and that of British-born, American architect and engineer Earnest L. Ransome, first patented in 1884. Clients or architects wanting to construct a concrete building would hire firms such as these to design and often build the structure according to their patented system, which gave the process some credibility in the absence of any codes or standards for reinforced concrete construction prior to 1904 (Forty 2012, 19).

What was especially novel and important about these early figures in the history of reinforced concrete was their keen understanding of the role of media, in particular photography, in the dissemination and wider acceptance of concrete construction over contemporaneous construction technologies using iron and steel. Trade publications and illustrated architectural magazines began to gain great popularity in the last quarter of the nineteenth century, and publications originating in the United States and Europe found a market in Canada as well, which soon began printing its own publications.[19] In 1898, Hennebique launched the periodical *Le Béton Armé*, which ran until 1939, intended for contractors and concessionaires but

[19] Facilitated by rail travel, and generated in part by the architectural developments going on in Chicago and the Midwest, urban centres such as Toronto experienced sufficient demand for such publications that by 1888, it had its own architectural periodical in the form of the monthly publication of the *Canadian Architect and Builder* (Arthur 2003, 163), which ran until 1908. In 1907, the monthly publication *Construction: A Journal for the Architectural Engineering and Contracting Interests of Canada* was launched in Toronto by the Consolidated Press, and this publication ran until 1934. These journals tended to be well-illustrated and showed photographs of individual buildings alongside lengthy articles detailing construction technologies and materials.

also aiming to influence potential clients. Every month, the journal would run photographs of in-progress or completed concrete buildings constructed using his patented method. Most popular with Hennebique were those images showing buildings that had survived various calamities, usually fires or earthquakes, and thus testified to the superiority of his reinforced concrete system, which integrated previously separate elements such as the column and the beam in a single monolithic construction. Between the journal, the trade conferences Hennebique organized, and the drawings created by his *bureau d'études*, the firm's output was so prodigious that Forty (2012) suggests "[w]hat Hennebique produced were not buildings, but images of buildings, whether production drawings, or photographs of completed buildings for public circulation" (20).

Despite the popularity of Hennebique's method in Europe (by 1905 he controlled one fifth of the reinforced concrete market internationally) (Forty 2012, 18), it was not realistic for the North American context, where a relative lack of skilled concrete labourers and higher wages meant that even with the money saved in fireproofing and insurance, his intensive monolithic construction method would have been too costly (Raafat 1958, 31). Ernest L. Ransome developed a simpler method of construction with ferroconcrete, twisting the metal reinforcing rods in order to heighten the material's tensile strength, and streamlining the actual building design as a way to cut down on labour. In creating a strong, fireproof concrete frame and exposed slab floors whose non load-bearing exterior walls were able to feature large windows, Ransome created an industrial typology—the Daylight Factory—which was ideally suited to multistoried industrial architecture

and soon became the standard in American factory construction. In Montreal, while there are some early examples that reference the Hennebique method of concrete construction,[20] the majority of early twentieth century design drew on Ransome's Daylight Factory model, though the exterior cladding typically reflected a more traditional, ornamental design.

As Reyner Banham makes clear in *Concrete Atlantis* (1989), it was not until Ransome began to exploit the evidentiary function of disaster photography—like Hennebique—that his method gained real credibility within the US construction market. He gained national attention in 1902 after a building that he designed and built out of reinforced concrete five years earlier—the East Coast plant of Pacific Coast Borax, at Bayonne, New Jersey—withstood a spectacular fire "so hot that steel twisted and iron melted into shapeless puddles on the floor…There could have been no more convincing demonstration of the virtues of the material…[as] the incontrovertible (and photographable) physical fact of the building's almost complete survival" (Banham 1989, 64).

The early photographic publicity for factories, warehouses and grain silos, designed and constructed by entrepreneurs such as Hennebique and Ransome, created what Legault (1992) describes as an "industrial iconography" (59). This iconography, which was founded on establishing reinforced concrete as a legitimate and superior building material, associated with rationalism, objectivity and calculation, was incredibly influential for a generation of European avant-garde

[20] Perhaps the best known example of this type of curvilinear architecture in Montreal using Hennibique's poured concrete method is the Edifice Joseph-Arthur-Godin, at the southwest corner of St-Laurent and Sherbrooke St. Built in 1914, this building, abandoned for years, is now restored and functions as a section of Hotel 10.

architects. By the 1920s, "[t]he building material was therefore empowered with properties which, going well beyond the simple constructional questions, indelibly participated in the universe of representations" (Legault, 1992, 58). In particular, proponents of concrete construction invested heavily in the representation of the material as permanent.

"Concrete for Permanence"

"No, it is concrete which is the most noble of materials—it is immortal…"

–Auguste Perret quoted in *Progressive Architecture* 1960, 142

Partly as a result of its lowly origins in utilitarian structures such as factories, foundations and drains, concrete construction has faced accusations of bad taste and an inherent ugliness since its rediscovery in the late nineteenth century. In response to this wider Victorian disdain for the fruits of industrialism, early cement and concrete entrepreneurs and enthusiasts stressed the material's innate durability through frequent, grandiose allusions to the cement of the Egyptian pyramids and Roman concrete constructions **(Figure 3)**. Slogans referencing time and permanence became the norm: for example, in an early issue of *The Cement Age*, an American trade publication for the industry which ran from 1904 to 1912, an advertisement for American Cement Co. shows the slogan "The Test of Time" (1904, np); twelve years later, when the Portland Cement Association of America was formed in 1916, it was with the tagline "Concrete for Permanence," reproduced in countless publications for decades to come. Claims to permanence, which were difficult to qualify given the material's still-experimental nature at the outset of the

twentieth century, were fleshed out in early trade publications through somewhat uneven references on the one hand to examples such as the coffered dome of the Pantheon (completed in 126 A.D. using materials and methods vastly different from those advertised at the turn of the twentieth century) and, on the other hand, photographs showing relatively recent concrete edifices, usually constructed within the previous decade, as proof of the material's immutability over time.[21] Images such as Hennebique and Ransome's, showing concrete structures that had survived disasters, were also popular to this end.

Despite the confidence of these early claims, they were usually cursory; the industry was careful instead to foreground the "eternal newness" (Forty 2012, 86) of concrete, and thus did not want to dwell at length on its historicity except as a way to shore up claims to permanence. So while concrete's immutability was emphasized on the one hand, so were its connotations of speed and flexibility; in *Cement Age* (1904), Robert W. Lesley writes rhapsodically that "It seems almost a philosophical thought that, in this age, when man changes and thought changes so quickly, the material representing the period is of a plastic and flexible nature" (np). Paradoxically—and perhaps unsustainably—the material was at once associated with ancient construction practices and the promises of a rapidly changing modernity.

In these claims to technological progress and the eradication of built obsolescence, images of classical concrete construction were often supported by

[21] Similarly, for the first year of its publication, *Cement Age* featured a monochromatic black and white illustration of the head of the Sphinx with the pyramids in the background on its cover, framing an inset image of either a contemporary example of concrete use or an abridged table of contents for the journal.

scientific-sounding discourse explaining, in lay terms, the chemical constitution of cement, such those reproduced in *Memories in Cement*, a booklet from 1909 which used illustrations showing "microscopic views" of cement and sand in order to solicit investment (**Figure 4**). Much was made of new applied testing methods for strength and resistance, often performed in collaboration between companies and new concrete engineering courses offered at universities, creating and regulating new "best practices" in construction, at the same time revolutionizing particular organizations of labour in construction as well as bringing a new level of uniformity to the built environment (Slaton, 2001, 2). In this way, the industry sought to dispel associations with the material's early experimental phase, prior to the introduction of engineering and construction standards, when a proliferation of badly conceived buildings subject to rapid deterioration saw concrete become "a synonym for streaked, cracked, shabby, decaying construction on the wrong side of the tracks and in the wrong part of town" (Huxtable 1960, 144).

Taste and Class: Concrete block and artificial stone

When concrete was finally admitted into the realm of domestic and public buildings in the early 1900s, subsequent to its experimental phase in industrial works, "it took on an even more dubious character, as 'artificial stone.'" (ibid). This imitative quality of concrete was, even more than its associations with utilitarianism and cost efficiency, its most damning property, and that which was described in the most moralistic terms. As artificial or imitation stone, concrete became the scourge of architects and engineers who railed against the "dishonesty" of techniques to

make concrete resemble stone or brickwork, either through bush-hammering monolithic surfaces to give the appearance of masonry, or through the use of cast concrete blocks and surface cladding.

The choice to disguise concrete as a more "noble" or historical material was derided as cowardly and unethical. As V.J. Elmont wrote in Canada's *Construction Journal* from 1913, "Many structures reveal the fact that both architects and engineers are afraid to let the reinforced concrete appear visible without any foreign embellishment. There is, in fact, a tendency to cling to the old forms, though no reason can be deduced why it should be forced into an unnatural imitation of stone buildings" (315). Arguments such as these placed an emphasis on trying to discern the so-called innate qualities of concrete in order to find "harmonious possibilities in conjunction with the purposes of utility and the monolithic character of the material" (316).

Questions of the proper and improper use of concrete often drew implicitly on established professional and class distinctions as one way to demarcate the field; within these discussions, the imitative qualities of concrete often came to stand in for a more general anxiety about the erosion of class distinctions. Simpson (1999) explains how "British writers in particular were alarmed not only by materials that imitated their betters, but by people who did so too" (161).

One of the main areas where this debate played out was in relation to concrete block, which became increasingly popular in North America during the first two decades of the 1900s. Thanks to the greater availability of high-quality, domestic Portland cement by about 1908 (Lynes 1954, 193), and the introduction of

affordable cement block pressing machines, middle-class do-it-yourselfers were able to cast their own blocks at home, sometimes setting up their own businesses selling the surplus they had created.[22] Using a machine advertised as "so simple a girl could use it" (Simpson 1999, 157),[23] amateurs were able to create fireproof structures which were promoted as more economical in the long run because they would last "practically forever" (ibid 17).

The scandal of concrete or cement blocks stems from the fact that not only did the material itself imitate its "betters" such as stone, but through the accessibility of the machine press, coupled with readily available building plans that instructed the untrained DIY-enthusiast on how to construct his own house or garage using these bricks, the layman similarly encroached on the professional realm of the architect and engineer. By 1907, the American Institute of Architects felt sufficiently compelled by the urgency of the situation to declare that, "while reinforced concrete had much to recommend it, concrete block did not and should be avoided" (Simpson 1999, 24). Despite this, concrete block construction did enjoy

[22] The Boyd Brothers of Ontario became so successful making these blocks on their own small machines that by 1907 they had opened their own plant and were selling so many of the blocks that they became known as "Boyd Block" in both Canada and the United States (Simpson, ?).
[23] While phrases like this were common, and stories about women using concrete are scarce, one article in *Cement World* (1908) reported how "Mrs. Mary Pollock [who] had just finished building a two-and-a-half-story [sic] concrete-block residence for herself and her husband in Cincinnati… Mrs. Pollock is just as deft at embroidery work, or making biscuits as she is in concrete work'" (quoted in Simpson, 156-157).

a modest popularity with architects[24] before being recuperated as the now ubiquitous cinderblock in the 1920s (ibid).[25]

Gilding the (Concrete) Lily: The role and refutation of Ornament

Great attempts were made by the Portland cement industry to dispel the idea that concrete was necessarily industrial or unsightly in its applications. *Beauty and Utility in Concrete*, a brochure published by the Chicago Portland Cement Co. in 1915 went to great lengths to explain how "concrete is almost an ideal material for ornamental uses and elaborate designs" (3) and used photographs of Frank Lloyd Wright's recently completed Midway Gardens in Chicago as an example of its aesthetic possibilities. The buildings and sculptures of the Midway were cast exclusively in concrete, despite the architect's professed ambivalence about the material.[26]

Concrete was advertised as suitable for all types of artistic and craft creations, from sculptures and elaborate architectural follies to garden ornaments. In promoting the beauty of concrete, the possibilities of ornamentation took on a great significance; for example, one of the advantages that concrete block

[24] For example, Halifax's Hydrostone neighbourhood, comprised of rowhouses constructed out of concrete block, was designed by the Montreal architectural firm of Ross and Macdonald after the explosion of 1917.
[25] Cinderblock, as Simpson (1999) explains, was introduced in the 1920s with the advent of new, lightweight aggregates, making it much less heavy than concrete block, and thus easier to handle and lay (27).
[26] As late as 1928, Frank Lloyd Wright denounced concrete as having 'neither son nor story; nor is it easy to see in this conglomerate a high esthetic property, because in itself it is amalgam, aggregrate, compound.' He preferred to call it 'Conglomerate'" (quoted in Huxtable 1966, 144). Wright was even more dismissive about concrete block: "There never was a more 'inferior' building material than was the old concrete block…The block was cheap imitation and abominable as material when not downright vicious. Every form of it undertook soon relegated it to the backyard of aesthetic oblivion" (quoted in Simpson (1999: 24); from Bruce Brooks Pfeiffer, ed., *Frank Lloyd Wright: Collected Writings : I:* 304(1992)).

construction offered to the consumer was the possibility of customization through the use of decorative inserts which could create blocks of varying colours and finishes, such as the incredibly popular "rockface," which simulated the texture of stone (obviously anathema to architects of the period).

In these debates about taste and beauty in concrete, the role of ornamentation was often implicitly linked to ideas of class and culture. While ornamentation had once been the exclusive and expensive privilege of the elite or upper class, and was used extensively in turn-of-the-century architecture as "an antidote [to the sterility of utilitarian design], articulating higher cultural values over bottom-line frugality" (Wright 2008, 27), industrialization and the greater accessibility of technologies such as the concrete block machine meant that there was suddenly a more democratized access to ornament in the early twentieth century (Simpson 1999, 2). During this period, from the late nineteenth to the early twentieth century, ornamentation became a marker not of privilege but of a bourgeois consumer class, and thus there was a concomitant shift in architecture and design towards a more stripped-down, minimalist style.

The most cogent and virulent articulation of this new disdain for ornamentation is the paean to asceticism written by Adolf Loos in 1908 (1971), wherein he famously describes how "the evolution of culture is synonymous with the removal of ornamentation from objects of everyday use" (20). Loos rails against ornamentation on a number of (sometimes contradictory) grounds: he links its creation to the exploitation of the working class while simultaneously dismissing a fondness for ornament as a regressive quality of the lower classes, as well as other,

'more primitive' cultures. Men of culture and refinement, Loos suggests, have no need of a retrograde "ornament disease;" art has ascended to take its place: "Freedom from ornament is a sign of spiritual strength" (24), Loos concludes.[27]

This shifting regard for ornament was extremely influential in the establishment of the modernist aesthetic as anti-aesthetic, and the "proper" handling of new concrete technologies played a determining role in its articulation. The general consensus that "[c]oncrete, to be practical, must be truthful" (Elmont 1913, 317) led to an explicit focus on finding techniques that took advantage of the material's plasticity and suitability to monolithic construction at the expense and disparagement of concrete's use in prefabricated, discrete units for assembly, such as the concrete block. Monolithic construction, which took advantage of concrete's distinct advantages over materials like brick and stone to create stronger seamless forms, was understood by the architectural establishment as the only respectable use for the material; the training and massive expense such construction entailed further ensured it would remain the undisputed property of a growing professional class.

Monolithic Concrete Construction

"The modernity of reinforced concrete has been represented architecturally in various ways, of which the original and most common has been *monolithism*"
–Adrian Forty 2013, 34 (emphasis in original)

[27] Loos was also morally opposed to the use of imitative materials in architecture. In "The Principle of Cladding," written in 1898, he reserves a special contempt for concrete: "One could cast St. Stefan's Tower in cement and erect it somewhere, but then it would not be a work of art… Poor [Heinrich von] Ferstel must have endured terrible agonies when they forced him at the last minute to nail an entire section of façade in poured cement onto his University" (Loos 1982, 66). Here Loos is referring to Ferstel's design of the University of Vienna's Main Building, which was built between 1877 and 1884.

In the early trade literature and architectural discourse surrounding concrete, the potential it holds for monolithic construction is on par with the importance of claims to permanence and fireproofing. It is articulated in many early publications as the saving grace of this otherwise utilitarian and purely functional material. The importance of monolithic construction was manifold: practically, it was thought that this type of construction, free of joints and seams, promised a cleaner, hermetic and "vermin-proof" environment. In addition, it was reasoned that through the creation of single-pour moulds that could be infinitely reused, this type of construction would create permanent concrete buildings with unprecedented speed and ease, leading to greater cost-efficiency and affordability.

One of the early interventions in the history of monolithic concrete construction for domestic purposes was made by Thomas Edison, who started the Edison Portland Cement Company in 1899.[28] In 1906, the famed inventor first announced his plans to design and build affordable concrete houses using a reusable mould and a single pour, as a method to address the poverty and overcrowding in American tenements,[29] a project he described in a press release at the time as "the salvation of the slum dweller" (Larned 1908, 268). Edison's announcement was the subject of much media attention and scepticism at the time, given his assertion that the entire house—including plumbing, stairs, decorative moulding, bathtubs and picture frames—would be entirely cast as one concrete monolith, accomplished in

[28] Edison's New Jersey company, which went on to supply the concrete for Yankee Stadium in 1922, was further influential in their development of the world's longest rotating kilns, which he subsequently licensed to other cement manufacturers ("Thomas Alva Edison and the Concrete Piano" 1980).

[29] The housing problem was largely the result of a massive influx of immigrants between the years of 1870 and 1920, where "some 20 million immigrants arrived in America," most of whom lived in "extreme poverty in overcrowded 'ghettos'" (Wright 2008, 50).

only a few hours, and that the whole house would not exceed $1200 (Larned 1908, 269). Perhaps not surprisingly given the complexity of the design and the stigma attached to living in a house designed for "slum dwellers," Edison's plans were not successful; as it turned out, the mould for the house required over two thousand cast-iron pieces, and an initial investment from interested builders of at least $175,000 in equipment (ibid). By 1910, Edison abandoned the project and, citing philanthropic reasons, made the patent freely available to any interested builders, of which there were considerably few.[30]

Like Hennebique's early concrete constructions, notably his famous apartment building in the rue Danton in Paris from 1892, Edison's houses mimicked the dominant style and form of the era, simulating masonry joints and discrete elements despite its monolithic nature (Bergdoll 2008, 15) (**Figure 5**). While monolithism was promoted as the ethical treatment of reinforced concrete from its earliest days, it did not fully emerge as an aesthetic until its subsequent adoption by the European modernist movement emerging in the 1920s.

Concrete Utopias: Modernism and *Béton Brut*

Though the development of concrete construction predates the articulation of modernism in architecture by a couple of decades, it is that movement—and the massive changes that it initiated in urban planning and built environment—with which it is most commonly associated, for better or worse. Here it is worth

[30] Several concrete houses were eventually built in 1917 by Frank Lambie and investor Charles Ingersoll in Union, New Jersey, where they remain and continue to be inhabited today ("Concrete Housing" 2015).

distinguishing between the terms *modernism* and *modernity*; though both terms are popularly linked to concrete in various ways, their connotations are distinct and should not be conflated. Modernity as we understand it today is often traced back to the 16th century and the work of the Renaissance Humanists (Toulmin, 1990: 25), which was further developed during the Enlightenment and the Scientific Revolution's skepticism towards tradition and superstition. Today it is commonly associated with wider sociological shifts over the last century (predominantly in the context of the west) such as secularization and urbanization. Though not unrelated, modernism (or Modernism), refers to the movement in art, literature, and more importantly for our purposes, architecture, which developed over the first three quarters of the twentieth century, and which is often understood "as a response, in the form of cultural tendencies and artistic movements, to the experience of modernity" (Doevendans and Schram, 2005: 31). In this way, modernism in architecture can be seen as a complex expression of the fundamental tensions and ambivalences of modernity, in particular the rapidly changing technologies and materials that it ushered in. The newly rediscovered concrete, and the emerging possibilities made possible by its reinforcement, are a key locus for the development and articulation of modernism in architecture and city planning.

While reinforced concrete construction was still largely scorned by the American architectural establishment as derivative, vulgar, and cheap, by 1910,[31]

[31] Wright (2008) describes how, upon his return from visiting the Ransome-designed United Shoe Machinery Company in Beverly, Massachusetts in 1910, the owner of Germany's Fagus Shoe-Last Company "presented Walter Gropius with photographs of Ransome's building" (54), which would serve as inspiration for the architect's subsequent design of the Fagus Factory, constructed between 1911 and 1913.

younger European architects were beginning to take a strong interest in these new utilitarian structures; by the early 1920s, "reinforced concrete acted as an index. Already then the mere presence of the building material seemed sufficient to qualify the modernity of architecture" (Legault, 1992, 61). The unprecedented plasticity, isotropic strength, and seamless monolithism made possible by reinforced concrete seemed to promise a renewal of architecture freed from what was increasingly being articulated by the architectural elite as the tyranny of ornamentation and historicist form (as well as their bourgeois associations).

Photographs of concrete American and Canadian factories and grain elevators, of the sort published in trade journals such as Hennebique's, were widely reproduced in works such as Gropius' *L'Esprit Nouveau* (1920) and Le Corbusier's *Vers une architecture* (1923), where they were rapturously described as the "magnificent first-fruits of the new age" (Le Corbusier, 2006: 33), capable of renewing "our expiring architecture" (ibid) with the calculations of new engineering practices. In these early manifestos, American engineers are described in effusive, somewhat condescending terms reminiscent of the "noble savage," whose constructions were idealistically thought to derive from a rigid emphasis on function over form.[32]

Early articulations of modernist architecture, such as those of Le Corbusier and Gropius, relied unquestioningly on an anachronistic dogmatism that promoted the inherent morality of one material over another. As a result, and paradoxically,

[32] This founding priniciple of modernism was built on a fallacy as many of these early engineers—Ransome included—did still adhere to many of the formal architectural conventions of the time, including the use of ornamentation, even in his factory designs (Banham 1986, 29).

both glass, because of its transparency, and concrete, with its closed hermeticism, were simultaneously held up as indicators of a new modernist honesty. For the architectural avant-garde of early twentieth century Europe, the new glass architecture—made possible by the greater load bearing capacity of reinforced concrete and the contemporary industrialization of sheet glass manufacturing—was understood to promise, quite literally, a completely novel politics of transparency and illumination, capable of wrenching the bourgeoisie out of the cozy trappings of their domestic bliss and false consciousness (McQuire, 2008: 162). Concrete, in its dual function as both structure and surface, was associated in this material economy with an honesty often described in didactic terms; in Le Corbusier's words, "[c]oncrete is a material that does not cheat; it replaces, it cuts out the need for that trickster, coating. 'Béton brut' says: I am concrete" (Potié, 2001: 102). This rigid orthodoxy for how concrete should be employed (monolithic, free of ornament or historic references, exposed structure as surface) would come to dominate the modernist and subsequent Brutalist aesthetic for decades, and accounts in large part for the vast amount of exposed concrete in urban centres to this day.

Modernist buildings designed during these early years were conceived of, in Le Corbusier's (2006) terms, as "machine[s] for living in" (151); brand-new 'cities in the sky' that promised to reduce overcrowding, increase light and air circulation, and introduce a higher quality of life. By ushering in heretofore unknown standards of hygiene (articulated in mutually inclusive physical and moral terms), these buildings were understood as medical and ideological panacea: able to arrest the spread of dangerous germs while simultaneously functioning as cures for the evils

of rapidly expanding urban centres. Through the standardization of these new materials, modernist architecture was international in its ambition. By 1923, critic Marie Dormoy had "announced the death of regionalism" (quoted in Legault, 1992, 61). As Robert Mallet-Stevens described three years later, "One builds the same way in Los Angeles as in Amsterdam, in Tokyo as in Paris. The requirements, the habits, the materials, are the same, thanks to reinforced concrete" (ibid). It is for this that concrete is often blamed today for the homogenization of urban centres and the erasure of local architectural characteristics.

"Erase the Traces!"

In its commitment to an idealized scientific rationalism, modernist architecture was explicitly hostile to what it characterized as a sentimental and backwards attachment to history, whether it be the individual's own or historicist references in architecture. These 'traces'—material or emotional ties that bind people to the past and thus the status quo—were famously invoked in Bertolt Brecht's lyric cycle from 1926, *Handbook for City-dwellers*, where he commands the reader to "erase the traces!", a sentiment echoed by Walter Benjamin in 1933 with his short essay "To Live Without Leaving Traces" (1999). The new modernist architecture of glass, concrete and steel, Benjamin wrote, had "created rooms in which it is hard to leave traces" and which, he declared "will transform humanity utterly" (701). In this sense, individual memory and a sentimental attachment to the past as represented through objects—be it photographs, heirlooms, or scuff marks

on walls—was understood as antithetical to the radically utopian promise of modernity and a future free of the fetters and inequities of the past.

Despite its foundational hostility to historicism and anti-monumentality, modernist architects were more ambiguous about the duration and longevity of their own work. Le Corbusier, reputedly influenced by Sant'Elia's *Futurist Manifesto* of 1914, wherein the author outlines how "[o]ur houses will last less time than we do. Every generation will have to make its own city anew" (Rainey et al. 2009, 18), described his own buildings as expendable machines not meant to last in perpetuity. Yet, by building almost exclusively in reinforced concrete—a material synonymous from its earliest marketing with a certain immutability and permanence—early modernists ensured that their buildings would likely outlive their architects.

Concrete's own susceptibility to weathering and the accumulation of traces was a rarely acknowledged, almost taboo fact. As Mostafavi and Leatherbarrow (1993) maintain, the temporal function of architecture was largely overlooked in part because of a modernist refusal to acknowledge the inevitable effects that weathering and time have on the surface and structure of a building: "the duration that is to follow the completion of the [modernist] building—the life of the building—is conceived as a subtraction from the ideal condition of the project realized before inhabitation and weathering" (82). Hence, they argue, modernism's fascination with photography as a method to capture this moment of the completed project before it's inevitable decline, and with reinforced concrete, promoted from its inception as always radically new, "so new that it has not yet happened, it belongs only in future time" (Forty 2012, 87).

Bad Memories—Brutalism

While the use of concrete in architecture was initially made acceptable by the International Style of modernist architecture during the 1920s and 1930s, it is the Brutalist style of the post-World War II period with which it has subsequently become synonymous. Rigidly non-decorative and utilitarian in appearance, Brutalist architecture is associated with a particularly fortress-like, imposingly institutional style and an inhospitable, often aggressively exposed concrete exterior. "Self-consciously ugly and ideologically generated" (Shonfield 2000, 3), Brutalism is a style that has greatly fallen out of favour over the last few decades and is often retrospectively understood as an ill-fated sociological experiment which put the pursuit of architectural integrity ahead of the needs or comfort of its users. However, there have been signs of a contemporary nostalgia and appreciation for the style, a contrarian impulse perhaps not in spite of, but because of its status as the unloved bête noire of modernism.[33]

Brutalism is often traced back to Le Corbusier's use of "*béton brut*" or rough-cast concrete, and takes as its founding principle the most dogmatic aspects of modernism's pursuit of "honesty" in monolithic construction (ibid, 7). Unlike Le Corbusier's unblemished white walls however, Brutalism embraced "the traces of contingencies and accidents, of human fallibility, and of the human hand" (Banham 1966, 16), often exaggerating the imprints made by the wooden formwork into

[33] Blogs and websites such as "Fuck Yeah Brutalism" (2010) and books such as *Concrete Toronto: A guidebook to concrete architecture from the fifties to the seventies* (2007) exemplify this renewed interest in Brutalist architecture.

which the concrete was poured, or bush-hammering it afterwards to give the impression of "corduroy concrete."[34]

This different handling of surface would seem to imply a shift in attitude towards "memory" in construction: as Réjean Legault (2006) writes about Pei's Everson Museum in Syracuse, New York, built in 1968, "In the final building…the horizontal traces of the pour waver on the surface of the walls, in an architectural version of Freud's 'return of the repressed'" (52). In a stark reaction to earlier modernism's hygiene of vision and asceticism, Brutalism explicitly celebrated concrete's more earthy, handicraft associations; as Paul Rudolphe famously described, "Concrete is mud. I work with concrete, not against it. I like mud." While this idea of concrete as mud, which Gissen (2009) writes, "contains notions of history; it embalms things and contains the past" (118) implies an embrace of concrete as a temporal register, Brutalism—similar to earlier articulations of modernism—was often more concerned with the appearance of honesty, and a primitivist aesthetic, than as an actual engagement with how future generations would engage with its bunker-like architecture.

Initially, it was thought that the rough surfaces provided by the Brutalist style would age better than the smooth finished concrete of early modernist icons, which were beginning to show unsightly staining and cracks by the 1950s. Rough-cast concrete was assumed to be much more forgiving of the detrimental effects of age and weathering (Forty 2012, 54), though time has not necessarily borne this

[34] This ribbed style of concrete is usually traced back to architect Paul Rudolph's initial employment of the technique for the Yale Art and Architecture Building from 1963; in Montreal, it is most often associated with Place Bonaventure, the façade of which "was developed in collaboration with the National Research Council" (Lortie 2004, 98).

out, as many Brutalist buildings are prone to the dampness of their climates, becoming stained and rusting from the inside-out. Despite being touted as "vandal-proof" as a result of their rough exterior and minimal fenestration, these buildings have been especially prone to the marks of time in the form of graffiti.

Internationally, and especially in the United States, the Brutalist style has come to be associated with the welfare state of the postwar period; in particular, with socially progressive housing projects that, in hindsight, seem to have failed to live up to their initial promise (largely because of a lack of ongoing upkeep and funding after the initial construction). As such, Brutalism is generally remembered today in the popular memory as an architectural failure, and the demolition of these concrete behemoths has become increasingly popular in the west, despite the widespread preservationist movement for modernist architecture in general. However, in both English and French Canada, Brutalism is most evident in the "civic and performing arts centres that were built across the country in the 1960s" (Legault 2011, 327), as well as the contemporaneous university building boom (**Figure 6**), and has thus come to be reminiscent of a particular era of re-investiture in public institutions by the Federal government. As such, while they tend to still be unloved by the general public, Canada's Brutalist buildings do nonetheless recall a period of robust public infrastructure, a time that increasingly evokes nostalgia in the face of increased austerity measures and government cutbacks.

New Technologies: Precast and Prestressed Concrete

The housing developments referred to in the previous section were also the result of new technological developments in concrete construction—specifically the introduction of prestressed and precast concrete after World War II.[35] Generally speaking, in prestressed concrete (or *béton précontrainte*), the high tensile strength of steel (usually in the form of rods or cables) is combined with concrete's superior compressive strength to create a structural material that is superior in both tension and compression, creating an internal stress that will counteract the stress introduced by an applied load.[36] As a result, longer unsupported spans could be produced with prestressed concrete than would be possible with traditional reinforced concrete; for this reason, the earliest examples of prestressed concrete works were usually bridges and elevated expressways.

Precast concrete refers to prefabricated units of concrete created in a factory that are later assembled at the construction site. This is in direct contrast to in-situ concrete construction, such as we see with formwork for monolithic concrete construction, where molds made of wood are built and concrete is cast at the site of construction. Though precasting had been around as long as modern cement (one

[35] Eugène Freyssinet, a French civil and structural engineer, is credited today as the inventor of prestressed concrete, with experiments in long span bridges going back to the early 1900s and his 1928 patented technique of casting high strength steel wires tensioned in concrete beams (Dyson 2009, 6). However, as Billington (2004) describes, he was unable to effectively communicate the specifications of his technique, and it was not until 1951 that these were introduced, via the Belgian engineer Gustave Magnel, to the North American context with the construction of the Walnut Lane Bridge in Philadelphia.

[36] The complicated process of prestressing is described on The Portland Cement Association's (PCA) website through the example of a row of books: "Instead of stacking the books vertically and carrying them, the books may be moved in a horizontal position by applying pressure to the books at the end of the row. When sufficient pressure is applied, compressive stresses are induced throughout the entire row, and the whole row can be lifted and carried horizontally at once" ("Prestressed Concrete" 2015).

can think of Ransome's use of precast concrete beams as well as the early vernacular use of "artificial stone" and concrete blocks at the turn of the century as early examples of prefabricated concrete construction), it was only with the introduction and development of prestressed concrete in North America during the 1950s that prefabrication gained greater legitimacy in architecture, which had previously derided anything other than monolithic construction as suitable to the material. In addition to the greater strength and load-bearing potential of prestressed, precast concrete, it offered the advantages of economic efficiency and standardization, further industrializing the building process in the latter half of the twentieth century. The growth of prefabrication was also a result of the housing and labour shortages generated by World War II, initiating a wave of state-sponsored subsidies and investment into the development of mass-housing and other urban renewal projects.

Prefabrication was heavily promoted in both Western countries and the Soviet Union during the 1950s and 1960s as a solution to the postwar housing crisis and a way of alleviating economic disparities and sub-standard living spaces. Because of the massive proliferation of prefabricated concrete buildings created using large-panel system building (LPS) in Central and Eastern Europe during these years, this type of large-scale construction took on the Soviet connotations it continues to carry today. The choice of concrete in the Soviet Union was the result of several factors: Khrushchev proposed everything should be made out of concrete to save metal (Forty 2012, 151), and concrete panel construction was more cost effective and less labour intensive than traditional masonry. Three to five-story

buildings (known as *Khrushchyovka*) could be erected quickly and relatively cheaply, and similar construction methods were used across the Eastern Bloc (**Figure 7**).[37] Similar housing complexes were also created in South American countries, such as Chile, where the KPD plant, a cement factory opened in 1971, was donated by the Soviet Union to support president Salvador Allende's Democratic Road to Socialism (Pedro Palmarola 2014). In the case of the *Khrushchyovka,* the buildings were not intended as a permanent solution; though these structures were designed to last only 25 years, many Russians continue to live in them today, though they have generally aged badly and are being systematically demolished in order to make way for higher-density buildings in large cities such as Moscow. In Western Europe, Forty (2012) notes, these buildings, and the problems they faced, became associated with the collapse of the welfare state.[38] The difficulties faced in maintaining, demolishing, or repurposing these already expensive structures only furthered the contempt they engendered locally. This history accounts partially for how concrete has been "particularly identified with the politics of the left" (ibid, 145), in direct contrast to the glass towers and condominiums of the neoliberal city.

In the context of Quebec, prefabrication is more generally associated with both social housing and the proliferation of highrises in the downtown core. Habitat 67 is a particularly famous example, a prefabricated housing complex that Moshe Safdie designed as part of his Master's thesis at McGill University's School of

[37] These include the massive *Panelák* of the former Czechoslovakia and the *Plattenbau* of East Germany.

[38] Here Forty is specifically referring to the partial collapse of Ronan Point in East London in 1968, a 22-story tower built using Large Panel Systems (LPS) only two years earlier. A gas explosion demolished a load-bearing wall and triggered the collapse of an entire corner of the building, killing four and injuring seventeen people. Ronan Point was demolished in 1986, as well as several other similar LPS tower blocks.

Architecture and which was constructed for Expo 67. Safdie's experiment, which was not actually completed in time for Expo but was nonetheless greatly admired as exemplary of Montreal's megastructral tendencies (Banham 1976), remains a popular destination for architecture enthusiasts, and is still in use as a residential property. However, while Safdie's use of prefabricated modular concrete units assembled on-site (similar to a giant set of building cubes) was predicted to induce a revolution in the use of prefabrication for social housing design, today the structure stands as a collection of luxury condominiums, an architectural monument to the optimism of Expo 67 but one that was too costly to reproduce.

In both the western and eastern contexts, prefabricated concrete—especially in the form of the large-scale housing project—took on particular leftist, socialist connotations, and, retrospectively, came to be synonymous with the perceived failures of these projects. More than the structural issues they might pose, as Forty (2012) describes, since the collapse of the Soviet Union in 1989, the major problem facing housing built using concrete panel systems constructions has been the "decommissioning" or "decontamination" of both their Cold War and welfare state associations (166). In both contexts, but especially in the West, controlled demolitions or "blow-downs," have thus become "regular public spectacles and were a useful device for marking the end of a period of history that politicians wished people to think had come to a close" (166). It is to one of these spectacular demolitions that postmodernist architecture critic Charles Jencks (1977/2002) famously accords the distinction of "the day Modern Architecture died" (9): March 16, 1972, when the Pruitt-Igoe housing complex in St. Louis, Missouri was brought

down in a controlled implosion that was broadcast worldwide.[39] Its demolition, recorded and broadcast repeatedly in the intervening years, has become a defining moment in the cultural memory of modernist architecture and the advent of postmodernism (**Figure 8**). As Reinhold Martin remarks (2010), even before its demolition,

> "Pruitt-Igoe had become an icon of modern architecture's presumed failures in the area of social reform…[and it] continues to haunt architectural discourse in the United States and beyond, as its demolition is replayed in the urban imaginary again and again, as if to confirm the ruination, several degrees removed, of the modernist utopia enterprise more generally" (14).

It is not only the spectacular demolitions of social housing projects such as the Pruitt-Igoe and Chicago's Cabrini Green and Robert Taylor Homes that signify this shift in feeling toward the legacies of modernist architecture; at the other end of the socioeconomic spectrum, Hollywood has taken a great delight in fantasizing the destruction of countless modernist mansions and masterpieces. As Thom Andersen illustrates in his film *Los Angeles Plays Itself* (2003), that city's most famous examples of domestic modernist architecture are those most often cast in contemporary cinema as the homes of villains, playgrounds of corruption and vice for the wealthy; in these films, the buildings tend to meet similarly explosive ends as that prefigured by the destruction of the Pruitt-Igoe. In this way, it is not

[39] Designed by Minoru Yamasaki and built in 1954, Pruitt-Igoe was a stark concrete modernist complex, a segregated public housing complex of 33 buildings that was praised, at its inception, as a breakthrough in urban renewal. However, by the 1960s, the Pruitt-Igoe began to fall rapidly into disrepair, eventually coming to be associated with high levels of crime and gang violence.

straightforward to parse the cultural and socioeconomic legacy of modernism, associated on the one hand with big government and the welfare state, while at the same time derided as the elitist and rarefied possession of an entitled few.

More than any other material, it is concrete—not glass, steel, or iron—that has come to be indelibly associated with the variable (mis)fortunes of modernism, which began to face a backlash as early as the 1960s by detractors who criticized the reigning International Style's universalizing pretensions, sterility, and elitism. This disillusionment, according to Jencks (1989) was as a result of modernism's failure to "communicate effectively with its ultimate users" (14). This failure to communicate—characterized by the machine aesthetic so popular with modern architects but often interpreted as hostile and dehumanizing by end users—was echoed in popular reaction to concrete construction as lifeless and cold. This was exacerbated, as Jencks notes, by the anti-historicism of modernism, which failed to "make effective links with the city and history" (ibid). Concrete, promoted as always-new and a solution to the traces of the past, was here posed as a faulty medium for the transmission of built history in the city. However, it was during this same period of growing disenchantment with modernism that its prime material began to show its own traces, once "[i]t became evident…that reinforced concrete was, like other materials, not spared from the injuries of time" (Ravelot and Culot 1992, 5). Weathered and dated concrete monoliths, once the pride of city planners, began to show their age. However, the way in which they communicated the passing of time was not desirable in the way of earlier ruins; the specter of aging concrete began to threaten the city with its own history.

Bad Ruins

Though Jencks was of the (contrarian) opinion that the ruins of the demolished Pruitt-Igoe should themselves be preserved as a warning about the hubris of modernist architecture for generations to come, most historians and architects have been unanimous in their assertion that concrete, given its associations with an always new and radically unblemished modernism, is wholly unsuitable to the classical ruin form as imagined by Simmel (1958) in terms of a dialectial struggle or collaboration between the works of culture and nature. The concrete modernist ruin is a dissonant object in its connotations of a thwarted progress narrative, a futurism already marred by the passage of time.

As modernist historian and art critic Nikolaus Pevsner remarked in 1959, the modernist ruin leaves the observer "with an uncomfortable feeling of ambiguity" (Pevsner 1959, 160). Speaking specifically in reference to Le Corbusier's badly decaying Villa Savoy at Poissy (**Figure 9)** only thirty years after its construction, Pevsner writes, "Le Corbusier's houses can't please in decay. Concrete structures with walls designed to be rendered white make bad ruins" (160). Pevsner was not alone in his conclusion; over twenty years earlier, Hitler's Minister of Armaments and War Production, architect Albert Speer, came to a similar conclusion. Articulating what he called his "Theory of Ruin Value," Speer describes how he discouraged the use of concrete and metal in the buildings of the Third Reich, as structures built with these modern techniques, he argued, would not make the sort of noble ruins appropriate to bequeath to future generations: "It was hard to imagine that rusting heaps of rubble could communicate these heroic inspirations

which Hitler admired in the monuments of the past" (Speer 1970, 56). These observations are not limited to a particular moment in history; contemporary criticism of concrete architecture comes to a similar conclusion. As David Lowenthal (1988) notes, "Concrete becomes more ugly with every passing year, looking greasy if smooth, squalid if rough" (163). Guiliana Bruno (2003) writes about the paradoxical nature of the modernist ruin: "Unlike the porous, permeable stone of ancient building, the material of modernism does not 'ruin'... Adverse to deterioration, it does not age easily, gracefully or elegantly… With concrete, there no longer can be lines emerging gently on the face of the building, line drawings on the map of time past. With concrete come only cracks, the breaking up of the façade" (80-1). Concrete's uneven aging and inability to properly *ruin*, as both Forty (2012) and Simonnet (2005) observe, troubles an earlier orthodoxy that understands architecture itself as that which "makes beautiful ruins" (Auguste Perret quoted in Collins 2004, 282).

These articulations all privilege an understanding of concrete ruins as somehow contemptible or ignoble, conveying nothing but the memory of violence, disaster and decline to future generations. The process of concrete's decay is too erratic, its buildings too monumental and anachronistic in the 'wrong way', to convey that particular timelessness of the ruin form. As Simmel explains, the inhabited or urban ruin lacks the "sensuous-suprasensuous balance of the conflicting tendencies of existence" (381)—culture and nature—because man, in

letting the building decay, is here the accomplice of nature (380) instead of culture.[40]

The unsuitability of the modernist ruin, and calls for the preservation and restoration of buildings such as Villa Savoye, led eventually to the creation of modernist conservation movements such as Docomomo International and the World Monuments Fund's advocacy and conservation program *Modernism at Risk*, as well as the recognition by UNESCO of several modernist buildings as World Heritage Sites. As Owen Hatherley (2009) points out, the growing preservationist discourse surrounding modernist architecture today is somewhat contradictory given the movement's foundational antipathy towards heritage and commemoration. To excavate the promised utopia of that movement through the preservation of its traces, Hatherley describes, might constitute the "final bitter betrayal of Modernism itself" (8), a nostalgia wholly at odds with modernism's hostility towards sentimentality. Yet Hatherley himself is nonetheless made wistful by the material remnants of an earlier modernist architecture, describing how, for him, "concrete walkways and windswept precincts have always seemed to … have a sharp poignancy" (8).

Ruinophilia

Hatherley's nostalgic anecdote reveals another paradoxical development in the *longue durée* of concrete monumentality: the current fascination with these

[40] Simmel also distinguishes between those ruins created through the slow erosion of time and creeping nature and those created by war and destruction, which, similar to the urban ruin, lack the necessary tension between nature and culture as their alterations are the work of man instead of nature (380).

"bad" ruins of modernity, exemplified by the growing popularity of activities such as urban exploration and the growth of tourism in meccas of post-industrialism such as Detroit. The interest in these erstwhile sites of industry lies not in their suitability for preservation or redevelopment, but in their very decrepitude. This new culture of ruins has been interpreted on the one hand as pathologically narcissistic, as in the *Atlantic*'s 2012 repudiation of a contemporary fascination with "ruin porn" **(Figure 10)**, an aestheticiation and fetishization of absence at the expense of the absent subject itself—in this case, the labour that was once the function of the building. David Gissen has elsewhere characterized this as "Urban Pastoral" (2012), the bourgeois exploitation of the image of domestic or industrial interiors associated with the working class as a shorthand for authenticity.[41]

On the other hand, this interest in the relatively recent ruins of industrialism has been described as ultimately generative, as in Svetlana Boym's (2008) description of a dialectical, "off-modern ruinophilia" with utopian undertones, a "third way" of conceiving of the possibilities of the project of modernity wherein "the best traditions of the off-modern in the rethinking of *techne*, estrangement, and toleration for the ruins of modernity" (35) can create new ways of working with the remainders of history. In a similar vein, Tim Edensor (2005) writes that these excessive and disorderly sites—in a manner akin to Foucault's Heterotopia—make "evident the hidden excess of the urban order, the surplus of production, the

[41] Gandy (2003) also uses the term "urban pastoral" but describes it as an "an intermediary aesthetic sensibility between rural nostalgia and the emergence of twentieth-century urban visions focused on new kinds of urban modernities facilitated by greater light, speed, and space" (275). Importantly, Gissen (2012) is referring to a contemporary phenomenon that has more to do with the aestheticization of industrial ruins and a potentially exploitative representational practice of working-class lives and domestic spaces.

superfluity of matter and meaning which violates order and disrupts the capitalist quest for the always new" (833); sites of embodied memory where the radical alterity of the past isn't neutralized by the narrative impulse of history.

Contemporaneous, and in some ways complementary to this resurgence of interest in ruins, the present moment is also witnessing what Forty (2012) has described as "a concrete renaissance" in contemporary architecture, a renewed commitment to the possibilities of the derided material.[42] Forty suggests that this is the result of a wider architectural interest, after the exhausting eclecticism of postmodernist architecture, in the quieter possibilities of concrete's neutrality, pliability, and a growing preoccupation with tectonics and material integrity. As opposed to the "all-or-nothing" (290) approach to concrete construction during the 1950s to 1970s, which was more interested in concrete's rigid, monolithic, fortress-like characteristics, Forty suggests that new architectural preoccupation is more tempered, using concrete more seamlessly in conjunction with other materials, playing up the softer side of concrete through its use in interiors, and even taking into account the effects of weathering on its surface during the initial design phase.

Similarly, at the same time that concrete is enjoying a renaissance in architecture, the last few years have also seen a growing body of literature—mostly from the field of architectural history—devoted to the material and looking at its wider history and relationship to culture. Forty's own monograph *Concrete and Culture*, Phaidon's massive photo collection *Concrete*, edited by William Hall, and

[42] Forty qualifies this renaissance as a mostly western phenomena, particular to North America and Western Europe, where exposed concrete fell out of favour in the 1970s, as opposed to the "less developed world" (279), where the use of exposed concrete has been continuous.

Pina Petricone's anthology *Concrete Ideas: Material to Shape a City*, were all released within months of each other in 2012. Other notable publications in this genre include *Concrete Toronto: A guidebook to concrete architecture from the fifties to the seventies* (2007), edited by Michael McClelland and Graeme Stewart, and Mark Kingwell's more philosophical *Concrete Reveries: Consciousness and the City* (2008). Though the specific breadth and focus of these publications differ, they all aim, to varying degrees, to rehabilitate the material—and effectively, the memory of modernist architecture—through a reappraisal of concrete's history and its relationship to modernity.

The renewed interest in the cultural history of concrete is not without precedent; in the francophone world, the last twenty years have seen a considerable increase in scholarship dealing with the history of reinforced concrete construction in France. This is largely made possible by the Hennebique[43] archives, which became available in 1989 when the Conservatoire national des arts et métiers (CNAM) deposited the vast holdings with the Institut français d'architecture (IFA). Edited collections such as *Le Béton en représentation : La mémoire photographique de L'entreprise Hennebique 1890-1930* (1993), Gwenaël Delhumeau's *L'invention du béton armé : Hennebique 1890-1914* (1999), and Cyrille Simonnet's *Le Béton : histoire d'un matériau* (2005) are all to some degree a product of this, as well as the important special issue of *Rassegna* 49, which was subtitled "Reinforced Concrete: Ideologies and Forms from Hennebique to Hilberseimer" (March 1992). Working in both French and English, Quebec-based architectural historian Réjean Legault has

[43] Belgian/French engineer and contractor François Hennebique was an early concrete entrepreneur whose influential work will be discussed in greater detail in Chapter 1.

written extensively on the relationship between materiality and modernity in both France (1993, 1997) and Canada (2011).

While the works in the French context were primarily concerned with an exploration of the role of Hennebique's archive in the creation of an industrial iconography and set of building and labour codes, the more recent Anglophone publications are more concerned with a revaluation of concrete more generally, especially in the later years of the modernist era. By and large, because the majority of these texts are written by architects or architectural historians, the tone of these monographs is illustrative of what Simonnet (2005) describes as the "*divorce affectif*" (back cover) between architects, who continue to think of concrete as a "noble" material (Leonard Koren, *Concrete,* 2012, 8) and the lay public, who continue to view it with suspicion. Because of their backgrounds within architecture and design, these monographs similarly tend to privilege the process of conception and building (or demolition), as well as the disciplinary history around the introduction of concrete to construction, as opposed to the study of how these buildings persist on the built landscape and generate shifting meaning over time and through discourse.

