

# Geologic Control

Studies on the Colonial Afterlife of Limestone in  
Montreal, Quebec Through Artifact

by  
Madeleine Reinhart

A thesis  
presented to the University of Waterloo  
in fulfillment of the  
thesis requirement for the degree of  
Master of Architecture

Waterloo, Ontario, Canada, 2023  
© Madeleine Reinhart 2023

## Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis including any required final revisions as accepted by my examiners. I understand that my thesis may be made electronically available to the public.

## Abstract

This research traces colonial legacies and settler imaginaries of the present across the urban environment of Montreal, Quebec through a single geologic material: limestone. French settlers extracted limestone upon arrival to Montreal using knowledge of quarrying and stone cutting acquired during construction of the Empire, designating the building material a paradigm of the French territory. They established quarries across the island of Montreal to accumulate wealth for the Empire and to distance the Indigenous population from access to land in the expanding urban condition, which began with the fortification of the merchant port town in the early eighteenth century. As the colony's population began to grow following the transition from French to British rule in the early nineteenth century, limestone quarrying shifted to an industrial mode of production to expand institutions and maintain the exclusive religious tenure of the Society of Priests of Saint-Sulpice. Limestone aggregate and cement were quarried in Montreal throughout the twentieth century, becoming a symbol of modernity when used to construct Habitat 67's reinforced concrete walls while reflecting nationalist sentiments during the centennial year of Canadian Confederation.

This thesis explores the evolution of colonialism in Montreal through the making of a series of architectural limestone artifacts: 1) fortification wall footings cut to militarize the port colony in the eighteenth century, 2) church ornamentation carved to re-assert Sulpician rule in the nineteenth century, and 3) reinforced concrete walls cast during the growth of industry in the twentieth century. Two additional artifacts reveal the result of this progression within the Empire and the colony: 4) a limestone bas-relief from a hall built for the 1931 Colonial Exhibition in Paris continues to promote resource extraction to serve the French Empire, and 5) limestone quarries in Montreal, documented with archival film, provide evidence of the social and ecological consequences of colonial extractivism. When paired with geological reports, archival documentation, and site observation, a direct engagement with limestone to re-enact the making of the original artifacts allows for reflection on expropriation, human labour, economic exchange, and technological advancement. This thesis concludes with conversations with a contemporary stone carver and a material researcher whose work responds to the extractive colonial history of limestone between the Empire and the colony. I ask: what has the role of limestone been in facilitating colonial nation-building processes in the city of Montreal, and how can limestone's colonial afterlife inform decolonial material relations in the future?

## Positioning Statement

First, I would like to acknowledge the land, terrain, and geos beneath our feet: its strata, veins, sheets, and folds. These geological layers provided me with the materials that made this thesis possible. I must also acknowledge the Indigenous communities of the lands on which I developed this thesis and extracted stone from, and their continued stewardship of the land that began thousands of years before the arrival of European settlers.

In writing a thesis on topics of resource extraction and colonial dispossession of land, the extractive qualities of the research practice in conjunction with my identity becomes relevant. I identify as a white member of a settler-colonial heritage community, and it is important before beginning this thesis that I position myself within the heritage of my ancestors. As members of the various waves of settlers arriving to Southern Ontario from Germany, France, Austria, and England throughout the late 1800s and early 1900s, my ancestors settled in Kitchener-Waterloo following the initial colonization of the region. This perspective together with my architectural education have expanded my understanding and recognition of the mutating patterns of human and ecological displacement, oppression, and material effects of colonization which are part of an ongoing global phenomenon in the present-day lives of Indigenous and settler communities alike.

While living in Paris, France, for an architecture internship, I often explored Père Lachaise Cemetery looking for a quiet escape. Walking up the steep and hilly terrain amongst thousands of tombs, I wondered about the site's unique topography and many ornate sculptural monuments. I soon discovered how entangled the cemetery was with the limestone quarrying industry of Paris. Père Lachaise was born out of a demand for increased burial sites and improved urban sanitation because of the overuse and unsanitary conditions of the city's central cemetery, Cimetière des Innocents, which had been used as a mass grave site since the Middle Ages. In addition to introducing new suburban cemeteries such as Père Lachaise, the urban sanitation project entailed exhuming the human remains of over six million corpses across the city of Paris and laying them to rest in what are now known as the Catacombs of Paris.<sup>1</sup> The Catacombs represent the afterlife of subterranean limestone quarries that for centuries supplied resources for the raising of the Empire. I was amazed to think about the mass movement of limestone, human remains, and the energy and labour required to exhume and transport them that once coursed

through the streets of Paris before Hausmann's intensive sanitation and modernization project. Within this desire to better understand the urban morphology and geomorphology of Paris came a further desire to comprehend how the material practices of limestone extraction were taken up across the Canadian landscape during the initial colonization of "New France" using the same familiar material as was used to build the Empire.