CHAPTER 2

Concrete Foundations: Silo No. 5

A large photograph of Silo no. 5 greets travelers in the international arrivals corridor of Montreal's Trudeau airport **(Figure 11).** The subject of the panorama would have seemed an unlikely choice only a few years ago. The long-abandoned concrete monolith was not seriously reconsidered as a potential tourist attraction until its purchase in 2010 by the Canada Lands Company (CLC), a Crown property management firm whose plans for the site remain undetermined (Sylvestre 2014). Despite its designation as a 'recognized' building by the Federal Heritage Buildings Review Office in 1995, fluctuating interest from heritage groups, artists, and academics in the intervening years, and its recent purchase by the CLC, the hulking concrete elevators, empty since 1994, continue to haunt the city's waterfront, a testament to the port's former glory as the "greatest exporter of grain in the universe" in the early 1920s.[44]

In the twenty years of its disuse, opinions about Silo no. 5 have shifted greatly, with calls for its demolition giving way to artistic installations and the subsequent recuperation of its value through a heritage narrative and growing industrial nostalgia. Most recently, since its purchase by the CLC in 2010, and the CLC's 2012 amalgamation with the Old Port of Montréal Corporation Inc. (OPMC), the Silo has been mobilized as part of a larger federal initiative to revitalize the waterfront as an "exceptional urban space for Montrealers to live, work and play"

[44] *Annual Reports*, Archives du Port de Montréal, Montréal, 1924, p. 61.

("Montréal's New Harbourfront" 2011).[45] Also in 2010, Montreal's then-mayor Gerald Tremblay declared that by 2017, "*[l]e nouveau Silo no 5 deviendra l'emblème de Montréal et une référence internationale*" (Béland 2010b).[46] This move to repurpose the Silo reflects a larger international trend—growing since the 1990s—of redeveloping unused, postindustrial harbourfronts as new sites of capital accumulation and urbanism through an emphasis on their historical and cultural significance (Meyer 1999, 13).

This chapter traces the shifting role of Montreal's Silo no. 5 from technological marvel that helped to establish the port city, at least temporarily, as Canada's metropolis, to its subsequent associations with Montreal's deindustrialization and decline after the opening of the Saint Lawrence Seaway in 1959. The silo, officially known as "Government Elevator No. 5," was given the number 5 in 1963 in reference to the four other grain elevators of Montreal at that time, despite the fact that its oldest section, Elevator B, built between 1903 and 1906, predates all but Silo no. 1 in its construction. Of the original port elevators, only Silo no. 5 remains.[47] In a city that largely resisted early mass-production techniques in construction (Ritchie et al. 1967, 73), the silos represent Montreal's first exposure to industrial concrete construction on a large, highly visible scale. As such, reactions to them—both positive and negative—helped to shape local

[45] This federal project was undertaken in 2007 to encourage the reuse of underutilized, mainly industrial Crown property.
[46] 2017 will mark the 50th anniversary of Expo 67, the 150th anniversary of Confederation, and the 375th anniversary of Montreal; as a result, there are several events and projects planned to commemorate the occasion.
[47] Silos no. 1 and 2 were demolished in 1983 and 1978 respectively. Silos no. 3 and 4 are not located in the port, but in the eastern Montreal neighbourhood of Mercier-Hochelaga-Maisonneuve. Silo no. 3 has been abandoned since the 1990s and parts of it have already been demolished. Of the five elevators, only Silo no. 4 is still in operation.

perception about the new material of modernity. The changing fortunes of Silo no. 5 over the last century similarly reflect changing notions around Montreal's concrete infrastructure, from cutting-edge technology to urban blight.

Cement History in Canada

"The Cement Industry, in a way, has paced the development of Canada because as industries took root and villages grew into towns, the demand for Portland cement increased substantially and, more and more, it became associated with the growth of the nation."

-*The Canada Cement Story* (1965, np)

Though it is taken from a promotional brochure for the industry, the quote above from the Canada Cement Company is for the most part accurate: cement did play a determining role in the development of intercontinental and international trade roots, and its introduction to construction is closely tied to the economic prosperity of Canada during the early years of the twentieth century. In order to understand the relationship of the silos to the city, it is necessary to first contextualize it within the broader history of the cement industry in Canada. This requires that we consider the material's close and unlikely imbrication with the settlement of the Canadian West and agricultural expansion during the earliest years of the twentieth century.

Early cement use in Canada was in many ways similar to its development in the United States, where steel dominated the construction industry far more than in Europe. Whereas Europe, since the 1920s, came to be understood as "the land of concrete" (Forty 2012, 107), the US was known as the "nation of steel" (ibid), as the American steel industry was and continues to be a powerful determining force in

the US construction industry (Rich 2007, 52). Though Forty describes Canada as an exception to this rule,[48] it was not really until after World War II that Canada's concrete use began to diverge significantly from that in the US. As architect and structural engineer Zdzislaw Przygoda, who arrived in Canada from Poland in 1952, wrote in his unpublished history of the Canadian building industry,[49] the labour costs for concrete construction were prohibitive in Canada as compared to Europe (1967, IV-2), leading to the frequent use of steel instead of reinforced concrete until the mid-1950s or so.

Despite the relatively piecemeal development of concrete construction in Canada during the early years of the twentieth century, its use in foundations and piers in Canada—particularly Montreal—did have an established history; as Ritchie et al. (1967) point out, the natural cement piers of the city's Victoria Bridge over the St. Lawrence were, at the time of the bridge's completion in 1859, considered "to be an engineering feat of international importance" (233). The use of local hydraulic (natural) cements was superseded in 1887 by the import of Portland cement, which cost twice as much as the natural cement but was generally acknowledged to be of a superior quality, brought in from England and the United States. The domestic

[48] Forty (2012) describes how, "Interestingly, the allegations of American prejudice against reinforced concrete never extended to Canada, where it was more readily accepted, partly, it is said, on account of its proportionally larger number of immigrant European architects and engineers, who took their skills and their preferences with them" (107). However, this refers more specifically to the postwar period of the 1950s onwards.

[49] Przygoda's *Pictorial history of Canadian building industry: drafts and research materials, 1955-1967*, available through the fonds of the Canadian Centre for Architecture, is a manuscript and collection of letters and photographs that was intended for publication to coincide with Expo 67 and Canada's centenary. Przygoda himself is an example of the immigrant influx Forty describes of European engineers who brought their familiarity and experience with concrete construction with them after the war.

manufacture of Portland cement began in Ontario and Quebec in the last two decades of the nineteenth century, and by 1890 Thomas M. Morgan had opened a manufacturing plant for Portland cement at Longue Pointe, just east of the Mercier-Hochelaga-Maisonneuve district of Montreal (Tagge 1924, 28-29).

The years 1898 to 1905 were boom years for the cement industry in Canada, driven by increased demand and the discovery of large marl[50] deposits (Przygoda 1967, 10-12). However, only three years later, the fledgling Canadian cement industry was in trouble: overproduction, the establishment of new companies, and high transportation costs meant that producers had to reduce prices to the degree that it was difficult to turn a profit: "The financial panic of 1907 caused an industrial recession and a temporary halt in construction. Cement prices tumbled; by the end of 1908 Canadian production was exceeding consumption by some 25 per cent" (Ross and Smith 2011, 449). The merger of these companies in 1910 under the stewardship of Max Aitken came to be known as the "Canada Cement Scandal." Despite the company's shady origins, the creation of the Canada Cement Co. Ltd (CCC) did have the effect of standardizing Portland cement in Canada and driving down costs for previously underserved locales in less central parts of the country. By 1910, the percentage of imported cement had fallen from 40.5% to 6.8%, and by 1914 Canada had practically stopped importing Portland cement altogether ("Canadian Register" 1959). From 1902 to 1920, the production of Portland Cement in Canada had gone from just over 500,000 barrels a year to nearly 7,000,000,

[50] Marl is a soft, mud-like sediment consisting of clay and lime that was a valued mineral deposit used in the manufacture of Portland cement during early twentieth century, later superseded by limestone quarrying by about 1919 ("Marl" 2010).

effectively eradicating the natural cement business by 1909 (*The Canada Year Book* 1920, 313). These years, the first two decades of the twentieth century, correspond roughly to the growth of Montreal as the world's preeminent grain exporting port, as well as its subsequent "Golden Age,"[51] characterized by the surge in population and a construction boom largely financed by the "rapid colonization of Western Canada" (Linteau 1998, 27).

The Agricultural roots of concrete in Canada

From its inception, the Canada Cement Company attempted to position what many have come to think of today as an urban material as one that was suitably rural in its many uses. The CCC noticed early on that concrete was not the exclusive domain of architects, engineers and contractors; it also had a wide popular appeal among 'do-it-yourself' minded citizen[s], particularly farmers ("Canadian Register" 1959). Soon after the company was formed, it began publishing a series of instructional brochures as a way to market its product to this audience. The first of these, *What the Farmer Can Do with Concrete* (1910) hailed the new material as a godsend to farmers, able to repair everything from damaged trees to leaky manure pits, and equated the use of cement on the farm with industrialization and modernization: "When a farmer buys his first bag of cement, and mixes it, he has taken one long step in the direction of progress" (4). These brochures were soon followed by a bimonthly journal, *Farm Improvements*, which the CCC went on to publish from 1912 to 1914. These publications dispel the myth that concrete was

[51] Vanlaethem and Gournay (1998) delineate the "Golden Age" of Montreal as those years just prior to the Great War up until the end of the 1920s (10).

always positioned as a necessarily urban or industrial material, as well as demonstrate the industry's early—and generally successful—attempts to associate the material with modernity and progress.

In its formative associations with farming, the growth of the cement industry in Canada was inextricably bound up with the settlement of the prairies and the establishment of Canada during this era as "the Empire's Granary" (Chambers 1903, 81). This was the result of several factors, chief among them being the "closing" of the American Frontier following the 1890 census, which essentially meant that there was no longer a discernible western frontier line, and therefore no more unsettled land for those headed west in the hopes of free and undeveloped land (Sutcliffe 1998, 21). This in turn led to the "great Canadian boom" of 1890 to 1910, and the large influx of immigrants and investment in Canada from the US and Europe. With the passing in 1897 of the Crow's Nest Pass Agreement, which significantly reduced the eastbound shipping cost of grains and flour, and the inducements offered to immigrants to settle the West under Sir Clifford Sifton in the early 1900s, the success of the agricultural industry in the western prairie provinces was intrinsically linked with the economic success of the nation at large. In this context, concrete played a supporting role both in its infrastructural use in the foundations of bridges for the rail lines, as well as in its use by homesteaders attempting to make their farms more efficient and "modern" through the construction of everything from hen houses to small grain silos made out of cement.

If, following Darin Barney (2011), we consider the development of elevated wooden grain elevators along the railway of the Prairies during the later years of the

nineteenth century as a type of "unconventional media that structure temporal and spatial experience" (5), the introduction of cement on a small scale, in rural settings, can be understood as a technological change that began to restructure the social and political relationships in both rural and urban settings. Through the development of unprecedentedly large terminal grain elevators in ports such as Montreal's—made possible through the fireproof and structural strength of slipform construction with the introduction of cement in the late nineteenth and early twentieth century, these silos belonged to the same logic of rationalization and centralization that Barney describes as consolidating the monopolistic power of both the railways and the larger grain manufacturers.

The symbiotic relationship of cement to agricultural infrastructure and the economic success of the nation reached its apotheosis in the construction of the massive steel and concrete grain elevators in the early 1900s along major trade routes. The Port of Montreal—known at the time as the "spout of the granary" (Chambers 1903, 81)—was arguably the most important of these as a result of its location along the St. Lawrence River, feeding out into the Atlantic ocean, and as Nathalie W. Senécal (2001) points out, its rapid development "driven by the commercial nationalism of the east-west rail link" (15). Though Montreal's preeminence as a grain exporting port was established before the introduction of concrete silos, with the construction of several large timber frame grain elevators,[52] the growth of the cement industry—and the changes in scale that it initiated in the

[52] These timber-frame elevators known as "A", "B", and "C" were constructed in 1884, 1885, and 1872, respectively. Despite their large size, by 1895 they were deemed insufficient to handle the increasing amount of grain required for export (Senécal 2001, 142).

design of grain handling infrastructure—facilitated Canada's entry into international trade networks, making it possible to store, handle, and move an unprecedented amount of goods both in and out of the harbor. By the 1920s, thanks to a port infrastructure that moved over 211 million bushels of grain in a year, Montreal had become the most important grain-exporting port in the world by the early 1920s (*Annual Reports* 1924, 61). In this way, cement played a determining role in the industrial boom and concomitant population explosion experienced by Montreal in the late nineteenth and early twentieth centuries, as people flocked from the city's rural environs to the newly prosperous metropolis, whose population grew from 48,207 in 1850 to a million inhabitants by 1930 (Sutcliffe 1998, 20).

Silo no. 5 and the move from steel to concrete in elevator construction

Constructed in stages in the city's industrial port, Silo no. 5 is actually a complex of four interconnected structures built between 1903 and 1959.[53] This conglomeration of elevators has been known as Silo no. 5, or "Government Elevator No. 5" only since 1963, when an overhead gallery was constructed joining the oldest sections of the complex (Elevator B as well as Annexes 1 and 2) to the newest (Elevator B-1). The oldest part of Silo no. 5, Elevator B, was commissioned by the Grand Trunk Railway in 1903 and was constructed, like its predecessor Silo no. 1 (built between 1902 and 1904), out of steel. Though both steel and concrete were valued in the construction of grain elevators over the previous timber frame

[53] These consist of Elevator ¨B¨ (1903-06), Annexes 1 (1913-14), Annex 2 (1923-24), and Elevator B-1 (1957-59).

structures, which were significantly smaller and highly flammable, steel was generally understood to be the superior building material for grain elevators, as the chief engineer of Montreal's port, Joseph Kennedy (1901), concluded in an article published in *Engineering News* published around the time of construction (42). As Reyner Banham (1986a) describes, concrete engineering for grain silos at this point was still an experimental and expensive technology in comparison to the relatively established use of steel.

While both steel and concrete marked a radical departure from the previous wooden grain elevators,[54] it was not until the now-demolished Silo no. 2's construction in 1912 that concrete cylindrical bins had emerged as superior to the rectangular steel bin, which turned out to be easily collapsible and prone to falling over in the process of emptying. As Banham (1986a) maintains,

> [t]he concrete frame avoided the expense of … added protection [as tile or brick cladding] by being inherently fireproof, and probably ingratiated itself with many industrial builders for another and apparently unconnected reason: the dimensions for a reasonably strong, economical and fireproof concrete upright usually came somewhere near to the fourteen-inch square dimension that everybody already knew well from slow-burning timber construction and from fireproofed steel-work. When all these considerations of speed, economy, daylighting, maintenance, seismic stability, and so forth

[54] These wooden elevators, which had occupied the port since 1884, had a lifespan of only 12 or so years due to the flammable and combustible nature of the grain dust in the presence of machinery. (Senécal 2001, 18). Explosions were a going concern in the grain storage and transportation industry and there were fatalities every year (ibid).

are added to fireproofing, there was a small advantage for reinforced concrete construction in industrial building (63-64).

This slim margin of superiority might not have been so consequential, Banham suggests, were it not for the propaganda of concrete engineers such as Ransome, with his disaster photography, and Hennebique, whose journal *Béton Armé* was "full of aggressive denunciations of steel and of the nefarious practices of steel producers" (Forty 2013, 23). In addition, Florian Urban (2012) points out how the choice of concrete over steel was also influenced by political considerations of the time as "the military industry depended on steel, which in many countries had become a rare commodity during the First World War" (10). For the Port of Montreal, there was an explicit emphasis on concrete construction after grain dust caused an explosion at Silo no. 1 in 1921, followed three years later by an even more serious explosion at Elevator B (the oldest part of Silo no. 5), which resulted in one death and $50,000 in damages (Groupe de Recherche sur l'histoire du Port de Montreal 1981, 64).

While concrete had been used to reinforce the dredged land that made up the waterfront's new piers in 1898, and the substructures of Silo no. 1 and Elevator B in the first decade of the 1900s, it was often disguised to resemble more "noble" materials such as stone. For example, when Silo no. 1 was erected between 1902 and 1904, the chief engineer responsible for its construction described how the "entire outer surface of the concrete [substructure] is blocked off to resemble massive masonry and bush hammered all over" (Chambers 1903, 110). It was not until the erection of Silo no. 2, completed in 1912, that concrete gained a strong

visual presence in the city. As its chief engineer John S. Metcalf boasted in his publication *Grain Elevators* (1926), the silo—the first of its kind to be built out of reinforced concrete—was, "at the time of its erection, probably the highest concrete building in existence" (116).[55]

By this time, concrete was also becoming a relatively established building material in the city, where by 1910, it "was beginning to achieve an edge on wood, which cost more both initially to put up and later in insurance premiums" (Ritchie et al., 245-47). Despite this, in the early twentieth century, concrete was still mainly associated with industrial uses such as manufacturing plants and grain silos, while the locally-sourced greystone which had become synonymous with Montreal architecture continued to be used for more prestigious domestic and office buildings.

The city's embrace of new building technologies during the first two decades of the twentieth century was tentative: as Gournay and Vanlaethem (1998) maintain, "[i]f Montreal's architecture bore witness to the city's economic strength, its functional and technological rationalism remained somewhat concealed beneath a décor inspired by the past" (13-14). Though reinforced concrete was used extensively in the construction of the new, larger buildings that were beginning to alter the city's skyline, its architecture nonetheless clung to historicist forms, and disguised the appearance of its concrete skeleton with cladding such as brick or

[55] Hyperbolic claims like this are common in the early literature of concrete engineering, much of it based solely on the claims of the very companies responsible for the construction of said building; for example, the French engineering company Hennebique also claims to have built the "tallest concrete building in the world" with the Royal Liverpool Building in England in 1908-1911. Built of their proprietary system, the building was approximately 15 storeys, or 94 meters. (Addis 1997, 108)

limestone. The reticence of Montreal architects towards new building technologies is perhaps most evident in their early opposition to the new invention of the steel skyscraper, which was derided as a garish, American conceit. As Montreal architect W.E. Doran stated in 1896, "greed and the desire to make the most use of land regardless of the right of neighbors to light and air called into existence the monstrosities of seventeen and twenty stories, now promising to reach out to thirty" (quoted in Gournay 1998, 155).

The association of concrete with strictly industrial uses began to shift slightly by 1915 with the construction of a few prestigious residential buildings out of concrete in Montreal, such as the Edifice Godin and Château Dufresne, as well as the headquarters of the Canada Cement Co. itself, Canada's first office tower built completely out of reinforced concrete, which was completed in 1922 in Philips Square. Despite their explicit use of new construction materials like concrete, the appearance of these buildings was still largely influenced by the Beaux Arts style of the previous century. It was the grain elevators that would come to embody the functionalism and rationalism later associated with the development of modernist architecture.

Montreal's changing skyline

In Montreal, the appearance of the new massive grain-handling machines along the waterfront garnered mixed reactions from citizens. The most vociferous complaint about the rapidly industrializing port was that the silos created a barrier, physically and visually, between the city and the river, obscuring the view of the

water with concrete and steel. This sense of division was compounded by the historical segregation of the industrial port from the city of Montreal by the Harbour Commission, a small but powerful group of local industrialists with control over the industrial port, who were able to have the area declared a separate zone from the city of Montreal. As a result of this, the port was not subject to the same city bylaw (in effect until 1924) restricting building heights to 10 stories (or 40 metres). At approximately 12-storeys high each, the concrete of Silo no. 2 and the steel of Silo no. 5's Elevator B loomed large over the compact structures of the oldest part of Montreal, challenging a city skyline that had traditionally been dominated by church steeples.[56]

The scale introduced by the grain elevators of the port began to be reflected in the city, as the money flooding into Montreal during its so-called Golden Age (the years just prior to the Great War until the end of the 1920s) as a result of the agriculture boom resulted in a "new commercial gigantism" (Gournay 1998, 154). Though still considerably smaller than the silos—due largely to the building bylaw limiting heights but also to the aforementioned distaste of local architects for American-style skyscrapers—these new ten-story commercial and industrial buildings nonetheless represented an unprecedented shift in scale for a city whose built environment was previously characterized by two and three-story stone walk-ups. By and large, these new industrial buildings—made possible by the introduction of reinforced concrete skeleton construction—were a "manifestation of

[56] As Mark Twain famously described after a visit in 1888, Montreal was "the city of a hundred spires" (Germain and Rose 2000, 53).

the economic and social power of big business and the Anglo-Protestant upper class" (ibid) of the city.

The role of reinforced concrete in these alterations to the Montreal skyline was thus a contradictory one in relation to the changes to the built environment in the decades preceding the Quiet Revolution, the era most commonly associated with the province's rapid modernization. Contrary to the popular—though now widely dismissed theory—that Quebec's modernity came rapidly and all at once after the election of Jean Lesage's Liberal government in June of 1960, the evolution in Montreal's built form demonstrates a more gradual shift in terms of the city's imbrication with modernity. This relationship is not straightforward, for as much as concrete—in the form of the silos and large new factories—did represent a visual interruption to the Catholic Church's previous dominance of the city's form, these buildings similarly invoked the historic economic disparity between the ruling Anglophone industrialists and the largely Francophone workforce whose labour created the capital necessary for the construction of these large new edifices.

Though it's important not to overstate this connection between concrete and the secular and anti-colonial discourse of the Quiet Revolution, by making possible new appropriations of space in the city, the building material did make manifest, and to some extent begin to challenge, preexisting relationships of power in the city. As such, buildings such as the silos and the large-scale factories of the early 1900s can be understood to have aided in the development of new urban subjectivities that were less reliant on earlier religious models, while also throwing into stark

relief, and compounding, the colonial legacy of economic inequity between the city's English and French populations.

The Image of the Silos

During the early twentieth century, the iconography of the silos—images reproduced in photographs, paintings, and especially postcards—helped to dispel some of the secrecy around the city's industrial port and worked to transform the silo into a symbol of progress and modernity. This was not a straightforward process; as essayist Stephen Leacock wrote, even as late as 1942 the grain elevators were understood primarily as a necessary evil, "a blot on the landscape, a disfigurement of nature's work," which nonetheless meant "so much to the life and industry of Canada, to the life line of imperial safety, that the eye that looks on them becomes trained to a new adjustment."[57] This new adjustment, a description that echoes Walter Benjamin's (2007) characterization of the "complex kind of training" ("On Some Motifs in Baudelaire," 175) that human perception had to undergo in confrontation with the sensorial shocks of modernity, was formalized and negotiated by the contemporaneous development of representational media such as photography and the postcard.

As Simonnet (2005) explains, reinforced concrete suffered from its very beginnings from a certain "*déficit d'iconicité*;" that is, especially in relation to steel

[57] Leacock (1942) also hastened to add that "Any prejudice against the appearance of the elevators is greatly lessened for anyone who has enjoyed the privilege of seeing the inside detail of their operations. One is lost in admiration at the ingenuity of contrivance which they represent. The movement of the grain along the carriers, its downpour through the chutes, its passage out along the aerial carriers running above the dock sheds to carry it to any needed point—these things represent the last word in the mechanical economic carriage of grain" (241).

construction, the workings of concrete structures were hard to understand solely from looking at them (115). Because of this iconic deficit or illegibility, photography became an important medium in the representation of new concrete structures, creating the "industrial iconography" that Legault describes regarding early images of factories and silos (1992, 59). As Senécal (2001) explains, in the early twentieth century, the new technology of the postcard became a powerful tool for disseminating these photographs of grain elevators as modern architectural curiosities representative of technological progress. Despite local antipathy, images of silos such as Montreal's were becoming, by the mid-1910s, powerful international symbols of modernity.[58] In these images, widely reproduced in the published works of Walter Gropius and Le Corbusier, the monumental "sublimity**"** and simplicity of the structures was emphasized, their complexity downplayed in order to transform them into "transcendent symbol[s] of technology" (Senécal 2001, 35).

In Canada, the government and railroad companies used the postcard as a way to communicate a new identity of the nation based on progress and industrial ingenuity as opposed to its previous connotations of rusticity and pristine nature (ibid, 34). Images of grain elevators, railway stations, and bridges became popular shorthand for communicating the country's modernity. In Montreal, by 1910, postcards such as that entitled "One Million Bushel Grain Elevator, Windmill Point, Montreal" (**Figure 12**) by Valentine & Sons' Publishing Co., Ltd, showing the oldest part of Silo no. 5 (Elevator B) would have given the tourist or the local a previously inaccessible perspective on the massive machinery of the port. Postcards such as

[58] Réjean Legault traces this back to Walter Gropius' use of an image of Buenos Aire's Bunge y Borne silos in 1913. (*Rassegna,* 1992, 59)

these, the production of which was largely monopolized by Montreal's Chisholm family (Poitras 1990, 44-45), would have been available in Grand Trunk Railway's Bonaventure Station and in stations along the lines connecting to the city.

Early postcard depictions of North American silos tended to present the structures as monoliths cut off from their wider urban and historical contexts. What was important in these images was not so much an accurate representation of the silo as it was, but instead as an ideal form signifying progress and modernity, a monolithic construction that demonstrated the possibilities of new technologies. As Réjean Legault (1993) points out, *"[a]ssociée au déplacement, la carte postale témoigne donc d'un phénomène corollaire : celui du dépaysement…Quittant le territoire de l'objet familier, la 'curiosité architecturale' devient l'un des thèmes de prédilection des cartes postales*" (84). Legault maintains that the circulation of these images—both in postcard form and through the reproduction of construction photography in trade journals such as Hennebique and Ransome's—created an iconography that continues to haunt contemporary architecture as a type of creation myth for modernism.

One of the most well-known examples of this sort of decontextualized, myth-making image is from a photograph of Montreal's very own Silo no. 2. Originally published in a 1913 article written by Walter Gropius for the journal *Jahrbuch des Deutschen Werkbundes*, the photograph of the massive reinforced concrete grain elevator was left unidentified, an "anonymous representation of the sublime form" (Senécal 2001, 40). Though it's not clear whether the image originally derived from

a postcard or from a promotional brochure,[59] the formal constraints of the image are similar in that the elevator is shown in isolation from the larger workings of the city, an abstract machine of pure, rational functionality. The same image was later reprinted in an essay by Le Corbusier for *L'Esprit nouveau* in October 1920, and again in his seminal work *Vers une architecture*, originally published in 1923 (**Figure 13**). Here, Le Corbusier went so far as to famously alter the image, removing the cupola of Marché Bonsecours from the background so as not to distract from the pristine form of the silo, and then further decontextualizing it by labeling the photo "American Grain Elevator" (Senécal 2001, 18).

Despite the mixed reaction to the physical reality of the silos in Montreal, there is evidence that representations of the elevators such as those reproduced in postcards and works such as Le Corbusier's took on an important iconicity at home as well, creating an alternate—and previously inaccessible—image of the industrial port for Montrealers. For example, in 1926 John Patrick O'Shea created a series of five stained glass windows based on the Port of Montreal for the City Council Chambers at City Hall, and crowned the Mayor's chair with a quasi-religious depiction of Silo no. 2 that appears to be based on the same image reproduced by Gropius and Le Corbusier (**Figure 14)**.[60] By depicting the purely industrial structure

[59] While Banham (1986) suggests that Gropius's images of grain elevators from North America were solicited "from various sources in America and Canada for over a year during the preparation of the article" (11), Legault (1993) notes that there is speculation that he received the image on a postcard from an American pen pal. Further, Legault contends, it might also have simply originated from the promotional material of this sort for concrete, which would have been easily acquired in Europe through publications such as Hennebique's (78).

[60] Though Senécal (2001) identifies this window as "Port of Montreal with elevator No.5" (114), it is clear from a comparison between the window itself and the photograph reproduced in *Vers une architecture* that it is actually based on an image of Silo no. 2. Senécal also misidentifies the artist as Charles O'Shea and the work from 1922; documents of the purchase retrieved from the Office of

in a style "apparently inspired by the formal conventions of religious stained glass art" (Senécal 2001, 38), O'Shea's windows offer another glimpse of Montreal's ambivalent approach to the changes of modernity, negotiating the ideals of progress and industry through a vernacular still greatly influenced by the hegemony of the Catholic Church, attenuating the stark functionalism of the modernist aesthetic through earlier artistic conventions.

Two years later, Montreal painter Adrien Hébert drew on this heroic image of the silo once again in his *Le port de Montréal* from 1924 **(Figure 15)**, which appears to also be based on the famous photograph of Silo no. 2. While contemporary critics praise Hébert as one of Quebec's first artists to depict the reality of urban life and the experience of modernity, it is evident by his use of photographic imagery that he was, like O'Shea, also drawing on and modifying representations made possible through new photographic technologies. This was likely a matter of necessity since access to the port was limited for those not working at the site. Nonetheless, by reproducing the same imagery through the formal and historical conventions of painting, Hébert's work functioned in a manner similar to O'Shea's stained glass, as a way to make palatable and help lessen the shocks of new technologies such as the grain elevator itself.

In the 1930s, another Montreal painter, Marian Dale Scott would also turn to the industrial port—as well as postcards of Montreal[61]—as a subject for her work.

Public Art at City Hall show the winning bid for the project was submitted by J.P. O'Shea & Company, "Manufacturers of Mirrors, Art Leaded & Ornamental Glass," in 1926, quoting a cost of $3,400 for five windows (O'Shea & Co. 1926).

[61] In 1938, Marian Dale Scott also completed a painting entitled *Tourist in Montreal*, which showed a series of abstract, overlapping snapshots or postcards with different, highly stylized scenes such as the Jacques Cartier Bridge, a streetcar, and a church. A year later, she produced *Postcards of Montreal*,

In this case however, Scott tended to emphasize the alienating effect of these massive structures, stripping the grain elevators down to their most rudimentary forms, devoid of human figures, and depicting the structures at oblique, exaggerated angles that played up their enormous scale. To heighten this sense of the shock of the new, Scott endowed her paintings with ironic titles such as *Agriculture* **(Figure 16)**, from 1939, which unlike the rolling fields that such a title might have connoted only a decade earlier, depicted instead the hulking grey concrete of the silo. Another painting, *Cement No. 1*, from the same year, provides evidence as to the associations of the material with industrial uses: the image is painted in a similar stripped down, geometric style, and shows a series of abstract buildings with connecting passageways reminiscent of the galleries of the grain silos. In these early works, Trépanier (2000) contends, Scott used images "devoid of human figures or that imprison them within a world of sharp angles, straight lines and concrete surfaces, [to illustrate] the dehumanizing coldness of the urban and industrial environment" (130).

The use of the image of grain elevators as a shorthand for modernity was on evidence again, in 1937, when the Federal government drew on it for the Canadian pavilion at the Paris Exposition **(Figure 17)**. Created by Quebecois sculptor Émile Brunet, the national pavilion was designed to resemble a complex of concrete silos in an attempt to rebrand the country as modern and technologically sophisticated. In his opening remarks at the exposition, Justice Minister Ernest Lapointe made this

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which developed this juxtaposition of views and city scenes even further. Scott's work with these paintings add further testimony to the rhetorical power and circulation of these postcards depicting the city (Trépanier 2000).

connection between the silos and Canada's modernity explicit, as well as imbuing them with life-sustaining qualities:

> *La Canada est une nation. Il a sa vie propre, ses arts et ses techniques. Le Pavillon même où nous sommes réunis en est la preuve. Son architecte, M. Emile Brunet, s'est inspiré de nos silos à céréales qui se dressent comme des remparts le long des routes terrestres ou maritimes du Canada, remparts qui ne contiennent que des réserves de vie* ("Revue Mensuelle Officielle" 1937).

The silos as symbols of modernity were also on evidence in literature, as in Gabrielle Roy's classic novel *Bonheur d'occasion* (originally published in 1945). This influential work is often credited with laying the foundation for Québec's Quiet Revolution (Robbins 2008, 14) because of the frank and sometimes brutal realism with which it tackled themes of poverty and dispossession among working-class French Canadians during the Depression. In the novel, the arrogant social-climbing character Jean Lévesque looks to the elevators for confirmation of his own aspirations: "*À sa droite, s'élevaient les massives rangées du silo à céréales. Il les regarda avec une amitié qui datait de loin, avec un nouvel intérêt et avec insistance, comme s'il lui fallait obtenir des murs impérieux, des tours de ciment, orgueilleuse œuvre de l'homme, une dernière confirmation de sa destinée*" (221).[62] The grain elevators—"these concrete towers"— came increasingly to represent both the promise and potential alienation of an unknown future, as well as the hubris of man

[62] From translation, *The Tin Flute* (1980): "On his right rose the massive rows of grain elevators. He looked at them as at old friends, but with new interest and insistence, as if these imperious walls, these concrete towers, owed him a final confirmation of his destiny" (213).

in creating these industrial giants. In the context of the novel, because wealth and power were largely the possession of the still largely Anglophone industrialists at the time, the concrete silos similarly evoke this economic and social disparity, a site of capital accumulation for the ruling class, and a site of alienated labour for the French-Canadian worker.

The Decline of the Silos

Construction in Montreal tapered off in 1929 with the Great Depression, and the following decade saw a great decline in building contracts (*Fifty plus* 1958, 18). This period also coincides with the election of Maurice Duplessis as Quebec Premier, and his long reign (from 1936 to 1939, and again from 1944 to 1959), a period known today as "*la Grande noirceur*" or the Great Darkness. This era in Quebec is today associated with corruption and patronage, as well as a hardline, pro-traditionalist stance, which promoted a strict adherence to the Roman Catholic Church, and vilified the growth of progressive social movements such as labour unions. The building slump in Montreal was thus further exacerbated by Duplessis's government, which placed a much greater emphasis on the development of the regions—considered the heartland of Francophone culture—over the infrastructure of urban centres.

The period of the Second World War represented the worst period in the port's history up until that point in terms of grain exports. While trade within North America increased after 1945, grain exports to Europe dropped off significantly after the war, making the Port of Montreal's access to the North Atlantic less

important. The physical segregation of the industrial port from the city of Montreal further intensified during wartime with the erection of a permanent fence to prevent sabotage and vandalism. Only those with business on the port were allowed entrance, creating a greater feeling of estrangement on the part of Montrealers towards the waterfront (Senécal 2001, 28).

The 1950s and 1960s did, however, represent a period of modernization at the port, with the construction of Silo no. 5's massive Annex B-1 between 1957 and 1959. A complex of 115 concrete silos that measure 185 metres in length, this most recent section of Silo no. 5 is the one most visible from the port, and the structure that most Montrealers identify with Silo no. 5 when they speak of it as a "concrete behemoth" (Panabaker 2005). The extension was undertaken in response to the construction of the St. Lawrence Seaway, which was being built at the same time to facilitate inland river navigation from the Port of Montreal. Ironically, it was the Seaway, a system of locks, canals, and channels that comprised the country's most massive concrete undertaking to date when it was constructed between 1954 and 1959, which accelerated the obsolescence of Montreal's port operations. Because of the Seaway, ocean-going vessels no longer had to stop at the Port of Montreal, but could continue unimpeded to the Great Lakes and inland destinations as far west as Lake Superior. As a result, the Lachine Canal's eastern entrance was filled in and closed in 1965 in order to facilitate access to the grounds of Expo 67 (Senécal 2001, 52).

Though the decline of Montreal as Canada's metropolis is often popularly linked to the rise of separatism in the 1970s and the referenda of 1980 and 1995, it

is as a result of the Seaway that the "city lost its status as a major industrial centre... From that point on, Montreal essentially entered a period of transformation from an industrial city into a city dependent on the tertiary sector, losing its status as the metropolis of the entire country and becoming instead the metropolis of its region" (Lortie 2004, 76).[63] Despite the surge of activity initiated for Expo and the cultural dynamism of Quebec during the 1960s, Montreal was already losing ground to Toronto, a city whose infrastructure had benefitted greatly from a period of immense public and private investment after World War II, and whose population doubled from one to two million people between 1951 and 1971 (Poplak 2007, 220). This trend would be exacerbated by the election of the Parti Québécois for the first time in 1976 and the introduction of Bill 101 a year later; as a result, many of the major international companies and financial institutions headquartered in Montreal decided to relocate to Toronto.[64]

As a result of the westward migration of trade, Montreal's giant silos grew increasingly obsolete, and by the mid-1960s, editorials in local papers began to once again decry the visual and physical obstacle that the elevators presented for Montrealers with respect to "their" river (Champoux 1966). The unwanted visibility of the silos was also seen as a problem by organizers in the run-up to Expo 67; given

[63] As Senécal points out, this shift was also a result of the declining demand from traditional European markets and the subsequent rise of Asian markets, leading to the Western migration of grain exporting to Pacific ports such as Vancouver's. The abolishment of the Crow Rate subsidies in 1984 by the Mulroney government strengthened this shift (52).

[64] Bill 101, or "The Charter of the French Language," is the controversial provincial law defining French as the official language of Quebec and designating its proper use in terms of education, business, commercial and public signage, products, websites, etc. Many international companies whose operating language was primarily English left the province subsequent to Bill 101's introduction; for example, Sun Life issued an announcement in 1978 that it would be moving its corporate headquarters from Montreal to Toronto as a direct result of the Bill, the largest corporate defection from the province since the PQ had taken power in 1976 ("Sun Life now remembers" 2012).

the event's triumphalist tone of technological progress, the increasingly redundant and unused silos represented an unwanted reminder of technological obsolescence. In an attempt to attenuate this sense of a visual interruption, the aging silos were camouflaged with a coat of grey paint in order to help them to better blend in with the view of the city from the grounds Expo 67 (Lesage 1966).

Despite this, the silos generated quite a bit of attention during Expo. Visiting architecture critic Reynar Banham (1976) remarked that the grain elevators "suddenly became some of the most widely commented [on] buildings there" (117). Banham cited the silos as proof that "megastructures grow wild in Montreal" (ibid) and argued that they could be fruitfully understood as the unlikely progenitors of the complex megastructures suddenly being built all over Montreal. Local architect Melvin Charney (1967) published "The Grain Elevators Revisited" in *Architectural Design* of that year, and argued that an understanding of the silos needs to move beyond a "simple appraisal of the design-image"—the idealization of the silos as pure geometric form—towards a greater appreciation of the grain elevators as complex mechanisms "rather than the lumpish neo-monuments of yesteryear" (331).

Despite this re-appreciation for the structures on the part of architects, there was increasing pressure, especially after the designation and redevelopment of Old Montreal as the city's first "*arrondissement historique*" in 1964, to demolish the silos. They were described in the press as obstacles to the city's heritage in that they blocked the view of the historical district from the water. While a few dissenting voices argued for their preservation as historical buildings in their own right, Silo

no. 2—that former icon of modernism made famous by Walter Gropius and Le Corbusier—was brought down by a controlled explosion in 1978.[65] In 1983, though there was considerable opposition,[66] Silo no. 1 was similarly demolished.

Silos as Industrial Heritage

By 1994, though still under the proprietorship of Montreal's Port Authority, Silo no. 5's empty hulking concrete frame and broken windows haunted the city's waterfront. Designated a "recognized building" by the Federal Heritage Buildings Review Office in 1995—a classification which does not prohibit demolition but nonetheless encourages or implies that changes should be made in accordance with particular heritage value—the Silo's fate was uncertain, with editorials still divided on whether it represented "blight or heritage site" (Peritz 1995).

In 1996, *La Presse* ran an editorial by contributer Alain Dubuc entitled "*Les fous du patrimoine*," where the author argued against the preservation of the Silo on the grounds that "*une ville n'est pas un cimetière, un ensemble figé de momies qui témoignent des moments de son passé*" (Dubuc 1996). In addition, he leveled the century-old argument that the silo blocked Montrealers' view of the water, and that demolishing it would open a window on the river. This had the reverse effect of galvanizing some popular support against Dubuc's point of view, most notably in the response pieces by the urbanist Pierre Malo, (1996) and the director of programs at

[65] Because it was such a massive expanse of reinforced concrete, Silo no. 2 did not go down easily; as one paper reported at the time, the first explosion did not succeed in razing the structure ("Un autre élévateur résiste à la dynamite" 1978).
[66] Among the groups opposing the demolition of Silo no. 1 were Heritage Montréal, Sauvons Montréal, the Syndicat national des employés du port de Montréal, and the Union des producteurs agricoles (Lemoine 1983, 2).

Heritage Montreal Dinu Bumbaru (1996), who argued for the preservation of the Silo on the grounds of its cultural significance, and pointed out that demolishing it would not in fact open a window on the river, as there were other installations behind it (such as the locks and the Bickerdike pier) that would still block the view.

In 1998, the Association québécoise pour le patrimoine industriel, in conjunction with Heritage Montreal, held a day of study on the topic of *Le silo no. 5 du port de Montréal et son secteur : le passé, l'avenir*, which similarly affirmed the growing sense that Silo no. 5, unlike nos. 1 and 2, should be preserved and reused. By 1999, the debate began to shift from whether to demolish the Silo—"ce mur de béton et de métal qui fait écran au fleuve" (Marsolais 1999)—to what uses it should ultimately be put to, leading to much speculation but no concrete plans.

The Culturization of Ruins: Art and Silo no. 5

Over this fallow time, Silo no. 5 became host to a number of artistic interventions that brought it a new notoriety. In 1997, perhaps taking a cue from all the press coverage referring to the Silo as a "screen blocking the river", the Montreal architecture firm Atelier in situ used the massive undulating concrete surface of Elevator B-1 to screen their large-scale light installation *Projections* (**Figure 18)**. Over the course of one night, Atelier in situ projected photographic imagery such as spiral staircases, caryatids, and a waterfall on the cylinders, in order to draw attention to the history of the structure. Unlike earlier visual representations of the silos as symbols of progress and the future, these projections instead foregrounded their obsolescence and evocative ties to the city's industrial past, locating the Silo as

a potential nexus of cultural memory and industrial nostalgia. Three years later, in 2000, Atelier in situ continued their campaign to preserve the elevator with their *Machine à voir* campaign, which took the form of a guerrilla advertising campaign, inserting images of the Silo in public spaces and billboards across the city.

Since *Projections*, the use of silos for light installations and projections has become somewhat common practice in Quebec.[67] In 2005, Axel Morgenthaler used the Canada Maltage grain elevators, in the shadow of Silo no. 5 in the industrial port, for his installation *Obsolescence.* Morgenthaler's "*poème lumineux*" featured strobe lighting in the conveyer houses above the silo—abandoned in 1980—to draw attention to the previous life of the building (Laurence 2005). Three years later, in 2008, Robert Lepage, Quebec's renowned theatre and film director and interdisciplinary artist, launched his *Moulin à images* or *Image Mill* in Quebec City to commemorate the 400th anniversary of the capital's founding. Like *Projections*, *Image Mill*, which ran every summer until 2013, used the massive concrete surface of the Bunge grain silos—which unlike Silo no. 5 are still in operation—as a massive projection screen to draw attention to the city's past. Unlike *Projections*, *Image Mill* used moving images and took the form of a projected film, the content of which varied slightly from year to year, but was usually tied to representations of Quebec City's past.[68]

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[67] This phenomenon is not limited to Quebec, international examples include Auckland, New Zealand's Silo Park, opened in 2011, which holds weekly screening of films on the side of Silo 7, and Buffalo, New York's Silo City, which hosts the yearly City of Night, a multidisciplinary art event that incorporates a lot of light installation and projections on the sides of the silos.

[68] With the exception of the version projected in its final year, 2013, which honored the work of famed National Film Board animator and director Norman McLaren on what would have been his 100th birthday.

In these light installations—part of a larger movement in art and architecture involving large-scale projections onto buildings, also known as "architectural projections" or "urban projections"—the silos themselves are used as screens for actual filmic or digital projections, most of them dealing with history and the passage of time. In this way, they can be productively understood as manifestations of Huyssen's (2010) description that "[r]eal ruins of different kinds function as screens on which modernity projects its asynchronous temporalities and its fear of and obsession with the passing of time" (19). By projecting—quite literally—representations of history on obsolete sites of industry, these installations can be read as attempts to negotiate the meaning of these potentially indecipherable legacies of modernity. In effect, they force a certain legibility on these abandoned sites, whose signification has become unmoored by their obsolescence.

In 2000, Silo no. 5 played host to another sort of installation, though this one was acoustic rather than visual. [The User]'s *Silophone* project, funded somewhat controversially by a large grant from the federal government, made use of the empty silo as a giant musical instrument through the installation of microphones and loudspeakers inside of four of Elevator B-1's empty storage chambers. These were then made accessible to the outside world via a website, a telephone number, and the "Sonic observatory," a permanent public sound installation located near the site in Montreal. People could call in or use the internet to broadcast sounds into the cavernous chamber of the concrete silos, and the echo would then be broadcast back to the speaker, a recording of which would then be made and put on the online archive of the project. Similar to Atelier in situ's interventions, [The User]

foregrounded the Silo's status as an obsolete technology, reimagining the city's interaction with the abandoned site through a reconfiguration of its emptiness as potentially generative.

These installations are vastly different from the earliest depictions of the grain elevators, photos such as those reproduced by Le Corbusier and Gropius, and paintings by local artists that emphasized the functionality and modernity of the silos, streamlining its form to create an idealistic utopian image of progress and what David Nye (1994) calls "the technological sublime." While avant-garde architects delighted in the image of the grain elevators as stolid monoliths cut off from history, these latest installations instead attempt to literally reanimate the structures, using light and sound to force these otherwise inaccessible buildings into a dialogue with an imagined past. With the exception of Lepage's *Image Mill,* these projects celebrate the structures on the grounds of their obsolescence and work to foreground the silos' status as neglected urban ruins. Instead of using them as models for a rationalist future, they portray the structures as archaic monuments to an industrial past. This is accomplished, for example, in *Projections*, with its use of the image of the caryatids projected on the cylinders of Elevator B-1, linking these former technological wonders of grain storage to the columns of antiquity and a classical ruin culture. *Silophone* similarly privileges an understanding of the Silo as an obsolete technology, as the echo effect created by its cavernous concrete chambers depends on its neglect and emptiness.

The success of these installations is similarly reliant on their status as concrete. Whereas the avant-garde modernist architects highlighted the material's

more prosaic attributes of being inherently fireproof and apparently devoid of historicism, these recent installations highlight the more aesthetic or poetic qualities that concrete has acquired over time. For example, the unblemished cylindrical surfaces of Elevator B-1, shapes determined by the structure's use of concrete (as opposed to rectangular steel elevators, for example), were the inspiration for which images were ultimately selected for *Projections* (Bonnemaison and Eisenbach 2009, 136). Similarly, Silophone was inspired by the unmatched resonant acoustic qualities that the smooth reinforced concrete of the cylinders made possible (Kronick 2000). These aesthetic treatments of concrete as an evocative object endowed it with a type of imaginative patina, a projection of lost time that the material's uneven susceptibility to decay and ruin could not otherwise convey.

In this way, though they may do nothing to change the actual economic reality of the postindustrial port, these installations functioned as a way to affect what Barndt (2010) describes as "the culturization of industrial ruins" (276). This process, the aestheticization of ruins that Hell and Schönle (2010) describe as "unavoidable" (1), works as a "screen in between matter and subjectivity… [buffering] the material consequences of structural change for residents and visitors alike" (Barndt 2010, 277). As such, artistic installations like *Projections* and *Silophone* are typically the first step in the rehabilitation of abandoned sites of industry as new sites of cultural capital, exorcising the ghosts of earlier lay-offs, decline and urban blight in a narrative of artistic reappropriation and heritage considerations.

Strategies of containment: The Silo as Cultural or Technological Hub

Installations such as *Projections* and *Silophone* have in distinct ways consecrated the concrete of the silo, making it more important as a heritage building replete with cultural credentials, and therefore more worthy of preservation. In the years after its abandonment, Silo no. 5 became a popular site for the growing trend of urban exploration—the generally illegal and potentially dangerous activity of breaking into and exploring industrial ruins—and so these artistic installations have also served as what Tim Edensor (2005) describes as "strategies of 'containment'" (312). These strategies, such as art and heritage practices, Edensor argues, function to give order to and rehabilitate sites of excessive wildness such as abandoned industrial sites, where the previously obvious schemas of meaning and utility of the factory have broken down and begin to threaten the wider illusion of order in the city (328).

Even before the sale of Silo no. 5 to the CLC, these strategies of containment began to be articulated along twin axes; namely, the transformation of the Silo into some sort of cultural centre (with or without adjoining condos or a hotel), and the conversion of the top of Elevator B-1 into a lookout with unparalleled views of the city. In the summer of 2005, Montreal's Port Authority, the owners of the site, issued a call for proposals to modernize and redevelop the unused silo. The top three proposals that made it through to the second round of considerations were BUSAC Immobilier, Société no. 5 (a consortium of Les Développements d'Arcy McGee et L.M. Sauvé Limitée), and Montreal's Musée d'art contemporain (MAC). Though each

proposal had common features,[69] it was the MAC's plan to convert the Silo no. 5 into an annex for the Musée d'art contemporain that generated the most public interest and press coverage.

Marc Mayer, then the director of the MAC, described how, because of a lack of available space at the existing museum at Place des Arts, the MAC was only to display approximately 1.5% of its collection, whereas, with the addition of the Silo, that would grow to 10% (Aubin 2005). The MAC's plan involved building the museum at the top of Elevator B-1, topped by a public observatory, a feature common to many of the proposals, as well as the installation of a museum on the history of Montreal's industrialism in the steel building of Elevator B. The older concrete annexes on the western side of the site would be razed to make way for residential units. Though Mayer hoped to open the gallery by the June 2009 (Delgado 2005), the plan to redevelop the silo ran out of steam by 2008 when Mayer left to become the director of the National Gallery of Canada. None of the final proposals were carried out and by 2010 the CLC had purchased the site and the speculation began again about what would be the fate of the still-vacant Silo.