These early interrogations of the landscape and questioning of material relations to my home in Canada formed the point of departure for this thesis in addition to a newfound perspective on the architectural profession as it relates to geologic extraction. My thesis research commenced in the studios overlooking the edge of the Grand River at the University of Waterloo School of Architecture in Cambridge, Ontario, situated on the centre line of the Haldimand Tract, a parcel of approximately 950,000 acres of land promised to the Haudenosaunee of the Six Nations of the Grand River (Mohawk, Oneida, Onondaga, Cayuga, Seneca, and Tuscarora) by the British Crown in the Haldimand Treaty of 1784 for their sole use and enjoyment, forever. Today, less than 5% of the original Haldimand Tract land grant remains in trust of the original stewards of the land, the Attawandaron, Anishinaabeg, and Haudenosaunee, as over 90% of the land was expropriated, leased, and sold by the Crown within the 40 years following the creation of the Haldimand Treaty.<sup>2</sup> In April of 2021, Haudenosaunee Confederacy Chiefs Council announced a moratorium on development in the Haldimand Tract,<sup>3</sup> attesting to the "perpetual care and maintenance mechanism" called for in the research of Phil Monture and the Six Nations Lands & Resources Department.<sup>4</sup>

My research continued within the study room at the Canadian Centre for Architecture (CCA), situated within the settlement known as Tiohtià:ke to the Haudenosaunee, Mooniyang to the Anishinaabeg, and Montreal to many others, within the traditional territory of the Kanien'kehà:ka (Mohawk). Kanien'kehà:ka is a place which has long served as a site of meeting and exchange amongst many First Nations including the Kanien'kehà:ka of the Haudenosaunee Confederacy, Huron-Wendat, Abenaki, and Anishinaabeg, who have continuously resisted encroachment and claims to their land through settler colonial dispossession beginning in the XVI Century when the Kaniatarowanenneh (Saint Lawrence River) was discovered and its

associated lands became a colonial project founded on European territorial expansion and economic exchange.<sup>5</sup> It is precisely this colonial project that my research is grounded in, and which inspired me to become more attuned to the material culture of the city.

Through this body of research, I have become increasingly committed to the discourse surrounding the social and material implications of resource extraction and how it carries potential to inform decolonial design strategies. In Max Liboiron's *Pollution is Colonialism*, they express the inherent ways in which the research process becomes a tool for appropriating the work of others, offering a means to transplant ideas to areas that they do not necessarily belong to serve the goals of the researcher. "Reading ethically," Liboiron suggests, "can mean refusing to read as a form of extraction, though academia has trained us to do so."<sup>6</sup> It has become my ongoing responsibility to consistently cite works of the authors I reference, make transparent my research methodologies and processes, and perhaps most importantly, to prioritize listening before speaking when entering into conversation with a community or culture other than my own.

#### Endnotes • Positioning Statement

- 1 Erin-Marie Legacey, *Making Space for the Dead: Catacombs, Cemeteries, and the Reimagining of Paris, 1780-1830*, (Ithaca, NY: Cornell University Press, 2019), 14.
- 2 Phil Monture, *Land Rights: A Global Solution for the Six Nations of the Grand River*, (Ohsweken, ON: Six Nations Lands & Resources Department, 2010), introduction summary.
- 3 Dan Taekema, "Six Nations Traditional Government Wants Moratorium on Development of Haldimand Tract," CBC News, 20 April 2021, <https://www.cbc.ca/news/canada/hamilton/haldimand-tract-development-moratorium-1.5993081>.
- 4 Monture, *Land Rights*, 3.
- 5 City of Montreal, "Reconciliation Strategy 2020-2025," 15.
- 6 Max Liboiron, *Pollution is Colonialism*, (Durham and London: Duke University Press, 2021), 35.

## Acknowledgements

It has been a privilege to work with my thesis committee at the University of Waterloo School of Architecture who continued to encourage, support, and question my approach towards thinking through limestone. First, I owe my sincere thanks and gratitude to my supervisor, Jane Mah Hutton, who enthusiastically shared her deep knowledge of material culture and landscape transformation throughout the course of this project. Jane consistently encouraged me to extend my research far beyond the walls of the school and introduced me to and authored many of the texts that grounded the theoretical and practical foundation of this thesis. It was an inspiring and formative experience to learn from Jane's patient, humble, and generous approach towards teaching, research, and writing. To my committee member, Adrian Blackwell, thank you for consistently approaching this body of work with engaging curiosity and for raising challenging questions along the way. Your sharp insight was vital in shaping my work and in bringing an initially expansive set of ideas into focus.

I would also like to express my gratitude towards the individuals and communities whose voices have shaped the work that follows. To begin, I wish to thank Dominique Lecieux of the B.P.E. Lecieux Group who offered his time to take me on a tour of the limestone quarries of Saint-Maximin in France. It was on this tour that I began to view quarries as something much more than commodified, bounded sites producing homogenous types of stone, but as ever-changing, unpredictable spaces hosting ecologically diverse assemblages of life and nonlife. I must also acknowledge the Verrecchia Endowment Fund team who welcomed me into their residency program at Château de la Maye in Versailles where I first began my hands-on exploration with limestone. I discovered the craft of stone carving alongside a group of talented artists in residence under the guidance of Bruno Combernoux. It was through Bruno that I became familiar with the work of Régis Eroyan and his limestone carving atelier in Montreal. Régis invited me to work with him in Montreal to produce a limestone artifact for my thesis collection and throughout our time working together, he shared stories of his extensive education and background in stone carving which began in France. These stories reinforced the underlying thread of this thesis which speaks to the legacy of stone carving in Quebec as a product of knowledge that has traveled from France since the seventeenth century.

I owe a special thanks to Nicholas Gilliland, partner at Tolila + Gilliland Atelier d'Architecture in Paris and lecturer at both the Rice School of Architecture Paris and the University of Kansas School of Architecture, and to Jim Njoo, professor at École Nationale Supérieure d'Architecture de Paris-La Villette and Rice School of Architecture Paris, whose support made it possible for me to partake in such rewarding field work. To Christine Piqueras, heritage director at the Palais de la Porte Dorée in Paris for her assistance uncovering archival materials, Heinz Koller and Michael Syms, fabrication specialists at the School of Architecture for their assistance producing many of my limestone artifacts, Matthew Glynn of Carmeuse Americas for the donation of hydrated lime with which I cast my bas-relief artifact, Mike Richmond of Genyk for the donation of a custom foam block for casting moulds, Dan Lovric of Freyssinet for the donation of post-tensioning cables with which I made my Habitat 67 artifact, and to my long-time friend, Sara Fleiszig, for her work in photographing my physical artifacts, thank you.

My time in Montreal was divided between working on this thesis and as a research fellow at the CCA as part of their Master's Students Program. Leslie Beedell and Sarah Chin created a supportive space for wider conversations regarding our place as settlers and designers in relation to land. Our research project centred the Algonquin community of Barriere Lake and their efforts to rebuild a self-governed healing centre on their territory. Under the supervision of Rafico Ruiz, we learned a great deal about initiating dialogue and relationships with communities before entering them with extractive objectives, as designers and architects so often do. Rafico had the unique opportunity to see my project at its conception stage as a guest critic for my Thesis Research and Development 1 studio, where he offered invaluable wisdom and resources that shaped my research in its beginning stages. His guidance and perspectives continued to shape my work during my time at the CCA. Our research team was welcomed onto the Rapid Lake reserve where conversations surrounding copper mining exploration on Algonquin territory provided context for the many ways that Indigenous jurisdiction, customary systems of governance, and land are being threatened by nation-state governance and extractive pursuits on an ongoing basis. I owe great thanks to the Barriere Lake community who had a substantial impact on my understanding of what settler colonialism is enacting in Canada today.

It was a privilege to work alongside colleagues and friends, both old and new, who generated some of the most productive conversations while inspiring me to challenge my assumptions along the way. I want to single out Martha Trivett, the ultimate support system, friend, editor, and sounding board. To the Advocacy\_\_\_Architecture team, Safaa Alnabelseya, Nilojan Jegatheeswaran, and Ali Khaja, thank you for your continued friendship and for sharing such provocative opinions, questions, and perspectives that have challenged the way I view the world.