The reasons for the early enthusiasm around the MAC's proposal of housing an art gallery or cultural centre at the Silo—and its resuscitation after the announcement that the CLC would again be soliciting proposals for the site's redevelopment—derive from a combination of factors, foremost among them the Silo's previous implication in artistic installations. These earlier projects prepared

[69] All three groups proposed to conserve the 44 cylinders of Elevator B-1, to install cultural museum commemorating the city's industrial heritage in the central steel section of Elevator B, and all of them would raze the western portion (Annexes 1 and 2) to install either a residential tower or modular condos (Baillargeon 2005).

the ground for an argument on behalf of the abandoned grain elevators as possessing the right credentials for such a project. This is reinforced by a wider international trend of converting old sites of industry such as factories and silos into museums and art galleries, with the transformation of London's Tate Modern the foremost example of this, often cited in the local press as a point of comparison. The Tate's galleries are housed in the former Bankside Power Station, transformed from an industrial relic in 2000 by the architecture firm of Herzog and de Meuron into the most popular modern art museum in the world. The Tate capitalized on the cache of industrial conversion for gallery sites once again in 2012 when they opened The Tanks, the vast underground chambers beneath the Power Station which once held a million gallons of oil and are today an extension gallery for live installation work.

The adaptation of former sites of industry as artistic or cultural centres is a development that has been gaining popularity over the last twenty years, with projects such as The Tanks, Argentina's Museum of Contemporary Art of Rosario (MACRo, housed in the abandoned Davis Silos), and the more recent plans to convert Cape Town's Grain Silo into a contemporary art gallery as notable examples. These conversions effectively capitalize on the gains of earlier "containment strategies" to transform disaffected industrial sites into sites of cultural industry.

Part of the problem with the rehabilitiation of Silo no. 5 in particular is related to the physical limitations created by its location on a pier, and the material restrictions created by its reinforced concrete. Located on the very narrow Pointe-du-Moulin, the parameters of the Silo are similarly constrained: though altogether the structures of Silo no. 5 measure over 400 meters, roughly the distance between

Montreal's Peel and Bleury Streets, it measures only 46 meters at its widest point, which are the decrepit Annexes 1 and 2. The concrete of the annexes is in especially bad shape compared with that of the much newer Elevator B-1, and Aldo Sylvestre, the CLC's Director of Real Estate for Quebec, has said that Annex 1 especially (built between 1913 and 1914) is not suitable for conversion given its current state; further, it is not protected to the same degree as the other buildings at the site (Sylvestre 2012). Elevator B-1, often the structure that comes to mind when the redevelopment of the site is discussed, due to both to its massive size and the fact that structurally it is the most sound of the buildings, is only 14 meters wide. Because of its design, comprised of two interlocking rows of narrow concrete cylinders, and the difficulty in opening or selectively dynamiting sections of the cylinders to open the space, it is a problematic structure to transform into to a museum, condos or a hotel as in the case of previous silo conversions in other locations (ibid). As a result, it is usually the gallery above the cylinders that is discussed in terms of an actual cultural site. The top three proposals chosen by the Port of Montreal after the call in 2005, all proposed (somewhat vaguely) converting the vast expanse of concrete below into containers for renewable energy, suggesting that they could be used to heat or cool the complex above.

The difficulty of appropriating this large vertical concrete structure led to the enthusiasm around a more recent proposal floated after the acquisition of the Silo by the CLC in 2010. In 2012, after the CLC had announced plans to solicit proposals for the site once again, one possible idea was again chosen as a favourite in the local press. Vert.com, a Quebec tech company, made headlines with their informal

proposal to convert the massive concrete cylinders into a data center, consisting of 112,000 servers placed vertically in the 44 cylinders of Elevator B-1, a project they branded *Siloctet* (Deglise 2012). The appeal of this plan was manifold: it spoke to the growth of the technology industry and the capital that such a venture could bring, gesturing to a new sustainability for the long-abandoned site, while at the same time, it proposed a tantalizing historical symmetry, substituting the storage of grain for the storage of pixels, and gesturing at a wider shift from a resource to a knowledge economy. As Éric Mateu, the spokesperson responsible for *Siloctet* described to the press, "*les grains et les données informatique ont besoin finalement du même environment pour leur conservation*" (ibid).

Despite the popularity of the project in the press, *Siloctet* has remained just a suggestion, and Sylvestre has described how Vert.com has yet to propose a comprehensive plan for the entire site as opposed to just the cylinders. Another issue with this plan, and with many of the proposals for the site over the years, is the fact that no redevelopment of the site can interfere with the still-functioning freight rail lines—owned and operated by the Port—that crisscross the Pointe-du-Moulin right through the site of Silo no. 5. This is problematic both because the lines essentially bisect the site and make it less pedestrian-friendly and less easy to adapt, and also because the vibrations of the train—which runs day and night—could potentially interfere with whatever is eventually installed at the site, whether it is a server farm or a museum, hotel, or art gallery.

Though Phase 1 of the Silo's redevelopment was originally scheduled for completion in 2017, Sylvestre (2014) has more recently indicated that these plans

have been pushed back, and that there will be a public consultation process in 2015 to define uses for the site. However, there are ongoing plans to create some type of short-term installation at the Silo in 2017 to mark the celebration of Montreal's 375th anniversary; Sylvestre has indicated that they are looking at examples such as Quebec City's *Image Mill* (though he indicated that that particular example was prohibitive in terms of expense) and other artistic installations for inspiration, and so it seems likely that it will involve some sort of projection.

View from the top: Silo as Lookout

The other idea that was consistently invoked in the press around the conversion of the silos was the creation of an observatory at the top of Elevator B-1. As Ross (2003) describes, in an architectural charrette organized in part by DOCOMOMO Quebec in 2000, "[i]t was generally agreed that giving access to the roof for the spectacular views it provides of the city and the river would be an important first step" (33). In an interview with *Le Devoir* a few years later, Dinu Bumbaru from Heritage Montreal proposed that, instead of spending millions redeveloping the Silo for residential or other purposes, "*il serait peut-être plus simple de placer un ascenseur menant à une terrasse pour permettre aux Montréalais de bénéficier de la vue exceptionelle offerte sur Montréal, le fleuve, le port, la Montérégie. Monter là, c'est une expérience symphonique, c'est Gershwin à Manhattan. On n'a pas vraiment besoin de plus que ça*" (Baillargeon 2005). Sylvestre has likewise mentioned the possibility of an observatory at the top of Annex B1 (Huddart and Lesk 2011), which was one of the recommendations resulting from a visioning

exercise conducted with local stakeholders in 2010 ("Visioning Exercise" 2010). Perhaps to stimulate interest in the project, soon afterwards, CLC posted a video on Youtube in that features a 360°, panoramic view from the top of the silo ("Pointe-du-Moulin, Montreal - Silo No.5 - 360 view" 2011). Despite the apparently simplicity of such a conversion, Sylvestre (2014) has more recently acknowledged that this project is complicated by safety and insurance issues.

The redevelopment of decommissioned industrial sites into urban promenades and lookouts is something that has gained popularity in recent years, most notably with the success of the High Line, an elevated railroad track converted into an aerial greenway in Manhattan in 2009. This type of ruin re-appropriation functions as an efficient way to make the erstwhile industrial site itself more picturesque, while simultaneously reorienting the gaze away from the industrial ruin back towards the city that found it so offensive during its original usefulness. A deceptively simple and powerful way of colonizing once-inaccessible and mysterious sites, this conversion process also effectively capitalizes on the industrial nostalgia of the present as a way to bring tourism and gentrification to previously underused areas of the metropolis. This type of conversion also speaks to a wider interest in climbing these sites, ascending or scaling them (whether through illegal urban exploration, or formal installations such as their conversion into lookouts or climbing gyms[70]). In turn, such strategies potentially rehabilitate "bad" or dangerous concrete ruins into something less threatening to modernity's ongoing

[70] The conversion of many old industrial sites into climbing gyms has also become somewhat standard practice as well. These include the Duisburg North Landscape Park in Germany, "Silo City Rocks" in Buffalo, and Montreal's very own Allez Up climbing gym in the former Redpath sugar silos, opened in 2013.

imbrication with narratives of progress and technological determinism, subsuming uncomfortable questions about unsustainable economies and unchecked growth into an urban pastoral landscape that effectively converts obsolete machinery into man-made nature.

In the case of Silo no. 5, such a project is especially compelling as it offers the prospect of transforming the structure's original status as a visual obstacle to the city and to the water, to the site of its ultimate reconciliation through a bird's eye perspective on the surrounding environment. To view the city from the Silo is finally to view the city without the Silo, an idea analogous to Maupassant's statement that he chose to eat lunch at the restaurant in the Eiffel Tower because it was "*the only place in Paris*, he used to say, *where I don't have to see it*" (Barthes 2005, 164). Much like Paris's Tower, Montreal's Silo would similarly become "the only blind point of the total optical system of which it is the centre and [the city] its circumference" (165).

For over a hundred years, Silo no. 5 has challenged Montreal as an anomaly: a symbol of modernity that the city could not readily assimilate or claim outright; an embarrassing blight on the local landscape praised by international critics; a heritage building that distracts from the city's historic district; and a barrier to Montreal's sightlines with unparalleled views of the metropolis. In the CLC's potential proposal to create a belvedere at the top of Silo no. 5, an obstacle in the city's panorama is potentially converted to the site of its ultimate reconciliation, where one might glimpse the fractured spaces and histories of Montreal's modernity and urbanity reanimated in a fantasy of visual plenitude.

CHAPTER 3

Concrete Honeymoon: The Turcot Interchange

There is a scene one hour into the zombie rom-com *Warm Bodies* (2013) in which a horde of the undead is lurching towards an anonymous American city, played without much embellishment by Montreal **(Figure 19)**. Overturned trucks, stalled cars, and weeds litter the foreground; an abandoned concrete overpass looms large on the horizon. This structure—recognizable to Montreal commuters as the onramp to the Mercier Bridge—forms the westernmost part of the Turcot Complex, a massive interchange in the southwest of the city. The zombies are heading (very slowly) east, along the concrete spans of the decrepit Turcot, towards the downtown core of the unnamed city. Montreal's much-maligned "crumbling infrastructure" needed little in the way of CGI to make it convincing as a ruinscape,[71] and local press praised director Jonathan Levine's ability to "appreciate the apocalyptic splendour of our Big O, Mirabel Airport and Turcot Interchange" (Brownstein 2013). As reviewer Brendan Kelly (2013) noted, "no post-apocalyptic film shot here would be complete without some scenes on the decrepit Turcot Interchange."

The Turcot Interchange—or simply "the Turcot" as it is unaffectionately known to Montrealers—is a vaunting stacked freeway hub that links highways 15 (Décarie Expressway), 20 (Autoroute du Souvenir—whose central part forms part

[71] The only obvious alteration to the landscape is a computer-generated Berlin Wall type of fortification around the downtown core that serves, in the narrative, to keep the zombies out and the humans in. The other significant change in the cityscape is that the Olympic Stadium has been moved from its location on the eastern side of the city to just south of downtown, a change necessitated by story, the ending of which takes place at the Big O.

of the Trans-Canada Highway), and 720 (Ville-Marie Expressway), and provides access to the Champlain and Mercier Bridges. Like so many "*monuments de la modernité architecturale québécoise*" (Gauthier 2011, 61), the Turcot was built in anticipation of Expo 67 to showcase Montreal's modernity to the world. When it officially opened (just two days before Expo in April 1967) it was considered a technological and engineering marvel of unprecedented scale.[72]

As with many freeways of the postwar era, the Turcot takes the form of an elevated and curving "spaghetti junction", the nickname given to the complicated and intertwining structures popularized during the postwar highway-building boom of the 1950 and 1960s.[73] Comprising over seven kilometers of road over an area of seventeen acres, the graded turnpike, with a radius of nearly a thousand feet, was the first of its kind in North America. The largest interchange of its kind in Quebec, today the Turcot's four levels handle an average of 300,000 vehicles a day, nearly five times the capacity it was designed to carry (Gauthier, Jaeger and Prince 2009, 21).

The Turcot has not aged well over its nearly-fifty year existence; as early as 2003, a report prepared for the provincial government by the engineering firm SNC-Lavalin confirmed that the structure was shedding chunks as large as one square meter before a wire mesh was added to keep them in place (Gohier 2011), creating a visual effect that does not inspire much confidence for motorists (**Figure 20)**. Since

[72] The Turcot was officially opened April 25th, 1967, two years after construction began in October 1965, and was constructed in stages. This initial unveiling comprised the first three grades of the autoroute, redistributing traffic between the Decarie from the north, what was then route 2 from the Mercier Bridge to the west to the Champlain Bridge and the Bonaventure Expressway to the south. ("Communiqué Inaugural" 1967).

[73] The term "spaghetti junction" was first used in 1965 in reference to the Gravelly Hill Interchange on M6 motorway in Birmingham, England (Moran 2009, 45).

the collapse of the De la Concorde overpass in 2006, the Turcot has become the most highly scrutinized structure in Quebec (Gauthier, Jaeger and Prince 2009, 23), subject to hundreds of inspections and repairs. Though plans to demolish and rebuild the entire Turcot Complex at ground level were unveiled in 2007 by Transports Québec, these have been mired in controversy since their announcement for a variety of reasons, including the proposed expropriation and demolition of residences in the Village des Tanneries neighbourhood, inadequate provisions for public transportation, and fears that the plans to increase traffic capacity at ground level will lead to greater air and noise pollution in the surrounding areas. Added to this, reconstruction plans were further stalled by the scrutiny of several of the major construction firms vying for the public works contract in the light of the Charbonneau Commission.[74]

As a result of these factors, the original completion date of 2016 for the new Complexe Turcot has been pushed back several times. Though Phase I began in 2011, in 2013, then-Quebec Premier Pauline Marois announced that the cost for the new Turcot had gone from the original projection of $1.4 billion to $3.7 billion, making it the most expensive construction project in the province's history (Madger 2015), with the completion date pushed back once again from 2018 to 2020 (CBC

[74] The final three consortia included Groupe Futur Turcot (of which SNC-Lavalin—an international engineering firm heavily implicated in the Charbonneau Commission—was a leading partner), Groupement Nouvel Échangeur Turcot (which, among other firms, included Quebec construction company Pomerleau, which had a project manager arrested by Quebec's anticorruption unit, UPAC, in October 2014 for allegedly attempting to sell strategic information to a competitor in the bidding process for the construction of the Turcot) and KPH Turcot (McCormick 2013), the winning bidder helmed by two US-based companies, Kiewit and Parsons, and WSP Canada, whose UK-based parent company, WSP Global, merged with the Montreal firm formerly known as Genivar Inc (a company that was also implicated in the Charbonneau Commission, and whose merger with WSP Global was seen by many as an attempt to distance themselves from the scandal in Quebec) (Van Praet 2013).

News 2013). In December 2014, Quebec's Transportation ministry (MTQ) finally announced that the contract for the reconstruction had been awarded to KPH Turcot, and that Phase 2 of construction—which includes the demolition of the existing structure and the building of the new Turcot—is set to begin in the summer of 2015 (Magder 2015). The older structure is being left in place while the new Turcot is built around and underneath it, with the aim of causing less disruption to traffic. However, this has meant that the interchange is in a perpetual state of construction, with lane closures announced daily in the news. This, in combination with delays and skyrocketing costs for the new Turcot, has generated even greater resentment for the already-unloved interchange.

This chapter examines how the Turcot, originally conceived of as one of Montreal's key life-sustaining "arteries", promoting circulation and thus the health of the city, has, in the intervening decades, become synonymous with stasis, death and decay, both at the physical level of infrastructure and metaphorically as a sign of the province's more general decline. This transformation has been mediated both by the actual aging of the structure's concrete, as well as by the shifting semantic economy around the material of modernity, itself partially a result of a concomitant transformation around attitudes towards urban sprawl and the automobile.

Concrete's fortunes shifted definitively during the postwar decades: from the early twentieth century's embrace of the novel material as a type of signature for modernist design and its most well-known architects such as Le Corbusier, its use in architecture was gradually eclipsed by its role in the development of urban infrastructure, especially its use in the construction of highways and expressways,

becoming, by the late 1950s and 1960s, the ubiquitous surface of urban modernity that we know today.

Much as the iron Parisian arcades were, for Walter Benjamin, the most important architectural form of the nineteenth century in France, determining many characteristics of urban life such as the habits of the *flâneur* and new movement of goods and people through the city, concrete highways have largely defined our experience of the twentieth century North American city, creating new ways of seeing, moving, and experiencing the metropolis. And while the arcades were dependent on new materials and modes of production such as the development of iron construction in the early 1800s, mid-century highway building was dependent on the development of reinforced and prefabricated concrete technologies. In this way, the aging, largely anonymous concrete of mid-century highways such as the Turcot offers, in a manner similar to that made possible by the iron and glass of Benjamin's vanishing arcades, a way of approaching and excavating the material traces of the past in the present, a way of tracing their shifting significance and unfulfilled utopic potential while also throwing the present into sharp relief.

(Infra)structures of Feeling

In the strictly functional terms through which they are usually understood, infrastructure such as highways and roads can be broadly understood as communication media: "built networks that facilitate the flow of goods, people, or ideas and allow for their exchange over space" (Larkin 2013, 238). They are also important representations of state power and authority over a given territory,

functioning to make the natural landscape more accessible and thus more easily governed, as well as performing a symbolic role as a marker of modernization and progress (Kaika 2006). In the form of highways and inner-city expressways, roads have dramatically reconfigured our understanding of cities, making them closer to one another in time through the speed of automobiles, as well as reorienting the urban experience around the trajectory and scale of the car.

Far from only technical objects however, infrastructure such as roads and highways also "operate on the level of fantasy and desire. They encode the dreams of individuals and societies and are the vehicles whereby those fantasies are transmitted and made emotionally real" (Larkin 2013, 333). As Joe Moran (2009) describes, roads are cultural artifacts as much as concrete ones, an understanding often overlooked in favour of their understanding as purely functional objects. According to Moran, "although cars are one of the most semiotically rich objects we own—loaded with the symbolic baggage of money, status, sexual competitiveness and aesthetic pleasure—roads, without which the cars would be almost useless, are simply part of our unnoticed collective life" (19). As such, roads are a classic example of Bowker and Star's (2000) assertion—echoing Heidegger's description of the move from the "ready-at-hand" to the "present-at-hand"—that infrastructures are "by definition invisible," only to "become visible on breakdown" (380).

Although they are roundly condemned today as aggressive, dangerous interstitial spaces hostile to human scale and urban life, the type of no-man's land

that J.G. Ballard epitomized in *Concrete Island* (1974),[75] expressways and highways once evoked an unbridled enthusiasm and optimism round the regeneration of the downtown core. Peter Hall, the geographer who wrote effusively about the promise of the elevated expressway in his *London 2000* (1963), describes our collective disenchantment with the promise of highways as "one of the biggest and most sudden psychological changes…that ever occurred in the history of the twentieth century" (207-208). Matthew Gandy (2003) links this disenchantment to the larger demise of technological modernism, citing how, "When the West Side Improvement in Manhattan was opened in 1937, for example, the *New York Times* described it as 'one of the most magnificent urban highways on earth.' Yet by 1973 the *Times* was referring to the same highway as 'an ugly traffic wall between the city and the river'" (117). As Moran (2009) describes, roads and highways "are a rich resource for…the study of how our thoughts and feelings change imperceptibly over time while seeming as natural and inevitable to us as breathing" (15).

Tracing the history of this shift through the changing cultural perceptions of concrete provides one way of charting the complex relationship between architectural and cultural forms and the complex emotional investments in possible futures that they reveal. As Penelope Harvey (2010) describes, concrete "is a substance that binds the material and ideational promises of modernity and also allows us to observe how and where fractures appear" (32). From a new, potentially

[75] Ballard's novel tells the story of Robert Maitland—an architect—who gets stranded on an interchange in London after crashing his Jaguar. Forced to survive only on what he finds in the fenced-off wasteland where he finds himself and what's in his car, the book is effectively a dystopian modern take on Robinson Crusoe, and along with his novels *Crash* (1973) and *High Rise* (1975) form what Peter Brigg has described as Ballard's "Urban Disaster Trilogy" (1985).

revolutionary material in the early decades of the twentieth century which epitomized the promise of the machine age for individual architects such as Le Corbusier seeking a "new architecture," it had already become associated, by the postwar building boom of the 1950s and 1960s, with the bureaucratic, anonymous urban renewal projects that were changing the circulatory networks of cities across North America and Europe.

This sharp contradiction between past and present is evidenced in the changing reactions to the Turcot over the last half-century: once a robust symbol of the utopic modernism of Expo-era Montreal, today its name summons wider connotations of the city as a crumbling, corrupt dystopia. Though its 220,000 cubic yards of concrete were once an index of the Turcot's unblemished modernity ("Communiqué Inaugural" 1967), today its splotchy, graffitied cement, held in place with wire mesh, is its greatest liability, the most visible sign of its premature decrepitude and most potent signifier of a perceived wider moral and fiscal laxity on the part of the province. Reactions to the surface of the Turcot, to its very concrete, are often visceral and emotional; as a resident of the working-class Montreal neighbourhood in the shadow of the interchange put it, in Shannon Walsh's documentary *St-Henri, the 26th of August* (2011),"[t]he Turcot Interchange is the worst shit I've ever seen. If it were up to me, instead of throwing away so much cash, I'd put a fresh coat of white paint to make it look shiny and new and that would be the end of that." Emotionally-charged reactions such as this to something as seemingly banal as a highway interchange illustrate Brian Larkin's (2013) assertion that, "[a]lthough massive infrastructural projects can be used to represent state

power to its citizens…the political effects of these projects cannot be simply read off from their surfaces. They generate complicated emotional investments that induce a range of sometimes counterintuitive responses and distinct, if ephemeral sensibilities" (334). In the case where these infrastructural projects are later interpreted as failures—or qualified failures as in the case of the Turcot—these emotional investments are further complicated. Drawing on Raymond Williams, Larkin describes how, in the context of soviet-era Russian highway investiture, "[t]he detritus of failed infrastructural projects bears witness to a certain structure of feeling that constitutes the postcolonial state's imaginative investment in technology" (ibid).

In the public imaginary of Quebec—and as represented in film, television, and news discourse dealing with the province's badly-maintained autoroutes, of which the Turcot is the preeminent example—the failure of infrastructure and anxiety around crumbling concrete have become part of the broader moral discourse around Quebec's regulatory and fiscal laxity. This, in turn, plays into a longer image of the province—and Montreal in particular—as somehow inherently corrupt and backwards, a narrative that stretches back to at least *la Grande noirceur*. However, while it is difficult to imagine from today's vantage point, where it's associated with death and decay, when the Turcot was unveiled in 1967, it was hailed as a modern marvel, capable of eradicating blight and bringing life-giving circulation into the city.

The History Of Montreal's East-West Expressway

Highways, and the concrete that made them possible, have radically reconfigured our relationship to the landscape over the last century, connecting once-distant locations with unprecedented ease and speed. In Canada, a country of massive distances and a relatively sparse population, the construction of the Trans-Canada Highway[76] (THC) and its contemporary provincial road infrastructure after World War II had a dramatic effect on the country's connectivity: as Lortie (2004) maintains, "if the great national work project of the nineteenth century was the transcontinental railroad, in the twentieth century it was the Trans-Canada Highway, far more than air transport, that symbolized unification of the territory" (79). Concrete manufacturers were aware of this, and would include photographs of the newly constructed sections of the Trans-Canada along with images of other concrete realizations, such as Place Victoria and the Manic 5 Dam[77] (**Figure 21**).

The country's major cities also underwent dramatic changes and reorganization after World War II with the development of inner-city highways and expressways attempting to ease growing automotive congestion. In Montreal, many of the changes to the city's road infrastructure came about as a result of the City of Montreal's Master Plan of 1944. The ideology of decentralization played a major role

[76] Though there had been agitation for a national roadway since as early as 1910, it was the Trans-Canada Highway Act of 1949 that initiated construction on what would become the world's largest national point-to-point highway system. Construction on the Trans-Canada Highway (TCH) began in 1950, though the highway was not opened until 1962, with the final segments completed in 1971. The result of a cost-sharing act between the federal and provincial governments, the construction of the highways was entirely under the jurisdiction of the provincial governments.

[77] Manic 5, also known as the Daniel-Johnson Dam, is located on the Manicouagan River. Constructed between 1959 and 1970 for Hydro-Québec, and composed of 67.5 million cubic feet of concrete, it is the largest largest hollow-body multiple-arch-and-buttress dam in the world ("Manic 5 dam" 2007, 9).

in the development of both the United States' and Canada's highway infrastructure. Expressway planning in Montreal during the 1940s and 1950s was largely influenced by America's interwar highways (Hodges, 2012, 54), and the 1944 Master Plan references examples from New York, Chicago, and Los Angeles, among other cities. The Turcot formed the westernmost point of the city planning department's long-term goal, first articulated in a report from 1948, to create an East-West Expressway easing downtown congestion and facilitating access to the areas surrounded the urban core and the rapidly-expanding suburbs off of the island. The route of the proposed expressway would later be laid out in the "Lalonde and Valois Plan" of 1959 (Hodges 2012, 46),[78] which would face several alterations before the expressway was completed in 1970 with the construction of the Ville-Marie Expressway, which stretched from the Turcot Interchange to the city centre.

Traffic and Circulation

The Office National du Film's (ONF—the French section of the National Film Board) series of two films from 1955, *Circulation à Montréal*, paints a portrait of Montreal in the mid-1950s as a city on the verge of a crisis: honking horns and gridlock are portrayed as a scourge threatening the city's livelihood. The "problem" of traffic in Montreal—as in the rest of North America—was understood at this time as a problem of scale: more cars in the city called for more roads and bridges, as well

[78] This engineering firm, founded in 1936 and responsible for a number of public works in Montreal in addition to the Turcot, later became known as Lavalin Inc. In 1991, Lavalin fused with another large Quebec engineering firm, SNC, to become SNC-Lavalin, one of the companies involved in the consortium Groupe Futur Turcot. SNC-Lavalin is currently being investigated by the Charbonneau Commission for alleged illegal party financing and their involvement in the construction of McGill University's new super-hospital, dubbed the "biggest corruption fraud in the history of Canada" (Hamilton 2014).

as the widening of existing streets. In the films, Montreal's status as the country's metropolis is described as dependent on long-term traffic solutions. In front of a large map of the city, a young Mayor Jean Drapeau[79] outlines the need for new expressways in the city using the common metaphor of circulation in the human body to describe the role of traffic in the city, explaining how, if the arteries don't function properly, economic problems are sure to follow.

The rhetorical use of the biological metaphor of circulation is not unique to city planning; as Erik Swyngedouw (2006) outlines, it had been in use since the influential work of the English scientist William Harvey on the circulation of blood in the early 17th century (110), and was soon coopted by Thomas Hobbes, in *Leviathan* (published in 1651), to refer to the movement of money within a national economy (Swyngedouw 2006, 110). However, it was not until the French Revolution that 'circulation' became a dominant metaphor to describe the movement of "ideas, newspapers, gossip and—after 1880—traffic, air, and power" (ibid). Soon after, by the mid-nineteenth century, architects also begin to speak of the inner city using the metaphor of circulation, particularly in terms of the importance of perpetually circulating water and the extraction of sewage (111). As Gandy describes (2004), the city began to be conceptualized as an ever-expanding network of pipes and conduits in which the efficacy of the water's flow became intrinsically bound up with the wealth, health, and hygiene of the city at large. Increasingly by the late nineteenth century, "the health of the body became the comparison against which the greatness of cities and states would be measured. The 'veins' and 'arteries' of the

[79] Drapeau served as mayor of Montreal twice, first from 1954 to 1957 and again from 1960 to 1986.

new urban design were to be freed from all sources of possible blockage" (Swyngedouw 2006, 112).

In terms of modern architecture and urban planning in the twentieth century, the use of biology as a dominant metaphor is commonly traced back to Le Corbusier's well-known articulation of the "*Ville Radieuse*" or Radiant City movement in urban design, conceived in the mid-1920s. As Le Corbusier (1947) described, "a plan arranges organs in order, thus creating organism or organisms. BIOLOGY! The great new word in architecture and planning…these skyscrapers (of the city center) will contain the city's brains, the brains of the whole nation" (2). Characterized by the image of skyscrapers in a park, the Radiant City ideally integrated vaunting freeway arabesques in a utopian ideal city form focusing on decentralization that, though it was never realized entirely, greatly affected the design of cities for decades to come. This type of regional planning, with a focus on dispersion and the thinning out the downtown core towards outlying communities and towns, was made possible by the advent and rise of the automobile, and led to a growing push for greater investiture in road infrastructure.

As in other large North American cities, in Montreal, the need for these new parkways and expressways to facilitate movement to and from the city was compounded by a growing push for redevelopment within the metropolitan core itself, in particular the erasure of lower-income, "blighted" areas. As well as access to the surrounding areas of the city, the Lalonde & Valois Plan of 1948 emphasized the importance of the new expressway in terms of "urban rehabilitation", essentially slum clearances through the expropriation of lower income areas, which "will be

less costly as regards land acquisition and will at the same time enhance the value of the adjacent areas." (quoted from 1948 plan in Hodges 2012, 46).

The original Lalonde & Valois Plan would also necessitate the demolition of several historic buildings, as well as the displacement of over a thousand families. Arguing against what they saw as this unnecessary destruction, architects and city planners Blanche and Daniel van Ginkel— Team Ten members of the Congres international d'architecture moderne (CIAM)[80]—were brought on as consultants to Montreal's Department of Planning in 1960 (Hodges 2012, 54); the plan was modified in accordance with a growing sentiment that these new expressways should not be so disruptive to the urban core. The rerouted elevated expressway, the van Ginkels argued, would function as a solution that would "add aesthetic value to the city" (47) as well as leave the ground below undisturbed. Though the van Ginkels' modified plan was not followed entirely,[81] their proposal for elevated expressways was influential in the subsequent development of the Turcot Interchange as a complex sculptural object at a high elevation.

Expressway Aesthetics

Though concrete highways today are generally understood as antithetical to nature, the early 'parkway' antecedents of the 1920s and 1930s were welcomed as "a means to foster a new kind of decentralized urban form and a closer engagement with the

[80] CIAM was an organization founded in 1928 by a large and influential group including Le Corbusier and Sigfried Giedion, with the objective of spreading the principles of the Modern Movement. Team 10, or Team X, was essentially a splinter group within CIAM formed at the organization's ninth congress in 1953. Team 10 expressed dissatisfaction with the idealism and rigid functionalism of the old guard of Le Corbusier and Gropius.

[81] For example, the van Ginkels' plan for the expressway to run along the Saint-Jacques escarpment to avoid massive demolition was not followed (Hodges 2012, 49).

natural world" (Gandy 2003, 121) by making the rural environs more accessible to city dwellers. As Sigfried Giedion first described in his *Space, Time and Architecture: The Growth of a New Tradition* (1941/1973), these parkways were not imagined as "an isolated track running through the countryside…[but] as part of its surroundings, part of nature" (832). Instead of being conceived strictly as the fastest way to get from point A to point B, these new parkways were designed with the idea of leisure at least as much as convenience. As Giedion maintains, "a parkway is for traffic, but mostly or exclusively for pleasure traffic" (824); this was the result of both the access and new vistas opened up by driving, as well as the actual kinaesthetic pleasure of movement. While the pleasure Giedion describes was partly the result of new automotive technology and the growing accessibility of cars, it was similarly a by-product of new highway construction and paving technologies. In the early days of the automobile, the unpaved macadamized road[82] was often a source of complaint before the introduction of asphalt,[83] which significantly cut down on the noise and dust associated with unpaved roads, making driving a more pleasurable experience. This early connection between driving, pleasure, and access to new views and experiences was seized upon by the Portland Cement Association, as evidenced with the cover of their trade catalogue *Seeing Concrete America* (1926),

[82] Macadamized roads refers to a building technology where "essentially, two or three progressively thinner layers of stone that have been carefully compacted" (Zardini 2005, 239).
[83] Though they are often invoked interchangeably, asphalt and concrete are different materials, and serve complementary functions. Asphalt, a mixture of bituminous pitch with either sand or gravel is most often employed as the protective, slightly flexible driving surface on top of a reinforced concrete structure. Mirko Zardini (2005) describes it in terms similar to concrete "as a victim of its own success, asphalt lost its original positive connotation after World War II, when it was transformed into an ally of the automobile and began to be perceived as the enemy of 'real' urban life" (244).

which makes explicit this connection between the new opportunities and views opened up by driving with the materiality of these new parkways (**Figure 22**).[84]

While asphalt made the driving surface more consistently smooth, reinforced concrete created new possibilities for the actual form of the road, especially through the introduction of the elevated expressway. As Avila (2013) describes, the interstate era of the 1950s and 1960s "introduced a regional network of high-speed arterials with elaborate interchanges that modeled feats of urban engineering… [and] dispensed with the niceties that underlie the parkway concept, building spare concrete thoroughfares with a ruthless efficiency that eschewed sensitivity to the contextual particularities of the city's diverse neighborhoods and communities" (36). Instead of enabling a closer communion with nature, these structures became celebrated in and of themselves, the object of the gaze as opposed to only its facilitator. Much like the grain silos of the 1920s, by the 1950s, elevated stacked freeways were venerated as symbols of progress; for example, Los Angeles's four-level interchange at the intesection of the Hollywood (or the 101) and Harbor (the 110) Freeways (popularly known as 'The Stack') was featured on postcards for city in the mid-1950s in much the same way as grain elevators and daylight factories were decades earlier (Avila 2013, 38; Banham 1971, 214).[85] After

[84] Also interesting about this image is the connection it makes between the ability to see (made possible by concrete and asphalt roads), with the actual subject of this gaze, which the journal shows—through reference to new concrete tennis courts, bridges, and even a concrete cross erected in Santa Fe (*Seeing Concrete America* 1926, 30)—is increasingly concrete.

[85] Los Angeles's Freeway system even inspired a ride at Disneyland, "Autopia," which opened in the 1950s (Avila 2013, 38), as well as Banham's 1971 essay by the same name, where he describes the freeway as "not a limbo of existential *angst*, but the place where they spend the two calmest and most rewarding hours of their daily lives" (222).

its construction, photographs of the Turcot Interchange were used to similar effect (**Figure 23**).

Montreal began to experiment with the elevated expressway by 1959, with the now-demolished two-level stacked concrete interchange at the intersection of Parc and des Pins Avenues, which necessitated the demolition of twenty-five historic row houses and the annexation of some of the adjoining Mount-Royal Park, all in the name of "urban renewal" (Lambert 2004, 17), also by the Lalonde & Valois Engineering firm responsible for the Turcot. By 1960, the elevated Metropolitan Boulevard (Autoroute 40) was completed along Montreal's north end. As Lortie (2004) describes, the 'Met' "belonged to an intermediate generation of public works: it was not really a boulevard, but it was not yet an urban expressway" (133). Six years later, the Decarie (Autoroute 15)—built below ground level—was unveiled, creating a north-south axis for the island. In 1967, both the Turcot Interchange and the Bonaventure Expressway (Autoroute 10, another elevated expressway, that led from the downtown core to the grounds of Expo) were opened to the public.

The popularity of postwar elevated highways was the result of a variety of factors: practically, they allowed for the separation of automobile and pedestrian traffic, ideally leaving the terrain beneath the expressway undisturbed; aesthetically, they contributed a "sculptural element [to] the landscape, enhancing it in much the same way as does a statue in parkland" (van Ginkel quoted in Hodges 2012, 48). As urban designer and landscape architect Lawrence Halprin describes in *Freeways* (1966), these "great concrete structures…stand like enormous sculptures marching through the architectonic caverns. These vast and beautiful works of

engineering speak to us in the language of a new scale, a new attitude in which high-speed motion and the qualities of change are not mere abstract conception but a vital part of our everyday experiences" (17). Far from today's associations of these stacked freeways with an alienating or dangerous landscape out of proportion with the human scale, scared with graffiti and rusted rebar, these new structures of pristine white concrete were viewed as beautiful objects in their own right, offering an unprecedented freedom of mobility.

Glimpses of modernity: Zoomscapes, Aerial perspectives, and the Mobile View

Despite its contemporary associations with weight and stasis, during the 1950s and 1960s, concrete—through its ubiquity in new highway construction—was intricately bound up with the freedom of mobility offered by the car. Evocative paeans to the highway were not unusual during this 1960s; in a special issue of *Canadian Art* from 1962 devoted to the automobile, the editors describe how "[t]here is an engineering aesthetic peculiar to the highway. At its best, the poetry of motion is transmuted into steel and concrete" (van Ginkel "Structures," 68). The exhilaration of driving on these curving, elevated highways was facilitated by the constant movement that Giedion likened, as early as 1941, to "sliding swiftly on skis through untouched snow down the sides of high mountains" (1973, 825). In Halprin's *Freeways* (1966), he describes the sensation in terms of a poetry of movement, a mobile "calligraphy where the laws of motion generate a geometry which is part engineering, part painting, part sculpture, but mostly an exercise in choreography in the landscape" (37).

This unprecedented mobility through and around the city introduced new perspectives, new ways of seeing based on constant movement. In this way, there was an important affective dimension to the experience of driving these new elevated highways, "an emotional delight arising from [the] broad view" they enabled (Kevin Lynch 1960, 44). In the same issue of *Canadian Art* from 1962 cited above, contributor—and later consultant on Montreal's East-West Expressway—Blanche van Ginkel points to the impact of the new mobile view made possible by driving on highways: "We see in a different way when we move rapidly—many images are received at high frequency and superimposed in the mind's eye to form a composite image" ("Editorial," 19). Though van Ginkel likens this perspective to that of the "world of the artist and to his quest for the realities of image," the sequential view of the motorist is most often compared to film; as Bruce Webb (1994) describes "[t]ravelers on a high-speed highway encounter a rapidly unfolding sequence of experiences—phenomena more akin to the sequences in a motion picture than to the still pictures architects and urban designers use in their work" (99). Similarly, Michael Schwarzer (2004) remarks that "[t]he vehicular landscape, like the rail landscape, encourages an understanding of architecture that is almost cinematic—architecture in motion, buildings assembled through shots, cities understood as scenes" (78). Unlike the train though, where the passenger experiences the steady movement of the landscape through the panoramic side-view of the window, motorists became initiated in the headlong, penetrative quality made possible by the windshield of the car.

Height also plays an important role in representations of spaghetti junctions like the Turcot, where the aerial view was often used in photographs and film to convey the "geometrical sublime" (Nye 1994, 89) of concrete formations that could not be grasped from the structure itself. Aerial views of the Turcot's construction were often used in the press of the time to convey the scale of the new interchange. A 1966 *Montreal Star* article ran photograph of the unfinished Turcot from the air with a caption describing it as a "dream development of the future." In 1967, the provincial cement industry magazine *Bétons du Québec* used a similar image for the cover of the August/September issue (**Figure 24**), further making explicit this link between cement and the new infrastructures of Montreal's modernity. Similarly, in Henri Michaud's film *La Transcanadienne* (1968), commissioned by the Office du film du Québec for the Ministry of Roads ("*le ministère de la Voirie*"), a combination of panning aerial views of the Turcot, motion shots of driving on the smooth new lanes, and footage of construction workers laying rebar and pouring concrete are used to convey the importance of the new interchange, which is described as the "*véritable centre nerveux de la circulation automobile dans la région Montréalais*" (Michaud 1968). The aerial or vertical view gives substance to the biological metaphor of circulation as it clearly shows the connectivity and networked reality of these otherwise hulking and seemingly autonomous structures.

This perspective offers a view on the highway that rationalizes and contains the sometimes erratic, mobile, and necessarily partial view of the motorist.[86] As

[86] This is contrasted further with the even more partial and claustrophobic view of the elevated expressway "enjoyed" by the pedestrian: more often than not, abandoned, shadowy spaces out of proportion with human scale, often fenced off and inaccessible.

Clive Aslet writes of the UK's Gravelly Hill Interchange (the original "spaghetti junction") "[s]een from the air, the ribbons of curving carriageway seem to interlace with the pleasing intricacy of an Elizabethan knot garden" (quoted in Moran 2009, 49). Viewed from the god's eye perspective of the airplane, away from the horns and exhaust fumes of the roadbed, even gridlocked expressways convey a certain logic and functionalism. The aerial view also plays with our idea of time: as Schwarzer (2004) describes, it allows us to glimpse the endeavors of humankind within the broader context and long-durée of the natural landscape, an impression of progress contained within timelessness.

With an average elevation of sixty feet, soaring up to one hundred feet above the ground at its highest point, the Turcot is Montreal's clearest articulation of the elevated freeway's potential to suture these two perspectives—the aerial view and the sweeping cinematic gaze of the car in motion. Though it's often tempered today by gridlock and construction, ideally, Montreal would unfold as though the motorist were in flight, swooping and soaring towards the skyscrapers of downtown. Partially as a result of the need to accommodate tall ships passing underneath along the Lachine Canal (whose waterfront operations would cease only three years later, in 1970, after being rendered obsolete by the opening of the Saint Lawrence Seaway in 1959), the Turcot's elevation was also a conscious design decision made to convey Montreal's now already-precarious status as a world-class metropolis for Expo 67. As the original press release from the Ministère de la Voirie du Québec stated, "*L'utilité de l'échangeur n'a d'égal que son allure spectaculaire*" ("Communiqué Inaugural" 1967). The spectacularity of the Turcot's elevation—

today widely considered (along with its concrete) one of its most offensive properties[87]—was understood at the time of construction as a triumph of engineering and a symbol of civic pride.

A "modernist victory cry" (DeWolf 2010), the Turcot's original design also included two continuous, parallel bands of fluorescent lights built into the guardrails, a futuristic touch likened to "alien landing lights" (Riga 2009), adding another element of drama to entering the city, especially at night. Though the Turcot's lights fared even worse than its concrete—lasting only two Montreal winters before salt corroded the aluminum casing and wiring (ibid)—the effect of driving on the Turcot during its inaugural year would be similar to Calvin Brook's (2007) description of travelling on the Gardiner Expressway in Toronto: "Riding the Gardiner in the 1960s was thrilling. The concrete guardrails on either side held a continuous light strip eight kilometers long weaving through the city lights. Driving into Toronto's downtown at night was the quintessential modern experience—a celebration of technology, freedom, speed and contemporary urbanism" (182). Lighting was a prominent feature of these new expressways of the 1960s: as one critic said of driving by night from the Expo grounds into the city, the Bonaventure Expressway became "the newly built 'great white way' into Montreal." ("Place Bonaventure" 1968, 34) (**Figure 25**). Though it was not visible from Expo, most tourists arriving from west of Montreal would have driven on the "smooth curving

[87] The "excessive" height of the Turcot draws almost as much ire as the state of its concrete, and it is partly as a result of this factor, which makes traversing their steep elevation feel that much more precarious. The new design for the Turcot features highway infrastructure built below the existing structure, most of it at ground level; the elevated portions will only reach 6 meters (CTV News "Turcot Interchange plan finalized" 2012).

forms of white concrete of the Turcot Interchange" (Hodges 2012, 50). As such, the "futuristic vision" (Riga 2009) initiated by the Turcot would have foreshadowed the city's wider embrace of a new concrete modernity during the 1960s.

Concrete Island

> "The difference
> here
> is the drama
> the concrete island
> made for it,
> history & drama, no
> geology to mess it up
> no sea to swallow it"
>
> —George Bowering, "Coming to Montreal from Vancouver" (1977, np).

The Turcot Interchange—along with its contemporary concrete mega-projects from the 1960s—represents the soaring height of Montreal's love affair with large-scale concrete construction. As McGill University architecture professor Pieter Sijpkes describes of his arrival in the city in 1966 and his first exposure to the Turcot,

> I saw the concrete being poured; I rode across it in a borrowed car the day it opened. And there was lots more fresh concrete curing in Montreal at that time; Luigi Nervi's Place Victoria had just been declared the highest concrete high-rise in the world, Ray Affleck's Place Bonaventure, the first real mega-building on earth was being denuded of its form work, and Moishe Safdie's boxes of Habitat '67 were just settling in on top of each other (Riga 2009).

The postwar building boom and sudden ossification of Montreal's landscape in concrete are staggering from today's vantage, where even seemingly modest

construction projects drag on for decades. For example, a 1967 article from *Concrete: The Journal of the Concrete Society* highlights the incredible speed of concrete construction in the city with the example of Luigi Moretti and Pier Luigi Nervi's Tour de la Bourse, completed in 1964 and (briefly) the world's tallest reinforced concrete tower:[88] "In the case of the 47-storey Place Victoria tower…the main structure was completed in a little over a year…The record time of construction was a little under fifty-seven hours for one floor" ("Concrete construction in Montreal," 258-259). The scale and speed of these designs was partly inspired by Jean Drapeau's enthusiasm and conviction—well-founded as it turned out—that Expo 67 would draw an unprecedented number of visitors to the city.[89] In the longer term, this infrastructure boom was also undertaken as a result of studies commissioned by the mayor's office which projected that Montreal's population would reach seven million inhabitants by the year 2000 (Lortie 2004, 88), over twice what the actual 2001 census shows.[90]

In preparation for the event that he championed and which forged his reputation as Montreal's greatest mayor (at least until his controversial involvement in the Montreal Olympics in 1976) Drapeau initiated a host of major changes to the city's built landscape, all fortified in reinforced concrete. In the five years leading up

[88] Tour de la Bourse, or the Stock Exchange Tower located in Victoria Square, was eclipsed as the world's tallest reinforced concrete tower in 1968 with the completion of Lake Point Tower in Chicago, which itself been demoted countless times with the subsequent construction of much taller towers in the intervening decades. The Tour de la Bourse was also eclipsed as the tallest building in Canada, a title it held for three years until the completion of Toronto-Dominion Centre in 1967.
[89] Expo 67 turned out to be one of the most successful great world's fairs of the twentieth century, welcoming over 50 million visitors over a period of six months (Kenneally and Sloan 2010, 17).
[90] The population of the City of Montreal in 2001 was listed at 1,039,534 people, while the Metropolitan area of Greater Montreal, or the Census Metropolitan Area (CMA)—which includes the neighbouring municipalities and off-island suburbs—listed the total population at 3,426,350, still vastly inferior to Drapeau's projections ("2001 Census of Canada Community Profiles: Montréal, Québec").

to the event, Montreal's metro system was created ex nihilo (and Île Notre-Dame, part of the grounds for the exposition, was created from the excavated rock); the underground city—a network of interconnected shopping and office complexes—was opened downtown; concrete megastructures such as Bonaventure, Habitat 67, Place Victoria began to challenge the silos' dominance of Montreal's built skyline; and the bulk of the province's autoroutes (including the Turcot) were built or expanded. Taken in combination with the newly created grounds for Expo, the new Montreal was conceived as a "'multilevel city,' where a new 'core' of subterranean links between skyscrapers and public infrastructures were described as a 'network' and an 'organism'" (Riar 2010, 193), a city at the "forefront of urban design" (Marsan 1990 *Evolution*, 343). Within this context, Montreal—and by extension Canada—became an international showpiece for displays of rapid concrete construction; in their first year of publication in 1967, *Concrete: The Journal of the Concrete Society*, operating out of the UK, published two separate articles relating to the event: "Concrete construction in Canada" (149-156) and "Concrete construction in Montreal: Expo' 67. Habitat" (255-265).

Within the grounds of Expo itself, the material also played a starring role. As engineer J. Hode Keyser remarked in an article praising the material's remarkable versatility in the trade publication *Bétons du Québec,* "*Expo 67 nous offre une occasion unique de nous rendre compte des mille et un usage du béton et de la façon dont nos architectes, ingénieurs, constructeurs et fabricants ont réussi à humaniser ce matériau*" (1967, 11). From the emblem of the fair, cast in place in a wall of 25 feet, to the construction elements of national pavilions such as those of Japan, France,

and Great Britain, to decorative walls at the administration pavilion of the fair itself, concrete was everywhere, a symbol of the fair's larger theme of the liberating potential of technology for mankind,[91] a material whose "*versatilité…dans l'espace d'à peine un siècle et demi a conquis le monde*" (ibid).

1960s Architectural Discourse around Concrete

Quebec's embrace of concrete architecture during the 1960s was not unusual for the time, though there remained some ambiguity in the wider international architectural discourse around the material, despite—or perhaps because of—its ubiquity in postwar building in both Europe and North America. *Progressive Architecture* devoted two special issues to the material during that decade. In the first, from October 1960, the editor noted the sudden resurgence of contemporary interest in concrete, and speculated that it was the result of several factors, namely cheaper construction costs, technological innovations in the material such as thin shell design, the popularity of precasting and prefabrication, and a desire for greater plasticity. He concludes the article with the observation that concrete "is the only structural material which has no stereotyped form and no inherent character of its own—it has to be shaped and given a finish by the designer himself" ("Editorial" 1960, 142). This last perspective—which would be echoed by Montreal's Melvin

[91] The theme of Expo 67 was "Man and His World," with an emphasis on a universalizing humanist discourse espousing world peace and a fellowship of man through technological progress. Given this context, the importance of "humanizing" (*"humanizer"*) concrete becomes more important, given its more complicated bunker-like associations from World War II.

Charney eight years later[92]—marks a decisive shift from the tone of editorials around concrete construction fifty, even thirty years prior, when architects and engineers were urged to accept concrete's innate characteristics (monolithism, plasticity, permanence and lack of ornamentation) and work within those confines.

This shift—from an emphasis on monolithic to precast concrete construction—was due to several factors. Practically, innovations in technology such as precasting, prefabrication, and pre-stressing had the effect of strengthening and standardizing modular construction and the assemblage of discrete concrete units, making it a less labour-intensive and therefore more cost-effective technology than cast-in-place or monolithic concrete construction. Changes in taste—away from the strict asceticism of early modernism with its focus on a rigid functionalism—meant that there was a growing interest in the ornamental potential of concrete, and decorative walls such as those at Expo, bearing abstract impressions and forms, were beginning to be widely accepted. This new emphasis on the surface treatment of concrete was distinct from the earlier era of decorative concrete, with its emphasis on the material's potential to imitate more "noble" surfaces. The influence of Brutalism and the raw surface treatment of *béton brut* made famous by Le Corbusier had created a context wherein the material finally had its own historicity, its own inherent style.[93]

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[92] In his article "Concrete: A Material, a System and an Environment," for *Architecture Canada* (June 1968), for which he was the guest editor, Charney describes how "concrete has no existential nature of its own. It is a composite, plastic material that is subjected to forming, reinforcing, machine handling and chemical change. It is subjected, futher[sic]-more, to the will of a designer who is concerned with the appearance of the product, and its image as a cultural artifact, as well as with its function" (41).

[93] However, this embrace of exposed concrete surfaces was not without its critics. By 1966, an article in *Progressive Architecture* hinted at a growing discrepancy between the desires of the architect and

This new concrete era was also marked by an increased confidence and assertiveness in concrete design and construction; no longer an experimental material shrouded in mysterious proprietary systems, reinforced concrete construction had been codified and transformed into a rational, scientific medium under the command of the engineer and their calculations.[94] Perhaps as a way to distance this bold new era from that which preceded it, the mistakes of the past were outlined in an article in the same issue by Ada Louise Huxtable. In her article "Concrete Technology in USA: Historical Survey," Huxtable acknowledged that, even in 1960, concrete had a bad reputation, but located it firmly in the past, claiming that "Today, reinforced concrete is no longer—in the pungent phrase-making of Frank Lloyd Wright—'the ideal makeshift of this, the vainglorious 'Makeshift Era.' This is the Concrete Era, an age with the promise of architectural greatness" (149). Despite the assertions of difference, the tone of the article echoes that of Le Corbusier and early cement entrepreneurs from decades earlier in proclaiming (yet again) that a new "concrete age" was upon us, made possible by newer, better technology.

Six years later, in October of 1966, *Progressive Architecture* put out yet another special issue devoted to concrete. Here one can discern a greater hesitancy

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those of the end users, stating that "[c]lients in general...simply do not like concrete in interiors, finding it unsympathetic and visually unattractive…one finds a texture like monumental seersucker a rather rough emery board to brush against in a room. How hard a brutal concrete is on clothes and skin has never been seriously examined. People even wonder if you can get insurance against persons scratching themselves on rough interior concrete" (215).

[94] As Slaton (2001) points out, this wider embrace of a new rationalized, standardized concrete was very much the result of the material's acceptance by university-based engineering faculty: "the university served as 'gatekeeper' for advanced technical occupations, and in the process of shaping scientific quality-control methods, technical experts embraced and reiterated the social patterns they found in the university" (25). To this end, she maintains, certain people were deemed more inherently capable of the appropriate 'mental habits' (24) of the concrete engineer; these tended (overwhelmingly) to be white protestant, native (American-born) males.

towards the material, even in terms of its once-acclaimed permanence; as one author acknowledges, "[i]n an age of vast and fast changes, permanence, in spite of its emotional allure, is simply not practical" ("Concrete, where do we go from here?" 1966, 215). The issue is full of articles with titles such as "Where Do We Go From Here?" and "Will Taste Finish Concrete?" and gives the impression of much hand-wringing around the future and potential of concrete; experts were divided, among other things, as to which method—cast-in-place or precast systems—best captures the absolute potential of the material, and whether the aestheticization of "mud" of exposed concrete represents the negation of its essential characteristics ("Puttering with the Potential" 1966, 173). The issue makes frequent reference to Montreal examples, such as the administration pavilion of Expo 67, with its concrete wall sculptures, and contains, as well, an entire article about the construction of Habitat 67. Throughout the issue, the authors make reference to the compromise that concrete represents, often making wistful reference to a "new material," not yet invented, that would replace concrete. This magical material of the future would "have the plastic virtues of concrete and none of its weighty faults…In other words, a material giving unlimited design freedom, with no practical limitations" (173). The best concrete, August Komendant argues, is that made without cement at all, and he describes a material that sounds more like an epoxy or a plastic (212). Even Moshe Safdie's revolutionary use of precast concrete in Habitat is revealed as a compromise, made necessary after he was unable to come up with a lightweight material suitable for casting the housing units (226). Concrete, despite its growing

ubiquity in urban design and architecture, is still posited in these articles as a material that has yet to live up to its potential.

Montreal and Concrete *Rattrapage*

Despite the architectural ambivalence and the beginnings, already by the mid-1960s, of a backlash against the rigid functionalism and universalism of modernist architecture and the fortress-like aesthetics of Brutalism, Montreal was only at the beginning of its concrete honeymoon. As if to make up for its delay in adopting new architectural forms such as the skyscraper during the first half of the twentieth century, the city skyline was radically transformed during the 1960s, with new skyscrapers designed by international architects such as I.M. Pei (Place Ville Marie, 1962), Mies van der Rohe (Westmount Square, 1964), and Luigi Nervi (Place Victoria, 1964). The scale of buildings in Montreal was reoriented completely, and the city—as well as the fairgrounds of Expo—"came to be celebrated as emblematic of avant-gardist theories on the 'megastructure'" (Riar 2010, 193), the architectural style that most embodied the 1960s' preoccupation with large-scale, multifunctional buildings. In Montreal, the term megastructure came to be synonymous with concrete; as discussed in the previous chapter, Reyner Banham, while visiting the World's Fair in 1967, cited everything from the aging silos to the underground city, as well as newly constructed concrete buildings such as Habitat 67 and Place Bonaventure plaza (Banham 1976) as proof of the city's megastructural tendencies.

In these newer buildings, concrete was no longer disguised as more noble materials, or used strictly for industrial projects; instead, it was left exposed, a

triumphalist symbol of technological mastery over nature. By the mid-1960s, full spread advertisements for Ciment Canada[95] in *Bétons du Québec* showed photographs of recently constructed structures such as Place Bonaventure—then the largest concrete building in the world—in downtown Montreal with the tagline "*Concepts audacieux…réalisations permanentes en béton*" (July/Aug. 1968, np) (**Figure 26**). More than just the raw material of these new megastructures, the concrete itself was also understood as a site of technological innovation. In the case of Bonaventure for example, "[t]he experimental façade, made up of panels of precast bush-hammered concrete with insulation material incorporated in them, was developed in collaboration with the National Research Council" (Lortie 2004, 98).

While the situation in Montreal was unique in terms of the speed and scale of its rapid concrete transformation, there was a marked prevalence of concrete architecture in Canadian cities during these years over their American contemporaries (Rich 2007, 52). This is the result of two major factors: first, the fact that the influence of the US steel market has not historically been quite as significant in Canada as in the United States; and second, that influence of European architects in Canada more experienced with concrete construction (ibid). This, in turn, had the effect of bringing down labour costs. In the postwar decades, Rich explains, "the large Canadian contractors, particularly through the '60s, '70s and '80s, developed a reputation for innovative concrete construction methods in large buildings, ahead of

[95] Though it's not clear exactly when this shift happened, by 1967 Canada Cement Company had begun to use this French version of its name in francophone publications, potentially in response to the growing consciousness around Quebec nationalism and language issues in the province.

their U.S. counterparts" (52). Aside from trade periodicals such as *Bétons du Québec,* (1961 to 1971), the *Bulletin des Ciments du St-Laurent* (1963-1964) the Canadian industry further supported the growing use of concrete with new trade journals such as *The National Concrete Producers' News*, which ran from 1967 to 1970 and similarly highlighted new concrete construction.

In the context of Quebec, this move away from classical and historical architectural forms during the 1960s and 1970s served complimentary municipal and provincial purposes. Locally, it was part of Drapeau's wider initiative (with mega events such as Expo 67 and later the Olympics of 1976) to rebrand Montreal as a wide-open, cosmopolitan, modern city in order to attract more industry and tourism to the city. Given the context of Quiet Revolution Quebec, the new concrete megastructures also represented an internationally inflected architecture ostensibly sanitized of colonial references, unhampered by the associations of a ruling Anglophone class and the legacy of the French regime. In their international modernism, they represented a definitive move away from the parochialism and anti-urbanism of the Duplessis era. Within this new national ideology of technological progress, concrete became, by default, the material through which natural resources were harnessed and "metabolized" as potential capital for the urban centers. Massive concrete projects such as the hydroelectric dam Manic 5, and the province's new highway infrastructure, became physical representations of Quebec's *rattrapage,* symbols of a national discourse increasingly tied to a new faith in technology, industry, and economic sovereignty. While images of new highway infrastructure such as the Turcot worked to consolidate a particular vision Quebec's

modernity based on urbanism, images of non-urban concrete realizations also took on important symbolic connotations. Manic 5 in particular played a key role in the articulations of Quebec's modernity and economic power during its construction in the late 1960s; for example, a multi-media display at Expo 67 showed the live construction of the dam through a closed-circuit television hookup that showed a live feed from three cameras installed at the building site. As Daigneault Bouchard (2013) describes

> Manic 5 underscored Québec's developing leadership in hydroelectric production and transportation at a moment in Canadian cultural and political history when the question of Québec's sovereignty was increasingly at stake. Thus the dam participated visually as well as financially and politically in the articulation of a modern, Québécois, francophone national identity (2).

An ad for Canada Cement from 1967 illustrates this connection between concrete and building Quebec's future with the tagline "*Le Québec bâtit pour l'avenir, en <u>béton</u> fait de ciment 'Canada'*" (**Figure 27)**.

This is not to overstate the connection between concrete and nationalism in Quebec; concrete megastructures were going up at an unprecedented rate across Canada during the 1960s and 1970s, and Legault (2011) has remarked that, by the 1980s, the Brutalist style had come to stand for a specific genre of modern architecture associated with the Canadian government's cultural policies (328). However, given the particular context in Quebec of Expo and the Quiet Revolution, these buildings have come, especially today, to be retrospectively understood as part of a larger project of Quebec's national construction. If, as Erin Hurley

maintains (2011), Expo 67 initiated a self-conscious process of "national mimesis—that of construction, which builds models of future (sought-after) worlds and altered social relations" (34), then concrete—relatively cheap and suitably modern—became the de facto material foundation of this national construction.[96]

Furthermore, with its associations of rigidity, scale, and an established scientific discourse, concrete was an ideal proxy for this new (implicitly masculine) Quebecois subjectivity, built on associations that "lace together modernity, nationality, and urbanity—each gendered male…and pit themselves against the tissue of tradition, regionalism, and ruralism—all gendered female" (ibid 37). Hurley is here referring to the longer tradition in Quebecois historiography (as well as cinema, literature, theatre, etc.) since the 1960s of associating a pre-Quiet Revolution Quebec—the "Dark days" of Duplessis—as a matriarchy, ruled by overly controlling mothers, absent fathers, and priests, otherwise known as "*pères en jupe*/fathers in skirts" (Marshall 2001, 105). The secular and liberal nationalism of the Quiet Revolution era sought to define itself in opposition to this "emasculating" dependence on Ottawa and the Catholic Church, and often defined its agenda in terms that privileged masculine stereotypes of autonomy and independence; as Mary Jean Green (2000) describes, "the image of the newly decolonised subject [w]as a virile, heterosexual man" (8).

[96] Concrete as the material of Quebecois nationalism also became symbolically linked internationally with Armand Vaillancourt's massive concrete sculptural fountain, designed for San Francisco's Embarcadero Plaza, adjoining the now-demolished Embarcadero Freeway. Officially entitled the Vaillancourt Fountain, the modernist sculpture has been known as the "*Quebec Libre*!" fountain since its dedication in 1971, when Vaillancourt himself graffitied the concrete surface with the separatist slogan ("War Whoop for Freedom," *Time*, 1971).

The Expressway as Living Death

Despite its suitably modernist and heroic connotations in this nationalizing context, concrete highways such as the Turcot and its contemporary large Canadian expressways were emblematic of an era that was already coming to an end when their construction was just beginning. Aside from the more general distaste mounting for concrete as the material of modernity, the growth of car-culture was facing greater opposition from urban communities. As early as the 1950s, the automobile was vilified by certain critics as the great destroyer of cities (Hodges 2012, 45), and, by the late 1960s, protests in American cities over proposed inner-city expressways had been fought and won.[97] These also included notable Canadian examples; as Ladd (2008) points out, in Toronto "the first of several proposed new freeways through the city center provoked fierce opposition (including from Jane Jacobs, who had recently moved from New York, and Marshall McLuhan) and became a major issue in the 1969 municipal elections…Vancouver's transformation was even more dramatic" (113). The ideas that more traffic meant more business, or that cities should be made more accessible to the car, were already losing ground in the 1960s.

Increasingly, the automobile—and especially the expressways being built to accommodate them in greater numbers—was seen as destructive to urban fabric, as opposed to its most necessary component. Lewis Mumford, an early proponent of

[97] These demonstrations by community groups and organizations are known today as the "Highway Revolts" or "Freeway Revolts" of the 1960s and 1970s. Perhaps the best known example of their success was the Lower Manhattan Expressway, a proposed expressway proposed by Robert Moses in 1941 and canceled in 1962 after widespread opposition led by urban theorist and community activist Jane Jacobs.

planned Garden City-style communities made possible by the automobile, became one of its most vociferous critics. Writing in 1963, he likened the building of new expressways and highways to "pyramid building with a vengeance: a tomb of concrete roads and ramps covering the dead corpse of a city" (1963, 248). Where once these new arteries were described in terms of life-sustaining circulation, they were increasingly thought of in terms of death and destruction.

In Montreal, this shift in thinking is evidenced in the NFB film *L'automobile* (Régnier 1972), from the *Urbanose* series, especially when contrasted with *Circulation à Montréal* from 1955. The 1972 documentary follows the controversy over the construction of the final section of the East-West Expressway, the Ville Marie (720), which initiated an extensive process of expropriation and demolition between 1965 to 1970, resulting in the eventual demolition of 3,000 houses (Lanken 1989, 12). In the film, which details the negative consequences similar expressways have had on cities such as Boston and San Francisco, and contrasts these with more pedestrian-friendly cities such as Amsterdam, Montreal's East-West expressway is described in terms of the devastation it will wreak by "penetrating the heart of Montreal" and tearing the adjoining neighbourhoods apart. This is in striking contrast to the series from 1955, in which a young Drapeau enthusiastically likens these same roadways to arteries, pumping the life-sustaining automobile economy of the city.

Anxious Landscapes and Zombie Infrastructure

The specter of death in relation to the aging infrastructure of the city brings us back to the opening image from this chapter, that of the abandoned Turcot in *Warm Bodies* (2013). In the film, the interchange serves as the connecting road between Mirabel Airport (where the zombies are headquartered) and the Olympic Stadium (where the uninfected humans are camped out), and as such, as itself trapped somewhere between the living and the dead. The figure of the zombie can be usefully extended to understand the contemporary Turcot as itself a type of interstitial space, an example of "zombie infrastructure," made brittle and inflexible by its crumbling concrete materiality. Suspended somewhere between functionality and obsolescence, between a glorious past and a certain death, zombie infrastructure threatens to infect the city, bringing chaos and destruction.

The figure of the zombie helps illuminate the different stakes around aging structures such as the Silo and the Turcot, which, despite their common materiality, evoke vastly different sentiments and stakes around cultural memory and the future of the city. Unlike the classic ruin, which draws a clear distinction between the past and the present, abandoned highways, such as the Turcot in *Warm Bodies*, or the similarly abandoned M1 motorway in London in Danny Boyle's zombie apocalypse film *28 Days Later* (2002), evoke an uncomfortable temporal limbo. As expressways built during the same era, the M1 and the Turcot speak to a particular vision of a prosperous future thrown into apocalyptic relief through their depictions as suddenly devoid of people or cars. As Borden (2013) explains in the context of Boyle's film, "the M1 is menacingly without time, suddenly cut adrift from both

centuries of history and the security of an expected future, and so is thrust into an eternal present where everything has changed and nothing can be assumed" (157-8). Not safely contained by the past, these structures function as a type of threat upon the present and the future.

The threat posed by aging infrastructures such as the Turcot—framed as a lumbering mass of rotting concrete—cannot be aestheticized or contained in the same manner as the industrial ruin, like Silo no. 5.[98] Unlike the ruins of antiquity, or the obsolete modernist architectural landmarks such as silos and factories, still-functioning interchanges such as the Turcot, however dysfunctional, are still deeply entrenched in our contemporary systems of communication and transportation, and as such, they "evade the secure meanings of the heritage industry or the easy consolations of nostalgia" (Moran 2009, 16). As Beatriz Jaguaribe (1999) explains, modernist buildings and infrastructure "made to be functional…cannot age gracefully because the very notion of aging is incompatible with their functionality as architectural machines" (309). In their decay and early senescence, these temporal effects are thrown into further relief, eliciting complicated emotional reactions—and in the case of the Turcot, downright hostility—towards the perceived failings of the recent past.

Still in operation, but threatening collapse, its entropy does not elicit the same nostalgia as the fully obsolete reminder of a more distant past; instead, it threatens

[98] Local archaeologist Daniel Marchand made the news in 2007 with his proposal to paint the sides of each section of the interchange as a way to bring life to "that big mass of concrete" ("Abandoned Turcot rail yards come to life with creative vision," *The Montreal Gazette,* 2007). In 2010, André Denis held a photo exhibition of images of the Turcot entitled "L'échangeur Turcot entre ciel et terre." Victor Arroyo created a film project entitled *Turcot 2.0* that was on display at the Canadian Centre for Architecture in Montréal in 2012 as part of show *ABC: MTL.*

the contemporary city with the immediate danger of disaster and calls into question progress narratives of the very recent past. Modernist ruins like the Turcot "express the decrepitude of the new. In their rebellion against the action of time, they manifest a denial of death and a negation of history," Jaguaribe (1999, 300-1) explains; unlike new constructions that affirm progress and history, aging functional "architectural machines" symbolize "the defeat of the new and … the debunkment of a future utopia [that] offers no exemplary redemption" (301).

These modernist ruins represent what Antoine Picon (2000) has described as the "anxious" or "technological landscape," a contemporary waste-scape that threatens to bury us alive in the rusted signs of humanity's "*triumph over nature"* (79*)*. Picon (2000) describes the anxiety we feel when confronted with these empty "technological landscapes" on the outskirts of cities—devoid of human beings or nature—in terms of a feeling of imprisonment, linking it to the claustrophobic perspective announced in the 18th century with Piranesi's series of engravings of prisons, the *Carceri.* Unlike Piranesi's *Vedute,* his famous engravings of Roman ruins which evoke Simmel's criteria of the ruin as architecture's return to nature, the *Carceri* announces, for Picon, "two essential characteristics of the contemporary technological landscape: its absence of clearly marked limits and the relativization of the meaning of human action toward which it drives" (71). This inescapability of the technological landscape, which no longer appears as a discrete object but instead as an inescapable "seamless web" (72), becomes impossible to "contemplate …from the outside, except perhaps from strategic command centers where one might envisage its destruction by means of atomic bombs" (ibid). Effectively, it is the

boundless nature of this landscape that gives rise to apocalyptic fantasies of its destruction. As a result, the obsolescent infrastructure is qualitatively dissimilar to the ruin:

> The ruin reintegrated, in successive stages, the traces of human activity in the cycles of nature. There is nothing of the sort in the contemporary city, where objects, if they don't disappear all in one go, as if by magic, are instead relegated to obsolescence, a bit like the living dead who endlessly haunt the landscape, preventing it from ever becoming peaceful again. We have gone from ruin to rust, from trace to waste (Picon 2000, 76-7).

This haunting—the city as a living death on the landscape—is made possible and fleshed out through the materiality of reinforced concrete, the ambiguous permanence of which threatens to confine humankind "in the middle of his productions as if within a prison, a prison all the more terrible since he is its builder" (81). Aging concrete is especially repellent, Forty (2012) suggests, because of the particular way in which it decays—unlike materials such as stone or wood—from the inside outwards, a process that he describes as "disconcertingly like cancer if one must draw a biological analogy" (59). In this way, a wider distaste for concrete today might be understood as a visceral reaction to the aging of a material with a lifespan roughly analogous to our own.

Picon's description of anxious landscapes goes some way to explain the contemporary fascination with apocalyptic narratives and zombies in popular culture. While many have traced the contemporary "Zombie Rennaissance" (Bishop 2009; McGurl 2010) to the aftereffects of the devastation and apocalyptic imagery of

September 11th (Bishop 2009), narratives of zombie apocalypse in early 21st century film and literature can today be productively linked to more ambiguous fears around the financial crisis of 2008 (specifically in the United States), and the subsequent global recession that has led to the adoption of strict austerity measures and a wider disinvestment in public infrastructure. This connection between the figure of the zombie and the threat of infrastructural collapse is most readily apparent in the invocations of Detroit—the ground zero for images of ruin porn and apocalyptic imagery—as a type of "Zombieland," [99] as well as the introduction of terms such as "zombie banks" and "zombie foreclosures" in the wake of the U.S. subprime mortgage crisis of 2008.[100] As Christian Long (2014) maintains, contemporary zombie films such as *Warm Bodies* "stage the danger the crumbling US infrastructure—and the way of life it supports—poses to the nation getting about its everyday business, an ambient danger that practically precludes the collective action necessary to confront social injustices."

Buried in Concrete

In Quebec, a consideration of zombie infrastructure and Picon's anxious landscape more generally is compounded by the very particular ways the fractures

[99] In 2012, developer Mark Siwak attempted to raise $145,000 to build an actual theme park Zombieland, "Z World," which would occupy 200 acres, and make use of the city's famed ruins and abandoned buildings. Though his campaign was not successful it did garner considerable media attention (Metcalfe 2012).

[100] A 'zombie bank' refers to a bank that "is insolvent but continues to operate until its fate is resolved by closure or merger" ("Definition of a zombie bank" *Financial Times Lexicon*). A 'zombie home' or 'zombie foreclosure'—a growing phenomenon, especially in the United States since the recession of 2008—refers to a house where the owner moves out after foreclosure has been started, but for some reason the foreclosure isn't finalized, leaving the property in limbo, with no one responsible for its upkeep (Nackman 2014).

in aging concrete infrastructure such as the Turcot signify a much longer history of anxiety over corruption and collusion in the construction industry. These anxieties are not only surfacing because of the cracks appearing on the surfaces of concrete infrasctructure; in Quebec, these issues are understood as foundational to Quebec's poured concrete infrastructure, quite literally "*coulé dans le béton*."

Denys Arcand's film *Rejeanne Padovani* (1973) depicts the shadowy world of contractors, mafia hitmen, and corrupt politicans involved in the opening of a new superhighway in Montreal (**Figure 28**). In the film, contractor and mafia don Vincent Padovani (president of Padovani Paving Ltd., among many other interests) hosts a lavish dinner party at his well-appointed suburban home. The party functions as a microcosm of local corruption in all levels of power: in attendance are both the Minister for Transportation responsible for awarding the highway contract and the mayor of Montreal (who, with his large glasses, bears a striking resemblance to Jean Drapeau); downstairs, mafia hitmen mingle with local police. Later, when Vincent's estranged wife Réajeanne shows up later begging to see her children, Vincent is persuaded to have her killed to keep her from ruining the inauguration of the highway. After she is shot, her body is disposed of in the freshly poured concrete of the new expressway.

The film depicts a sense of growing sense of cynicism in Montreal around the construction of public works and infrastructure, a marked change from the optimism around the modernisation of the city during 1950s and the 1960s. This change in perspective in Quebecois cinema is often traced to the October crisis of

1970,[101] a polarizing moment in the sovereignty movement subsequently linked to the *"perte d'innocence collective*" (Tremblay 2010) of the nationalist movement of the previous decade. Bill Marshall (2001) describes the crisis as foundational in its construction of an image of the nation and identity built around lack (38), which further intensified and polarized both Canadian and Quebec nationalisms. This is also the era when, as Marsan (1990 *Montreal in Evolution*) describes, the utopian optimism of Expo 67 was revealed as "neither a beginning nor an ending, but only spectacle for the moment, magnificent but without any future…mask[ing] the rapidly evolving reality of approaching decline" (383).

Marshall (2001) describes Arcand's 1973 film as a "devastating critique of contemporary Quebec society [that] captures some of the atmosphere of Montreal in between the October crisis and the first Parti Québécois government, between Expo and the Olympics, when the long-serving mayor Jean Drapeau was embarking on grandiose urban development in cahoots with land speculators and developers" (151). More than progress and construction, these large infrastructural projects are depicted in Arcand's film as ultimately destructive to both the social and urban fabric; concrete is the material used to destroy the old and bury secrets that the present does not want to acknowledge or come to terms with. In this way, from today's vantage point, the crumbling of these same autoroutes can be understood as

[101] The October crisis refers to the 1970 kidnapping of British diplomat James Cross and Quebec's employment minister Pierre Laporte (who was later assassinate), by the Front de libération du Québec (FLQ). These events led to what many felt was the unnecessary employment by the federal government of the War Measures Act, and the subsequent detention of over 500 people without trial, for being suspected FLQ sympathizers (Marshall 2001, 37).

functioning in the manner of Freud's return of the repressed, a reckoning for the unchecked development of the 1960s and early 1970s.

The choice of concrete as this evocative object is deliberate for Arcand: as Poirier and Thériault (2012) point out, "*[b]éton, politique et gouvernements, dans une représentation globalement négative, sont étroitement liés dans l'imaginaire du cineaste*" (5). Here, the authors point to *Réjeanne*'s frequent shots of Quebec City's 'Complexe G' (officially known as L'Édifice Marie-Guyart, a concrete skyscraper completed in 1972 that houses many of the province's various ministries), as well as to the director's use of the Olympic Stadium in *L'âge des ténèbres* (2007) as proof of this wider tendency of Arcand, one that associates concrete with short-sightedness, corruption, and the bureaucratization of modern Quebec, especially after 1970 (5). These associations will be further explored in the following chapter looking at the case study of the Olympic Park's concrete.

Montreal as "Sin City"

As Poirier and Thériault (2012) suggest, *Réjeanne Padovani* is of particular interest today as it effectively foreshadows the political situation in contemporary Quebec, especially in light of the recent Charbonneau Commission, allegations of corruption in the awarding of public works contracts, and the involvement of organized crime in the construction industry, especially insofar as it relates to highway construction. As Jack Ludwig (1976) describes, as early as Montreal's Olympics in 1976, the shady dealings of developers and corruption in the construction industry were fairly common knowledge among Montrealers; on one

tourbus through the city hosted by the community group "Save Montreal," Ludwig heard from his guide, for example, that the newly completed "Autoroute [was] built at a cost of 60 million dollars a mile" (154). Even four decades after the release of Arcand's film, highways—especially those within the city of Montreal—remain the most potent signifier of this connection between concrete, crime, and corruption in Quebec, where a 2008 Transport Canada report found that one kilometer of urban road costs 46% more to build than in the rest of the country (Perreaux and Séguin 2009).[102]

This sense, of the perceived lack of integrity of the province's highways as representative of a more pernicious degeneration, plays into a longer association of Quebec—and Montreal especially—as inherently corrupt and backwards. This is partly a hangover from the days of prohibition when Montreal became a popular destination for Americans, Canada's "sin city," associated (particularly during the 1920s and 1930s) with its nightlife, jazz culture, and other illicit pleasures such as brothels and speakeasies. By the 1940s and 50s, Auf der Maur (1976) describes, "Montreal was a centre of vice and corruption" (20). It was this same reputation that, as a young lawyer, Jean Drapeau sought to dispel and capitalize on politically when, along with the Public Morality Committee, he launched a campaign to clean up the city's infamous Red Light District and expose corruption involving the police

[102] More recently, these connections—between highways, corruption and organized crime—came to the fore with a 2009 episode of the Radio-Canada investigative program *Enquête*. In the program, François Beaudry, a former senior engineer at the Quebec Transport Ministry turned whistleblower, outlines how a group of fourteen construction companies ("The Fabulous Fourteen") fixed public works bids and drove the cost of the major road contracts in the Montreal area up by 35 percent ("Une collusion qui coûte cher" Radio-Canada 2009). This show created a furor in Quebec, where it eventually led, in the same year, to the creation of Opération Marteau (Operation Hammer), a provincial police task force charged with investigating reports of public work bid-rigging and the influence of organized crime.

and organized crime with the Caron Inquiry in the early 1950s. His successful election as Mayor in 1954 is often attributed to his reputation at the time as a crusader for public morality and "cleaning up the city;" (ibid, 21).

Inasmuch as Drapeau's legacy involved the creation of new concrete infrastructure in the city, it was equally dependent on the destruction of older, less desirable neighbourhoods in his attempt to rebrand Montreal as progressive and respectable. This entailed the razing and paving over of several neighbourhoods (mostly to make way for new concrete megastructures),[103] as a way to rebrand the city as suitably modern and capable of hosting mega-events such as Expo 67 and the Olympics of 1976. Drapeau's attempts to rewrite urban history through widescale demolition in addition to construction is similarly featured—and critiqued—in *Rejeanne Padovani* (1973), and the end of the film uses documentary footage showing the controversial demolition of residences for the construction of the Ville-Marie Expressway in 1970.

Despite Drapeau's efforts—and largely as a result of many of them—Quebec is often characterized today, especially by English Canada (and within the province itself) as morally suspect and backwards, largely as a result of its contemporary associations with crime and corruption, as well as the legacy of the anti-modernizing discourse of the Duplessis-era *Grande noirceur.* In this narrative, Quebec is represented as a fiefdom where language and cultural politics

[103] These newer complexes include the controversial public housing project Habitation Jeanne-Mance (1959), which took the place of the former Red Light District; the CBC Radio-Canada tower headquarters (1971), which necessitated the demolition of the Faubourg m'lasse neighbourhood, and the Expo World's Fair Autostade (1967), a stadium demolished in the late 1970s, which replaced Goose Village near Griffentown.

problematically trump economic factors and public accountability; a city whose supposed "*laissez faire*" attitude is understood as both an enticement and a threat to the rest of the country. In October 2010, the national magazine *Macleans* capitalized on these received ideas and created a stir when it ran a cover featuring a photo collage of the provincial mascot Bonhomme Carnaval carrying a briefcase overflowing with cash, beside a headline proclaiming Quebec "The Most Corrupt Province" (Patriquin 2010) (**Figure 29)**. The article, which many in the province condemned as "Quebec bashing", was largely an indictment of then Premier Jean Charest's Liberal Government and their alleged association with graft, favouratism, corruption, and the involvement of organized crime in the construction industry.

Permeability and Concrete corruption

In news discourse explaining the condition of Quebec's decaying infrastructure, frequent allusions are made to the alleged "permeability" or "poor quality" of the province's concrete, especially during the 1960s and 1970s. As Saeed Mirza, an Emeritus Professor in McGill University's Civil Engineering department who is frequently quoted in both the local and national press, explains,

> "Our problem is we built most of the facilities in the '60s and '70s, built them in a hurry…The result is that the quality control was not there…Our concrete is permeable and we didn't design the drainage on our overpasses and bridges properly. The lack of drainage and the permeability of the concrete enabled the chlorides to get in from the de-icing salts. That, of course, led to the

corrosion of the steel reinforcements. When steel corrodes, it expands. That pressure causes the weakest link to fail" (Mirza quoted in Gohier 2011).

The alleged permeability of Quebec's concrete is the subject of some dispute, with engineers divided on whether there is something particular to the province's cement.[104] A report from *La Presse* (2011) found that despite Quebec's Ministère des Transports' claims that the concrete was the problem with the Turcot, the issue really affecting the structure was that the steel reinforcements had not been properly placed in the concrete caissons at construction (Lessard 2011). Whether or not concrete is actually the source of the problem with the Turcot today, the image of Quebec's concrete as somehow more permeable, more susceptible to corruption, remains a powerful tool with which to understand the rhetorical significance that the porous material has taken on in the wider moral discourse around Quebec's supposed corruption. Effectively, this wider moral discourse has so infiltrated popular perception of the local concrete that, despite its actual physical integrity, it is understood as rotting from in the inside out, a powerful symbol of endemic corruption.

In this way, the very (concrete) emblems of Quebec's sudden modernity have begun to symbolize its very opposite; they have become another in the long list of proofs of Quebec's inherent corruption and alleged backwardness. Instead of the unblemished modernity projected by Expo and new autoroutes like the Turcot, these same structures now signify the failures of "modern" Quebec. This

[104] Concordia structural engineering professor Adel Hanna has stated that "the concrete in Quebec is normal… I don't think concrete is the issue," and Sherbrooke civil engineering professor Brahim Benmokrane agrees with this assessment, stating that "the quality of concrete in Quebec is good and carefully monitored" ("Concrete quality 'not the issue" 2006).

connection—wherein the symbols of Quebec's coming of age are themselves reminders of the province's much maligned fiscal and regulatory laxity—has only intensified with time, as the actual physical integrity of the structures themselves comes into question.

The New Turcot and the Aesthetics of Transparency

As the moment of its destruction draws near, the Turcot—perhaps Montreal's most unloved structure after the Olympic Stadium—has enjoyed some unlikely artistic attention. From October 2014 to January 2015, Etienne Tremblay-Tardif's "Signage Matrix for the Refection of the Turcot Interchange" was on display at the Musée d'art contemporain de Montréal (MACM) as part of its Biennale 2014 show entitled "*L'avenir (looking forward)*." Upon entering the museum, the visitor was greeted by Tardif's work, which consisted of approximately three hundred, seemingly randomly assembled prints of highway signs, architectural renderings, press clippings and historical pamphlets (**Figure 30**). These were all printed in bright colours on paper and fabric and hung on crisscrossing clotheslines. In the accompanying descriptive panel, the Turcot was described as "the now crumbling interchange [that] has become a testament to the failures of late-modernist utopianism. Slated for a drastic overhaul, it could well serve as the backdrop in a Hollywood post-apocalyptic, sci-fi disaster film" ("Etienne Tremblay-Tardif" 2014). Unlike the use of art as a containment strategy in the case of Silo no. 5, Tardif's piece works as a type of eulogy to the Turcot, using it as a way to signal to these deeper ambivalences around "looking forward" to a future where it is no longer clear what

progress actually looks like. Despite its description of the Turcot as "crumbling," Tardif's work does not actually explore the concrete materiality of the interchange, sublimating the bulky solidity of the structure into lightweight paper, its splotchy grey and brown monotone into brightly coloured banners. However, it is the Turcot's aging concrete, more than any of the textual or visual representations of the structure marshaled by Tardif, that summons the spectre of a vanished modernist utopia, of the decline of a particular progress narrative that is no longer sustainable.

Both Tardif and MACM curator Marc Lanctôt are critical about the plans for the new Turcot, which Lanctôt argues lacks the spectacle and ambition of the older structure:

> The idea that the Turcot Interchange in the '60s was this thing right out of the Jetsons, [and now] it's become this crumbling, scary, potentially life-threatening structure which will be replaced by something quite plain — there's not a lot of ambition. It has no vision, no space age. It's going to be a a [sic] road with another road going through it. (Kelly 2014).

The presentation of the new Turcot as modest appears to be a deliberate choice on the part of Transports Québec: the discourse around the new interchange stress its scaled down design and relative modesty in comparison to the grandiose vision of the 1967 structure. Press releases from Transports Québec (2009) and news reports describe how the new interchange will be lowered, and thus eliminate the "spaghetti snarl of raised lanes to ground level" (CTV News March 25, 2013). This move away from the drama of the mobile perspective and the privileged zoomscape of the driver similarly informs the new design, which after complaints

from community groups, has incorporated reserved lanes for public transit. Perhaps in order to soften the image of the interchange as a technological or "anxious landscape", the new design also makes room for added green space on the site. This "greening" of the interchange has been interpreted by some as a cynical ploy to detract from the fact that the new interchange will inevitably mean more cars and traffic, not less; as local cycling and pedestrian advocate Derek Robertson describes, "we still have the same basic concept of a wider, larger highway, with more asphalt, more concrete, more noise, more dust, more pollution" ("Final plan for Turcot Interchange unveiled" CBC News 2012).

The bulky, opaque concrete of the Turcot is antithetical in every way to the image of "greater transparency in government and public institutions" ("Editorial" *The Montreal Gazette* 2014) that the Quebec government is attempting to project in the wake of the Charbonneau Commission. Instead of the reinforced concrete pillars of the old structures, the new interchange will make use of steel girders, which Alain-Marc Dubé, the project bureau director for the Turcot Project, says will give the interchange a "sleeker look" (McCormick 2013). Artist renderings of the new Turcot from the *Montreal Gazette* ("The Turcot Interchange: before and after" 2014) show before and after images wherein photos of the dirty, weathered concrete overpasses are replaced with renderings of pristine, sleek flyovers, their barriers made of transparent glass instead of concrete or wire. The surface of many of these new structures are covered with what appear to be plastic tiles of contrasting colours, reminiscent of the pixels on a computer screen, reflecting a new digital

model of technological progress (**Figure 31**).[105] While it is still years from completion, the design of the new Turcot reflects a definitive shift in Quebec away from concrete as the ideal material for national construction.

[105] This architectural treatment using colourful grid patterning is also evident in the new MUHC Superhospital—visible from the Turcot—which opened in Montreal in the spring of 2015

CHAPTER 4

Concrete Hangover: The Olympic Park

Though its Tower is advertised as having one of the best views of the city, most Montrealers know the Olympic Park (which comprises the Tower and the Stadium, among other buildings) as a spectacle in itself, a building to look at as opposed to look from. Facing eastward from Montreal's Mount Royal, the Olympic Stadium hovers on the viewer's horizon like a concrete UFO, its gigantism dwarfing its surroundings, its impossibly inclined Tower skewing the otherwise unbroken right angles of the city. Even for the tourist looking down at Montreal from observatory of the Tower, what's most visible are the Olympic buildings themselves: the puckered white roof of the Stadium, the rippling skylights of the Velodrome (now the Biodôme), and the Olympic Village condominium pyramids overwhelm the surrounding city through the sheer scale and uniformity of concrete.

For the tourist, the site—especially the Stadium and Tower with which the Park has become synonymous—is a curiousity, both because of its architectural strangeness and as a result of the infamy of the debt it created for the province. As Tim Abrahams observes (2011), for the visitor, it is difficult to reconcile the scandal of the stadium's construction with "the joy of visiting the truly extraordinary spectacle in the east of the city." For the Montrealer however, the experience of the stadium as architectural spectacle is inevitably filtered through, and in many ways determined by, an extensive media discourse stretching back over forty years, detailing the stadium's incredibly fraught history both before and after its

construction for the 1976 Olympics.[106] Since the Games, the "fallen stadium" (Hamilton "What does the future hold" 2011) has faced continuous problems, most notably related to the massive debt its construction and upkeep have incurred, as well as ongoing problems with its roof(s). This media discourse has created a paradoxical situation wherein, as Guillaume Éthier (2010) describes, the monument most synonymous with the city is simultaneously understood as the one most hated by Montrealers (213).

Designed by French architect Roger Taillibert, the Olympic Park includes the Stadium, the Tower, the Sports Centre (also known as the Swimming Pool), the Velodrome (now the Biodôme), and adjoining underground parking lots, all cast in concrete.[107] The scale of the site is staggering: according to an informational panel at the Tower itself, the stadium is made up of 12,000 prefabricated elements, and necessitated the pouring of 71,500 cubic meters of concrete. The 165 meter tower, roughly fifty stories tall, leans precipitously at a 45 degree angle over a stadium with the largest seating capacity in Canada,[108] a giant elliptical concrete dome that has been variously compared to a spaceship, a shell, and the world's largest toilet. The

[106] The sheer volume of press detailing the considerable issues surrounding the stadium, its financing, construction, roof saga and other upkeep issues is considerable; as one archivist at the Canadian Centre for Architecture told me, while the vertical files of press clippings for other buildings in Montreal are generally kept upstairs, the six folders for the Olympic Park are kept downstairs as they present too much of a challenge to bring back and forth.

[107] The park also includes pre-existing sports facilities such as the Maurice Richard Arena (built in 1962) and Centre Pierre Charbonneau (1957). In recent years, the park has also become home to the Saputo Stadium (opened in 2008), Cinéma StarCité (2000), the Planetarium Rio Tinto Alcan (2013), and the newly renamed Esplanade Financière Sun Life (2012). The Olympic Village, a twin-tower concrete pyramid-style structure built to house the athletes during the games, was constructed adjacent to the site's northeast corner. Though its design and construction also generated considerable controversy (Auf der Mer 1976, 74-81), it was not designed by Taillibert and was built separately from the actual Olympic facilities.

[108] For the opening ceremonies of the Olympic Games of 1976, the Stadium was equipped to seat over 70,000 (Taillibert 1977, 51). The Parc Olympique website puts the current seat count at 56,000 ("The Stadium" Parc Olympique 2015).

adjoining Velodrome, a cycling arena once described as a massive concrete stingray (Jackson 2011, np), was converted into Montreal's Biodôme in 1992 (much to Taillibert's chagrin[109]). Bounded by the Rue Sherbrooke, Rue Viau, Avenue Pierre de Coubertin, and Boulevard Pie-IX, the Park occupies roughly 20 city blocks, or 114 acres (Howell 2009, 13). The inclined Tower—the largest in the world—faces little in the way of competition for its dominion over the local skyline, and looms large over the predominantly low-lying residential area of Mercier–Hochelaga-Maisonneuve, a predominantly francophone neighbourhood in the city's east end that has a long reputation as one of Montreal's poorest.

Nicknamed the "Big O" because of its shape, and later "Big Owe" because of its cost, the stadium was recently ranked as the number one over-budget project in the world, going 1990% over its originally estimated cost ("Monumental Budget Busters" Podio 2014). While the accuracy of this claim is open to speculation,[110] it is clear that Mayor Jean Drapeau's famous statement about the supposedly self-financing Games—that "the Montreal Olympics can no more have a deficit than a

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[109] In his *Stade olympique de Montréal, mythes et scandales* (2010) Taillibert describes his frustration with the conversion of the Velodrome : "*La RIO en a fait ce biodôme qui n'y a pas sa place. Une arène sportive n'est ni un zoo pour pingouins, ni un jardin des plantes*" (13).

[110] It's difficult to pin down the numbers that swirl around the estimated and final costs of the 1976 Olympics. The Podio article ("Monumental Budget Busters" 2014) lists the original budget at $148,667,400, with final costs at $3,107,148,660, though it's not clear whether this is in USD or CAD. Howell (2009) describes how the deficit described by the CBC and the *Montreal Gazette*—$2.192 billion—is a "crazy amount" (10). This figure, he argues, is unsubstantiated and exaggerated, and "seems to include the cost of adding the tower and roof to the Stadium after the Games, converting the Velodrome to a nature museum, the cost of the Olympic Village without the proceeds of the sale of the Olympic Village, plus all the late interest payments made by the Regie des Instillations" (ibid). Similarly, Pound (2010) argues that the often cited $1.5 billion that most Montrealers believe the Olympics cost is a false number including as it does all the one-time costs of the Games with the long-term infrastructure that is still in use today (such as the extension to the metro and new roads). However, both Pound and Howell cite Drapeau's error in not separating the Olympic-specific costs from the basic infrastructure improvement costs in his original estimate, which, Howell (2009) argues, was created "far too early for the cost estimates to be reliable" (23).

man can have a baby" (Howell 2009, 23)—was off the mark. Largely as a result of the unforeseen Olympic debt, which was only officially paid off in 2006, the popular understanding of the stadium has been dominated by the common perception and resentment of the stadium as a failure, a white elephant that took taxpayers three decades to finance.

Concrete Failure

Though Taillibert's design for the Olympic Park is often cited as an example of Organic Modern architecture, whose non-linear forms the architect modeled on plant and animal forms, the site is routinely described today in the contemporary press as a "concrete wasteland" (Hamilton "What does the future hold" 2011) devoid of the green space normally associated with a park. Built adjoining Montreal's Botanical Gardens, the Park itself is conspicuously lacking in vegetation, a fact which, along with the monotony of concrete, creates various seasonal problems, from a wind-tunnel effect created during the colder winter months to a heat island phenomenon in the summertime (RIO 2013, p. 28).

With reports of falling concrete as recent as 2012, concrete is posed as yet another problem with the beleaguered stadium, one that links it to the wider contemporary discourse around the integrity of the province's concrete infrastructure. As one user speculates in the online comments section of a 2011 *National Post* article about the future of the site, "If this structure is built out of concrete, it will destroy itself in another 30 years. Just like Quebec bridges and parking garages. Nobody has to do anything" (Hamilton "What does the future hold"

2011). While concrete is posited as one of the main challenges to the Olympic Park's integration into its neighbourhood, it also poses a problem for its hypothetical destruction. As the CBC reported in 2011 after the appointment of an advisory committee by the Régie des installations olympiques (RIO) to look into the future of the Olympic Park, officials maintain that "blasting alone couldn't take down the 35-year-old concrete behemoth" ("Whither Big Owe" 2011).[111]

This chapter explores the variety of ways in which the material basis of the Olympic Park as concrete has variously mediated and shaped public opinion of the Stadium as a built failure or white elephant since its construction. While the history of the Stadium is unique in its particularities, it was nonetheless affected by wider public disenchantment towards the material of modernity during the 1970s. It was during this decade that concrete became increasingly—and negatively—associated with the monumentalizing impulse that had begun to characterize urban design in Montreal by the early 1970s, with megastructures such as Mirabel Airport (1975) and the Maison Radio-Canada Tower (1973). More than any other structure in the city, the Olympic Stadium demonstrates how the material of modernity, once associated with Montreal's prosperity, expansion, and circulation, came to be associated with an ongoing narrative of over-spending, poor management, and corruption in the province. These more general negative connotations around the monolithism of Quebec's concrete megastructures were exacerbated in the case of the Olympic Park by specific circumstances around its architecture and

[111] Because of its construction in prestressed concrete, the entire site would have to be demolished by hand, costing anywhere from $500 to $700 million (Hamilton "What does the future hold" 2011; "Whither Big Owe" 2011).

construction—in particular, the Mayor's choice of a foreign architect, Roger Taillibert, and the cost and difficulty involved in realizing his massive concrete design. While concrete had previously been associated with the anonymity of civil engineering and public works such as the Turcot Interchange, here it moved problematically into the realm of the auteur, coming to be understood as a signature for the widely reported chauvinism of Taillibert and the megalomania of Mayor Drapeau.

After the optimism and rapid development during the Expo-era of the 1960s, Montreal in the 1970s is commonly understood today as a period marked by increasing cynicism and overdevelopment in the city, a time of expropriations and housing shortages, in which community groups such as Sauvons Montréal (1973) and Héritage Montréal (1975) were formed in direct response to the demolition initiated for large new developments in the city. As Auf der Maur (1976), one of the Mayor's most vocal critics, described at the time, "Drapeau fancies himself the Haussman of Montreal, encouraging the development of the city, the tearing down of old, decrepit buildings and the erection of gleaming skyscrapers… [he] has no plan and he has allowed fly-by-night developers to come in and destroy much of the city's character" (31). As Dane Lanken (1989) writes, "[t]hings were changing rapidly, and the kind of city people hoped for, a city of parks and nice neighbourhoods, of historic buildings and a dynamic downtown, was being lost to parking lots and dull concrete towers" (11).

After the expropriations and slum clearance undertaken for the inner-city expressways of the 1950s and 1960s under the Dozois Plan,[112] the 1970s was also a time of growing activism and mobilization to create more affordable housing. Despite high-profile experiments such as Habit 67 to create new forms of affordable housing, Drapeau was not interested in addressing the city's growing housing crisis, once famously stating that "[t]he ugliness of slums in which people live doesn't matter if we can make them stand wide-eyed in admiration of works of art they don't understand" (quoted in Auf der Mer 1976, 96). This seems to have guided the mayor's choice of design for the Olympic Village: while citizen groups argued that the construction built for housing visiting athletes should be conceived long-term for use as affordable housing (Auf der Maur 1976), Drapeau instead chose a complex and costly concrete pyramid design[113] known today for its luxury condos. As such, the concrete of the Stadium and the adjoining Village serve as a reminder of a time when concrete was increasingly problematized as an ambiguous material of both overdevelopment and urban erasure, the antithesis of a growing urban heritage and citizen movement.