For funding this research, I gratefully acknowledge the Social Sciences and Humanities Research Council, The University of Waterloo School of Architecture, The Faculty of Engineering at the University of Waterloo, as well as the Ontario Graduate Scholarship Program. Such generous awards and financial support from these institutions enabled extensive field research between the two landscapes being centred in this thesis and provided the opportunity to take on the ambitious work of learning the unique craft of carving limestone.

To Piper Bernbaum, Rick Haldenby, and Dr. Anne Bordeleau, thank you for making my decision to return to the University of Waterloo to complete my master's degree an easy choice. This research would not have been possible to pursue at any other school.

For Lynn, Shirley, Tom, and Yasmine



# Table of Contents

iii	Author's Declaration
v	Abstract
vii	Positioning Statement
xi	Acknowledgements
xv	Dedication
xvii	Table of Contents
xviii	List of Figures
<b>1</b>	<b>Introduction</b>
<b>18</b>	<b>Re-Enacting Colonial Limestone Transformation</b>
21	Collection / Archives of Colonial Material Praxis
23	Observation / Field Notes Between the Empire and the Colony
25	Making / Materializing the Archive and Field Notes
31	Resurgence / Legacies of the Paris Basin
<b>42</b>	<b>Artifacts of Limestone's Colonial Afterlife</b>
47	Cutting / Fortification Wall Footings and the Militarization of the Port Colony, 1717
63	Carving / Notre-Dame Church Mouldings and the Reassertion of Sulpician Rule, 1824
75	Casting / Habitat 67 Precast Concrete and the Growth of Industry, 1964
89	Exhibiting / Palais de la Porte Dorée Bas-Reliefs and the "Legitimization" of Colonization, 1928
107	Extracting / Francon Quarry Wall and the Mutating Quarry Effect, 2022
<b>128</b>	<b>Disrupting Extractive Futures</b>
133	A Conversation with John-Philippe Smith, Dominion Sculptor of Canada
141	A Conversation with Anna Saint-Pierre, Designer and Doctoral Researcher
156	Conclusion
166	Bibliography
178	Appendix