[112] The Dozois Plan was a slum-clearance plan approved by Duplessis's provincial government wherein the red-light district of Montreal was effectively razed to create the government-run apartment building Habitations Jeanne-Mance in 1959. Despite his pro-modernist stance, Drapeau was actually against this plan—describing it as a "Communist measure"—as he felt that social housing would detract investment from the east side of the downtown core (Byrnes 2013). He lost the 1957 election and by the time he had returned to power in 1960, the housing project was already built.

[113] The twin-tower Village complex, built in the east-end of the city, is based on André Minangoy's Marina Baie des Anges complex in Cote d'Azur in southern France. Built in a hasty and ill-coordinated manner (Auf der Mer 1976, 81), the concrete of these structures has also proven problematic, and during the "topping-off" ceremonies in August of 1975, an 8th floor balcony came crashing down on balconies below due to anchoring problems (ibid).

History of Financing and Construction Scandals

Montreal was finally awarded the XXI Olympiad in May of 1970, after bidding on the Games of 1932, 1944, 1956, and 1972 (Howell 2009, 13). Work on the 1976 Montreal Olympic bid had been underway since the mid-1960s, when Mayor Drapeau conceived of it as a follow-up to the unprecedented success of Expo 67, a second act that would seal Montreal's fate as a world-class city and attract foreign investment. Drapeau met opposition almost immediately. There was much skepticism about the feasibility of his proposed "modest Games," which he had initially told the International Olympic Committee (IOC) would only cost $124 million, much less than similar games that had been hosted for in recent years (Auf der Maur 1976, 17), and a fraction of the final cost of the Montreal Olympics. Drapeau made it clear to the IOC that Montreal would primarily make use of existing facilities for the events, with the exception of the new construction of a 70,000 capacity stadium (Latouche 2011, 205). By the time Montreal's newly appointed Comité Organisateur des Jeux Olympiques (COJO) unveiled the "self-financing" scheme three years later, the new budget was set at $310 million, of which $250 million would be allotted to the construction of the new Olympic Park. This cost would be offset, according to Drapeau's plan, through a federal lottery and the sale of Olympic coins and stamps, in addition to the money generated by the sale of television rights to the Games (Auf der Maur 1976, 42).

Problems arose before construction even began, when studies revealed that the ground under where the Olympic Park was to be constructed—a former golf course adjoining the Botanical Gardens—could not support the weight of the heavy

concrete facilities designed by Taillibert. The remedy for the heavy concrete installations was more concrete; the brittle terrain was reinforced at a cost of over $7 million (ibid, 97-98), which was not budgeted in the projected costs of the Park. This also led to delays in construction, already behind schedule; as a result, the Velodrome, which was supposed to be finished in time to host the 1974 World Cycling championships, was not completed on time and the championships had to be relocated to a temporary facility built quickly at the Université de Montréal football stadium. When construction on the Stadium began in 1974, it ran almost immediately into further technical and logistical problems, due again to the complexity (and weight) of Taillibert's design. That same year, the provincial government, led by Liberal Robert Bourassa, concerned about the schedule and mounting costs, appointed the firm of Lalonde, Valois, Lamarre, Valois & Associés (also known at the time as Lavalin, or today as SNC Lavalin, and the same company responsible years earlier for the Turcot) to be the project managers of all Olympic construction, an imposition that infuriated Drapeau (ibid, 104).

By the summer of 1975, Lavalin put the cost of construction at $675 million (ibid, 123). The city of Montreal was forced to finance construction, as COJO had only made $25 million back at this point. By 1975, $421 million had been spent on construction and an additional $300 million was still needed. Work stoppages began as a result of unpaid bills, a situation compounded by long-standing labour disputes at the site. By that November, the provincial government, worried that work would not be completed in time for the Games, stepped in and took over construction, eliminating Drapeau and Taillibert from the equation (ibid, 127) and creating RIO to

oversee the completion of construction. By the opening ceremony of the Games in July 1976, construction costs had soared to nearly $1 billion, a number that would continue to grow after the games with the completion of the Tower and installation (and reinstallation) of the retractable and subsequent fixed roofs.[114]

After the Games, RIO appointed a committee to look into the completion and future of the Olympic installations; the *Comité consultatif chargé d'étudier l'avenir des installations olympiques* was helmed by architecture professor Jean-Claude Marsan, and made several recommendations as to how the site might be integrated into the existent fabric of the city as a hub of recreation and sport. According to RIO's report ("Pour le Parc Olympique" 2012) on the findings of their 2011 advisory committee, Marsan's recommendations were mostly sidelined and ignored after the Parti Quebecois created the *Commission d'enquête Malouf sur le coût des Jeux de la XXIe Olympiade,* an inquiry which ran from 1977 to 1980 at a cost of an additional $3 million.[115] The Commission laid the lion's share of the blame for cost overruns at Drapeau's feet for letting the designs become too complex and for giving Taillibert too much autonomy, findings that were said to be disappointing to the Parti

[114] The media discourse surrounding the various roofs of the Olympic Stadium gives the erroneous impression that there have been upwards of four or fives roofs since the Olympic Games. Taillibert's *Stade olympique de Montréal , mythes et scandales* (2010) puts the count at three (76). In fact, the Stadium has only ever had two roofs built, despite many mishaps, proposals and much speculation over the years. The first roof was finally installed a decade after the Games in 1986, and made of Kevlar fabric by Socodec-Lavalin. Often described as the "Taillibert roof" because it was retractable—despite the architect's disavowel of it (ibid)—the roof was ripped by heavy winds in 1991. This was finally replaced in 1998 by a non-retractable roof made out of a material called Sherfill II (fiberglass coated with Teflon), made by Birdair at a cost $37 million. This roof caved in under pressure from snow buildup a year later in 1999, injuring two workers setting up a trade-show below, and was subsequently repaired several times. Although RIO issued a call for proposals for a new roof in 2004, the Birdair roof is still in place at the stadium today, though it is plagued with problems such as rips and other damage, and the stadium remains closed in the winter months.

[115] Howell (2009) puts the cost of the Malouf Inquiry at $8 million but this is likely as a result of adjusting for inflation (200).

Québécois, who had initiated the inquiry after they came to power in 1974 in order to highlight the incompetence of Bourassa's Liberal government (Howell 2009, 201).

Models of the Future

One of the key ways in which the stadium was mediated and presented to the public before its construction and during controversy amid mounting costs was through scale models and maquettes. These representations of the planned Olympic Park had a strong rhetorical power, and worked to mollify and contain criticism of the project, which began very early on. At a large press conference held in the spring of 1972, Drapeau revealed the first glimpses of the proposed stadium to a suitably impressed crowd through the use of a scale model (Auf der Maur 1976, 38) (**Figure 32)**. With its inclined tower and bowl-like stadium, supported by thirty-four cantilevered ribs, the project was quite striking, especially given its pricetag, which at that point was a relatively modest $103.8 million (Howell 2009, 57). Even Auf der Maur (1976), one of the Games' most vociferous critics, and a founder, in 1973, of the municipal group Montreal Citizens' Movement (MCM) which was created in part to oppose the secretive management style and demolitionist policies of Jean Drapeau, describes how "[t]he complex, depicted entirely in white to enhance its beauty, was more than impressive. It was staggering" (38). To a press and a public that were already skeptical about the Mayor's promise that the Olympics would not cost a cent, and that the facilities could be completed on time, the beauty and promise heralded by the model held a strong persuasive power.

Three years later, another scale model of the Games facilities would be used to even greater effect. In response to the threat to his leadership posed by an emergency meeting called by the Municipal Affairs Committee of the National Assembly in 1975, Drapeau sent a 400-square-foot scale model of Taillibert's design to Quebec City (Auf der Maur, 109). Dramatically lit for television, the "gleaming white maquette" (ibid) was used by the Mayor for maximum effect, as he pointed out its various features and outlined the importance of the Tower, which the press and his critics found especially extravagant. In another bout of showmanship, in order to explain how the Tower would support and control the retractable roof, the Mayor passed around a piece of the membrane roofing material to the assembly, so that they could "tell their children and grandchildren that they had touched the Olympic Stadium roof" (ibid). After several days of hearings, the provincial government endorsed Drapeau's plans and gave him permission to continue with Taillibert's design.

The image of the completed Stadium continued to play an important role even after the Games had begun, functioning as a surrogate for the still unfinished stadium and tower, which would not actually be completed for another decade, as well as the first retractable roof, which was only installed in 1987.[116] It bears underscoring here that neither the tower nor the roof—the source of so much resentment on the part of Montrealers ever since—were actually in place for the Olympics during the summer of 1976. These elements are so heavily associated with the contemporary site that aerial photographs of the stadium from the summer of

[116] Though they weren't requirements for the IOC, both the tower and the roof were essential to Drapeau's desire that the Stadium become a year-round, international showpiece for the city.

the Olympics are uncanny today, depicting what appears, in retrospect, to be a ruin in reverse, with its the truncated, unfinished tower of the stadium appearing as if it's been severed **(Figure 33).**

Writer Jack Ludwig (1976) describes the experience of attending the opening ceremonies in the unfinished Stadium:

> "One could think of the unfinished Stadium tower with its exposed steel rods making vertical penmanship strokes in the sky as some imaginative sculpture breaking the monolithic façade of concrete. One could hold in abeyance the projected images of a completed tower on postcards, handbooks, magazines, and in scale models all around Montreal. *That* tower was full of restaurants and gyms and club facilities. More important, its cables operated the retractable roof so necessary to the Olympic Stadium's becoming Montreal's showpiece…" (emphasis in original, 2).

The maquette was also used effectively during the Games in 1976, where one of the souvenirs available for purchase was a "Build it yourself" Olympic Stadium, a small plastic scale model, about 8 by 10 cm, of the completed stadium **(Figure 31)**. Much like Drapeau's larger maquettes, this small toy-like model, consisting of four pieces that clip together to form the tower and stadium, is made completely out of smooth, shiny white plastic. While there are no actual cables for the stadium's proposed retractable roof, the effect is simulated through the use of small raised bumps in the plastic model showing the effect of the cables on the proposed textile surface of the roof. The souvenir model also came with an accompanying information panel describing the functionality and construction of the finished

stadium, claiming, among other things, that the shape of the stadium is "evocative of a giant seashell" and that, once the "portable roof" is installed, the stadium will be "convertible within minutes from baseball to football" (Information Panel, "Construisez-le vous-même" [model] 1976).[117]

In this way, during the intervening decade between the Olympic games and the completion of the facilities in 1987, the image of the stadium, and especially of the tower, functioned as a type of suturing device, a promissory note to Montrealers and Quebecers that the stadium in which they had invested so heavily would eventually be completed. Maquettes and images of the stadium seen either from above or far away also helped to rationalize and make more coherent the massive site, which, if seen from nearby and during the years of its ongoing construction, resembled nothing so much as the city's largest construction site (Auf der Maur 1976): an unprecedented amount of cranes, machinery and labourers, as well as unassembled concrete sections that littered the site like dinosaur bones, obscuring the supposed pristine beauty of its final iteration. Models suggested a certain immediacy and finitude that the built stadium could never approximate, their smooth white surfaces only making the final material seem even heavier, more porous and grey.[118]

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[117] Interestingly, in the French version of this text which is printed alongside the English, the claims about the roof are not nearly as far-flung, instead describing the roof will transform "en moins d'une heure pour répondre à la géométrie des jeux de surface (baseball, football)" (Information Panel, "Construisez-le vous-même" [model] 1976), a claim that would be much closer to reality once the roof was installed in 1987.

[118] Models continue to play a significant role in mediating and informing the public understanding of the stadium today. When visiting the Tower, one level of the observatory is reserved for an otherwise empty room with three scale models of the stadium: one showing the entire park, one showing just the stadium and the tower with a cut out to show the cantilevered concrete ribs, and then one of just a single rib, which was used as an assembly guide on the construction site, according to the information panel beside the maquette. In this context, the models serve a dual function, working as a defense of the stadium's overwhelming concreteness—showing it as technological and complex—as well as making the monumental site more legible. These contemporary models serve to rationalize

As Éthier (2010) suggests, maquettes could also be understood as problematic in the history of reception around the stadium, as they tended to set up unrealistic expectations on the part of the press, and in turn, the public, in terms of how long construction should take: "*Tout se passe dans la sphère médiatique comme s'il était impardonnable que le monument phare de Montréal ne soit pas passé, sans délai, de la maquette à son état définitif*" (227).[119] Within this alarmist discourse, Éthier continues, anything that went wrong with the project was attributed to Taillibert, increasingly represented in the press as an arrogant, chauvinistic and stubborn (219).

Stadium as ambiguous national monument

Before cost overruns and delays were an issue, the Stadium's construction was controversial for another reason: the appointment of a foreign architect. In an unusual move, Quebec and Canadian architects were not invited to bid on the construction of these new facilities; instead, Drapeau hired French architect Roger Taillibert, largely as a result of the former's admiration of the architect's Parc des Princes stadium in Paris. Typically, the Games were seen as an opportunity to promote architects from the host country, and so the choice of Taillibert over a local

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the choice of concrete at the site. In a description of the ribs from one informational panel at the site as the "Building blocks of the Olympic Stadium," the panel goes on to tell the reader about the technical feats of the building, including the complicated use of prefabricated elements and the amount of concrete used in creating them.

[119] Éthier (2010) bases his findings on a corpus of newspaper articles relating to Taillibert and the Stadium from *La Presse* and *Le Devoir,* dating from 1972 to 2009. English newspapers such as *The Montreal Gazette* were excluded, he explains, as the study of Taillibert's media "personality" is easier to gauge within a unilingual context. However, Éthier does note that there seems to be some discrepancy between the two languages in terms of how the press characterized Taillibert; particularly, the francophone press tended to attribute more affirmative traits to the architect, which Éthier suggests may be as a result of the complex cultural rapport between French Quebec and France (214).

architect, especially given the increased consciousness around Quebec independence and issues of cultural sovereignty, was controversial. In 1972, the Ordre des architectes du Québec (OAQ) publically denounced the partisan appointment and called for a more open international contest (Roult 2011, 104); though this request was not granted, the OAQ did require Taillibert to pass a French test in order to work in Canada (Taillibert 2000, 31-32).

Despite the mayor's claims that "Art transcends nationalism" (Auf der Maur 1976, 36-37), Montreal's stadium cannot be understood outside of the national context, especially given the highly charged political climate of post-October Crisis Quebec. As Rubén Gallo (2005) describes, "Olympic stadiums [are] constructions of extreme allegorical importance…designed to convey a carefully crafted image of the nation" (202). This is certainly the case with the Montreal Olympic stadium, meant to convey a certain image of Quebec and Montreal to the world. However, the nationalism promoted by Drapeau needs to be qualified as it is distinct from that generally associated with the era of the Quiet Revolution and the referenda that succeeded it. Drapeau's was an anachronistic brand of nationalism: more *Survivance* than *Révolution tranquille*, more French-Canadian than Québecois. Though committed to the survival of French Canadian culture and a strong promoter of Quebec's economic growth, Drapeau remained neutral during the 1980 referendum on independence, and in response to criticism over the possible deficit resulting from Expo 67 once declared, "No cost is too high when the price is the cost of being a Canadian" (Auf der Maur 1976, 29). An ally of the provincial and federal liberal governments, Drapeau cast frequent aspersions on the Parti Québbécois, who were

openly critical of the mayor and his Olympic plans (Howell 2009, 200). Drapeau was adept at dividing and conquering when it came to Montreal's French and English allegiances, and "enjoyed pointing out to the French–speaking population that any criticism of the Olympics and of his stewardship was but an English plot against Quebec, while reminding Anglophone citizens that to criticize the Games would contribute to a victory of the 'Séparatistes'" (Latouche 2011, 211). Though the choice to locate the stadium in the historically francophone east end of the city was part of the Mayor's longer plan to develop and help stimulate the economic growth and power of French Canadian culture in Montreal (Fréchette-Lessard 2011, 15), his reputation as a Francophile, and his choice of a Parisian architect for the Games, opened the Mayor up to criticism in the post-colonializing context of Quebec during the 1970s.

Despite his ambiguous nationalism, there is little doubt that Drapeau conceived of the stadium project as something larger and more significant than simply a year-round sporting complex meant to stimulate economic growth and draw foreign investment to the city. Having once famously suggested that "What the masses want are monuments" (McKenna and Purcell 1980, 145), Drapeau hired Taillibert to create a showpiece for the city that "people will cross oceans to see" (Auf der Maur 1976, 97), and often invoked the pyramids and the Parthenon as reference points for the stadium's importance. The idea of a legacy, and the importance of duration were paramount to Drapeau at this later stage of his career; in the Preface to Taillibert's *Construire l'avenir* (1977), Drapeau writes "*Il n'y a donc pas de développement véritable sans durabilité, comme il ne peut se trouver de culture*

en dehors du temps. Tout ce qui meurt sans laisser de trace illustre la faiblesse de l'homme" (5). Unlike the majority of the installations built for Expo 67,[120] Drapeau understood the Olympic complex as a permanent contribution to the city's landscape, one that would communicate to generations, and to this end, the choice of its architect—and its material as concrete—were central.

Materials of National Construction

Though the importance of Olympic stadiums as constructions of national significance has been widely acknowledged (Gallo 2005; Dyreson 2013), the materiality of these constructions has for the most part been overlooked, with scholars concentrating more broadly on the architecture, urban environment, and social and political contexts of their construction. However, the materiality of these constructions, and how these materials communicate, are of paramount importance in how these sites are understood both at the time and their later analysis. This is best illustrated by the Berlin Games of 1936, the moment in which Olympic stadiums took on a newly politicized, nationalizing discourse (Gallo 2005). While the case of Berlin's Reichssportfeld is an extreme example of the use of the Olympic

[120] Most of the 90 national and theme pavillions constructed at the Expo 67 fairgrounds of Îles St-Hélène and Notre Dame were disassembled after the event, with the notable exceptions of the French Pavillion (now the Montreal Casino) and the America Pavillion (now the Montreal Biosphère). Mayor Drapeau had wanted to have a permanent Expo symbol constructed, the Expo Tower, modeled on the Eiffel Tower and designed by a French architect. The Tower, plans for which Auf der Maur (1976) suggest greatly resembled the later tower of the Olympic Stadium and suggests the leaning Tower of Pisa, became one of the Mayor's "few public defeats" (38) after plans for it were scrapped because of costs. The plan for an Expo Tower began after the Mayor had initially been looking into having the Eiffel Tower disassembled and sent to Montreal for Expo; though he had permission to go ahead with the project from President de Gaulle, the company that owned the Tower had reservations about getting the Tower back (*The Fifth Estate* 1980).

Games for the purposes of Nazi propaganda, it does illustrate the importance that the materiality of these constructions can have.

Architect Werner March's original design for a sleek modern stadium for the 1936 Games, made of steel, glass, and cement with unadorned exterior walls, was thrown out after Hitler toured the building site in 1934. Reportedly claiming that he would rather cancel the Games than hold them in "a modern glass box" (Large 2007, 154), Hitler wanted a stadium that conveyed the sort of grandeur and classicism with which Nazi architecture would eventually become synonymous. Albert Speer was called in to consult, and a new plan was drawn up to clad the reinforced concrete skeleton in German limestone and decorate its façade with massive cornices (ibid). The use of local limestone was important as it connoted a rootedness in the soil, as well as durability, power and strength; it also expressed Speer's "Theory of Ruin Value," discussed in Chapter 1, which eschewed the use of modern material such as steel and cement for constructions of the Third Reich.

In Montreal in the early 1970s, the choice to use concrete was made for reasons not dissimilar to Speer's rejection of the same material, proof of the material's shifting associations in the intervening decades. That is, though it was criticized forty years earlier as an amnesiac material, lacking in nobility and unsuitable to ruin, by the early 1970s, its links to antiquity and its purported durability were foregrounded. Though Auf der Maur (1976) and other critics of the Games suggest that Taillibert "sold the Mayor on concrete on mystical as much as architectural grounds" (131), the Mayor's choice of Taillibert, a well-known expert in prestressed concrete, made its materiality a foregone conclusion. Drapeau

wanted a stadium that would last for the ages, and so the use of concrete, already established over the preceding century as a "permanent" material, made practical sense. However, it is true that Taillibert was quite adamant in his admiration of concrete, with poetic descriptions often verging on the incomprehensible:

> *Le béton est la plus belle pâte a modeler que l'on ait eu entre les mains à ce jour. Il permet de traduire dans l'espace les formes qui décrivent les fonctions statiques et ces fonctions statiques s'inscrivent dans l'espace pour couvrir et reprendre les efforts pour les transporter en des lieux sûrs"* (Castro 1976, 11).

More often, Taillibert and Drapeau drew on concrete's ancient lineage as a way to justify its use. Referring to the material as a type of "recycled stone," Drapeau likened Taillibert's design to a high-tech reworking of the monuments of antiquity. Taillibert also drew on this pedigree to describe his work: "*Si les principes sont anciens, les moyens sont de son temps. Il transmet les messages de la pierre aux ressource nouvelles du béton*" (Taillibert 1977, 3).[121] Concrete, he continues later is "*la roche écrasée qu'il est possible de façonner à volunteer, comme le faisaient les Romains dans l'Antiquité, en y incorporant à present de l'acier qui permet de realiser des forms audacieuses et inattendues*" (75). Here we can discern a shift from the anti-historicism of early modernism towards an appreciation for concrete's history, as well as movement away from the strict functionalism and monolithism of early

[121] Taillibert wrote three monographs in which he defends himself and the stadium from his critics. These include *Construire l'avenir* (1977), *Notre cher Stade olympique : lettres posthumes à mon ami Drapeau* (2010), and *Stade olympique de Montréal, mythes et scandales* (2010).

concrete architecture towards an embrace of it as a more versatile, dynamic material.

At the same time that its ancient links were being invoked, the complexity and innovation of Taillibert's design (with a stadium that consisted of 2,000 prestressed, prefabricated concrete units meant to fit together seamlessly and necessitating the use of computers and detailed studies) relied upon a futuristic techno-rationalist discourse that conferred upon the material a distinctly modern, cutting-edge quality.[122] In this way, the discourse around concrete materiality preceding and during the construction of Montreal's Olympic Stadium partook of the twin themes—those of an ancient claim to permanence and a futuristic material suitable for a narrative of progress—that the earlier concrete entrepreneurs had relied upon and used to distinguish concrete at the turn of the nineteenth century. The success of this strategy was qualified, and concrete would come to be increasingly problematized during the construction of the stadium, as well as with the completion of the tower after the Games.

Concrete nations: Concrete as Colonial Technology

During the construction of the facilities, and especially in the post-mortem that followed the Games with the Marsan and Malouf reports, concrete came increasingly to be foregrounded as one of the major contributing factors to the

[122] For example, in a pamphlet given to construction workers at the Velodrome site in 1974, which was to be constructed from the roof down, potential skepticism was allayed through claims to a building revolution made possible by new materials and techniques: "*L'homme nouveau, en découvrant les secrets des matériaux légers et durables, a révolutionné l'art de bâtir. Pour la première fois en Amérique du Nord, une construction hardie sera 'montée' du haut vers le bas*" ("Rendez-vous76" 1974).

excessive cost of the Olympic Park. Experts, widely quoted in the press, suggested that costs could have been cut by upwards of $100 million had the structures been made out of structural steel instead of concrete, and castigated Taillibert for the ultimate anti-modernist sin of putting aesthetics ahead of functionality in his design ("Experts slam" 1976, 52). Though these suggestions for alterations were put to Drapeau and Taillibert before and during the construction process, the duo was apparently unmovable in their commitment to the use of precast concrete, and Drapeau was quoted in the press as saying "Taillibert is a concrete man...why discuss steel?" (Auf der Maur 1976, 131).

This controversy invoked important national and historical distinctions between the use of steel (favoured in North American—particularly American—construction) and concrete (still understood as more typical of European building practices), as well as Quebec's complex cultural relationship to both locales. As a result, reports detailing the added expense involved in Taillibert's use of concrete similarly implicated a criticism of the architect's perceived chauvinism and lack of understanding for local conditions. Because of the longstanding influence of the steel industry in the United States in particular, and in North America more generally, the labour and costs associated with building in structural steel were purportedly less than those of building in the prestressed concrete called for by Taillibert's design. In addition to the higher material costs, the use of prestressed and precast concrete necessitated the import of expertise and equipment from Europe; as Taillibert (1977) describes, while France was the "*berceau du béton précontraint*" (32), where the technology had been developed by the French

structural and civil engineer Eugène Freyssinet in the early 1900s, the technology was still relatively unknown on the other side of the Atlantic. Similarly, the technique of precasting concrete, Taillibert' describes (1977), was also only at its beginning stages in North America (70).

Precasting was essential to the design of the stadium, which consisted of thirty-four cantilevered ribs, themselves comprised of 2,000 components that needed to fit together with millimeter precision (Auf der Maur 1976, 105-6). The assembled ribs weighed as much as 185 tonnes each. Adding to the complexity of prefabrication was the lack of uniformity of the ribs themselves: because the stadium was designed as an ellipse instead of a circle, each of the thirty-four ribs was unique and necessitated different molds sent from France (Taillibert 1977, 71), adding another $20 to $30 million to the price of the stadium (Auf der Maur 1976, 106). In response to criticism that he should have made his design more uniform (a circular as opposed to elliptical stadium) like the majority of North American baseball stadiums, Taillibert countered that such a design would have been boring and "monotone" (59).[123]

In his own monograph from 1977, the architect's distaste for steel is inseparable from his similar disdain for North American culture in general, which he frequently refers to as lacking in history (1977, 65) and obsessed with materialism and money (ibid, 66). He characterizes the baseball stadiums of the United States as 'steel monuments' (ibid, 56), and describes himself as an "*ennemi des monstres de métal*" (ibid, 21). Taillibert's hostility towards steel (which has softened

[123] The stadium was designed to be converted into a baseball stadium after the Games, and became the home of the Montreal Expos from 1977 to 2004.

considerably in recent years[124]) was characterized in the press as both an example of French chauvinism and the capricious whim of a prima donna architect ("Experts Slam" 1976, 52).

Taillibert (1977) asserts that his use of concrete was misunderstood in the context of North America: "*On me reprocha, notamment… d'avoir utilisé le béton—considéré comme le matériau du pauvre—sur un continent ou l'acier est roi, etc. Bref, de ne pas être Canadien*" (92). Here, Taillibert poses the Canadian derision for concrete as itself an example of a certain underdevelopment and ignorance: in the context of North America, which he describes as still working within mostly traditional building methods, concrete is still (wrongly) understood as the "material of the poor," whereas in Europe, "*nous cherchons à aller au-delà en industrialisant la plus possible*" (1977, 70), and the new technologies of prestressed concrete created possibilities of which North Americans were still largely ignorant. Taillibert's patriotic attachment to concrete as a properly "French" technology was not unusual; as Forty (2012) notes, while "many nations have put much effort into asserting ownership of concrete…The country that has without doubt been the most aggressively proprietal is France" (104). Over the twentieth century, Forty continues, these claims became increasingly nationalistic, as in Jean Epstein's 1938 film *Les Bâtisseurs*, wherein concrete is cast as the "new national material of France" (ibid).

[124] Taillibert has been in the news in Quebec again recently for his criticism of the proposed reconstruction of the new Champlain Bridge in concrete, a design the architect has criticized for the "*vision soviétique*" of its heavy concrete. Taillibert himself has put forward a proposal for a bridge made completely out of steel, which he says is more appropriate given how "*Montréal a le droit d'avoir un monument digne de ses liaisons avec le continent américain* (Nouveau pont Champlain: Roger Taillibert a son idée à 1,8 milliard de dollars." TVA Nouvelles 2014).

Taillibert (1977) describes the pressure from the North American steel industry during the construction of the stadium in almost conspiratorial terms, describing how "*Il est certain que les producteurs d'acier nord-américains étaient furieux de voir que dans les constructions olympiques de Montréal le béton avait la partie belle"* (75), and implies that the inflation of steel prices during construction could have been as a result of this displeasure on the part of the steel industry.[125] In a hypothetical aside, Taillibert speculates how, had he created his facilities out of steel, they would have worked as advertising for the steel industry, "*S'ils étaient realisés en acier, quelle revanche et quelle publicité pour les industriels nord-américains !*" (1977, 76).

What the architect couldn't have known at the time of his writing was that the tower would be completed in steel when construction resumed a decade later, reaching its final elevation in 1987. Because of the instability of the ground upon which the tower is built, after the Games it was found that completing the structure in concrete would make it too heavy for the ground to support. As a result, the last 83 meters of the Tower were built out of steel caissons. ("The Construction" Parc Olympique 2015). As Éthier (2010) suggests, aside from the purely technical aspects of this process, the choice to complete the stadium at this point in the mid-1980s using "*l'expertise proprement québécoise*" (220) also had political implications in the context of pre-referendum era Quebec. Effectively, the use of Quebec labour and

[125] Because steel is still a component of reinforced concrete, a great quantity of it was still necessary for Taillibert's design: he (2010) cites that 90 000 tones of steel were used for the Olympic Park (49) and that the price of steel went from $200 a tonne to $900 a tonne in six months (1977: 76). In his 2010 publication, Taillibert is less conspiratorial and cites the oil crisis for the rise in material costs (49).

Quebec companies like Socodec mark an attempt to reconquer Taillibert's stadium and to domesticate, to a certain extent, its materiality and technological expertise, formerly branded as French.

Grey Matter: Labour issues

This patronizing discourse, repeated in the press, of an expert Frenchman coming in and "teaching" the Quebecois workers, reproduced a problematic colonizing narrative in the context of an increasingly nationalistic Quebec. This dynamic was further exacerbated by labour disputes at the construction site, and press coverage referring to the stadium as "European" in design and maladapted to the local culture (Éthier 2010). Taillibert, who appears to have been either tone-deaf or outwardly hostile to the political climate in Quebec, made the situation worse with inflammatory statements to reporters, referring in one example to the relationship between his coterie of French experts and the Quebecois labourers thusly: "[t]he grey matter is in France: and the muscle is in America" ("Experts Slam," 52).

In order to ensure quality control as well as mitigate potential labour disputes on the construction site (Taillibert 2010, 34), the prefabrication or pre-casting of the sections of the Olympic stadium was to take place off-site, at a factory specially constructed for the project. The use of precasting off-site allowed Taillibert to skirt the two major unions responsible for construction in the province; as a result, the unions were reportedly unhappy with the situation, and Taillibert (2010) describes how the factory received bomb threats and faced sabotage—including the theft of

concrete—on the construction site as pressure tactics meant to delay construction (40).[126]

It's important here to contextualize the labour situation at the Olympic Park within the broader politicization of building projects in Quebec. Because of the unprecedented construction and infrastructural development of the 1960s and 1970s in the province, a growing number of labourers was needed for the creation of megaprojects such as Mirabel Airport and the Olympic installations, leading to increased competition and rivalry among the province's two largest union confederations, the *Fédération des Travailleurs du Québec* (FTQ) and *Conférération des Syndicats Nationaux* (CSN). After the largest of these megaprojects—the James Bay hydroelectric project, in northern Quebec—was disrupted by violence and vandalism on the part of union workers in 1974, Premier Robert Bourassa appointed the "*Commission d'enquête sur l'exercice de la liberté syndicale dans l'industrie de la construction*," or the Cliche Commission, to look into corruption in the construction industry. This commission, which held public hearings for 80 days, heard claims that intimidation, violence, negligence, and the influence of organized crime were rife within Quebec's labour unions, and found the leader of one of the unions guilty of negligence.

[126] The theft of concrete deliveries is one of the most popular anecdotes I heard when asked to describe the subject of my dissertation. As soon as the construction of the Olympic Stadium came up, Montrealers of a certain age all seemed to know the same stories about construction workers pilfering cement from the site. Taillibert (2010) describes this most "flagrant" of thefts: "*Les agents de contrôle du chantier fermant les yeux, les camions à toupies arrivaient pleins de béton par une porte et repartaient par une autre sans avoir déposé leur chargement, parfois jusqu'à trois fois dans la même journée. Ils livraient en ville ou dans les environs, à des amis ou sur des sites ou l'on construisait des villas ou des piscines aux frais de la Ville de Montréal*… " (41). These remain anecdotes however and are difficult stories to fact-check.

This was the context in which work upon the Olympic Park—the largest construction site in Montreal—was taking place in 1975. As a result, it is not difficult to see the appeal that precasting concrete, especially at a non-unionized factory, would have for a large project such as this. The use of off-site labour for the prefabrication of the construction elements was also partially a result of the problems encountered in the construction in 1974 of the Velodrome, whose pieces were poured at the site, often in terrible weather, leading to slowdowns and uneven quality (Taillibert 1977, 71). In January of 1975, Schokbéton Quebec Inc., a company that specialized in the construction of concrete facades and floors, was awarded the contract for prefabrication and a factory was constructed half an hour's drive northwest of the city in St-Eustache.[127] The giant pieces—some weighing as much as 100 tonnes—were then transported by highway into the city for assembly by crane in a process Taillibert (1977) likens to a giant "*jeu de meccano*" (72).

The introduction of reinforced concrete for monolithic construction in the early twentieth century had a strong influence on the division of labour on the construction site; as Slaton (2001) argues, beginning in the early 1900s, the material began to call "for a relatively small coterie of highly trained specialists to supervise the work of many little-trained, and much lower-status, laborers" (1). The wider use of prefabrication after World War II, as evidenced with sites like the Olympic Park, amount to a further deskilling of construction work, whereby the expertise and

[127] Schokbéton is still in operation in St-Eustache today; tellingly, images of the Olympic Stadium are not showcased on their website with other major works, despite the fact that it was this contract—which effectively municipalized the company (Auf der Mer 1976, 144)—that led to the creation of the factory out of which the company still operates. Drapeau later suggested that the company be nationalized as part of Quebec's 'industrial patrimony' "no doubt as revenge for the firm's threat to suspend production if its bills were not paid" (ibid 130).

technology of building are made increasingly obscure and specialized, mostly taking place off-site before construction even begins.

Even with prefabrication, the fact remained that the individual pieces did require human labour to erect and assemble at the actual construction site, and there were several strikes that affected cost and the construction schedule; these include the 1974 steelworkers' strike, and two shorter strikes as the result of clashes between the FTQ and the CSN in May and October of 1975. The delay caused by strikes and labour stoppages was one of the main reasons cited for the creation of RIO when the provincial government took over construction in late 1975. When the Malouf Report was released in 1980, though the judge laid much of the blame for cost overruns and delays at Drapeau's feet, he also castigated the unions: "*Ce sont les syndicats qui mettaient constamment des bâtons dans les roues ...Tout cela provenait de la FTQ. Elle avait adopté des stratégies de gros syndicats internationaux américains qui contrôlaient tout.*" (Shaffer 2013).

In addition to these labour issues, the use of prefabrication met other resistance at the construction site. Taillibert (1977) reports having to repeatedly explain the merits of prefabrication to foremen who suggested that it would be cheaper and easier to simply pour the concrete for the ribs on-site (74). He characterizes the resistance of the workers as partially borne out of ignorance (a lack of experience with the technology of precast and prestressed concrete) but also the result of fear, recounting how one foreman came to him to express concern (which he reproduces in a distinct Quebecois vernacular): "*votre truc, ça vas se*

casser la gueule" (72). This situation was aggravated, Taillibert writes, by Canadian journalists who would predict that "*Tout va s'écraser*" (ibid).

Concrete Danger

Despite Taillibert's reassurances to the foreman on the construction site, Olympic concrete came to be problematized in the media discourse both during construction and for decades afterwards, where it was represented as a dangerous, even fatal material.[128] The problems began in August 1975, when a worker fell to his death and another five were injured after the collapse of an 85-tonne beam of concrete at the stadium. In February 1976, a similar accident involving the collapse of two concrete beams killed four workers. Despite RIO's reassurances to the press that the latter accident was the result of human error and not a design flaw with the stadium, headlines such as "*85 tonnes de béton 'Olympiques' tuent un ouvrier*" (*Journal de Montréal* 1975) and "Olympic Stadium: Four workers killed by beam" (Associated Press 1976), which ran internationally alongside images of the fallen concrete console, worked to create a sense of peril around the monumental materiality of the stadium. This sense of peril around the site was further exacerbated by reports from just before the opening ceremonies in 1976 about cracks in ill-fitting concrete sections needing to be repaired with epoxy glue (Auf der Maur 1976, 116).

[128] During construction, up to eleven construction workers were killed. This number is somewhat controversial; while the unions claimed eleven workers were killed, the Olympics Installations Board (OIB) put the number at seven, counting only those who died at the site and not those who died later from injuries (Auf der Maur 1976, 132). Auf der Mer himself puts the number at twelve (ibid).

Nearly fifteen years after the Games, these fears resurfaced after a 55-tonne beam fell onto an empty walkway in September of 1991, leading to an inspection of the structure, which found "living cracks" in the concrete ribs ("Team of experts probes Big O" 1991). In the aftermath of this incident, many local experts and architects went on record claiming that the site was not safe. Architecture professor Philip Bobrow described how he wouldn't let his family go to the stadium (ibid), and Jean-Claude Marsan, the architect who wrote the eponymous report of 1976, told *La Presse* that the collapse of the beam confirmed that the whole stadium rests on a faulty concept by Taillibert, and suggested (somewhat prophetically) how a buildup of snow on the roof could cause an avalanche (Noel 1991). In response to these fears, RIO ran ads in local newspapers with the image of the Stadium and the Tower rendered as a giant flexing bicep with the tagline "*Je suis de retour! Plus fort que jamais*!" (**Figure 35)** as a way to assuage public anxieties around the integrity of the concrete.

In 1999, just such a snow build up on the newly-installed Birdair roof caused a partial collapse and injured two workers below. That same year, a survey conducted by SOM-La Presse confirmed that the stadium evoked fear on the part of certain Montrealers, reporting that "*56% des gens interrogés cragnent d'y aller* (Malboeuf 1999). Later that year, *La Presse* released another article stating that the base of the tower was showing cracks, citing a 1995 official report obtained by the paper which blamed the fissures on seasonal changes in temperature, insufficient

coating on armatures, and the retraction and flux of the concrete (Noel 1999).[129] That same year marks the first instance in which talk of demolishing the stadium begins in earnest in the press with a series of articles published in both the English and French newspapers (Semenak 1999; Malboeuf 1999; Noel 1999).

While still generally perceived as a hostile, concrete wasteland, over the next decade, the safety of the Stadium was not under the same scrutiny, and media attention tended to be concentrated on the ever-expanding network of rips in the fixed roof as opposed to the concrete ("Dossier" *Esquisses* 2011, 26). A 2008 report by the engineering firm Dessau Inc. and LVM-Technosil for RIO found that, for the most part, structurally, the concrete of the Park was in good shape (ibid), and at a roundtable discussion held by the OAQ in 2011, participants focused more on the dangers caused by climatic conditions, such as the build up of massive icicles on the inclined tower which necessitates the yearly installation of a fence to prevent pedestrians from walking underneath ("OAQ Roundtable" 2011). However, by March of 2012, the state of the stadium's concrete was again in the news, with reports of the collapse of a concrete slab measuring 8 by 12 meters from the ceiling of one of the underground parking garages. At this point, the stadium's reputed decline began to be recuperated into the broader cultural narrative in Quebec, wherein it was represented as "the latest sign of the city's crumbling infrastructure" ("Concrete falls" CBC News 2012).

[129] The report went on to also say that the Tower was built of two different types of cement, another reason for the cracks: "*Le ciment type 30 dégage une plus grande chaleur et s'il a été employé pour produire le béton des éléments avec les grandes sections, son emploi devient également une des raisons de la fissuration*" (Noel 1999).

Concrete Audacity: Infrastructure as art

In addition to labour issues at the time of construction, Taillibert's particular use of prestressed, precast concrete reignited the dispute about disciplinarity which had divided architect and engineer in the discourse surrounding the Stadium's construction. In a *Civil Engineering, ASCE* article entitled "Experts slam the Olympic structures of Montreal" (1976) a panel of experts, from civil engineers to architects, discussed Taillibert's designs and weigh in on the finished results of the stadium. As the title suggests, it is not a glowing review, with many agreeing with Dr. Anton Tedesko, a consulting engineer from New York, who declared that he "believe[d] that there were no capable, knowledgeable engineer experienced in construction active from the very beginning to guide the architect. I suspect a lack of partnership, no early joint effort, between designer and constructor" (50). Tedesko goes on to assert that as it stands, Taillibert's structures

> "do damage [sic] to the cause of concrete. Our young people should be told that these structures did not have to be done this way. As built, this gigantic demonstration project is almost an argument against the use of concrete and for the use of structural steel or aluminum under similar circumstances in the future" (50-51).

In these discussions, concrete is positioned as the fulcrum between the position of the engineer and that of the architect, as the experts point out that consulting engineers should have instructed Taillibert about the wastefulness and design issues surrounding his use of prestressed concrete. In the debate, while the experts are unanimous in their condemnation of the structures, the engineers tend

to advance the position that the consulting engineer should have been brought in earlier to avoid subsequent construction issues.

These debates invoke the important historical distinction that industrialization and new materials such as iron (and later reinforced concrete) introduced to building in the early nineteenth century. The development and increased use of new construction technologies such as prestressed and prefabricated concrete necessitated increasing cooperation and a blurring of the distinctions between architect and engineer. While early modernist architects such as Le Corbusier exalted American engineers as the progenitors of a new architecture based on an idealized rationalization and functionalism, by the late twentieth century we can discern a retrenchment of former disciplinary hierarchies and resentments. In the same article from 1976 ("Experts Slam"), this tension is articulated by Mr. Jean-Louis Lalonde, a Montreal architect who, in response to another panelist decrying the treatment of engineers as slaves at the architect's bidding, declares how, "As an architect, most of the time I resent the fact that the engineer seems to becoming the god more and more" (53). In the context of Quebec, this discourse similarly invokes the theme of an overall lack of oversight and coordination of efforts between the various professions.

This slippage—between the role of architect and the role of engineer—was variously embraced and elided by Taillibert in his self-presentation as a builder not an architect, an artist not an engineer (Auf der Maur 1976; Taillibert 1977). Despite his much-discussed use of cutting-edge technologies and computers in the service of his design, and in a manner akin to his presentation of concrete as both cutting-edge

and ancient, Taillibert attempted to present himself in the somewhat nostalgic mode of the craftsman or artisan as a way to defend himself from detractor's critiques of his design and extravagant use of concrete. This narrative was strongly enforced by Mayor Drapeau, who described his and Taillibert's opposition to steel in similar terms: "The Stadium is a work of art. Never, never, never did we think of changing the design…It would have been like carving a beautiful statue out of bronze—and then, as costs went up, completing it with feet of wood" (Auf der Maur 1976, 121). The mayor's comments about the sanctity of art are revealing and somewhat ironic given his censorship, two days before the Olympic's began, of the *Corridart* public art exhibition commissioned by COJO.[130]

Critics took issue with these claims to artistry, arguing that a piece of public infrastructure was not equivalent to a piece of art. Often, this discussion similarly hinged on Taillibert's use of concrete. Marsan (1978) described how, in using the vastly more expensive and unnecessary prestressed concrete, Taillibert sacrificed function to form: "*La vérité est que l'architecture de Roger Taillibert sacrifie tout, avec gravité et élégance, aux dieux de l'esthétique formelle*" (29). This discussion of concrete as a fanciful, artistic medium marks a definitive shift from earlier examples such as Silo no. 5 and the Turcot Interchange, where the material was associated with a certain anonymity, efficiency and functionalism.

[130] *Corridart* was a 5.5 km-long public exhibition of installation work along Sherbrooke St. that lasted for only six days in 1976. Organized by COJO, the artistic installation was imagined as the cultural compliment to the Games, a means to beautify and glorify the city and lead visitors to the Olympic Park. Instead, artist and architect Melvin Charney conceived of a public exposition consisting of banners, murals, collages and audiovisual works sharply critical of the Mayor and his administration's policies and the city's rapid large-scale development at the expense of historical buildings. Outraged with the public criticism, Drapeau had the exhibition torn down overnight, a controversial move that is still discussed as the most egregious example of artistic censorship in the city's history (Ludwig 1976, 155).

As Taillibert himself describes, in North America at the time, concrete was still popularly understood as the *matériau du pauvre* (1977, 92); within this context, attempts to associate the industrial material with fine art were (unsurprisingly) met with scepticism. Éthier (2010) proposes that the perception of Taillibert as portrayed in the press over the last forty years has largely determined popular reaction to the stadium itself; that is, that the eccentricities and perceived "audacity" of the architect have condemned the stadium in similar terms in the eyes of most Montrealers. The press has exacerbated Québécois resentment towards their "*monument de béton*" (228), Éthier proposes, through its consistent portrayal of Taillibert as a type of "*prince maudit contre lequel il était bienvenu de se révolter*" (ibid).

Éthier argues that the stadium represents a particularly Quebecois ambivalence, one caught between an admiration for the building's monumental ambition and a certain North American pragmatism. Throughout its history, Taillibert—and by extension, the stadium—has come to be synonymous with an arrogant persona opposed to the collective "we" who have inherited the space and the debt. Éthier goes on to suggest that more than anything, Taillibert attempted "*à sa façon particulière, de traduire dans le béton l'audace d'une société québécoise devenue précipitamment adulte dans la deuxième moitié du XX^{e} siècle*" (228). This "translation" though "audacious concrete" was not accepted, he suggests, primarily as a result of this negative press coverage but also as a result of a more fundamental North American/Quebecois discomfort with eccentricity, monumentality and "audacity." Éthier implies that the stadium's concrete could be understood in a

therapeutic narrative of reconciliation; that, if Quebec were to finally exonerate Taillibert, and attempt to understand and fully accept the audacity of Montreal's "*monument phare*" and its "*poésie du béton*," it would somehow be in a better place to finally embrace its (own) audacity and ambitions in the process. However, while this linking of the architect and his stadium might help to explain the earlier resentment for the project, it seems more likely today that the failures of the stadium have shifted, with the concomitant shifts in the infrastructure of feeling around Quebec's aging concrete, to be read as symbolic of the more general failures of Quebecness (in terms of fiscal mismanagement, corruption, and collusion between political officials and the construction industry). This shift has been further consolidated and exacerbated through the representation and use of the Olympic stadium as a setting in recent film.

The stadium plays itself: the Big O as backdrop in contemporary film

Though RIO attributes much of the Stadium's negative reputation today to the public memory of debt and the roof saga, as well as the bad press it engendered in the decades following, the site's status has also been determined through its frequent remediation in film and television over the intervening years. Two notable recent examples are Denys Arcand's *L'âge des ténèbres* (2007) and *Warm Bodies* (2013), discussed in the last chapter. Though very different in terms of genre and story, the films both cast the stadium as emblematic of larger hypothetical dystopias.

In Arcand's film, which is arguably more "realistic" than *Warm Bodies'* zombie apocalypse, the setting is a present-day Quebec. *L'âge des ténèbres* touches on a variety of contemporary themes in the province, and amplifies them to full blown moral panics: a radio program playing in the protagonist's car describes an outbreak of C. difficile; public servants wear hospital masks to work, teenagers are more plugged in to their iPhones than to the drama in their own family, political correctness has hamstrung human communications, and a bloated state bureaucracy has overwhelmed the former glory of Quebec's national project. In the film, the stadium is shown as the labyrinthine headquarters of the Quebec provincial government. In an early scene, our "hero", Jean-Marc Leblanc, a bored civil servant, is driven to his office on a golf cart through the stadium, past a pile of concrete rubble with a official sign beside it that reads "*chute de béton*" **(Figure 36)** an inside joke referencing public discourse around both the state of Quebec's concrete, and a perceived lack of action and accountability on the part of officials (instead of repairing the structure, a sign is erected to warn of "falling concrete").[131] Through a variety of problematic racial and sexist stereotypes, the film reiterates the Quebecois cinematic trope of the powerless, white male as synecdochal for the frustrated national project in Quebec.[132] Towards this end, the stadium is portrayed as soulless monolith to the vacuity of the provincial government, its concrete

[131] Moments before this scene, Jean-Marc is in the commuter train to work with countless other commuters, all wearing face-masks and speaking on their cell phones. The only distinct thing we overhear is one man saying loudly into his phone "…on ne peut pas prendre les chances avec ça. Faut renforcé le béton… " (Arcand 2007)

[132] As Marshall (2001) and Schwartzwald (1991), among others, have pointed out, there is a tradition in Qubecois cinema of associating the national project with a frustrated Oedipal complex.

representative of the bureaucratic banalities and petty personal squabbles that have stalled Quebec's greater ambitions in the morass of North American culture at large.

In *Warm Bodies*, the stadium is completely divorced from its Quebecois context, cast instead as an abandoned stadium in a post-zombie-apocalyptic American city. In a panning shot near the beginning of the film, we are shown the stadium—renamed ITV Stadium—which appears to have landed like a ship in the middle of downtown. Using CGI, the entire structure was relocated southwest of its actual site, in order to serve the narrative of the film, where it works as an entry point into the walled city of uninfected humans. While there are several scenes shot at the stadium, it is in the one towards the conclusion of the film that the particularity of the Olympic Stadium becomes clear and it loses its anonymous qualities. Surrounded in the cavernous empty stadium by "Boneys" (the super-villainous zombies of the film), the two protagonists, "R" and Julie, jump from an opening on the side of the building. They fall past the distinctive roof of the Velodrome, with the white mast of the Tower receding behind them, and land in one of the small decorative pools near the base of the Tower. As they're getting out, they are once again surrounded, this time by the human army trying to keep them apart (it's a zombie-update of Romeo and Juliette). They are also flanked by the concrete of the site, which has been covered in graffiti to add to its already dystopic splendor **(Figure 37).** Weeds grow on the concrete and it's not clear whether these were added or native to the site. Here the dated and somewhat ruinous qualities of the stadium—its bunker-like architecture, its chipped surfaces, the homogeneity of its

concrete—are used to enforce the sense of a vanished civilization, a bygone era. In the film, the Stadium successfully realizes concrete's ambition to ruin.

Olympic Ruins

Montreal's stadium is not, strictly speaking, a ruin. While underused, it is not abandoned. Nonetheless, because of the debt and controversy it generated, it is often invoked in larger discussions of how to make use of these massive and expensive installations after they outlive their short-term usefulness for the Games. Usually Montreal—along with the more recent example of Athens from 2004 (Wergeland 2012)—is invoked as a type of warning, an object lesson in the need to build flexible installations that can be properly integrated after the games in their urban surroundings (Kiuri and Teller 2012). As Meyer-Künzel (2007) describes, "Montreal Olympics in 1976 demonstrated the risks involved in the staging of a monster event" (139).

Towards this end, there has been a recent wave of interest in photographs of Olympic sites abandoned and in disrepair. Articles such as *The Atlantic's* "The Ruins of Champions: Photos of Abandoned Olympic Sites" (Cottrell 2012) and *Popular Mechanic*'s "12 Forgotten Olympic Venues Fallen Into Disrepair" (2012)[133] show the "ruins" of Games from as recently as four years earlier, such as Beijing's ripped and tattered volleyball stadium, or abandoned Olympic Sports Complex in Athens built for the 2004 Games. Montreal's Velodrome is also included in this last list (ibid). The

[133] The images of the ruins from the 1984 Games in Sarajevo are especially eerie, as the photographs of the concrete podium are riddled with bullet holes; the accompanying text describes how it was used as an execution site during the siege a decade later ("12 Forgotten Olympic Venues Fallen Into Disrepair" 2014).

appeal of these images appears to result from several factors, most notably that they partake of the larger cultural interest in images of aestheticized decline, the fascination elsewhere dismissed as "Ruin porn," discussed in Chapter 1. Images of the accelerated ruination caused by the Olympics are in many ways more striking than those of the ruins of industrialism, given that they are often from the very recent past and constructed on a different scale: massive installations costing upwards of several billion dollars and built quickly and primarily for short-term use. Filmed and televised during the events for which they were newly constructed, they tend to exist in the popular imagination in a state of perpetual newness, and so images of them weathered and stained with graffiti only a few years after their construction are shocking. Images such as this add weight and gravitas to wider claims about the unsustainability of this type of building for mega-events, out of touch and out of scale with the urban context, and ill-conceived in terms of longer-term use (Wergeland 2012).

With the rips in its roof and the cracks in its concrete, Montreal's stadium is usually understood today as existing in a perpetual state of decline, with the latest reports outlining the necessity of repairs costing $220 million (CBC "Montreal's Olympic Stadium" 2015). While the Big O is not—strictly speaking—a ruin, it is an ambiguous monument: built for a future that never materialized, it is understood as existing in a perpetual state of decline from the present of the Games. The public imaginary around the stadium is today shaped by this structuring tension between

the weight of the past and the glorious possibilities—always out of reach, too expensive or time-consuming—of the future.[134]

The Whiteness of Concrete

Today, from a distance, the Olympic Stadium and Tower appear to be the uniform, gleaming white that made the original maquettes so persuasive. Perhaps it as a result of the power of these earlier plastic models that RIO decided, ten years after the Games, to paint the Olympic buildings white. To paint concrete is of course a sin against Modernism's embrace of the material as inherently honest and not in need of any additional finishing. There is no indication in Taillibert's writings that this paint was part of his original design. From 1976 to 1986, the light grey concrete of the buildings had been left exposed, and photographs of the newly constructed stadium from just after its construction in 1976 show the exposed concrete of the giant consoles of the stadium, and the vaunting archways of the tower's base, already marked with rust and staining (picture in Orlandini, 2010, 93).

Michel Langlois, a structural engineer at the Stadium, clarifies that what appears to be paint is actually a "*membrane d'imperméabilisation blanche afin de le protéger des intempéries, des glissements abrasifs de neige durcie ou de glace*" (Langlois 2014). Langlois explains the decision to cover the concrete as the result both of practical necessity (the need to protect the more vulnerable elements of the design, such as the sloping chutes of the roofs from the abrasive movement of snow

[134] Explicit references linking the site with the future have characterized the discourse around the stadium since its construction, from Taillibert's monograph *Construire l'avenir* (1977) to RIO's latest report *Pour le Parc olympique. L'achèvement. L'avenir* (2012).

and ice), and of aesthetic considerations as the membrane "*permet également au Stade d'avoir une apparence de couleur blanc uniforme et non gris terne*" (ibid). Further to this, when the height of the Tower was completed out of steel in 1987,[135] it left a seam, which is still visible today, where the concrete turns into steel, and it is likely that the membrane was chosen in advance as a way to soften the appearance of this transition.

Coating the concrete of the Olympic Stadium is reflective of the growing antipathy during the mid-1980s towards these large concrete structures, once the pride of the city. At this point a decade after the Games, frustrations with cost overruns and the slow pace of construction were once again making headlines; within this context, it's easy to see how whiteness might have offered a way of rebranding the stadium as somehow new and complete, a delivery on the original promise of those early maquettes. By choosing to cover the stadium and adjoining buildings in a white membrane in particular, RIO—whether consciously or not—linked the porous, rough concrete of the beleaguered stadium back to the smooth, plastic models that were so successful in allaying doubts before construction began during the 1970s. As such, painting the stadium can be understood as an attempt to summon an era of greater optimism and civic pride for both the site and the city itself.

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[135] Because of the instability of the ground upon which the tower is built, after the Games it was found that completing the structure in concrete would make it too heavy for the ground to support. As a result, the last 83 meters of the Tower were built out of steel caissons ("The Construction" Parc Olympique 2015).

The success of this strategy is unclear. Up close, the whiteness of the Park is not so pristine; its layers of paint are badly chipped, marked with rust stains and peeling away to reveal older layers of paint as well as the bare concrete beneath (**Figures 38 and 39**). The painted whit(ish) surfaces of the Stadium, Tower, and Biodôme, clash with the exposed concrete walls of the adjoining metro stations, stairwells, and parking facilities; a contrast that reveal the sham of the Olympic installations' paint job. As such, the whiteness has now been incorporated into the site's longer narrative of decay. The membrane has a lifespan of seven years (Langlois 2014), and so, every year, a part of it is cleaned, repaired, and a new coat resistant to ultra-violet light is applied; at the end of seven years, the entire site has been treated, and the process begins again. This need for constant upkeep and repair adds to the sense of eternal construction and the unfinished status of the site, a legacy of its long construction and completion for and after the Games. Despite RIO's attempts, the whiteness of the stadium today summons nothing so much as its literal depiction in the press and popular culture as a "white elephant" or "*éléphant blanc*."

The most popular structure of the Park is one that is not white at all, but covered in graffiti: the concrete tunnel known as le Sifflet (or, confusingly, "The Big O") was built—somewhat controversially[136]—as a passageway for Olympic athletes on their way into the stadium **(Figure 40)**. Abandoned for years before its reappropriation by local skateboarders, Sifflet stands today as a world-famous skate park, drawing international tourism and an international following that both

[136] Auf der Mer (1976) rails about this extra cost and complications that this viaduct entailed, costing somewhere in the realm of nearly $14 million (117).

confounds and pleases RIO, who decided to relocate the 400 meter tunnel in 2012 after the construction of the Saputo Soccer Stadium threatened its continued existence. Named by *Thrasher* magazine as one of ten best places in the world that skaters should see before they die by ("Le Sifflet" 2015), the Sifflet—whose use was never intended by its architect—is nonetheless the Olympic structure that best fulfills Taillibert's goal that the site should be reserved as a space for the pursuit of amateur sport, one of the only "unsullied values still in existence" (Taillibert, 1977, my translation, 149).

A New Stadium

Montreal has been without a home baseball team since the Expos were moved to Washington, D. C. in 2004 and renamed The Nationals. Nostalgia for the defunct team is strong in Montreal (Fischer 2015; Gordon 2015), where reminders of the Expos are everywhere, from their tri-coloured logo on baseball caps and T-shirts, to the team's former mascot, Youppi, who now leads the cheers for the Montreal Canadians at the Bell Centre. But the Olympic Stadium is the prime reminder of the vanquished team, and has long faced allegations that the Expo's demise was partly the result of all the complications of the structure and the problems with its retractable roof.[137] However, in the last two years, the Olympic Stadium has attracted nearly 200,000 baseball fans to four pre-season Toronto Blue Jays games. The high attendance of these games has reportedly attracted attention

[137] The concrete of the stadium also plays a role in this, as the acoustics created by Taillibert's design apparently created a type of echo chamber that made it difficult to hear the actual game (Newberry 2015).

from officials of Major League Baseball (MLB) and resuscitated hopes (especially on the part of the Montreal Baseball Project[138]) that the city might again host a Major League team.

The current upsurge in baseball enthusiasm and Expos nostalgia has not carried over to their former home. Despite the success and record turnout of the exhibition games hosted by the Olympic Stadium, MLB commissioner Rob Manfred has emphasized in these preliminary discussions that in order to be seriously considered, Montreal would first need to commit to a new stadium. In a feasibility study conducted for the Montreal Baseball Project (MBP) in 2013, the authors indicate that the Olympic Stadium would not be the franchise's home: "it was not designed for baseball, it is poorly located and requires significant maintenance and upgrade" ("Feasibility Study Examining the Return of Major League Baseball to Montreal" 2013, 11). Some of the reasons MBP list for this include the lack of available dining amenities around the Stadium, the need for a downtown location, the stadium's age, and ongoing problems with the retractable roof and structural problems (21). Similarly, there is no love lost for the Big O in the press coverage surrounding these recent developments around a possible return of baseball to Montreal, where the stadium was described in one article from *The Guardian* as "moribund" (Lengel 2015). In these articles, the concreteness of the site is often invoked as a further strike against it. To this end, Gordon's (2015) description is typical: "There's still way too much concrete; it's the same old dowdy monolith."

[138] The Montreal Baseball Project, headed by former Expo Warren Cromartie, is a group that has been agitating for the last three years to bring baseball back to the city.

The concrete of the stadium, in these recent accounts, is presented as a manifestation of the weight of a past that overdetermines and overwhelms any present or future use for the structure. If, as Bélanger (2002) contends, grand projects "such as the Olympic Stadium—have remained in Montreal's popular memory as municipal, if not provincial, disasters" (79), this popular memory is ballasted in aging concrete, which prevents the stadium from moving successfully into the future. It is simply too heavy, too freighted with the past and the city's historical relationship to both the stadium's construction and the semiotics of concrete in Montreal more generally.

Despite all the comments in response to newspaper articles and radio phone-in shows querying the future of the stadium, with many Montrealers opining they "would choose to bulldoze the mess" (Riga 2010) it remains unclear whether the general contempt many feel for the stadium is stronger than the attachment many feel towards this contempt. That is, the stadium is a building that Montrealers "love to hate," much in the way that Kingwell (2008) describes our ambiguous attachment to concrete today (4). Talking about what to do with the stadium has become a municipal pastime, regardless of whether these conversations actually lead anywhere. Discussions of transforming the stadium into a giant ski jump,[139] water park, or the world's largest flower pot (Riga 2010) give voice to a public imaginary still struggling to come to terms with what Montreal should look like today, or more generally, with what a city should be. Similarly, the when the same discussions are

[139] This is in reference to the most recent proposal by Inbox Events to convert the Tower into a ski jump to coincide with Montreal's 375th anniversary in 2017. While plans are still in the preliminary stages, the city and province have committed $250 000 to help fund the testing phase of the project. (Ski jump plans for Olympic Stadium tower take off," CBC News 2015).

punctuated by calls for the stadium's demolition, these function as a way to give vent to public frustrations about the perceived failures of the Quebec government in managing these large-scale infrastructure projects. These hypothetical remodelings of the Big O's concrete do not rehabilitate the stadium's concrete in the same manner that the containment strategies of Silo no. 5 do; however, they do create a space wherein alternative urban spaces might be articulated or imagined, and where received ideas about Montreal can be rehearsed, confirmed, and refuted.

Conclusion

This project is not intended as an apology for Montreal's concrete, a plea to appreciate it in the light of its early revolutionary connotations or its present apocalyptic splendor. While the material did help to create new urban forms and subjectivities, ways of seeing and circulating in the city, concrete was also used to enforce a certain homogeneity on the city's built environment through its ubiquity in tower blocks and Brutalist megastructures, and to introduce a monumentality that has proven somewhat stultifying in its immutability. The present study seeks instead to make clear how, through approaching a material such as concrete as itself a type of media—one with its own technological and cultural history—we might approach new ways of understanding the experience of urbanism and modernity.

As the above case studies of Montreal have sought to demonstrate, concrete functions medially through the ways in which it serves to structure space and by the manner in which it acts in relation to time. In the most immediate sense, concrete has changed our relationship to built space in the city by introducing unprecedented scale and density to the landscape, altering not only the ways in which we circulate within and experience the city, but our very understanding of urbanity itself. It is difficult to overestimate the phenomenological shift that reinforced concrete construction, through its reorientation of the city axis from a horizontal to a vertical plane, has had on our conception of both the city and our relationship to it. Concrete has likewise had a profound effect on the rhythms and speed of circulation within cities. Though associated with the postwar sprawl of the suburbs, concrete infrastructure and highways have also compressed space, making it possible to

travel longer distances at greater speeds, and introduced new networks of circulation at both the local and international levels.

Concrete buildings are not only experienced architecturally: with the contemporaneous development of photographic technologies, concrete constructions were among the first buildings to partake in a significant way in the world of representations, and the recirculation of these images has worked to affect real changes on the built environment, as well as to condense a set of relationships between locality and cosmopolitanism. This general economy of images, including photographic, cinematic and other communicative forms, is filtered through a complex web of intersecting cultural histories and public memories, as well as changing ideologies around what constitutes modernity and progress. In the postindustrial present, these images are summoned to serve larger general arguments about ruinscapes, as well as failed or resuscitated modernities; in so doing, they reveal the status of some places as generic signifiers within an economy of film locations and others as iconic markers of place.

Perhaps even more important than the spatial changes concrete has introduced to the built landscape is the effect it has had on the way in which we experience time in the city. First of all, concrete works to freeze utopian thinking in space, giving form to particular visions of modernity and progress. As these buildings age and weather, the triumphalism of their initial construction is undermined in a way that is difficult to reconcile with the material's reputation for permanence and eternal novelty. Effectively, the visibility of concrete's aging becomes a mirror through which societies live out their relationship to history. Our

relationship to these concrete 'traces' or ruins, the choices made at different moments in history as to what constitutes either an architectural heritage worth preserving or a failure best demolished, bear witness to the contingencies of cultural memory: what is thought worth remembering and what the present would rather forget. In turn, the manner of their care raises value judgements about a society's integrity and cultivation of its heritage. In all of these, concrete buildings become bearers of memory and generators of political discourse. In turn, these aging buildings and infrastructures are further contextualized within broader international networks and circuits, which identify cities in variable states of decay or advancement relative to others, reducing them in a sense, into tokens of a dispersed and uneven modernity.

Concrete Montreal

As these case studies demonstrate, concrete has functioned as a prime medium in Montreal's negotiation with modernity over the last century, giving form to ongoing debates around urbanity, circulation, duration, and scale in the city. Concrete unites diverse phenomena through a particular set of materialities, technologies, and representations, and despite its much-maligned rigidity, in Montreal it has been largely characterized by its polysemy, its ability to shapeshift and articulate successive and competing visions of urbanism and modernity. In choosing the particular case studies to illustrate this, I have tried to show how the technological and cultural history of concrete itself has influenced its local adaptation, and in turn, how its locality (in a particular space with a particular history) has likewise affected its understanding over time. In turn, this evolution—

of concrete's cultural history in Montreal—also rehearses a broader history of the city itself, one that illustrates the complex relationship between the city's built space and the public imaginary.

The history of Montreal's concrete is, like that of the city itself, not straightforward, subject both to the shifting fortunes of the material globally as well as the particular vagaries of Quebec's societal and political climate. It is not enough to simply equate concrete with a sudden modernity in the province, as the material has just as often served as a type of bulwark against challenges to the status quo. Though the grain silos of the early twentieth century did alter the city skyline, their concrete was generally disguised so as not to challenge the traditionalism and conservatism of the dominant architectural ethos, or recuperated through their representation in photographs and paintings as part of a new industrial sublime. Through the sudden ubiquity of exposed concrete during the postwar period, the material gained a stronger visual presence in the city: infrastructure built for Expo 67, such as the Turcot Interchange, and new high-rises made possible by reinforced concrete, challenged the city skyline once again and introduced new ways of circulating in the city. Firmly associated with the province's sudden modernity and growing nationalism during the Quiet Revolution of the 1960s, concrete became symbolic of a confident, new Quebecois perspective.

After this decade of optimism and enthusiasm around urban renewal projects, realized for the most part in exposed concrete, by the early 1970s concrete became, with the construction of controversial megastructures such as the Olympic Stadium, antithetical to a new urban ethos more interested in preservation and

increasingly skeptical of municipal and provincial authorities. By the late 1990s, concrete itself had become synonymous with a wider history of disenchantment with the promises of modernity, as the material became increasingly associated with collapses, corruption, and collusion. Once the material through which Quebec attempted to "catch up" with the rest of North America, and the fabric of a new, hard-won modernity in the province—concrete has since become another marker of Quebec's exceptionalism, an index of its endemic backwardness.

The growing importance of the Quebec sovereignty movement during the mid-twentieth century further complicates the way in which Montreal's concrete is interpreted today. While concrete might have represented the material of (Quebecois) national construction during the rapid development of the 1960s, the history of concrete's use in Montreal also traces other national affiliations. During its early use for the construction of the railways and the grain elevators in the early twentieth century, concrete helped to articulate an emergent pan-Canadian nationalism; decades later, with the construction of the Olympic Stadium, concrete was presented as a foreign, French technology imposed upon the fledgling nation of Quebec. Even during the concrete Quebec heyday of the 1960s, the material was simultaneously used to consolidate a particular vision of a publically-minded Canadian federalism through the construction of public institutions with a Brutalist aesthetic (Legault 2011).

The political associations of concrete in Quebec over the last century are similarly complex. As Forty (2012) describes, internationally concrete has been "identified with the politics of the left, an alignment traceable from the beginning of

the twentieth century" (145). Despite its early associations with socialism and experimental housing projects such as Thomas Edison's, in Montreal, concrete was mainly used at the beginning of the twentieth century to consolidate the capital and power of the city's ruling elite and wealthy industrialists. It was only during the late 1950s and especially with the growing nationalism of the 1960s that concrete came increasingly to be aligned with statist politics and public infrastructure. The left-of-centre politics of the provincial Parti Québécois government during this era were often at odds with Montreal's municipal government—especially Mayor Drapeau—which by the 1970s, was much more interested in soliciting private investment for development in the city, and so the wide-scale concretization of the city during these years is a result of both of these trajectories.

Update on Case Studies

As the concrete of the last century ages and shifts, so have the associations attributed to it. While with some case studies, such as Silo no. 5, this aging process—in combination with various containment strategies and a growing appreciation for industrial ruins—has led to a greater appreciation than it enjoyed at the time of its construction, this has not been the case for many of the city's other concrete buildings. The Turcot, once a beacon of progress and modernity's investment in the automobile, has since become synonymous with a hostile technological environment, a threat that cannot be contained because of our ongoing dependence on the functionality of highway infrastructure. Its well-publicized lack of physical integrity is today used as shorthand for larger issues in the realization of public

works in Quebec, problems such as mismanagement, corruption, and cost overruns. Finally, the concrete of the Olympic Stadium, already understood as one of the reasons for problems and cost overruns during construction, has only grown more controversial over the last few decades, as high-profile collapses and expensive repairs have undermined attempts to rehabilitate the stadium in the public's eyes. Today, the concrete of the site is understood as a challenge both to its wider integration into its surrounding neighbourhood (because of its fortress-like qualities) and to its hypothetical destruction.

Today, what unites Silo no. 5, the Turcot Interchange, and the Olympic Stadium—besides their materiality—are the delays surrounding their respective redevelopment. While the CLC has recently released another press release announcing their intention to hold more public consultations with the ultimate goal of coming up with a master plan for the Old Port and the Pointe-du-Moulin (which includes Silo no. 5) (CLC "Launch of consultations on revitalizing the Old Port of Montréal" 2015), this process will take at least another year and a half, and Sylvestre (2015) has confirmed that nothing will likely happen at the site until 2018 or 2019 at the earliest. Similarly, despite the former mayor's declaration (as discussed in Chapter 2) that he would see the Silo turned into an international symbol for the city on par with the Eiffel Tower for the celebrations of Montreal's 375th birthday, Sylvestre has now said there will be no special events or changes to the Silo in line with these plans, as they did not receive the necessary funding (ibid).

The Turcot plans, mired for years in controversy over the redesign and then embroiled in continuances for the Charbonneau Commission, are finally underway,

with the new interchange set to open in 2020. The construction process has been turned into a type of litmus test for Quebec's commitment to "clean up" corruption in the construction industry, a way of moving away from the negative associations of the former structure and all that it represented (Peritz and Séguin 2013). As a result, the new Turcot—built at ground level and rendered in the official projections as unobtrusively and modestly as possible, flanked by trees and bikers—is also lacking any of the drama and spectacle of its predecessor, which was constructed in just under two years. Daily closures to the interchange while it undergoes construction have only furthered public exacerbation with the works, causing major slowdowns and traffic jams, and it remains to be seen whether the $3.7 billion project—the largest infrastructural work that Transport Quebec has ever handled—will be completed by 2020. When it is completed, the new Turcot, built of concrete and galvanized steel, is supposed to last for at least 75 years, decades longer than the current structure, meaning that the legacy of the Turcot will likely stretch into the twenty-second century.

The Olympic Stadium—despite the monthly odes to its decrepitude in the open letters and op-ed pages of local papers—is still operational, though it remains unclear what its fate longer term will be.[140] In June of 2015, *Le Journal de Montréal* published a report commissioned by RIO in 2009 (but never released), which put the stadium's demolition cost at anywhere between $700 and $800 million. This would entail a slow and painstaking process over five years in order to avoid the creation of a toxic dust cloud (made up of concrete, asbestos, and other construction

[140] In the shorter term, its fate at the moment involves attempting to sell 55,000 tickets for the One Direction concert in September 2015.

debris) as a result of an explosion, as well as the potentially catapultive effect that the prestressed cables might have if suddenly released from their concrete encasements (LeCavalier June 16 2015). With an estimated cost of $220 million in structural repairs needed even before the additional cost of a new roof, and an annual operating cost of $17 million, the Quebec Liberal government appears to be in a holding pattern as to what to do with the structure. In Montreal, there is a general sentiment—a mixture of pride and loathing—that nothing will change, that, as one local writer puts it, the "concrete monstrosity…[is] just too big and too weird to die" (Carpenter 2015).

The reasons for the various delays at the three sites are diverse, and are more generally reflective of the drawn-out process of development in the post-industrial city, where a variety of stakeholders and institutions must be accountable for increasingly large and expensive infrastructural projects. However, the slow pace of change around these three sites is also illustrative of the wider ambivalence that continues to surround the concrete monoliths of modernity. While most would agree that these buildings reflect an outdated and anachronistic vision of progress, there is no general consensus as to what should replace them. In the absence of a contemporary vision for the future, there is a contradictory nostalgia surrounding these behemoths of the recent past, a longing for the concreteness of the past that, despite its disillusionments, is at least knowable. These buildings mark time in the city and convey, just through their duration, a sense of the interconnectedness between the past and the present. Conversations and op-eds written twenty years earlier are repeated almost verbatim today; public consultations generate more

consultations, and plans are seldom and only very slowly realized. We experience the givenness of the built landscape over and over again, afresh, its decrepitude somehow always new, always a crisis, but not acute. Not allowed to go to ruin completely, in the absence of public willpower or desire to actually rehabilitate them, these concrete buildings linger, perpetual reminders of our ongoing attachment to an unsustainable progress narrative that either fetishizes the future or romanticizes the past.

Bibliography

"Concrete Housing." Accessed May 15, 2014. http://www.ieeeghn.org/wiki/index.php/Concrete_Housing.

"PechaKucha." Accessed May 15, 2014. http://www.pechakucha.org/presentations/brutalism.

"Turcot." Accessed June 2, 2014. http://www.turcot.gouv.qc.ca/projet/pages/historique.aspx.

"Definition of a zombie bank." Financial Times Lexicon Accessed 26 June 2014. http://lexicon.ft.com/term?term=zombie-bank.

"Zombie (computer science)." Wikipedia Accessed June 26, 2014. http://en.wikipedia.org/wiki/Zombie_%28computer_science%29.

"Pointe-du-Moulin, Montreal - Silo No.5 - 360 view." Last Modified Jan 6, 2011 Accessed May 7. http://www.youtube.com/watch?v=fsNKt8sDsiE.

Handbook of some Engineering Works in Canada. 1904. Edited by Canadian Society of Civil Engineers. Montreal: Witness Printing House.

Memories in Cement and their Bearing Upon the Future with Some Facts of Present Importance. 1909. Detroit, Mich: Cement Products Co.

What the Farmer Can Do with Concrete 1910. Montreal: Canada Cement Company Limited.

Beauty and Utility in Concrete. 1915. Chicago: Chicago Portland Cement Co. .

The Canada Year Book. 1920. Ottawa: F. A. Acland.

Annual Reports, 1924. 1924. In *Archives du Port de Montréal*. Montreal.

Seeing Concrete America. 1926. Chicago: Portland Cement Association.

Revue Mensuelle Officielle 1937. edited by Commissariat Général de l'Exposition.

"Early Use of Concrete in Industry." 1957. *Progressive Architecture* 38 (9):138.

Fifty plus 1906-1958 : a short history of E.G.M. Cape and Company, engineering and construction. 1958. Montreal: The Company.

"Canadian Register—Canada Cement Company Limited, 1959." In. 1959. *Canadian Register of Commerce & Industry*. The Globe Encyclopedia Company.

"Editorial." 1960. *Progressive Architecture*:142.

The Canada Cement Story 1965. Montreal: Canada Cement Company Limited.

"Concrete, where do we go from here?". 1966. *Progressive Architecture*:142.

"Concrete, where do we go from here?". 1966. *Progressive Architecture*:142.

"Concrete at Expo 67." 1967. *Concrete Products* (70):35.

"Concrete construction in Canada." 1967. *Concrete: The Journal of the Concrete Society* 1 (5):149-156.

"Concrete construction in Montreal: Expo' 67. Habitat." 1967. *Concrete: The Journal of the Concrete Society* 1 (8):255-265.

Communiqué Inaugural. 1967. Québec: Service de l'Information et des Relations publiques, Ministère de la Voirie du Québec.

"Place Bonaventure, Montreal." 1968. *Architectural Design* 38:33-42.

Urbanose: Série de 15 films-documents tournés à Montréal et dans d'autres grandes villes du monde. 1971. Montreal: National Film Board.

"War Whoop for Freedom." 1971. Last Modified May 3, 1971 Accessed June 20, 2013. http://web.archive.org/web/20080308235430/http://www.time.com/time/magazine/article/0,9171,876984,00.html.

"Paris stadium design: Parc des Princes structure's unique concrete features." 1972. *Concrete: The Journal of the Concrete Society* 6 (2):32-35.

Rendez-vous76. 1974.

"85 tonnes de béton 'Olympiques' tuent un ouvrier." 1975. *Journal de Montréal* Aug. 30.

"Experts Slam the Olympic Structures of Montreal ". 1976. *Civil Engineering, ASCE*:50-54.

Construisez-le vous-même [model] : Stade olympique = Build it yourself : Olympic Stadium. 1976. Montreal.

Olympic Stadium: Four workers killed by beam. 1976. Montreal: Associated Press.

"Un autre élévateur résiste à la dynamite." 1978. *La Presse*, July 8, np.

"Démolir l'élévateur à grain, une décision irréversible!". 1979. *La Presse*, 25 October 1979, A7.

"Thomas Alva Edison and the Concrete Piano." 1980. *American Heritage* 31 (5).

Mayor Jean Drapeau aims for an Expo 67 tower. 1980. In *The Fifth Estate*: CBC.

Construction de Elevateurs a grain du port de Montreal 1885-1970. 1981. Groupe de Recherche sur l'histoire du Port de Montreal.

"Team of experts probes Big O ribs to see whether structure is safe." 1991. *Montreal Gazette*, Oct. 23.

"Silo n°5: Monstre ou chef-d'œuvre: Une exposition d'histoire, d'art et d'architecture." 2000. *Le Vieux-Montréal*.

"2001 Census of Canada Community Profiles: Montréal, Québec (Census Metropolitan Area)." 2001. Statistics Canada. http://www12.statcan.ca/english/profil01/CP01/Details/Page.cfm?Lang=E&Geo1=CMA&Code1=462__&Geo2=PR&Code2=24&Data=Count&SearchText=montreal&SearchType=Begins&SearchPR=01&B1=All&Custom=.

"2001 Census of Canada Community Profiles: Montréal, Québec (Ville)." 2001. Statistics Canada. http://www12.statcan.ca/english/profil01/CP01/Details/Page.cfm?Lang=E&Geo1=CSD&Code1=2466025&Geo2=PR&Code2=24&Data=Count&SearchText=montreal&SearchType=Begins&SearchPR=01&B1=All&Custom=.

"Silo 'our Eiffel Tower'." 2003. *The Montreal Gazette*, 18 August 2003, A6, My Montreal.

Public Request for Proposals: Grain Elevator No. 5 and its Site on Pointe-du-Moulin Pier. 2005. edited by Montreal Port Authority. Montreal.

"Quebec calls inquiry into deadly overpass collapse." 2006. CBC News Accessed May 13, 2014. http://www.cbc.ca/news/canada/quebec-calls-inquiry-into-deadly-overpass-collapse-1.571783.

"Concrete quality 'not the issue." 2006. *The Montreal Gazette*, Oct. 3. Accessed May 11, 2015ß. http://www.canada.com/story_print.html?id=23b82bc7-436d-4f97-a36a-3fe35b88d805&sponsor=.

Redevelopment of the intersection of Avenue du Parc - Avenue des Pins. 2007. Ville de Montréal.

"The Turcot Interchange ". 2007. Last Modified November 3, 2007 Accessed May 20, 2014. http://expolounge.blogspot.ca/2007/11/turcot-interchange.html.

"Abandoned Turcot rail yards come to life with creative vision." 2007. Last Modified February 5.

Manic 5 dam. 2007. L'Assomption, QC: Hydro Mobile.

"Gérald Tremblay: Des silos verts." 2009. *La Presse*, 19 September 2009, A15, Rêvez Montréal.

Une collusion qui coûte cher. 2009. Radio-Canada/CBC.

"Turcot Complex Reconstruction Project." 2009. Transports Québec Accessed 2015. http://www.bape.gouv.qc.ca/sections/mandats/Complexe_Turcot/documents/DA2_%20ANG.pdf.

"Police ID Body Found In Lake, Victim Had Alleged Ties To Organized Crime." 2010. Last Modified May 25, 2010 Accessed May 13, 2014. http://www.citynews.ca/2010/05/25/police-id-body-found-in-lake-victim-had-alleged-ties-to-organized-crime/.

"Fuck Yeah Brutalism." 2010. Accessed May 15, 2014. http://fuckyeahbrutalism.tumblr.com/.

"Marl." 2010. University of Waterloo, Last Modified Dec. 24, 2010 Accessed May 6. https://uwaterloo.ca/wat-on-earth/news/marl.

"Visioning Exercise." 2010. CLC Accessed May 7. http://www.pointedumoulin.ca/planning-process/visioning-exercise.

"Dossier: L'avenire du parc olympique: Le sens de l'avis." 2011. *Esquisses* 22 (4):12-31.

"Dispatches." 2011. CBC, Last Modified December 8 2011 Accessed July 2. http://www.cbc.ca/player/Radio/More+Shows/Dispatches/2011/ID/2174688085/s.

Les anglicismes: Anglicismes phraséologiques: "Coulé dans le béton". 2011. Office québécois de la langue française Québec.

"Whither Big Owe? Public to ponder stadium's future." 2011. CBC News, Last Modified 11 Dec. 2011. http://www.cbc.ca/news/canada/montreal/story/2011/09/15/montreal-olympic-stadium-future-cp.html.

"Big O esplanade to become 'urban park'." 2011. CBC, Last Modified 11 Dec. 2011. http://www.cbc.ca/news/canada/montreal/story/2011/11/02/mtl-bigodevelopment.html.

"Table ronde sur l'avenir du Parc olympique de Montréal." 2011. Salon Montréal, Olympic Stadium Tower, 8 Dec. 2011.

"Montréal's New Harbourfront: What's happening at the harbourfront?". 2011. Accessed May 20, 2014. http://www.montrealsnewharbourfront.ca/en/.

"OAQ Roundtable on the future of the Olympic Stadium." 2011. Montreal, Dec 8.

"Montreal mayor's party got kickbacks, contractor says." 2012. CBC, Last Modified October 1, 2012 Accessed May 13, 2014. http://www.cbc.ca/news/canada/montreal/montreal-mayor-s-party-got-kickbacks-contractor-says-1.1139447.

'Donnie Brasco' says Mob controls construction via unions. 2012. edited by CBC: CBC.

"Turcot Interchange plan finalized." 2012. Last Modified May 4. http://montreal.ctvnews.ca/turcot-interchange-plan-finalized-1.805300.

Pour le Parc olympique. L'achèvement. L'avenir: Rapport du Comité-conseil sur l'avenir du Parc olympique. 2012. Montreal: Le Conseil d'administration de la Régie des installations olympiques (RIO).

"Montreal mayor's party got kickbacks, contractor says." 2012. Accessed April 22, 2015. http://www.cbc.ca/news/canada/montreal/montreal-mayor-s-party-got-kickbacks-contractor-says-1.1139447.

"Sun Life now remembers: yes, we left Quebec in 1978." 2012. *Montreal Gazette*, Feb. 9. Accessed May 7, 2015. http://montrealgazette.com/business/sun-life-now-remembers-yes-we-left-quebec-in-1978.

"Final plan for Turcot Interchange unveiled." 2012. CBC, Last Modified May 4, 2012 Accessed May 13. http://www.cbc.ca/news/canada/montreal/final-plan-for-turcot-interchange-unveiled-1.1140347.

"Concrete falls in lot at Montreal's Olympic Stadium." 2012. CBC, Last Modified Mar. 5, 2012 Accessed May 14. http://www.cbc.ca/news/canada/montreal/concrete-falls-in-lot-at-montreal-s-olympic-stadium-1.1254592.

"Making Montreal buildings safer: The legacy of Léa Guilbeault." 2013. *The Montreal Gazette*, March 18, 2013, Civic Lessons. http://blogs.montrealgazette.com/2013/03/18/making-montreal-buildings-safer-the-legacy-of-lea-guilbeault/.

"New Turcot will come later and cost more, Marois says." 2013. CBC Accessed May 7. http://www.cbc.ca/news/canada/montreal/new-turcot-will-come-later-and-cost-more-marois-says-1.1303230.

Rapport Annuel 2013. 2013. Montreal: Le Conseil d'administration de la Régie des installations olympiques (RIO).

Feasibility Study Examining the Return of Major League Baseball to Montreal. 2013. Montreal: Ernst & Young Orenda Corporate Finance Inc.

"Ready-mixed fortunes." 2013. *The Economist* (June 22):68-69.

"Falling "cosmetic" concrete prompts hundreds of structural inspections." 2014. CTV, Last Modified January 14, 2014 Accessed May 13, 2014. http://montreal.ctvnews.ca/falling-cosmetic-concrete-prompts-hundreds-of-structural-inspections-1.1638630.

"Etienne Tremblay-Tardif." 2014. Musée d'art contemporain de Montréal Accessed May 13. http://bnlmtl2014.org/en/artists/etienne-tremblay-tardif/.

"Editorial: Lessons from the Charbonneau commission." 2014. *The Montreal Gazette*, News Desk. Accessed May 13, 2015. http://montrealgazette.com/opinion/editorials/editorial-lessons-from-the-charbonneau-commission.

"The Turcot Interchange: before and after." 2014. Montreal Gazette Accessed May 13. http://www.montrealgazette.com/news/turcot-interchange/index.html.

"Monumental Budget Busters." 2014. Podio Accessed May 13. https://podio.com/site/budget-busters.

"12 Forgotten Olympic Venues Fallen Into Disrepair." 2014. Popular Mechanics Accessed May 14. http://www.popularmechanics.com/outdoors/sports/news/12-forgotten-olympic-venues-fallen-into-disrepair#slide-8.

"Nouveau pont Champlain: Roger Taillibert a son idée à 1,8 milliard de dollars." 2014. TVA Nouvelles Accessed June 1. http://tvanouvelles.ca/lcn/infos/national/archives/2014/11/20141111-130539.html.

Quebec Cement Industry Condemns Government Decision To Invest In The Port-Daniel-Gascons Cement Plant Project 2014. The Cement Association of Canada.

"The Stadium." 2015. Régie des installations olympiques (RIO) Accessed May 13. http://parcolympique.qc.ca/en/the-park/olympic-stadium/.

"The Construction." 2015. Régie des installations olympiques (RIO) Accessed May 13. http://parcolympique.qc.ca/en/the-olympic-park/montreal-an-olympic-city/the-construction/.

"Montreal's Olympic Stadium needs $220M facelift, government report says." 2015. CBC, Last Modified Mar. 31, 2015 Accessed June 8. http://www.cbc.ca/news/canada/montreal/montreal-s-olympic-stadium-needs-220m-facelift-government-report-says-1.3016520.

"Ski jump plans for Olympic Stadium tower take off." 2015. CBC, Last Modified June 5 Accessed June 10. http://www.cbc.ca/news/canada/montreal/ski-jump-plans-for-olympic-stadium-tower-take-off-1.3102351.

"Prestressed Concrete." 2015. The Portland Cement Association, Last Modified 2015 Accessed June 15. http://www.cement.org/cement-concrete-basics/products/prestressed-concrete.

"Le Sifflet." 2015. Régie des installations olympiques (RIO) Accessed June 18. http://parcolympique.qc.ca/le-parc/autres-attraits/le-sifflet/.

Launch of consultations on revitalizing the Old Port of Montréal. 2015. Montreal: Canada Lands Company.

Abbas, Ackbar. 1997. *Hong Kong: Culture and the Politics of Disappearance*. Edited by Dilip Gaonkar, and Benjamin Lee, *Public Worlds*. Minneapolis and London: University of Minnesota Press.

Abrahams, Tim. 2011. "The Olympics were all set to begin." CCA Accessed November 2. http://www.cca.qc.ca/en/study-centre/1449-tim-abrahams-the-olympics-were-all-set-to-begin.

Acland, Charles R. 2007. "Introduction: Residual Media." In *Residual Media*, edited by Charles R. Acland, xiii-xxvii. Minneapolis and London: University of MInnesota Press.

Addis, Bill. 1997. "Concrete and steel in twentieth century construction." In *Structure and style: conserving twentieth century buildings* edited by Michael Stratton, 103-142. London: E & FN Spon, an imprint of Champman & Hall.

Adrian Forty, and Susanne Küchler, ed. 1999. *The art of forgetting*. Oxford: Berg.

Aislin. 2011. August 2011. The Gazette.

Ali, Mir M. 2001. "Evolution of Concrete Skyscrapers: from Ingalls to Jinmao." *Electronic Journal of Structural Engineering* 1:2-14.

Alonso, Pedro, and Hugo Palmarola, ed. 2014. *Monolith Controversies: Chile National Pavilion, Biennale Architettura*. Berlin: Hatje Cantz Verlag GmbH & Company KG.

Amalric, Laurent. 1995. "Amas de béton ou précieux vestige ? ." *La Presse*, December 23, 1995.

Arcand, Denys. 1973. Rejeanne Padovani. Westmount, QC: Christal Films.

Arcand, Denys. 2007. L'âge des ténèbres. Montreal, QC: Alliance Films.

Arthur, Eric. 2003. *Toronto: No Mean City*. 3rd ed. Toronto: University of Toronto Press.

Arup. 2010. Smart Cities: Transforming the 21st century city via the creative use of technology.

Assmann, J., and John Czaplicka. 1995. "Collective memory and cultural identity." *New German Critique* 65:125-133.

Auf der Maur, Nick. 1976. *The billion-dollar game: Jean Drapeau and the 1976 Olympics*. Toronto: J. Lorimer.

Avila, Eric. 2013. "All Freeways Lead to East Los Angeles: Rethinking the L.A. Freeway and Its Meanings." In *Overdrive: L.A. Constructs the Future 1940-1990*, edited by Wim de Wit, and Christopher James Alexander, 35-47. Los Angeles, CA: Getty Research Institute.

Bachelard, Gaston. 1994. *The Poetics of Space*. Boston: Beacon Press.

Baillargeon, Stéphane. 2005. "Hôtel et muse pour le silo no. 5." *Le Devoir*, 9 Dec 2005

Ball, Norman R. 1988. *Building Canada: A History of Public Works*. Toronto, Buffalo, and London: University of Toronto Press.

Ballard, J. G. *Concrete Island*. New York: Farrar, Strauss & Giroux.

Banerjee, Sidhartha, and Lia Levesque. 2012. "Montreal warned years ago about cost overruns in its 'closed' construction market." Accessed May 13, 2014. http://www.thestar.com/news/canada/2012/11/12/montreal_warned_years_ago_about_cost_overruns_in_its_closed_construction_market.html#. .

Banerjee, Sidhartha. 2013. "Construction boss angrily denies he is 'Mr. Sidewalk' " *The Globe and Mail*, February 21, 2013. Accessed May 13, 2014.

http://www.theglobeandmail.com/news/national/construction-boss-angrily-denies-he-is-mr-sidewalk/article8927535.

Banham, Reyner. 1966. *The New Brutalism: Ethic or Aesthetic?* New York: Reinhold Publishing Corporation.

Banham, Reyner. 1967. "L'Homme à l'Expo." *New Society* (1 June):811-814.

Banham, Reyner. 1971. "Ecology IV: Autopia." In *Los Angeles: The Architecture of Four Ecologies*, 213-222. Middlesex, UK and New York: Penguin Books.

Banham, Reyner. 1976. *Megastructure: Urban Futures of the Recent Past*. London: Thames and Hudson.

Banham, Reyner. 1986. *A Concrete Atlantis*.

Banham, Reyner. 1996. *A Critic Writes: Essays by Reyner Banham*. Berkeley and Los Angeles: University of California Press.

Barber, Stephen. 2002. *Projected Cities: Cinema and Urban Space*. London: Reaktion Books Ltd.

Barndt, Kerstin. 2010. "Memory Traces of an Abandoned Set of Futures": Industrial Ruins in the Postindustrial Landscapes of Germany." In *Ruins of modernity*, edited by Julia Hell, and Andreas Schönle, 270-293. Durham, NC: Duke University Press.

Barney, Darin. 2011. "To Hear the Whistle Blow: Technology and Politics on the Battle River Branch Line." *Topia* (25):5-28.

Barthes, Roland. 2005. "The Eiffel Tower." In *Rethinking Architecture: a reader in cultural theory*, 164-172. London and New York: Routledge.

Beaumont, Matthew, and Gregory Dart, ed. 2010. *Restless Cities*. London and New York: Verso.

Béland, Gabriel. 2010. "Visites du silo numéro 5: Au cœur de la 'bête endormie'." *La Presse*, October 8, 2010, 4.

Béland, Gabriel. 2010. "Silo no5: redonner vie à une masse de béton." Last Modified November 2, 2010 Accessed May 16, 2014. http://www.lapresse.ca/actualites/montreal/201011/02/01-4338414-silo-no5-redonner-vie-a-une-masse-de-beton.php.

Belanger, Anouk. 2002. "Urban space and collective memory: Analysing the various dimensions of the production of memory." *Canadian Journal of Urban Research* 11 (1):69-92.

Bell, Duncan S. A. 2003. "Mythscapes: memory, mythology, and national identity." *British Journal of Sociology* 54 (1):63-81.

Bell, Michael, and Craig Buckley, ed. 2010. *Solid States: Concrete in Transition*. Edited by Michael Bell, *Columbia Boks on ARchitecture, Engineering, and Materials*. New York: Princeton Architectural Press.

Benevolo, Leonardo. 1977. *History of modern architecture: The Modern Movement*. Vol. 2. Cambridge, MA: MIT Press.

Benjamin, Walter. 1989. "The Flâneur." In *Charles Baudelaire: A Lyric Poet in the Era of High Capitalism*, 35-66. London: Verso.

Benjamin, Walter. 1999. "To Live Without Leaving Traces." In *Selected Writings, Volume 2: 1927-1934* 701. Cambridge, MA: Belknap Press of Harvard University Press.

Benjamin, Walter. 2002. *The Arcades Project*. Translated by Howard Eiland, & Kevin McLaughlin. Cambridge, MA and London, UK: The Belknap Press of Harvard University Press.

Benjamin, Walter. 2007. "The Work of Art in the Age of Mechanical Reproduction." In *Illuminations: Essays and Reflections*, edited by Hannah Arendt, 217-252. New York: Schocken Books.

Benjamin, Walter. 2007. "Theses on the Philosphy of History." In *Illuminations: Essays and Reflections*, edited by Hannah Arendt, 253-264. New York: Schocken Books.

Benjamin, Walter. 2007. "On Some Motifs in Baudelaire." In *Illuminations: Essays and Reflections*, edited by Hannah Arendt, 155-194. New York: Schocken Books.

Bennett, Tony, and Patrick Joyce, ed. 2010. *Material Powers: Cultural Studies, History, and the Material Turn*. Edited by Tony Bennett, Penny Harvey, and Kevin Hetherington, *Culture, economy and the social*. New York and London: Routledge

Benton, Tim, ed. 2010. *Understanding Heritage and Memory Understanding Global Heritage* Manchester and New York: Manchester University Press.

Bergdoll, Barry. 2008. "Home Delivery: Viscidities of a Modernist Dream From Taylorized Serial Production to Digital Customization." In *Home Delivery: Fabricating the Modern Dwelling*, edited by Barry Bergdoll, and Peter Christensen, 12-26. New York: The Museum of Modern Art.

Bergeron, Maxime. 2006. "Silo N°5: Le chemin sera long..." *La Presse*, 26 April 2006, 1-4.

Bergson, Henri. 2005. *Matter and Memory*. Translated by N.M. Paul, and W.S. Palmer. New York: Zone Books.

Berman, Marshall. 1988. *All That Is Solid Melts Into Air: The Experience of Modernity*. New York: Penguin Books.

Bijker, Trevor Pinch and Wiebe. 1992. "The Social Construction of Facts and Artifacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other." In *The Social Construction of Technological Systems*, edited by Wiebe E. Bijker, Thomas P. Hughes, and Trevor J. Pinch, 17-50. Cambridge, MA: MIT Press.

Billington, D. P. 2004. "Historical Perspective on Prestressed Concrete." *PCI Journal* 49 (1):14-30.

Bishop, Kyle. 2009. "Dead Man *Still* Walking: Explaining the Zombie Renaissance." *Journal of Popular Film and Television* 37 (1):16-25.

Bishop, Kyle. 2009. "Dead Man *Still* Walking: A Critical Investigation into the Rise and Fall…and Rise of Zombie Cinema." Doctor of Philosophy, Department of English, University of Arizona.

Bonhomme, Jean-Pierre. 1996. "Le silo du Vieux, une valeur patrimoniale?" *La Presse*, 03 August 1996.

Bonnemaison, Sarah and Ronit Eisenbach. 2009. *Installations by Architects: Experiments in Building and Design Paperback*. New York: Princeton Architectural Press.

Borden, Iain. 2013. *Drive: journeys through film, cities and landscapes*. London: Reaktion Books Ltd.

Boshra, Basem. 1999. "Feds pay $100,000: Old grain elevator music to their ears." *The Montreal Gazette*, 27 July 1999.

Bourassa, André. 2011. "L'imagination au pouvois." *Esquisses* 22 (4):5.

Bowering, George. 1977. *Concrete Island: Montreal Poems 1967-71*. Montreal Vehicule Press.

Bowker, Geoffrey C., and Susan Leigh Star. 2000. *Sorting things out: classification and its consequences*. Cambridge, MA: MIT Press.

Boyer, D. . 2006. "Ostalgie and the Politics of the Future in Eastern Germany." *Public Culture* 18 (2):361-381.

Boyle, Danny. 2002. 28 Days Later. Fox Searchlight Pictures.

Boym, Svetlana. 2008. *Architecture of the Off-Modern*. New York: Princeton Architectural Press.

Brigg, Peter. 1985. *J .G. Ballard*. Mercer Island, WA: Starmont House.

Brook, Calvin. 2007. "The Gardiner Expressway." In *Concrete Toronto: A guidebook to concrete architecture from the fifties to the seventies*, edited by Michael McClelland, and Graeme Stewart, 182-185. Toronto: Coach House Books.

Brown, Bill. 2001. "Thing Theory." *Critical Inquiry* 28 (1):1-22.

Brownstein, Bill. 2013. "Review: Warm Bodies." Last Modified February 1, 2013 Accessed May 20, 2014. http://www.montrealgazette.com/entertainment/movie-guide/Review+Warm+Bodies/7899323/story.html.

Bruno, Giuliana. 2011. "Modernist Ruins, Filmic Archaeologies." In *Ruins*, edited by Brian Dillon, 78-81. London, UK & Cambridge, MA: Whitechapel Gallery & MIT Press.

Bumbaru, Dinu. 1996. "Répliques: À la défense du silo #5." *La Presse*, 19 August 1996, Éditorial.

CanadaNewsWire. 2011. Transparent Concrete Makes its North American Debut at Greenbuild NEXT. Canada NewsWire.

Carpenter, Lorraine. 2015. "Why the Women's World Cup Matters." *Cult Montreal*, June 17. Accessed June 20 2015. http://cultmontreal.com/2015/06/why-the-womens-world-cup-matters/.

Castells, Manuel. 1989. *The Informational City: Information technology, economic restructuring, and the urban-regional process*. Oxford: Basil Blackwell.

Castells, Manuel. 1996. *The Rise of the Network Society*. Vol. 1, *The Information Age: Economy, Society and Culture*. Cambridge and Oxford: Blackwell Publishers.

Castells, Manuel. 2009. *Communication Power*. Oxford: Oxford University Press.

Castro, Marc. 1976. "Roportage: 'Le Béton est la plus belle pâte à modeler…' Roger Taillibert." *Bâtiment* 51 (8):11-12.

Castro, Ricardo L. 1989. "Significant Buildings of the 1980s." In *Grassroots, Greystones & Glass Towers: Montreal Urban Issues and Architecture*, edited by Bryan Demchinsky, 109-118. Montreal: Véhicule Press.

Castro, Ricardo L. 1995. "Grain Elevator No. 5 deserves place in urban landscape: Significance of industrial landmarks little understood." *The Montreal Gazette*, 28 October 1995, N2.

CBC. 2011. "Re-imagining the Olympic Park." [Radio]. CBC Accessed July 2. http://www.cbc.ca/cinqasix/2011/11/12/re-imaging-the-olympic-park/.

Chambers, Emest. 1903. *The Book of Montreal: A Souvenir of Canada's Commercial Metropolis*. Montreal: Book of Montreal Company.

Champagne, Sara. 2009. "Un nouvel ambassadur pour le silo n° 5." *La Presse*, October 7, 2009, A6, Montréal Plus.

Champoux, Roger. 1966. "La fleuve derrière un mur." *La Presse*, Nov. 12, np.

Charbonneau, France, Roderick A. Macdonald, and Renaud Lachance. 2014. Rapport d'étape de la Commission d'enquête sur l'octroi et la gestion des contrats publics dans l'industrie de la construction. edited by Commission d'enquête sur l'octroi et la gestion des contrats publics dans l'industrie de la construction. Québec, QC: Gouvernement du Québec.

Charley, Jonathan. 2004. ""The concrete memory of modernity: Excerpts from a Moscow Diary"." In *Tracing Modernity: Manifestations of the Modern in Architecture and the City*, edited by Mari Hvattum, and Christian Hermansen, 195-214. New York and London: Routledge.

Charley, Jonathan. 2004. "The concrete memory of modernity: Excerpts from a Moscow Diary." In *Tracing Modernity: Manifestations of the Modern in Architecture and the City*, edited by Mari Hvattum, and Christian Hermansen, 195-214. Routledge.

Charney, Leo, and Vanessa R. Schwartz, ed. 1995. *Cinema and the Invention of Modern Life*. Berkeley and Los Angeles: University of California Press.

Charney, Melvin. 1967. "The grain elevators revisited." *Architectural Design* 37 (July):328-331.

Charney, Melvin. 1968. "Concrete: A Material, a System and an Environment." *Architecture Canada* 45 (6).

Chartier, Jean. 1999. "Un campus universitaire dans le silo no. 5?" *Le Devoir* 18 Jan 1999.

Chusid, Jeffrey M. 1992. "The American Discover of Reinforced Concrete." *Rassegna* 49 (March):66-73.

Co., J.P. O'Shea &. 1926. "Letter to The Executive Committee of the City of Montreal." Nov. 19.

Cohen, Jean-Louis, and G. Martin Moeller, Jr., ed. 2006. *Liquid Stone: New Architecture in Concrete*. New York: Princeton Architectural Press.

COJO. 1978. Montréal 1976 : Games of the XXI Olympiad : official report. Montreal.

Collins, Peter. 2004. *Concrete: The Vision of a New Architecture*. 2nd ed. Montreal and Kingston: McGill-Queen's University Press.

Colomina, Beatriz. 1994. *Privacy and Publicity: Modern Architecture as Mass Media*. Cambridge, MA: The MIT Press.

Company, Canada Lands. 2011. "Pointe-du-Moulin." [website]. Canada Lands Company Accessed Dec. 11, 2011. http://www.clc.ca/properties/pointe-du-moulin.

Condit, Carl W. 1968. "The First Reinforced-Concrete Skyscraper: The Ingalls Building in Cincinnati and its place in Structural History." *Technology and Culture* 9 (1):1-33.

Connerton, Paul. 1989. *How Societies Remember*. Cambridge: Cambridge University Press.

Cooper, John Irwin. 1969. *Montreal A Brief History*. Montreal and London: McGill-Queen's University Press.

Corbusier, Le. 1928. *Vers une architecture : Nouvelle édition revue et augmentée*. Paris: Les Editions G. Crès. et cie.

Corbusier, Le. 1947. *Concerning Town Planning*. London: Architectural Press.

Corbusier, Le. 2006. *Toward an Architecture*. London: Frances Lincoln Ltd. Original edition, Vers une architecture.

Cottrell, Claire. 2012. "The Ruins of Champions: Photos of Abandoned Olympic Sites." *The Atlantic* (Aug. 14).

Council, T. Ritchie and the staff of the Division of Building Research National Research, ed. 1967. *Canada Builds: 1867-1967*. Toronto: University of Toronto Press.

Cowie, Jefferson, and Joseph Heathcott ed. 2003. *Beyond the Ruins: The Meanings of Deindustrialization*. Ithaca and London: ILR Press.

Crinson, Mark, and Paul Tyrer. 2005. "Clocking off in Ancoats: time and remembrance in the post-industrial city." In *Urban Memory: History and amnesia in the modern city*, edited by Mark Crinson, 49-71. New York and London: Routledge.

Croft, Catherine. 2004. *Concrete Architecture*. London: Laurence King Publishing.

Curtis, Christopher, and Jan Ravensbergen. 2014. "Highway 40 overpass is safe despite concrete falling off, officials say." *The Montreal Gazette*, January 14, 2014. http://www.montrealgazette.com/Highway+overpass+safe+despite+concrete+falling+officials/9381447/story.html.

Daigneault Bouchard, Marie-France. 2013. "Manic 5 at Expo 67: Territorial Megastructure or the Connection of Three Spaces." Masters of Arts, Art History, Concordia University.

Décarie, Jean. 2005. "Que faire du silo ?" *La Presse* 19 Octobre 2005.

Deglise, Fabien. 2008. *Montréal souterrain : sous le béton, le mythe*. Montreal: Les Édition Héliotrope.

Deglise, Fabian. 2012. "Le Silo no. 5, citadelle numérique ?" *Le Devoir*, 26 March 2012 A1-A8. Accessed May 7, 2015. http://www.ledevoir.com/culture/actualites-culturelles/345941/le-silo-no-5-citadelle-numerique.

Delgado, Jerôme. 2005. "Les rêves de grandeur du MAC passeront-ils par le silo No. 5 ? ." *La Presse*, December 23, 2005.

Delhumeau, Gwenaël, ed. 1993. *Le Béton en représentation : La mémoire photographique de L'entreprise Hennebique 1890-1930*. Paris: Hazan : Institut Français d'Architecture.

Delhumeau, Gwenaël 1999. *L'invention du béton armé : Hennebique 1890-1914*. La Page, Brussels: Norma Editions.

Derrida, Jacques. 1995. *Archive Fever: A Freudian Impression*. Translated by Eric Prenowitz. Chicago: University of Chicago Press.

Deschamps, Yves. 2005. "Pourquoi sauver le silo no. 5? La ville n'est pas un musée" " *Le Devoir* 11 (or 14) Dec 2005, Idées.

Devlin, Bernard. 1955. Circulation à Montréal (Première partie) Canada: National Film Board of Canada.

Devlin, Bernard. 1955. Circulation à Montréal (Deuxième partie) Canada: National Film Board of Canada.

Devlin, Bernard. 1955. Circulation à Montréal: 1re partie. Montreal: National Film Board of Canada.

Devlin, Bernard. 1955. Circulation à Montréal: 2e partie. Montreal: National Film Board of Canada.

DeWolf, Christopher. 2010. "I Dream a Highway." Maisonneuve, Last Modified July 23. http://maisonneuve.org/article/2010/07/23/i-dream-highway/.

Dickinson, John Alexander, and Brian J. Young. 2008. *A short history of Quebec*. Montreal and Kingston: McGill-Queen's University Press.

Dillon, Brian. "Fragments from a History of Ruin." *Cabinet* 20 (Ruins):55-60.

Dillon, Brian, ed. 2011. *Ruins*, *The Documents of Contemporary Art*. London, UK & Cambridge, MA: Whitechapel Gallery & MIT Press.

Dinges, Tyson. 2009. "The History Of Prestressed Concrete: 1888 To 1963." Master of Science, Department of Architectural Engineering and Construction Science Kansas State University.

Doevendans, Kees, and Anne Schram. 2005. "Creation/Accumulation City." *Theory Culture Society* 22 (2):29-43.

Dougherty, Kevin. 2011. "Construction probe will dig deep." Last Modified November 11, 2011. http://www.montrealgazette.com/news/Construction+probe+will+deep/5694164/story.html.

Dougherty, Kevin. 2014. "Quebec economy minister cements investment in limestone deposit." Accessed June 20, 2014. http://www.montrealgazette.com/news/Quebec+economy+minister+cements+investment+limestone+deposit/9899757/story.html.

Dubuc, Alain. 1996. "Éditorial : Les fous du patrimoine." *La Presse*, 8 August 1996.

Dufour, Valérie. 2005. "Nouvelle vocation pour le silo n° 5." *Le Journal de Montréal*, 9 December 2005, 32.

Dupaul, Richard. 2005. "Le silo no 5 près du Vieux-Port suscite de l'intérêt." *La Presse*, July 20, 2005.

Dyreson, Mark. 2013. "If We Build It Will They Come? The Plans for a National Stadium and American Olympic Desires." In *The Rise of Stadiums in the Modern United States: Cathedrals of Sport*, edited by Mark Dyreson, and Robert Trumpbour, 56-73. New York: Routledge.

Edensor, Tim. 2005. "The ghosts of industrial ruins: ordering and disordering memory in excessive space." *Environment and Planning D: Society and Space* 23:829-849.

Edensor, Tim, Bethan Evans, Julian Holloway, Steve Millington and Jon Binnie. 2012. "Playing in industrial ruins: Interrogating teleological understandings of play in spaces of material alterity and low surveillance." In *Urban Wildscapes*, edited by Anna Jorgensen, and Richard Keenan, 65-79. London and New York: Routledge.

Élie-Morin, Marie-Claude. 2011. "La RIO : Changement de direction." *Esquisses* 22 (4):29-31.

Elliot, Brian. 2011. *Benjamin for Architects*. New York and London: Routledge.

Elmont, V.J. 1913. "Pleasing Design in Reinforced Concrete." *Construction: A Journal for the Architectural Engineering and Contracting Interests of Canada* 6:315-317.

Epstein, Steven. 2008. "Culture and Science/Technology: Rethinking Knowledge, Power, Materiality, and Nature." *The ANNALS of the American Academy of Political and Social Science* 619 (1):165-182.

Éthier, Guillaume. 28 July 2014. Nouveau pont Champlain: Le mirage de l'«audace» architecturale. *Le Devoir*.

Éthier, Guillaume. 2010. "Le stade olympique et Taillibert : le prix de l'audace ou la poésie du béton." In *Histoire et idées du patrimoine, de la régionalisation à la mondialisation*, edited by Karine Hébert, and Julien Goyette, 211-228. Québec: Éditions Multimondes.

Fischer, Doug. 2015. "The Montreal Expos: How the team of the '80s became nostalgia's team." The Ottawa Citizen, Last Modified April 4 Accessed June 9. http://ottawacitizen.com/sports/baseball/the-montreal-expos-how-the-team-of-the-80s-became-nostalgias-team.

Fischer, Joachim. 2008. *Concrete Beton Béton*, *Architecture Compact*: H.F. Ullman.

Forty, Adrian. 2000. *Words and Buildings: A vocabulary of Modern Architecture*.

Forty, Adrian. 2005. "Concrete and Memory." In *Urban Memory: History and amnesia in the modern city*, edited by Mark Crinson, 75-95. New York and London: Routledge.

Forty, Adrian. 2006. "The Material without a History." In *Liquid Stone: New Architecture in Concrete*, edited by Jean-Louis Cohen, and G. Martin Moeller, Jr., 46-56. New York: Princeton Architectural Press.

Forty, Adrian. 2012. *Concrete and Culture: A Material History*. London: Reaktion Books.

Foucault, Michel. 1986. "Of Other Spaces." *Diacritics* 16 (1):22-27.

Foucault, Michel. 2002. *The Archaeology of Knowledge* New York and London: Routledge.

Fréchette-Lessard, Corinne. 2011. "Patrimoine: Le visage des valeurs." *Esquisses* 22 (4):15-16.

Gabeline, Donna. 1975. *Montreal at the crossroads*. Montreal: Harvest House.

Gallo, Rubén. 2005. *Mexican Modernity: The Avant-Garde and the Technological Revolution*. Cambridge, MA: The MIT Press.

Gamble, David, and Nicolas Van Praet. 1999. "Not just a silophone…more a multimedia concept, with CD, video and radio." *The Montreal Gazette*, July 28, 1999.

Gandy, Matthew. 2003. *Concrete and Clay: Reworking Nature in New York City*. Cambridge, MA: MIT Press.

Gandy, Matthew. 2004. "Rethinking urban metabolism: water, space and the modern city." *City: Analysis of Urban Trends, Culture, Theory, Policy, Action,* 8 (3):371–387.

Gandy, Matthew. 2005. "Cyborg Urbanization: Complexity and Monstrosity in the Contemporary City." *International Journal of Urban and Regional Research* 29 (1):26.

Gauthier, Pierre, Jochen Jaeger, & Jason Prince, ed. 2009. *Montréal at the Crossroads: Superhighways, the Turcot and the Environment*. Montreal, New York, and London: Black Rose Books.

Gauthier, Pierre. 2011. "L'échangeur Turcot entre ciel et terre." *Urban History Review / Revue d'histoire urbaine* 39 (2):61-62.

Geertz, Clifford. 1973. "Thick Description: Toward an Interpretive Theory of Culture." In *The Interpretation of Cultures*, 3-30. New York: Basic Books.

Germain, Annick. 1988. "Patrimoine et avant-garde. Le cadre bâti : entre le passé et l'avenir." *Cahiers de recherche sociologique* 6 (2):115-129.

Germain, Annick and Damaris Rose. 2000. *Montreal: The Quest for a Metropolis*. Chicester & New York: John Wiley and Sons.

Giedion, Sigfied. 1973. *Space, Time and Architecture: The Growth of a New Tradition*. Cambridge, MA: Harvard University Press.

Giedion, Sigfied. 1995. *Building in France, Building in Iron, Building in Ferroconcrete*. Los Angeles: Getty Center for the History of Art and the Humanities.

Gilliland, Jason. 2001. "Redimensioning Montreal: Circulation and urban form, 1846--1918." PhD, Geography, McGill University.

Gilliland, Jason. 2004. "Muddy shore to modern port: redimensioning the Montréal waterfront time-space." *Canadian Geographer* 48 (4):448-472.

Gissen, David. 2009. *Subnature: Architecture's Other Environments*. New York: Princeton Architectural Press.

Gissen, David. 2012. "Subnature." CCA: Toolkit for Today 2012, Montreal, 9 July to 20 July 2012

Gohier, Philippe. 2011. "Montreal is falling down." Macleans, Last Modified 11 Dec. 2011. www2.macleans.ca/2011/08/23/montreal-is-falling-down/.

Gohlke, Frank. 1992. *Measure of emptiness : grain elevators in the American landscape (Creating the North American Landscape)*. Baltimore: The Johns Hopkins University Press.

Gordon, Sean 2015. "Blue Jays' Martin lives out childhood dream in Olympic Stadium exhibition game." *The Globe and Mail*, Apr. 3, 2015. Accessed May 3, 2015. http://www.theglobeandmail.com/sports/baseball/jays-martin-lives-out-childhood-dream-in-olympic-stadium-exhibition-game/article23797126/.

Gournay, Isabelle, and France Vanlaethem 1998. "Introduction." In *Montreal Metropolis 1880-1930*, edited by Isabelle Gournay, and France Vanlaethem Montreal: Stoddart Publishing.

Gournay, Isabelle. 1998. "Gigantism in Downtown Montreal." In *Montreal Metropolis 1880-1930*, edited by Isabelle Gournay, and France Vanlaethem 153-82. Montreal: Stoddart Publishing.

Graham, Stephen ed. 2010. *Disrupted Cities: When Infrastructure Fails*. New York and London: Routledge.

Greco, Joann. 2012. "The pscychology of ruin porn." The Atlantic Accessed May 10. http://www.citylab.com/design/2012/01/psychology-ruin-porn/886/.

Green, Mary Jean. 2000. "Jacques Godbout and the Quebec Writer: Engendering the National Text." *Quebec Studies* (30):7-16.

Gubler, Jacques. 1992. "The Beauty of Reinforced Concrete." *Rassegna* 49 (March):84-89.

Guggenheim, Michael. 2009. "Building memory: Architecture, networks and users." *Memory Studies* 2 (1):39-53.

Guthrie, Jennifer. 2011. "Dans le ventre du silo n° 5." *Métro*, May 18, 2011, 8.

Gyulai, Linda. 2007. "Road design moving from elevation." Accessed June 19, 2014. http://www.canada.com/story_print.html?id=3c497447-ef61-42e6-ab92-91f4e6f64459&sponsor=.

Gyulai, Linda. 2014. "Rizzuto's construction links traced to '60s Montreal: Records show Mob boss worked on Expo '67, city parks." Last Modified January 30, 2014 Accessed June 24, 2014. http://www.montrealgazette.com/business/Rizzuto+construction+links+traced+Montreal/9450396/story.html.

Halbwachs, Maurice. 1992. *On Collective Memory*. Edited by Donald N. Levine, *The Heritage of Sociology*. Chicago and London: The University of Chicago Press.

Hall, Peter. 1963. *London 2000*. London: Faber.

Hall, William, ed. 2012. *Concrete*. London Phaidon Press Limited.

Hallé, Jacqueline. 1998. "Silos à céréales—patrimoine en danger: Silo n°5—Port de Montréal." *Héritage Canada* 5 (3):12-14.

Halprin, Lawrence. 1966. *Freeways*. New York: Reinhold Publishing Corporation.

Hamilton, Graeme. 2011. "That's the way the city crumbles." CanWest Global, Last Modified June 6, 2014. http://news.nationalpost.com/2011/08/02/graeme-hamilton-thats-the-way-the-city-crumbles/.

Hamilton, Graeme. 2011. "What does the future hold for Montreal's fallen Olympic Stadium?". CanWest Global, Last Modified Jan. 20. http://news.nationalpost.com/2011/09/24/what-does-the-future-hold-for-montreals-fallen-olympic-stadium/.

Hamilton, Graeme. 2014. "Arthur Porter and associate split $22.5M payout in 'biggest corruption fraud in the history of Canada,' Quebec inquiry hears." Last Modified May 20, 2014 Accessed May 21, 2014. http://news.nationalpost.com/2014/05/20/arthur-porter-and-associate-split-22-5m-payout-in-biggest-corruption-fraud-in-the-history-of-canada-quebec-inquiry-hears/.

Hartoonian, Gevork, ed. 2009. *Walter Benjamin and Architecture*. New York and London: Routledge.

Harvey, Penelope. 2010. "Cementing relations: the materiality of roads and public spaces in provincial Peru." *Social Analysis* 54 (2):28–46.

Hatherley, Owen. 2009. *Militant Modernism*.

Heidegger, Martin. 1962. "The Being of Entities Encountered in the Environment." In *Being and Time*, 95-102. New York: Harper and Row.

Heidegger, Martin. 1962. "How the Worldly Character of the Environment Announces itself in Entities Within-the-world." In *Being and Time*, 102-107. New York: Harper and Row.

Heidegger, Martin. 1971. "The Thing." In *Poetry, Language, Thought*, 145-184. New York: Harper and Row.

Hell, Julia, and Andreas Schönle. 2010. *Ruins of modernity*. Durham, NC: Duke University Press.

Henere, Amiria, Martin Holbraad, and Sari Wastell. 2007. "Introduction: thinking through things." In *Thinking through Things: Theorising Artefacts Ethnographically*, edited by Amiria Henere, Martin Holbraad, and Sari Wastell, 1-31. New York and London: Routledge.

Henry Aubin, The Gazette. 2005. "Redesigning Silo No. 5." *The Montreal Gazette*, December 17, 2005, A31.

Hilton, Christopher. 2006. *Hitler's Olympics: The 1936 Berlin Olympic Games*. Stroud: Sutton Publishing.

Hodges, Margaret E. 2012. "Expressway Aesthetics: Montreal in the 1960s." *Journal of the Society for the Study of Architecture* 37 (1):47-55.

Hollis, Edward. 2009. *The Secret Lives of Buildings: From the Parthenon to the Vegas Strip in Thirteen Stories*. London: Portobello Books.

Howell, Paul Charles. 2009. *The Montreal Olympics : an insider's view of organizing a self-financing games*. Montreal and Kingston: McGill-Queen's Universtiy Press.

Hubbard, Phil, and Rob Kitchin, ed. 2011. *Key Thinkers on Space and Place*. Los Angeles and London: Sage.

Huddart, Kaj, and Cory Lesk. 2011. "The former glory of grain: Investigating a relic of Montreal's industrial past." *The McGill Daily*, Oct. 17. Accessed May 7, 2015. http://www.mcgilldaily.com/2011/10/the-former-glory-of-grain/.

Hurley, Erin. 2011. *National Performance: Representing Quebec from Expo 67 to Céline Dion*. Toronto: University of Toronto Press.

Hustak, Alan. 2008. "Grain elevator rises above its looks." *The Montreal Gazette*, August 20, 2008.

Huxtable, Ada Louise. 1957. "Reinforced-Concrete Construction." *Progressive Architecture* 38 (9):139-142.

Huxtable, Ada Louise. 1957. "Factory for Packard Motor Car Company—1905." *Progressive Architecture* 38 (10):121-122.

Huxtable, Ada Louise. 1957. "Factory for Ford Motor Car Company—1909-1914." *Progressive Architecture* 38 (11):181-182.

Huxtable, Ada Louise. 1960. "Concrete Technology in USA: Historical Survey." *Progressive Architecture* 41:144-149.

Huyssen, Andreas. 2003. *Present Pasts: Urban Palimpsests and the Politics of Memory*. Edited by Mieke Bal, and Hent de Vries, *Cultural Memory in the Present*. Stanford, CA: Stanford University Press.

Huyssen, Andreas. 2006. "Nostalgia for Ruins." *Grey Room* 23 6–21.

Huyssen, Andreas. 2010. "Authentic Ruins: Products of Modernity." In *Ruins of Modernity*, edited by Julia Hell, and Andrea Schönle, 17-28. Durham, NC: Duke University Press.

Innis, Harold A. . 2006. *The Bias of Communication*. 2nd ed. Toronto: University of Toronto Press.

Jackson, Sacha. 2011. *Montréal & Québec City*, *Moon Travel Guides*. Berkeley, California: Avalon Travel.

Jacobs, Jane. 1992. *The Death and Life of Great American Cities*. New York: Vintage Books, A Division of Random House, Inc.

Jaguaribe, Beatriz. 1999. "Modernist Ruins: National Narratives and Architectural Forms." *Public Culture* 11 (1):294-312

Jameson, Fredric. 1991. *Postmodernism, or, The cultural logic of late capitalism*. Durham, NC: Duke University Press.

Jameson, Fredric. 2002. *Archaeologies of the Future: The Desire Called Utopia and Other Science Fictions*

Janssen, Shauna. 2009. "Reclaiming the Darling Foundry: From Post-Industrial Landscape to Quartier Ephemere." Master of Arts, Special Individualized Program, Concordia University.

Jencks, Charles. 1989. *What is post-modernism?* 7th ed. New York: St. Martin's Press.

Jencks, Charles. 2002. *The Language of Post-modern Architecture*. 7th ed. New Haven, CT: Yale University Press.

Joerges, Bernward. 1999. "Do Politics Have Artefacts?" *Social Studies of Science* 29 (2):411-431.

Joerges, Bernward. 1999. "Scams Cannot Be Busted: Reply to Woolgar & Cooper." *Social Studies of Science* 29 (3):450-457.

John, Warren St. 2006. "Market for Zombies? It's Undead (Aaahhh!) ", Last Modified March 26 Accessed June 16, 2014. http://www.nytimes.com/2006/03/26/fashion/sundaystyles/26ZOMBIES.html?_r=2&oref=slogin&.

Johnson, Jim, (Bruno Latour). 1988. "Mixing Humans and Nonhumans Together: The Sociology of a Door-Closer." *Social Problems* 35 (3):298-310.

Kaika, Maria. 2005. *City of Flows*. New York and London: Routledge.

Kaika, Maria. 2006. "Dams as Symbols of Modernization: The Urbanization of Nature Between Geographical Imagination and Materiality." *Annals of the Association of American Geographers* 96 (2):276-301.

Kelly, Brendan. 2013. "Warm Bodies is a great showcase for Montreal-area white elephants." Last Modified February 1, 2013 Accessed May 20, 2014. http://blogs.montrealgazette.com/2013/02/01/warm-bodies-is-a-great-showcase-for-montreal-area-white-elephants.

Kelly, Jeanette. 2014. "Turcot Interchange inspires Montreal artist Étienne Tremblay-Tardif." CBC, Last Modified Oct. 24, 2014 Accessed May 13. http://www.cbc.ca/news/canada/montreal/turcot-interchange-inspires-montreal-artist-%C3%A9tienne-tremblay-tardif-1.2811708.

Kenneally, Rhona Richman, and Johanne Sloan, ed. 2010. *Expo 67: not just a souvenir*. Toronto: University of Toronto Press.

Kenneally, Rhona Richman, and Johanne Sloan. 2010. "Introduction: Dusting Off the Souvenir." In *Expo 67: not just a souvenir*, edited by Rhona Richman Kenneally, and Johanne Sloan, 3-24. Toronto: University of Toronto Press.

Kennedy, Joseph. 1902. "Fireproof Grain Elevators in North America." *Engineering News* XLVI:42.

Kenny, Nicolas. 2004. "S.O.S. silo! ." *La Presse*, 4 October 2004, A21.

Keyser, J. Hode. 1967. *Bétons du Québec* 6 (5):7-11.

King, Deborah. 2000. "Silo's conversion hits a cultural note." *The Globe and Mail*, July 18, 2000, B13.

Kingwell, Mark. 2008. *Concrete Reveries: Consciousness and the City*. Toronto: Viking Books.

Kittler, Friedrich A. 1990. *Discourse Networks*.

Kittler, Friedrich A. 1996. "The City is a Medium." *New Literary History* 27 (4):717-729.

Kittler, Friedrich A. 1999. *Gramophone, Film, Typewriter*.

Kiuri, Miranda, and Jacques Teller. 2012. "Olympic stadiums in their urban environment: a question of design and cultural significance." *Journal of Cultural Heritage Management and Sustainable Development* 2 (2):115-129.

Klein, Kerwin Lee. 2000. "On the Emergence of Memory in Historical Discourse." *Representations* (69):127-150.

Kom, Joel. 2005. "Time-worn landmark captivates developers, architects." *The Montreal Gazette*, July 10, 2005, A3.

Kreiner, Emma. 2013. "Saint-Henri and the Urban Uncanny: A Comparative Analysis of Hubert Aquin's *À Saint Henri le cinq septembre* (1962), and Shannon Walsh's *Saint-Henri The 26th of August* (2011)." Master of Arts, Art History, Concordia University.

Kronick, Ilana. 2000. "Musique Concrete." *The Hour*, 8 June 2000.

Ladd, Brian. 2008. *Autophobia: Love and Hate in the Automotive Age*. Chicago: University of Chicago Press.

Laforest, Daniel. 2009. "The Blurry Outlines of Historical Urban Space: Quebec City's 400th Anniversary, its Literary Status and its Suburbs." *British Journal of Canadian Studies* 22 (2):197-213.

Lambert, Phyllis. 2004. "Preface: Interior Transformations." In *The 60s: Montreal Thinks Big*, edited by André Lortie, 15-19. Montreal: CCA.

Lamey, Mary. "Proposals tabled for Silo No. 5: Redevelopment can't interfere with workings of the port or its rail lines." *The Montreal Gazette*.

Langlois, Michel. 2014. "E-mail to the author." 11 December, 2014.

Lanken, Dane. 1989. "Montreal: At the New Crossroads." In *Grassroots, Greystones & Glass Towers: Montreal Urban Issues and Architecture*, edited by Bryan Demchinsky, 11-15. Montreal: Véhicule Press.

Laporte, Stéphane. 2012. "Pauline Marois, la dame de béton." *La Presse*, Jan. 23. Accessed April 22, 2015. http://www.lapresse.ca/debats/chroniques/stephane-laporte/201201/21/01-4488100-pauline-marois-la-dame-de-beton.php.

Large, David Clay. 2007. *Nazi Games: the Olympics of 1936*. New York and London: W. W. Norton & Company.

Larkin, Brian. 2008. *Signal and Noise: Media, Infrastructure, and Urban Culture in Nigeria*. Durham, NC: Duke University Press.

Larkin, Brian. 2013. "The Politics and Poetics of Infrastructure." *Annual Revue of Anthropology* 42:327–343.

Larned, E. S. 1908. "The Edison Concrete House." *Cement Age* 6 (3):268-274.

Larsen, Lars Bang. "Zombies of Immaterial Labor: The Modern Monster and the Death of Death." Accessed June 17, 2014. http://www.e-flux.com/journal/zombies-of-immaterial-labor-the-modern-monster-and-the-death-of-death/.

Latouche, Daniel. 2011. "Montreal 1976." In *Olympic Cities: City Agendas, Planning, and the World's Games, 1896 - 2016*, edited by John Gold, and Margaret Gold, 197-217. New York: Routledge.

Latour, Bruno. 1988. "Mixing Humans and Nonhumans Together: The Sociology of a Door-Closer." *Social Problems*.

Latour, Bruno. 1993. *We Have Never Been Modern*. Cambridge, MA: Harvard University Press.

Latour, Bruno. 2005. "From Realpolitik to Dingpolitik, or how to make Things public." In *Making Things Public: Atmospheres of Democracy*, edited by Bruno Latour, and Peter Wiebel, 14-41. Cambridge, MA: MIT Press.

Latour, Bruno. 2005. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford and New York: Oxford University Press.

Laurence, Jean-Christophe. 2005. "Les silos oubliés." *La Presse*, May 17 2005, 5.

Lauzon, Gilles, and Madeleine Forget, ed. 2004. *Old Montreal: History through Heritage*. Montreal: Les Publications du Québec.

Law, John. 1999. "After ANT: complexity, naming and topology." In *Actor network theory and after*, edited by John Law, and John Hassard. Oxford and Malden, MA: Blackwell Publishing.

Le Goff, Jacques 1992. *History and Memory*. New York: Columbia University Press.

Leach, Neil, ed. 2003. *Rethinking Architecture: a reader in cultural theory*. London and New York: Routledge.

Leacock, Stephen. 1948. *Montreal, Seaport and City*. Toronto: McClelland & Stewart.

Lebedinskaia, Natalia. 2010. "Framing Visibility and Access: Picturing Silo No. 2 as Montréal's Industrial Pride, Modernist Icon, and Public Space." Montreal as Palimpsest III: The Dialectics of Montreal's Public Spaces, Montreal, Quebec, September.

Lebel, Jean-Marie. 2005. ""Le Québec se modernise!" : les années Lamontagne." *Cap-aux-Diamants : la revue d'histoire du Québec*:65-69.

LeCavalier, Charles. 2015. "Au moins 700 M$ pour démolir le Stade olympique." *Le Journal de Montréal*, June 16. Accessed June 20 2015. http://www.journaldemontreal.com/2015/06/16/au-moins-700-m-pour-demolir-le-stade-olympique.

Lefebvre, Henri. 1992. *The Production of Space*. Translated by Donald Nicholson-Smith. Oxford, UK and Cambridge, MA: Blackwell Publishers.

Legault, Réjean. 1992. "Material and Modernity." *Rassegna* 49 (March):58-65.

Legault, Réjean. 1993. "La circulation de l'image " In *Le Béton en représentation : La mémoire photographique de L'entreprise Hennebique 1890-1930*, edited by Gwenaël Delhumeau, 77-95. Paris: Hazan : Institut Français d'Architecture.

Legault, Réjean. 1997. "L'appareil de l'architecture modern : New Materials and Architectural Modernity in France, 1889-1934." Doctor of Philosophy, Dept.

of Architecture; Dept. of Urban Studies and Planning, Massachusetts Institute of Technology.

Legault, Réjean. 2006. "The Semantics of Exposed Concrete." In *Liquid Stone: New Architecture in Concrete*, edited by Jean-Louis Cohen, and G. Martin Moeller, Jr. New York: Princeton Architectural Press.

Legault, Réjean. 2011. "The Idea of Brutalism in Canadian Architecture." In *Architecture and the Canadian Fabric*, edited by Rhodri Windsor Liscombe. Vancouver: UBC Press.

Lemay, Yannick. 2012. "La dame de béton." Le Journal de Montréal Accessed June 15. http://www.journaldemontreal.com/2012/01/26/la-dame-de-beton.

Lemoine, Mario. 1983. "Le Débat continue: Démolir ou préserver ce silo." *Le Journal du Vieux Montréal* 3 (1):1-17.

Lemoine, Réjean, and Olivier Vallerand. 2008. "30 ans d'architecture à Québec: Remonter le temps." *Inter : art actuel* (100):40-47.

Lengel, David. 2015. "Hope springs eternal in Montreal with unlikely baseball revival afoot ". The Guardian Accessed June 8.

Lesage, Gilles. 1966. "L'apparence du port sera amélioré pour I'Expo." *Le Devoir*, Nov. 11.

Lesley, Robert W. 1904. *Cement Age* 1 (1):np.

Lessard, Denis. 2011. Échangeur Turcot: «Une faiblesse de structure». *La Presse*.

Letarte, Martine. 2008. "Paysage industriel: Un silo comme riche héritage controversé." *Le Devoir*, June 7 2008, Paysages.

Létourneau, Jocelyn. 2004. *A History for the Future: Rewriting Memory and Identity in Quebec* Translated by Phyllis Aronoff, and Howard Scott Montreal and Kingston McGill-Queen's University Press.

Leuenberger, Christine. 2006. "Constructions of the Berlin Wall: How Material Culture is Used in Psychological Theory." *Social Problems* 53 (1):18-37.

Levine, Jonathan. 2013. Warm Bodies. Summit Entertainment films, Lions Gate Films Inc.

Levine, Marc V. 2003. "Tourism-based redevelopment and the fiscal crisis of the city: The case of Montreal." *Canadian Journal of Urban Research* 12 (1):102-123.

Linteau, Paul-André. 1998. "Factors in the development of Montreal " In *Montreal Metropolis 1880-1930*, edited by Isabelle Gournay, and France Vanlaethem Montreal: Canadian Centre for Architecture and Stoddart Publishing.

Lobato, Ramon. 2008. "Crimes against urbanity: The concrete soul of Michael Mann." *Continuum: Journal of Media & Cultural Studies* 22 (3):341-352.

London, Mark. 1989. "Postmodernism Comes to Montreal." In *Grassroots, Greystones & Glass Towers: Montreal Urban Issues and Architecture*, edited by Bryan Demchinsky, 130-142. Montreal: Véhicule Press.

Long, Christian. 2014. "Title." *christianlong.org*. http://christian-long.org/2014/07/07/zombie-infrastructure/.

Loos, Adolf. 1971. "Ornament and Crime." In *Programs and Manifestoes on 20th-century Architecture*, edited by Ulrich Conrads, 19-24. Cambridge, MA: MIT Press.

Loos, Adolf. 1982. "The Principle of Cladding." In *Spoken into the Void: Collected Essays 1897-1900*, edited by Aldo Rossi, 66-69. Cambridge, MA and London, UK: The MIT Press. Original edition, Neue Freie Presse, September 4, 1898.

Lortie, André, ed. 2004. *The 60s: Montreal Thinks Big*. Montreal: CCA.

Lowenthal, David. 1988. *The Past is a Foreign Country*. Cambridge, UK and New York: Cambridge University Press.

Ludwig, Jack. 1976. *Five Ring Circus: The Montreal Olympics*. Toronto: Doubleday Canada Ltd. .

Lynch, Kevin. 1960. *The Image of the City*. Cambridge, Mass and London, England: The M.I.T. Press.

Lynes, Russell. 1954. *The Tastemakers*. New York: Harper & Brothers Publishers.

Macaulay, Rose. *Pleasure of Ruins*.

MacGregor, Alison. 2010. "Silo No. 5 becomes crown property." *The Montreal Gazette*, November 2, 2010.

Macpherson, Don. 2012. "The crumbling Concrete Lady and the shameless PQ." *The Montreal Gazette*, January 31. Accessed April 22, 2015. http://vigile.net/The-crumbling-Concrete-Lady-and.

Macpherson, Don. 2015. "Charbonneau construction inquiry should get extension for its report." *The Montreal Gazette*, January 30. Accessed April 22, 2015.

http://montrealgazette.com/opinion/columnists/don-macpherson-charbonneau-construction-inquiry-should-get-extension-for-its-report.

Madan, Emmanuel, and Thomas McIntosh. 2001-2002. "Silophone." *Espace Sculpture* (58):23-25.

Madger, Jason. 2015. "St-Rémi St. to close until end of June." *The Montreal Gazette*, May 13. Accessed May 22, 2015. http://montrealgazette.com/news/local-news/st-remi-st-to-close-until-end-of-june.

Magder, Jason. 2014. "Warrant for Shockbéton, Saramac unsealed." Last Modified March 18, 2014 Accessed May 13, 2014. http://www.montrealgazette.com/news/Warrant+Shockb%C3%A9ton+Saramac+unsealed/9633364/story.html.

Magder, Jason. 2015. Quebec signes $1.54B contract to replace Turcot Interchange. *The Montreal Gazette*.

Magrill, Barry. 2012. "Pouring Ecclesiastical Tradition into a Modern Mould: Reinforced Concrete Churches in Canada." *Journal of the Society for the Study of Architecture* 37 (1):3-15.

Malboeuf, Marie-Claude. 1999. "Le Stade fait peur." *La Presse*, Feb. 6.

Malo, Pierre. 1996. "La qualité de ville: La démolition du silo à grains numéro 5 n'ouvrira pas une 'fenêtre sur le fleuve'." *Le Devoir*, 30 August 1996.

Marcuse, Herbert. 1991. *One-Dimensional Man: Studies in teh Ideology of advanced Industrial Society*. Boston: Beacon Press.

Marsan, Jean-Claude. 1978. "Construire l'avenir mais comment ?" *Le Devoir*, Jan. 7, 29.

Marsan, Jean-Claude. 1990. *Sauver Montréal : chroniques d'architecture et d'urbanisme*. Montreal: Éditions du Boréal.

Marsan, Jean-Claude. 1990. *Montreal in Evolution: Historical Analysis of the Development of Montreal's Architecture and Urban Environment*. Montreal: McGill-Queen's University Press.

Marshall, Bill. 2001. *Quebec National Cinema*. Montreal and Kingston: McGill-Queen's University Press.

Marsolais, Claude-V. 1999. "Que faire du silo no. 5 ?" *La Presse* 27 March 1999.

Martin, Reinhold. "Utopia's Ghost."

Massey, Doreen. 1995. "Places and Their Pasts." *History Workshop* (39):182-192.

Massumi, Brian. 2002. *Parables for the Virtual: Movement, Affect, Sensation*. Durham and London: Duke University Press.

McClelland, Michael, and Graeme Stewart, ed. 2007. *Concrete Toronto: A guidebook to concrete architecture from the fifties to the seventies*. Toronto Coach House Books.

McCormick, Carroll. 2013. "Rebuilding Turcot Interchange." Accessed June 20, 2014. http://www.rocktoroad.com/.

McGurl, Mark. 2010. "The Zombie Renaissance." *n+1* (9).

McKenna, Brian and Susan Purcell. 1980. *Drapeau*. Toronto: Clarke Irwin.

McQuire, Scott. 2005. "Immaterial Architectures: Urban Space and Electric Light." *Space and Culture* 8:126-140.

McQuire, Scott. 2008. *The Media City*

Melhuish, Clare. 2005. "Towards a Phenomenology of the Concrete Megastructure." *Journal of Material Culture* 10 (1):5-29.

Mertins, Detlef. 1996. "The Enticing and Threatening Face of Prehistory: Walter Benjamin and the Utopia of Glass." *Assemblage* (29):6-23.

Metcalf, John S. 1926. *Grain Elevators*. Montreal: John S. Metcalf Co.

Metcalfe, John. 2012. "Weirdest Idea to Save Detroit Yet: Zombies." The Atlantic, Last Modified Jul 3 Accessed May 11. http://www.citylab.com/design/2012/07/weirdest-idea-save-detroit-yet-zombies/2461/.

Meyer, Han. 1999. *City and Port: The Transformation of Port Cities: London, Barcelona, New York and Rotterdam*. Utrecht, Netherlands: International Books.

Meyer-Künzel, Monika. 2007. "Urban Development with Olympic Games and World Exhibitions – is it Possible to Plan Usage?" In *German Annual of Spatial Research and Policy: Restructuring Eastern Germany*, edited by Sebastian Lentz, 139-153. Berlin: Springer.

Michaud, Henri. 1968. La Transcanadienne Canada: Office du film du Québec.

Milroy, Sarah. 2005. "Museum in a silo? Now that's a plan." *The Globe and Mail*, December 13, 2005, R1-R2.

Moran, Joe. 2009. *On Roads: A Hidden History*. London: Profile Books Ltd.

Morog. 1981. *Le Beau béton*, *Collection architecture et technologie*. Paris: Éditions du Moniteur.

Mostafavi, Mohsen, and David Leatherbarrow. 1993. *On Weathering: The Life of Buildings in Time*. Cambridge, MA: MIT Press.

Muise, Monique. 2012. "Interactive: Lino Zambito's Charbonneau Commission testimony." http://www.montrealgazette.com/corruption/zambito.html.

Muise, Monique. 2014. "Order of Engineers closes book on most investigations into De la Concorde overpass collapse." *The Montreal Gazette*.

Mumford, Lewis. 1934. *Technics and Civilization*. San Diego, CA: Harcourt Brace and World.

Mumford, Lewis. 1952. *Art and technics*. New York: Columbia University Press.

Mumford, Lewis. 1956. *From the Ground Up: Observations on Contemporary Architecture, Housing, Highway Building, and Civic Design*. New York: Harcourt, Brace.

Mumford, Lewis. 1963. *The City in History: Its Origins, Its Transformations, and Its Prospects*. London: Secker & Warburg.

Mumford, Lewis. 1963 *The Highway and the City: Essays*. Toronto: Mentor Books.

Mumford, Lewis. 1981. *The Culture of Cities*. Westport, Conn.: Greenwood Press.

Nackman, Barbara Livingston. 2014. "Legislation aims to curb 'zombie' homes." Last Modified June 24 Accessed June 26, 2014. http://www.lohud.com/story/news/2014/06/22/zombie-homes-upset-frighten-neighbors/11250079/.

Newberry, Paul. 2015. "Column: More than a decade after Expos departed, Montreal shows its worthy of an MLB do-over." Last Modified May 29 Accessed June 9. http://www.winnipegfreepress.com/sports/baseball/column-more-than-a-decade-after-expos-departed-montreal-shows-its-worthy-of-an-mlb-do-over-305527861.html.

Noel, André. 1991. "Quebec ferme le Stade olympique." *La Presse*, Sept. 14.

Noel, André. 1999. "La base du mât sérieusement fissurée." *La Presse*, Jan 20.

Nora, Pierre. 1989. "Between Memory and History: Les Lieux de Mémoire." *Representations* (26):7-24.

Nye, David E. 1994. *American technological sublime*. Cambridge, MA: The MIT Press.

Olsen, Bjørnar. 2003. "Material Culture after Text: Re-Membering Things." *Norwegian Archaeological Review* 36 (2):87-104.

Orlandini, Alain. 2010. *Le Parc Olympique de Montréal: le béton sublimé*. Paris: Somology éditions d'art.

Paley, Dawn. 2012. "Turning Around Turcot." Last Modified September 28, 2013 Accessed June 1, 2014. http://www.dominionpaper.ca/articles/4642.

Palley, Reese. 2010. *Concrete: A Seven-Thousand-Year History*. New York: The Quantuck Lane Press.

Panabaker, Ian. 2005. "Modernism is Us report: Lively debate and a collegiate atmosphere flavour the Conserving the Modern in Canada conference." *Canadian Architect*.

Paré, Isabelle. 2009. "Le Musée des beaux-arts du Canada veu relancer le projet du silo n° 5." *Le Devoir*, 26 February 2009, B8.

Parent, Claude. 1993. "Préface : Matériau, architecture et entreprise." In *Le Béton en représentation : La mémoire photographique de L'entreprise Hennebique 1890-1930*, edited by?, 13-26. Paris: Hazan : Institut Français d'Architecture.

Parr, Joy. 2010. *Sensing Changes: Technologies, Environments, and the Everyday*.

Patriquin, Martin. 2009. "Montreal is a disaster." Macleans, Last Modified 11 Dec. 2011. http://www2.macleans.ca/2009/10/29/montreal-is-a-disaster/.

Patriquin, Martin. 2010. "Quebec: The most corrupt province. Why does Quebec claim so many of the nation's political scandals?". Macleans, Last Modified June 24, 2014. www2.macleans.ca/2010/09/24/the-most-corrupt-province/.

Peritz, Ingrid. 1995. "Waterfront grain elevator: blight or heritage site?" *The Montreal Gazette*, 5 August 1995.

Peritz, Ingrid. 1996. "Grain elevator's fate up in the air." *The Montreal Gazette*, 18 August 1995.

Peritz, Ingrid. 1996. "Other cities have turned silos into hotel, condos." *The Montreal Gazette*, 18 August 1996.

Peritz, Ingrid. 2011. "Quebec's anti-corruption crusader Duchesneau gets the axe " *The Globe and Mail*, Oct. 28, 2011. Accessed Dec. 11, 2011.

http://www.theglobeandmail.com/news/politics/quebecs-anti-corruption-crusader-duchesneau-gets-the-axe/article2217555/.

Peritz, Ingrid and Rhéal Seguin. 2013. "Quebec's integrity test turns Montreal interchange into a symbol of clean dealings " *The Globe and Mail*, March 25. Accessed June 20 2015. http://www.theglobeandmail.com/news/national/quebecs-integrity-test-turns-montreal-interchange-into-a-symbol-of-clean-dealings/article10292888/.

Perreaux, Les, and Rhéal Séguin. 2009. "Montreal Mafia controls 80 per cent of road contracts, whistleblower says " *The Globe and Mail*, Oct. 15. Accessed May 11, 2015. http://www.theglobeandmail.com/news/national/montreal-mafia-controls-80-per-cent-of-road-contracts-whistleblower-says/article4288973/.

Perreaux, Les, and Ingrid Peritz. 2013. "Laval's ex-mayor faces gangsterism charges." *The Globe and Mail*, May 9, 2013. Accessed May 13, 2014. http://www.theglobeandmail.com/news/national/lavals-ex-mayor-faces-gangsterism-charges/article11811064/.

Peters, John Durham. 1999. *Speaking into the Air: A History of the Idea of Communication*. Chicago and London: University of Chicago Press.

Petricone, Pina, ed. 2012. *Concrete Ideas: Material to Shape a City*. London: Thames & Hudson Ltd.

Pevsner, Nickolaus. 1936. *Pioneers of the Modern Movement: From William Morris to Walter Gropius*. London: Faber & Faber.

Pevsner, Nickolaus. 1959. "Time and Le Corbusier." *Architectural Review* 125 (746):159-165.

Phillips, Erica E. 2014. "Zombie Studies Gain Ground on College Campuses: Students, Professors Study Culture of Living Dead." Last Modified March 3, 2014 Accessed June 26, 2014. http://online.wsj.com/news/articles/SB10001424052702304851104579361451951384512.

PhotoShotArt. 2014. "Zombieland - Detroit - Ruin Porn - Abandoned Buildings - Apocalypse - 8x10." https://www.etsy.com/ca/listing/124141152/zombieland-detroit-ruin-porn-abandoned.

Picon, Antoine. 2000. "Anxious Landscapes: From the Ruin to Rust." *Grey Room* (1):64-83.

Pinch, Trevor. 2010. "On making infrastructure visible: putting the non-humans to rights." *Cambridge Journal of Economics* 34 (1):77–89.

Poirier, Christian, and Mélissa Thériault. 2012. "Cinéma, éthique et politique. La société québécoise au prisme de *Réjeanne Padovani*." Accessed June 18, 2014. http://www.nouvellesvues.ulaval.ca/en/no-13-hiver-printemps-2012-le-cinema-quebecois-et-les-autres-arts-dirige-par-elspeth-tulloch/article-hors-dossier/cinema-ethique-et-politique-la-societe-quebecoise-au-prisme-de-rejeanne-padovani-par-christian-poirier-et-melissa-theriault/.

Poitié, Phillippe, and Cyrille Simonnet, ed. 1992. *Culture constructive*. Edited by Danièle Valabrègue. Vol. 29, *Les cahiers de la recherche architecturale*. Marseille: Editions Parenthèses.

Poitras, Jacques. 1990. *La carte postale québécoise Une aventure photographique*. Laprairie, QC: Éditions Broquet.

Poitras, Jacques. 2008. *Beaverbrook: A Shattered Legacy*. Fredericton, NB: Goose Lane Editions.

Poplak, Lewis. 2007. "The Flying Form and Development in Toronto." In *Concrete Toronto: A guidebook to concrete architecture from the fifties to the seventies*, edited by Michael McClelland, and Graeme Stewart, 220-221. Toronto: Coach House Books.

Potié, Philippe. 2001. *Le Corbusier: Le Couvent Sainte-Marie de La Tourette / The Monastery of Sainte Marie de La Tourette*. Paris: Fondation Le Corbusier.

Pound, Dick. 2010. "Montreal: The Olympic Legacy." Maisonneuve Accessed May 13. http://maisonneuve.org/article/2010/02/14/montreal-olympic-legacy/.

Przygoda, Zdzislaw 1967.

Québec. 1980. Commission d'enquête sur le coût de la 21e olympiade. Montreal: Government of Quebec.

Raafat, Aly Ahmed. 1958. *Reinforced Concrete in Architecture*. New York: Reinhold Publishing Corporation.

Radstone, Susannah. 2000. "Working with Memory: An Introduction." In *Memory and Methodology*, edited by Susannah Radstone, 1-24. Oxford & New York Berg.

Radstone, Susannah. 2008. "Memory studies: For and against." *Memory Studies* 1 (1):31-39.

Rainey, Lawrence, Christine Poggi, and Laura Wittman, ed. 2009. *Futurism: An Anthology*. New Haven, CT: Yale University Press.

Rao, Vyjayanthi. 2009. "Embracing Urbanism: The City as Archive." *New Literary History* 40 (2):371-383.

Ravanel, Liciana, and Maurice Culot. 1992. "Editorial." *Rassegna* 49 (March):5.

Régnier, Michel. 1972. L'automobile. In *Urbanose*. Canada: National FIlm Board of Canada.

Régnier, Michel. 1972. L'automobile In *Urbanose*: National Film Board of Canada.

Riar, Inderbir Singh. 2010. "Montreal and the Megastructure, ca 1967." In *Expo 67: not just a souvenir*, edited by Rhona Richman Kenneally, and Johanne Sloan, 193-210. Toronto: University of Toronto Press.

Rich, David. 2007. "Canadian Concrete." In *Concrete Toronto: A guidebook to concrete architecture from the fifties to the seventies*, edited by Michael McClelland, and Graeme Stewart, 52-53. Toronto Coach House Books.

Ricœur, Paul. 2004. *Memory, History, Forgetting*. Chicago: The University of Chicago Press.

Riegl, Alois. 1996. "The Modern Cult of Monuments: Its Essence and Its Development." In *Historical and philosophical issues in the conservation of cultural heritage*, edited by Nicholas Stanley Price, Mansfield Kirby Talley, Alessandra Melucco Vaccaro, 69-83. Los Angeles: Getty Publications.

Riga, Andy. 2009. Turcot: McGill architect says it can be fixed. *The Montreal Gazette* (June 3, 2014).

RIO. 1991. Je suis de retour! Montreal: La Presse.

Robbins, Wendy. 2008. "Changing Times." In *Minds of Our Own: Inventing Feminist Scholarship and Women's Studies in Canada and Québec, 1966–76*, edited by Wendy Robbins. Waterloo, ON: Wilfrid Laurier University Press.

Romba, Katherine. 2005. "Technik und Kultur: The German architectural discourse on iron, 1890--1918."

Ross, J. Andrew, and Andrew D. Smith. 2011. *Canada's Entrepreneurs: From the Fur Trade to the 1929 Stock Market Crash*. Toronto: University of Toronto/Université Laval.

Ross, Susan. 2003. "Montreal's Grain Elevator No 5: The Uncertain Fate of a Modern Icon." *Docomomo* (28):32-34.

Roth, Matthew William. 2007. "Concrete Utopia: The Development of Roads and Freeways in Los Angeles, 1910-1950." Doctor of Philosophy, History, University of Southern California.

Roult, Romain. 2011. "Reconversion des héritages olympiques et renovation de l'espace urbain: Le Stade olympique comme vecteur de développement." Doctorat en études urbaines et touristiques, Department of Urban Studies and Tourism, Université de Québec à Montréal.

Roy, Gabrielle. 1980. *The Tin Flute*. Toronto: McLelland & Stewart.

Roy, Gabrielle. 1993. *Bonheur d'occasion*. Montréal: Éditions du Boréal.

Samuel, Raphael. 1994. "The Return to Brick." In *Theatres of Memory Volume 1: Past and Present in Contemporary Culture*, 119-135. London and New York: Verso.

Savard, Stéphane. 2009. "Quand l'histoire donne sens aux représentations symboliques : l'Hydro-Québec, Manic-5 et la société québécoise." *Recherches sociographiques* 50 (1):67-97.

Savard, Stéphane. 2010. "Retour sur un projet du siècle : Hydro-Québec comme vecteur des représentations symboliques et identitaires du Québec, 1944 à 2005." PhD, History Department, Université Laval.

Schnapp, Jeffrey T. 1997. "The Fabric of Modern Times." *Critical Inquiry* 24 (1):191-245.

Schryer, Robert. 2014. "Resolutions for a Quebec free of fear and falling concrete." *The Montreal Gazette*, January 2, 2014, Viewpoints. http://www2.canada.com/montrealgazette/features/viewpoints/story.html?id=1d21d24b-61f3-4824-b5e3-853f662aa94e.

Schwartzwald, Robert. 1991. "Fear of Federasty: Quebec's Inverted Fictions." In *Comparative American Identities: Race, Sex, and Nationality in the Modern Text*, edited by Hortense H. Spillers, 175-195. New York: Routledge.

Schwarzer, Mitchell. 2004. *Zoomscape: Architecture in Motion and Media*. New York: Princeton Architectural Press.

Scott, Nick. 2010. "Storied Infrastructure: Tracing Traffic, Place, and Power in Canada's Capital City." *ESC: English Studies in Canada* 36 (1):149-174.

Séguin, Rhéal. 2011. "In about-face, Charest gives construction probe full powers " *The Globe and Mail*, Nov. 9, 2011. Accessed Dec. 11, 2011. http://www.theglobeandmail.com/news/politics/in-about-face-charest-gives-construction-probe-full-powers/article2231288/.

Seidman, Karen. 2014. "Fibre-reinforced concrete seen as solution to infrastructure crisis." *The Montreal Gazette*.

Semenak, Susan. 1999. "Big O is our Eiffel, city architect says." *Montreal Gazette*, Jan. 27.

Senécal, Nathalie H. 2001. "The No. 5 Terminal Grain Elevator in the Port of Montreal: Monument in a Shifting Landscape." Department of Art History, Concordia University.

Shaffer, Marie-Ève. 2013. "Commission Malouf." Fédération professionnelle des journalistes du Québec Accessed May 14. http://www.fpjq.org/commission-malouf/.

Shonfield, Katherine. 2000. *Walls have feelings: Architecture, Film and the City*. London and New York: Routledge.

Simmel, Georg. 1958. "The Ruin." *Hudson Review* 11 (3):379-385.

Simonnet, Cyrille. 1992. "The Origins of Reinforced Concrete." *Rassegna* 49 (March):6-14.

Simonnet, Cyrille. 2005. *Histoire d'un matériau: le béton*. Marseilles: Parentheses.

Simpson, Pamela H. 1999. *Cheap, Quick, & Easy: Imitative Architectural Materials, 1870-1930*. Knoxville: The University of Tennessee Press.

Slaton, Amy E. 2001. *Reinforced Concrete and the Modernization of American Building, 1900-1930*. Baltimore and London: The Johns Hopkins University Press.

Smithson, Robert. 1967. "Passaic."

Sophia, Zoë. 2000. "Container Technologies." *Hypatia* 15 (2):181-201.

Soutar, Annabel. 2011. "Infrastructures: What Can We Do?" Accessed May 13, 2014. http://porteparole.org/en/uncategorized/infrastructures-what-can-we-do/.

Speer, Albert. 1970. *Inside the Third Reich*. New York: Simon & Schuster, Inc.

Steedman, Carolyn. 2002. *Dust: The Archive and Cultural History*. Manchester: Manchester University Press.

Steiner, Ralph, and Willard Van Dyke. 1939. The City. United States: American Documentary Films, Inc.

Stewart, Susan. 1984. *On longing : narratives of the miniature, the gigantic, the souvenir, the collection* Baltimore, MA: John Hopkins University Press.

Sturken, Marita. 2007. *Tourists of History: Memory, Kitsch, and Consumerism from Oklahoma City to Ground Zero* Durham, NC: Duke University Press.

Sturken, Marita. 2008. "Memory, consumerism and media: Reflections on the emergence of the field." *Memory Studies* 1:73-79.

Sutcliffe, Anthony. 1998. "Montreal Metropolis " In *Montreal Metropolis 1880-1930*, edited by Isabelle Gournay, and France Vanlaethem 20-23. Montreal: Stoddart Publishing.

Sutherland, James, Dawn Humm, Mike Chrimes. 2001. *Historic Concrete: Background to Appraisal*. London: Thomas Telford Books.

Swyngedouw, Erik. 2006. "Circulations and metabolisms: (Hybrid) Natures and (Cyborg) cities." *Science as Culture* 15 (2):105-121.

Sylvestre, Aldo. 2012. "Meeting." May 4.

Sylvestre, Aldo. 2014. "Telephone conversation." July 25.

Sylvestre, Aldo. 2015. "Telephone conversation." June 19.

Tagge, A.C. 1924. *The Cement Industry in Canada*. Montreal: Canada Cement Company Limited.

Taillibert, Roger. 1977. *Construire l'avenir*. Paris: Presses de la Cité.

Taillibert, Roger. 2000. *Notre cher Stade olympique : lettres posthumes à mon ami Drapeau*. Montréal: Stanké.

Taillibert, Roger. 2010. *Stade olympique de Montréal, mythes et scandales*. Montreal and Paris: Éditions Grenier/Éditions Dilecta.

Taussig, Michael. 2004. "Cement & Speed." In *My Cocaine Museum*, 159-170. Chicago: University of Chicago Press.

Taylor, A. J. P. . 1972. *Beaverbrook*. London: Hamish Hamilton.

Theodore, David. 2000. "Silo's song is a little off key." *The Montreal Gazette*, June 10 2000.

Thompson, John B. . 2000. *Political Scandal: Power and Visibility in the Media Age* Cambridge: Polity Press.

Tremblay, Odile. 2010. "À chacun son Octobre." Last Modified October 2, 2010 Accessed June 24, 2014. http://www.ledevoir.com/culture/actualites-culturelles/297315/a-chacun-son-octobre.

Trépanier, Esther. 1998. *Peinture et modernité au Québec, 1919-1939* Québec: Éditions Nota bene.

Trépanier, Esther. 2000. *Marian Dale Scott : pioneer of modern art*. Québec: Musée du Québec.

Trigg, Dylan. 2006. *The Aesthetics of Decay: Nothingness, Nostalgia, and the Absence of Reason*. Edited by Robert Ginsberg, Victor Yelverton Haines & Jo Ellen Jacobs. Vol. 37, *New Studies in Aesthetics*. New York: Peter Lang.

Urban, Florian. 2012. *Tower and Slab: Histories of Global Mass Housing* New York and London: Routledge.

van Ginkel, Blanche. 1962. "Design with the Automobile: Structures." *Canadian Art* XIX (1):68.

van Ginkel, Blanche. 1962. "Design with the Automobile: the Landscape." *Canadian Art* XIX (1):52-57.

van Ginkel, Blanche. 1962. "Editorial." *Canadian Art* XIX (1):19.

van Ginkel, H.D.P. 1962. "Design with the Automobile: The City." *Canadian Art* XIX (1):44-50.

Van House, Nancy, and Elizabeth F. Churchill. 2008. "Technologies of memory: Key issues and critical perspectives." *Memory Studies* 1 (3):295-310.

Van Praet, Nicolas 2013. "Genivar rebranding as WSP Global in bid to distance firm from Quebec corruption scandal." *Financial Post*.

Van Praet, Nicolas 2014. "McInnis Cement project in Quebec sounds alarm bells in U.S. ." *The Globe and Mail*, Nov. 11. Accessed June 20 2015. http://www.theglobeandmail.com/report-on-business/quebec-mcinnis-cement-project-sounds-off-alarm-bells-in-us/article21541807/.

Vervoort, Patricia. 2006. "'Towers of Silence': The Rise and Fall of the Grain Elevator as a Canadian Symbol." *Histoire sociale / Social History* 39 (77):181-2004.

Vidler, Anthony. 1994. *The Architectural Uncanny*. Cambridge, MA: The MIT Press.

Virilio, Paul. 1994. *Bunker Archeology* New York: Princeton Architectural Press.

Virilio, Paul. 2004. "The Aesthetics of Disappearance." In *The Paul Virilio Reader*, edited by Steve Redhead, 57-81. New York: Columbia University Press.

Walter, Emmanuelle, and Lydia Paradis Bolduc. 2011. "Une histoire de béton: Du village olympique au ciment écolo." *Esquisses* 22 (4):32-33.

Ward, Janet. 2001. *Weimar Curfaces: Urban Visual Culture in 1920s Germany*. Edited by Edward Dimendberg, Martin Jay, & Anton Kaes, *Weimar and Now: German Cultural Criticism*. Berkeley, Los Angeles, and London: University of California Press.

Webb, Bruce. 1994. "Engaging the Highway." *Architecture and Urbanims (A + U)* (289):99-104.

Wergeland, Even Smith 2012. "When Icons Crumble—The Troubled Legacy of Olympic Design." *Journal of Design History* 25 (3):304-318.

Wigley, Mark. 2000. "The architectural cult of synchronization." *October* (94):?

Wigley, Mark. 2001. *White Walls, Designer Dresses: The Fashioning of Modern Architecture*. Cambridge, MA: MIT Press.

Williams, Raymond. 1977. *Marxism and Literature*. Oxford, UK: Oxford University Press.

Williams, Raymond. 2003. *Television: Technology and Cultural Form*. New York and London: Routledge.

Williams, R. F. 1963. "Early Reinforced Concrete Buildings in Montreal." Architecture, McGill University.

Wilson, Peter Lamborn. "Black Pyramid / Concrete & Cement." *Cabinet* 27 (Mountains).

Winner, Langdon. 1980. "Do Artifacts Have Politics?" *Daedalus* 109 (1):121-136.

Winner, Langdon. 1986. "Do Artifacts Have Politics?" In *The Whale and the Reactor: a search for limits in an age of high technology*, 19-39. Chicago: University of Chicago Press.

Winner, Langdon. 1993. "Upon Opening the Black Box and Finding it Empty: Social Constructivism and the Philosophy of Technology." *Science Technology & Human Values* 18 (3):362-378.

Woods, Allan, and Julian Sher. 2013. "Montreal Mayor Michael Applebaum charged with 14 offences." Last Modified June 17, 2013 Accessed May 13, 2014.

http://www.thestar.com/news/canada/2013/06/17/montreal_mayor_michael_applebaum_has_been_arrested.html.

Woodward, Christopher. 2012. "Learning from Detroit or 'the wrong kind of ruins'." In *Urban Wildscapes*, edited by Anna Jorgensen, and Richard Keenan, 17-32. London and New York: Routledge.

Woolgar, Steve. 1991. "The Turn to Technology in Social Studies of Science." *Science, Technology and Human Values* 16:20-50.

Woolgar, Steve, and Geoff Cooper. 1999. "Do Artefacts Have Ambivalence? Moses' Bridges, Winner's Bridges and Other Urban Legends in S&TS." *Social Studies of Science* 29 (3):433-449.

Wright, Gwendolyn. 2008. *USA: Modern Architectures in History*. London: Reaktion Books.

Young, Christopher. 2003. "Kaiser Franz and the Communist Bowl: Cultural Memory and Munich's Olympic Stadium." *The American Behavioral Scientist* 46 (11):1476-1490.

Zardini, Mirko. 2005. "The Ground of the Modern City and the Preponderance of Asphalt." In *Sense of the City: An alternate approach to urbanism*, edited by Mirko Zardini, 211-245. Montreal: Canadian Centre for Architecture; Lars Müller Publishers.

Appendix I: Figures

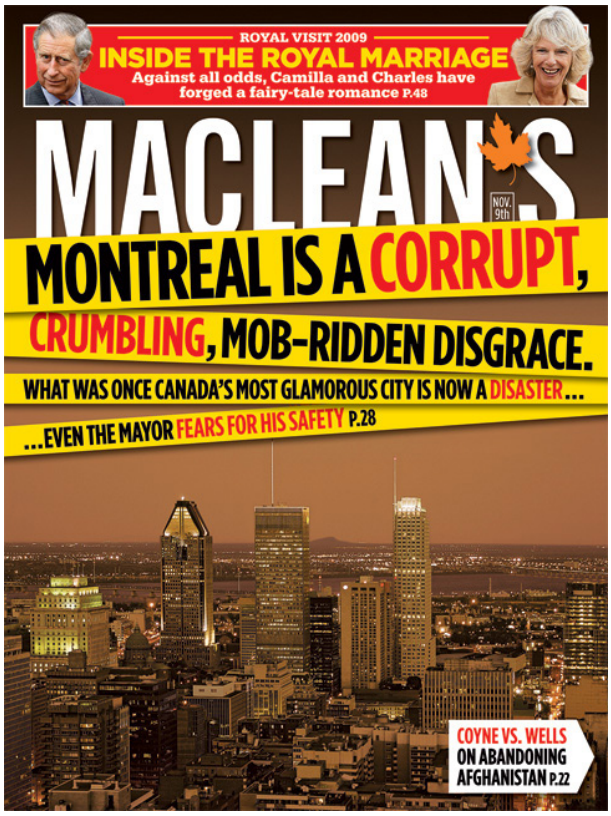


Figure 1: *Maclean's* cover, Nov. 9, 2009

Figure 2: Yannick Lemay (aka Ygreck)'s caricature of Pauline Marois, from *Le Journal de Montréal*, 2012 (© QMi Agency)

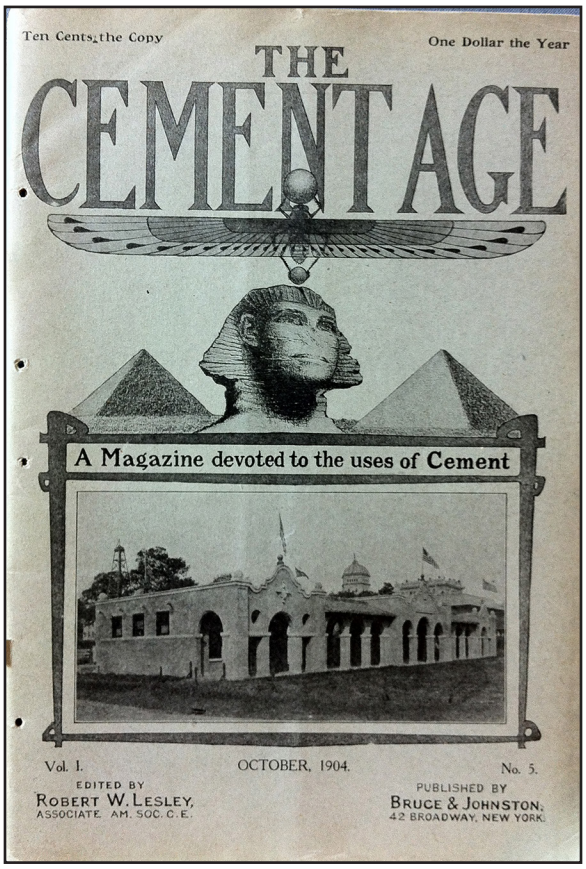
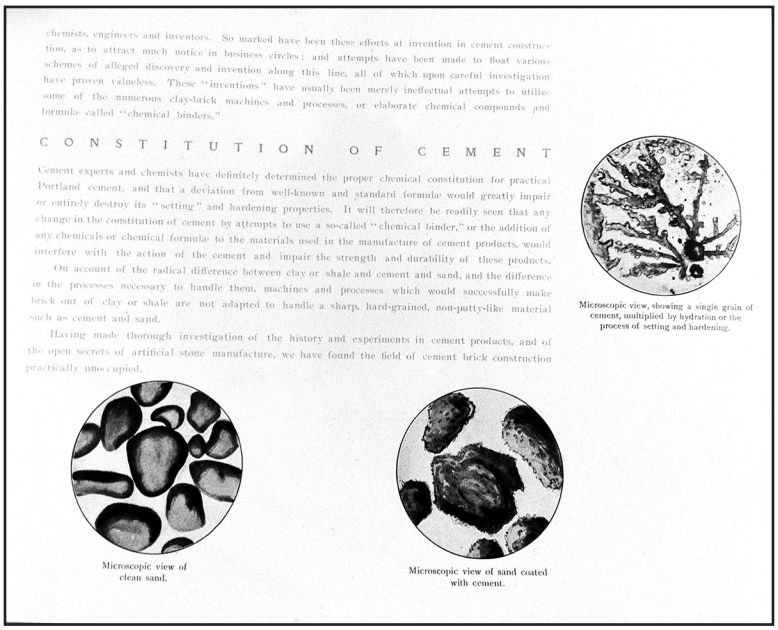


Figure 3: Cover of *The Cement Age*, 1904



chemists, engineers and inventors. So marked have been these efforts at invention in cement construction, as to attract much notice in business circles; and attempts have been made to float various schemes of alleged discovery and invention along this line, all of which upon careful investigation have proven valueless. These "inventions" have usually been merely ineffectual attempts to utilize some of the numerous clay-brick machines and processes, or elaborate chemical compounds and formulæ called "chemical binders."

CONSTITUTION OF CEMENT

Cement experts and chemists have definitely determined the proper chemical constitution for practical Portland cement, and that a deviation from well-known and standard formulæ would greatly impair or entirely destroy its "setting" and hardening properties. It will therefore be readily seen that any change in the constitution of cement by attempts to use a so-called "chemical binder," or the addition of any chemicals or chemical formulæ to the materials used in the manufacture of cement products, would interfere with the action of the cement and impair the strength and durability of these products.

On account of the radical difference between clay or shale and cement and sand, and the difference in the processes necessary to handle them, machines and processes which would successfully make brick out of clay or shale are not adapted to handle a sharp, hard-grained, non-putty-like material such as cement and sand.

Having made thorough investigation of the history and experiments in cement products, and of the open secrets of artificial stone manufacture, we have found the field of cement brick construction practically unoccupied.

Microscopic view, showing a single grain of cement, multiplied by hydration or the process of setting and hardening.

Microscopic view of clean sand.

Microscopic view of sand coated with cement.

Figure 4: Image showing "microscopic views" of cement from *Memories in Cement,* 1909

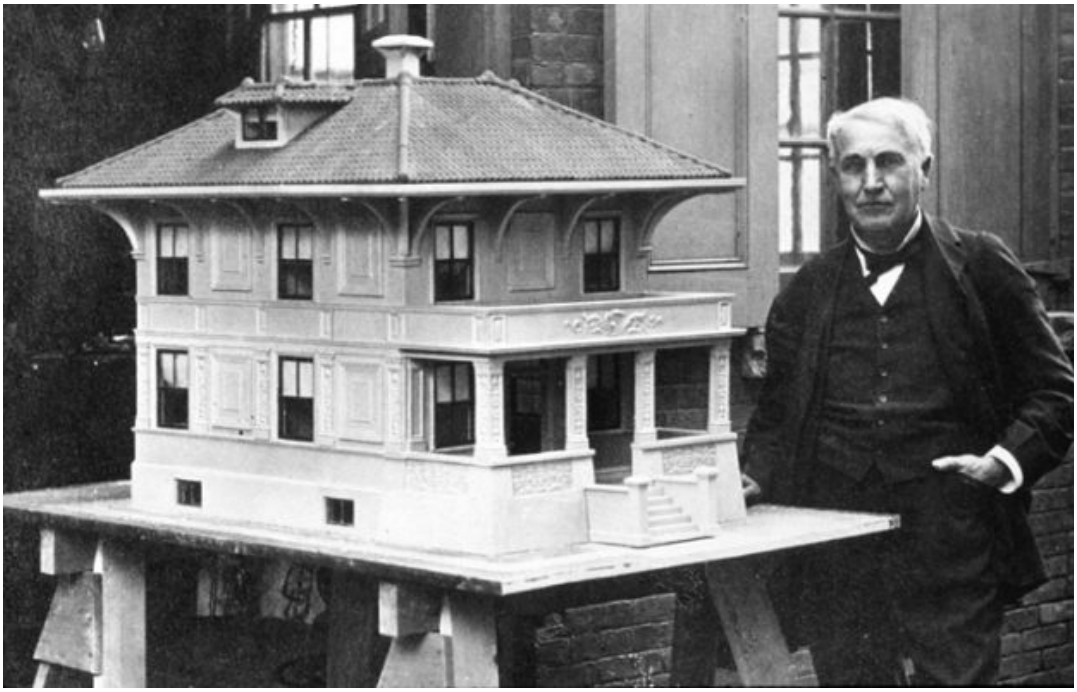


Figure 5: Thomas Edison with a model of his concrete house, c. 1911
(Photo: "Thomas Edison concrete house model.jpg," Wikimedia Commons)

Figure 6: McGill University's (Brutalist) McLennan Library Building, completed in 1969
(Photo: Author, 2014)

Figure 7: Example of *Khrushchyovka*-style construction in Czech Republic being demolished in 2014
(Photo: http://fuckyeahplattenbau.tumblr.com)

Figure 8: Demolition of Pruitt-Igoe, 1972
(Photo: "Pruitt-Igoe-collapses.jpg," Wikimedia Commons)

Figure 9: Le Corbusier's Villa Savoie, 1959.
(Photo: © Rene Burri / Magnum Photos)

Figure 10: Example of "ruin porn": The Lee Plaza, photograph
by Philip Jarmain, 2011

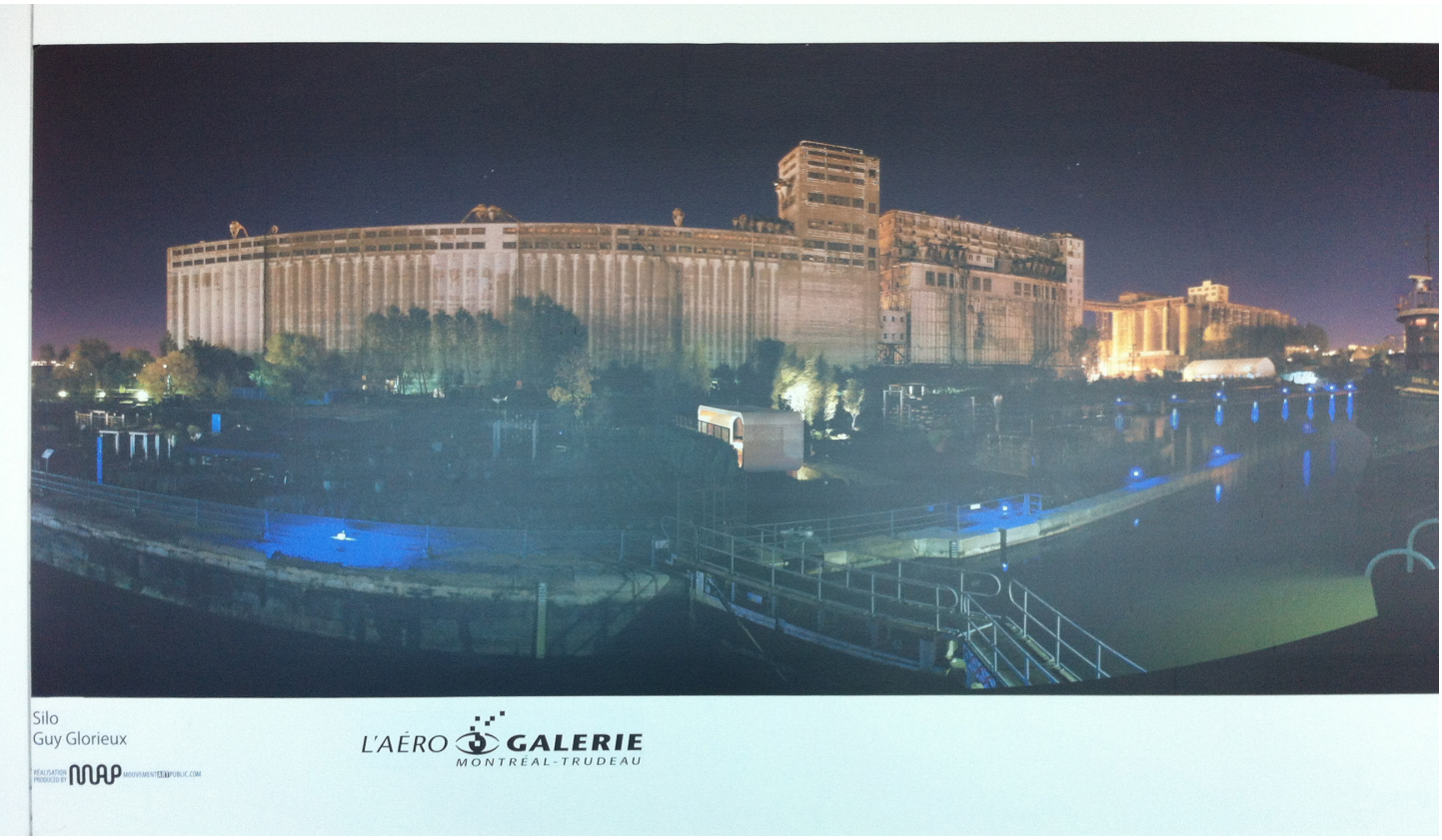


Figure 11: "Silo," photography by Guy Glorieux

Figure 12: Postcard showing Grand Trunk Elevator, aka Elevator B, Windmill Point, Montreal, c. 1910 (Photo: © Valentine & Sons' Publishing Co. Ltd.)

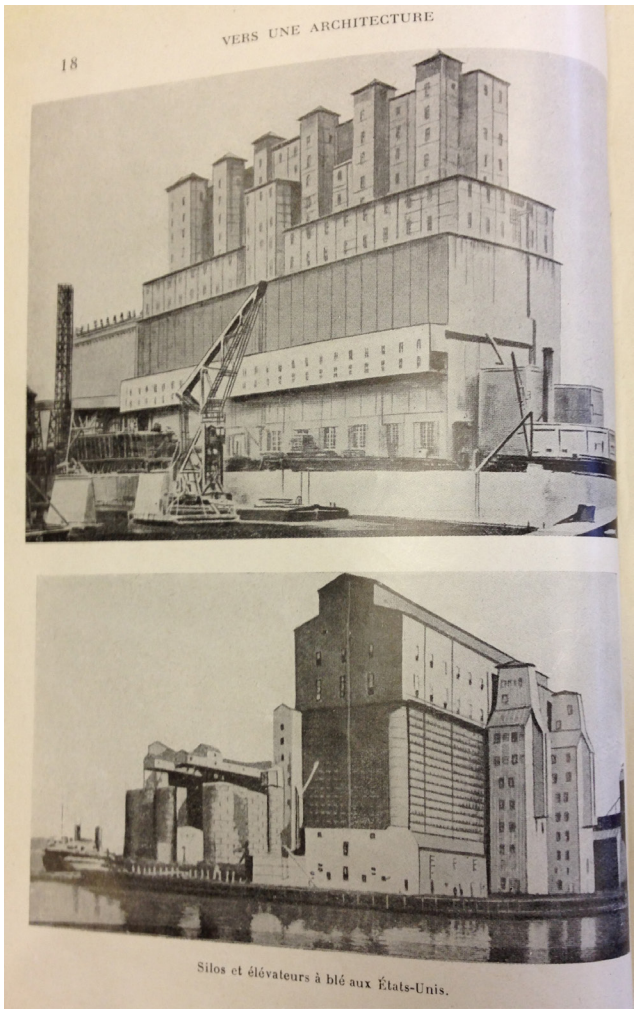


Figure 13: Page from Le Corbusier's *Vers une architecture* (1928), showing Silo no. 2 misidentified as "Silos et élévateurs à blé aux Etats-Unis" (p. 18)

Figure 14: Photograph of J.P. O'Shea's stained-glass window depicting Port of Montreal with Silo no. 2, City Council Chambers, City Hall, Montreal, c. 1926. (Photo: © Archives de la Ville de Montréal : U-1145-12)

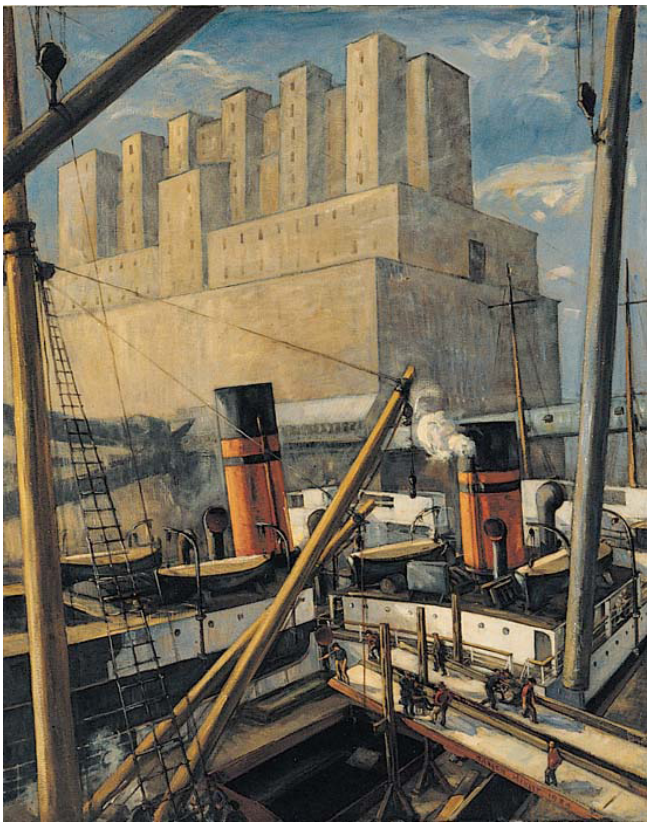


Figure 15: *Le port de Montréal*, Adrien Hébert, 1924

Figure 16: Marian Dale Scott, *Agriculture*, 1939

Figure 17: Canadian pavilion at the Paris Exposition created by Émile Brunet, 1937

Figure 18: Caryatides_Projections, by Atelier in situ, for Panique au Faubourg organized by Quartier Éphémère, Montreal, 1997 (Photo: Jean-François Lenoir)

Figure 19: Still from *Warm Bodies*, 2013

Figure 20: The Turcot Interchange (mesh reinforcement visible in lower left), 2011. (Photo "Échangeur Turcot.jpg," Wikimedia Commons)

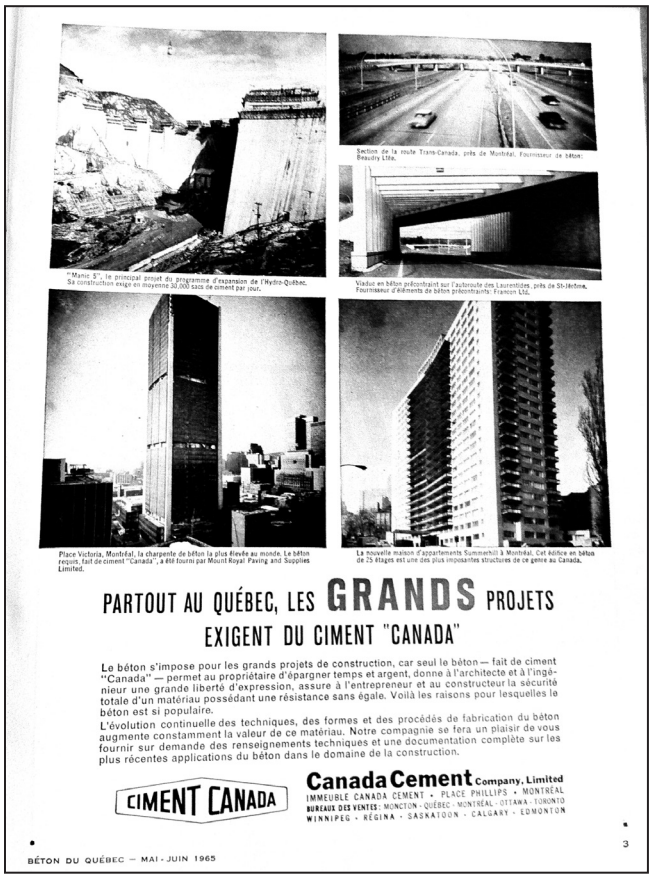


Figure 21: Advertisement for Canada Cement showing a section of the Trans-Canada outside of Montreal (Top right)
(From: *Bétons du Québec,* 1967)

Figure 22: Cover of *Seeing Concrete America,* 1926

Figure 23: Postcard showing Turcot Interchange (Photo: E. Otto)

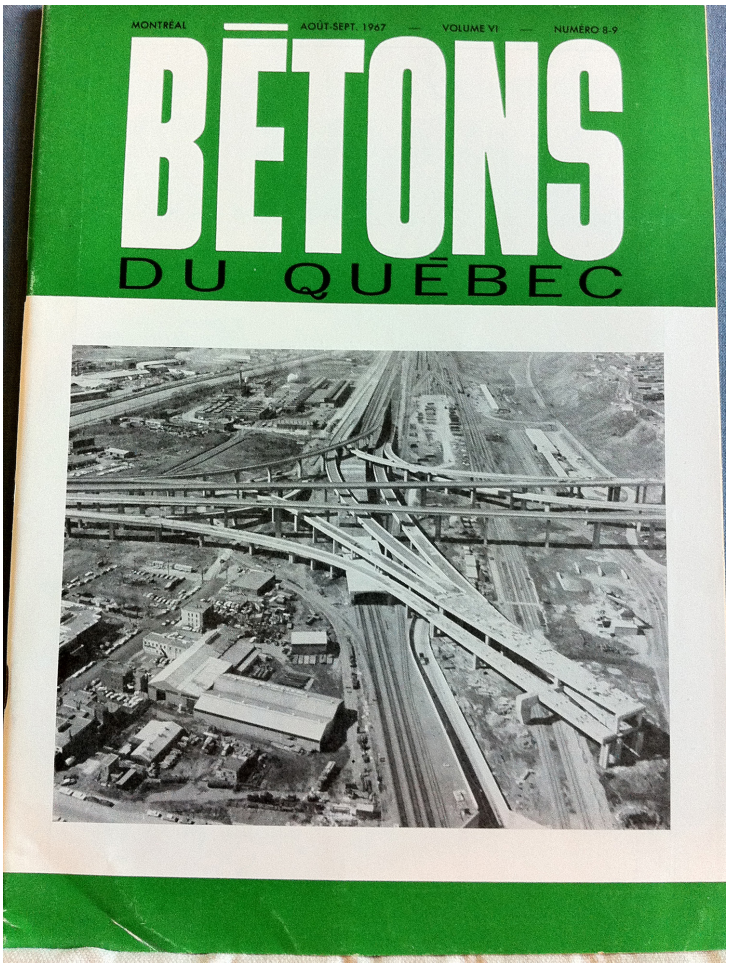


Figure 24: Cover of *Bétons du Québec* (Vol. VI, no. 8-9, 1967) showing aerial view of the unfinished Turcot Interchange

Figure 25: Postcard showing a view of Montreal from the Bonaventure Expressway, 1969
(Photo: Eric Jaeger)

Figure 26: *Bétons du Québec* spread showing Place Bonaventure (Vol. 7, No. 4, July/Aug. 1968, np)

Figure 27: Advertisement for Canada Cement from *Bétons du Québec* showing ongoing construction in Montreal (Vol. 5, No. 12, Dec. 1966, np)

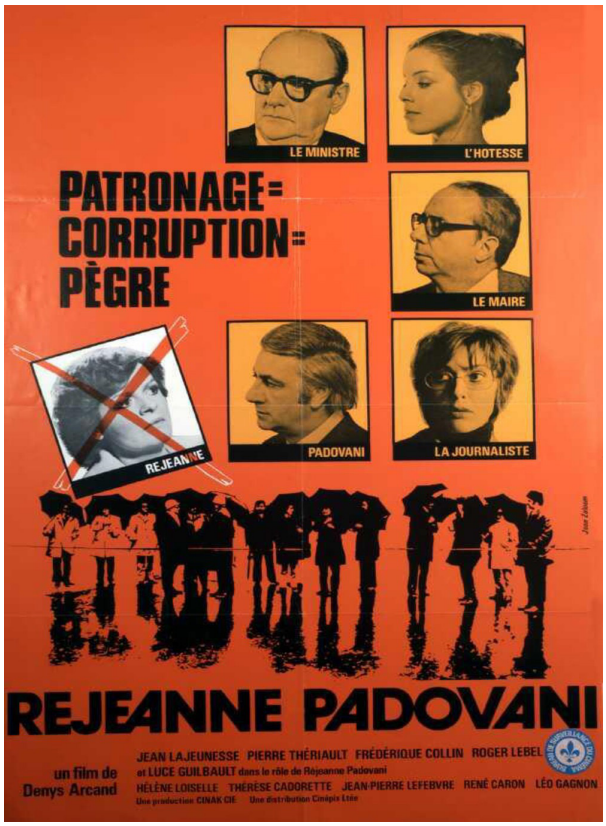


Figure 28: Poster for *Rejeanne Padovani*, 1973 (Courtesy of Cinak)

Figure 29: Cover of *Maclean's* featuring 'Bonhomme,' 2010

Figure 30: Etienne Tremblay-Tardif's "Signage Matrix for the Refection of the Turcot Interchange," 2014 (Photo: Author, 2014)

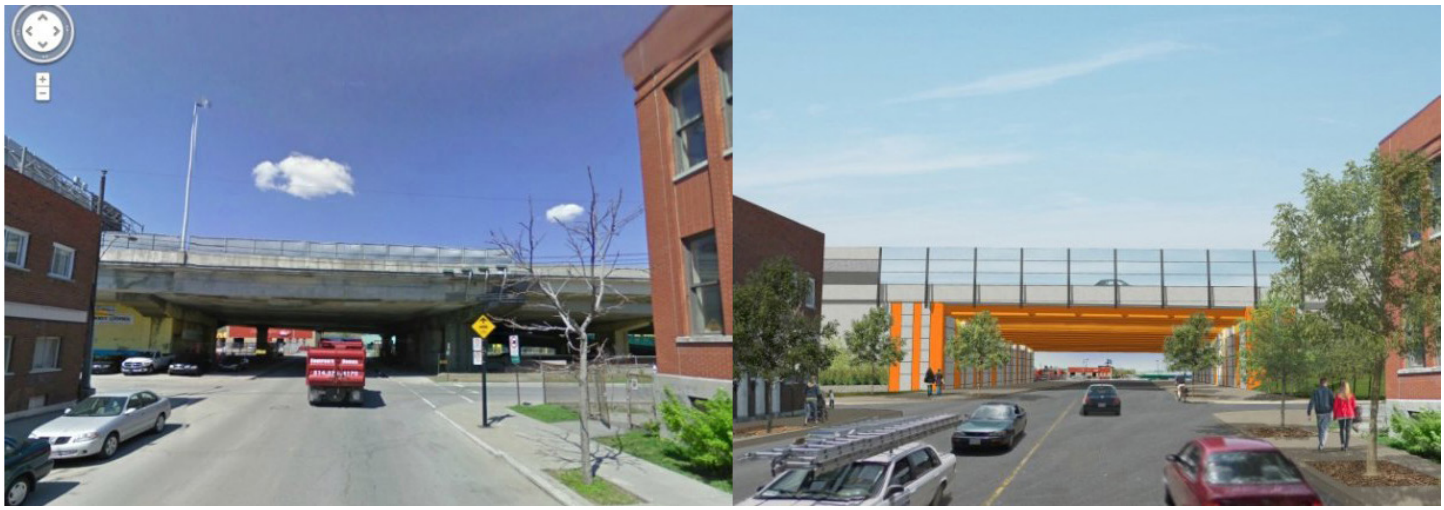


Figure 31: Before and after images of The Angers St. overpass section of the Turcot (Source: Google Street View images [left] and Ministère des Transports [right])

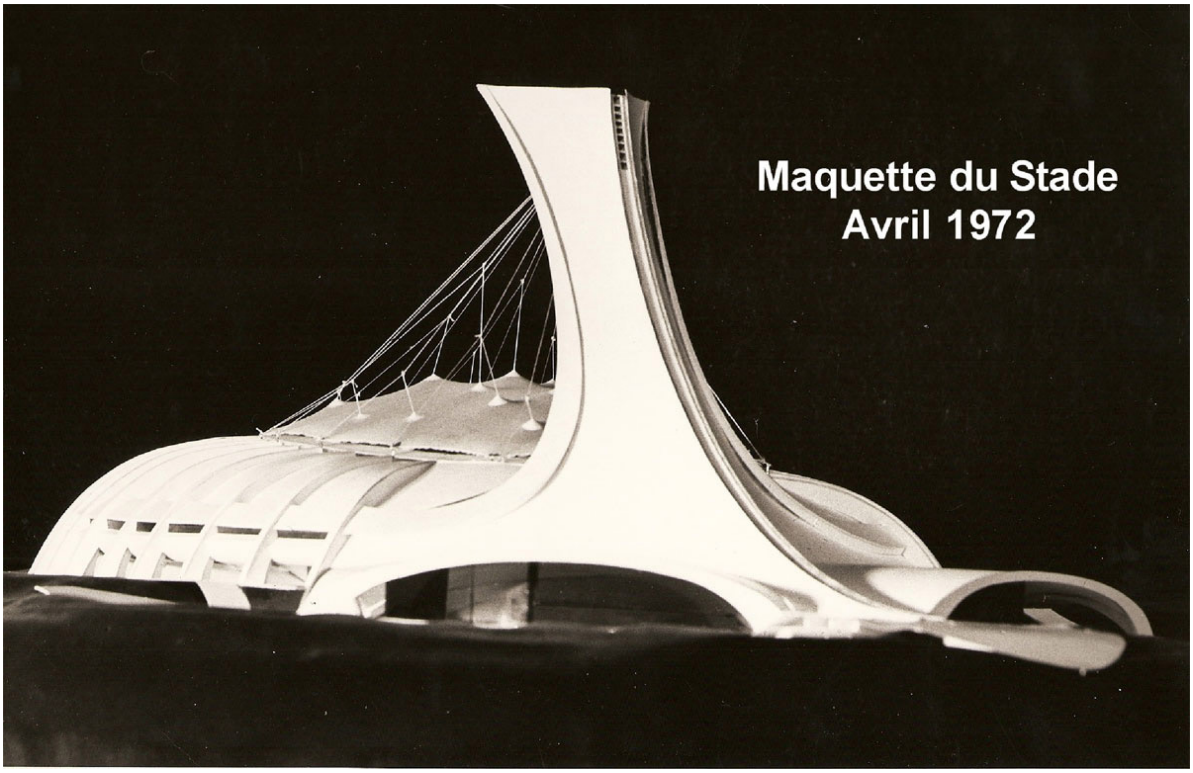


Figure 32: Maquette of Olympic Stadium and Tower, 1972

Figure 33. View of the Olympic Park, 1976
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Figure 34: Build-it-Yourself" Olympic Stadium model, 1976
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Figure 36: Still from *L'âge des ténèbres* (2007)

Figure 37: Still from *Warm Bodies*, 2013

Figures 38 and 39: Photographs showing chipped membrane on roof of the Biôdome (left) and the weathering and staining on the base of the Tower (right) (Photos: Author, 2014).

Figure 40: Sifflet skate park, 2013 (From: http://parcolympique.qc.ca)