# List of Figures

- 1 fig. 0.1 Aerial view of the Francon limestone quarry in the Saint-Michel neighbourhood of Montreal, September 2021.  
Drone photograph courtesy of Joshua MacDonald and Andrew Ashbury, September 26, 2021.
- 3 fig. 0.2 Operational quarry or mine in Southern Quebec observed from an airplane, August 2022.  
Author's photo.
- 4 fig. 0.3 Illustration of Montreal's limestone fortifications built using a scaffolding system.  
Image in Anne-Marie Balac et. al (eds), *Lights Under the City: When Archeology Recounts Montreal*, (Quebec, QC: Recherches amérindiennes Qué., 2016), online version, no page numbers.
- 6 fig. 0.4 Map of historic and current sites of limestone quarrying activity on the island of Montreal.  
Drawing by author. Base map informed by "Former quarries," City of Montreal, accessed February 11, 2022, <https://montreal.ca/en/topics/former-quarries>; André Jobin, *Map of the island of Montreal designating the public roads, the parishes the fields and the villages which are there, the canal of Lachine, the various parts of the Island which are not yet in a state of culture*, 1834, pen and ink on paper, Saint-Sulpice Collection, Bibliothèque et Archives nationales du Québec, Province of Quebec, Canada; HW Hopkins, *Atlas of Montreal and its Suburbs 1879-1895, especially 1879*, 1913, no. AC M001 P501-1-D007, City of Montreal Archives, Montreal, Quebec.
- 7 fig. 0.5 Map of Montreal illustrating the relationship between sites of extraction and sites where the limestone was transported for use as a building material, representing the four limestone material flows in Montreal centred in this research.  
Drawing by author. Base map informed by "Former quarries," City of Montreal, accessed February 11, 2022, <https://montreal.ca/en/topics/former-quarries>; André Jobin, *Map of the island of Montreal designating the public roads, the parishes the fields and the villages which are there, the canal of Lachine, the various parts of the Island which are not yet in a state of culture*, 1834, pen and ink on paper, Saint-Sulpice Collection, Bibliothèque et Archives nationales du Québec, Province of Quebec, Canada; HW Hopkins, *Atlas of Montreal and its Suburbs 1879-1895, especially 1879*, 1913, no. AC M001 P501-1-D007, City of Montreal Archives, Montreal, Quebec.
- 8 fig. 0.6 (Page 9) Colonial afterlife of limestone in Montreal.  
Drawing by author.
- 11 fig. 0.7 Michel Espagne's concept of the cultural transfer adapted to the cultural transfer between France and Montreal.  
Sketch by author.
- 12 fig. 0.8 3D scans of three existing architectural limestone elements to model artifacts after: fortification wall footings, Notre-Dame church mouldings, Palais de la Porte Dorée bas-reliefs.  
Image by author, 3D scans produced using Polycam.
- 14 fig. 0.9 Francon quarry in operation, October 1972.  
Photograph of Francon quarry in operation, October 1972, no.VM94-B102-005, Archives of Montreal, Montreal, Quebec.
- 21 fig. 1.1 (Page 19) Diagram of research methods.  
Drawing by author.
- 21 fig. 1.2 Francon quarry reduced to a single line within which endless amounts of material is produced.  
Image in Henri Rinfret, *Quarry Exploitation Report GM 14186: National Quarries Ltd* (Quebec QC: Ministry of Natural Resources, 1964), 6.
- 22 fig. 1.3 Quarry workers squaring limestone from the Mile End quarries, with Montreal's mountain visible in the background c. 1920.  
Photograph of Mile End limestone quarries c. 1920, n.d., no.VM94-Z156-5, Archives of Montreal, Montreal, Quebec.
- 24 fig. 1.4 Incision lines at the BPE Lecieux quarries in Oise, France, indicate preparations to extract blocks of Lutetian limestone. The shallow quarry wall in the background reveals that the strata of limestone sit directly beneath the alvar, May 2022.  
Author's photo.
- 24 fig. 1.5 Fortification wall footings at Parc du Champ-de-Mars, Old Montreal. A reconstructed corner stone contrasts the original corner stone, June 2022.  
Author's photo.
- 25 fig. 1.6 Author cutting the edges of the fortification wall stone; lines carved into the edges of the stone were meant to provide straight lines to guide the construction of the length of the walls, August 2022.  
Author's photo.
- 25 fig. 1.7 Casting concrete and rebar to replicate carved window mouldings of Montreal's Notre-Dame Basilica, December 2022.  
Author's photo.
- 26 fig. 1.8 Reaching the ideal consistency of pervious concrete, January 2023.  
Author's photo.
- 26 fig. 1.9 Three parts hydrated lime putty to four parts sand mortar kneaded by hand, January 2023.  
Author's photo.
- 26 fig. 1.10 Still from short film of limestone quarrying processes at Miron quarry in Montreal c. 1988.  
Film footage from "In 1988, it was the last lap of the Miron quarry," CBC Radio Canada Archives Video, 2:53, 15 May 1961, <https://ici.radio-canada.ca/nouvelle/1097712/carriere-miron-histoire-depotoir-cirque-soleil-tohu-parc-frederic-back>.
- 28 fig. 1.11 Palais de la Porte Dorée hydrated lime artifact following repairs to cracking; colour of the artifact becoming lighter after drying, February 2023.  
Author's photo.

- 29 fig. 1.12 Hydrated lime material tests, January 2023.  
Author's photo.
- 30 fig. 1.13 Crystalline limestone block from Saint-Marc quarries following the first cuts, August 2022.  
Author's photo.
- 31 fig. 1.14 Limestone blocks represent one of Paris' heritage materials at the exhibition *Resources: Filming Raw Material and Revealing Know-How*, Pavillon de l'Arsenal, May 2022.  
Author's photo.
- 31 fig. 1.15 The relationship between human settlement and the geology of the Paris Basin is represented in TVK's *The Earth is an Architecture*, presented at lille3000, Lille Palace of Fine Arts, May 2022.  
Author's photo.
- 32 fig. 1.16 Lutetian limestone blocks, heritage material of the Paris Basin at *Bap! Biennale of Architecture and Landscape* in Versailles, June 2022.  
Author's photo.
- 33 fig. 1.17 Limestone blocks amongst hay bales, gypsum plaster, and wood; the architectural heritage materials of the Paris Basin at *Bap! Biennale of Architecture and Landscape* in Versailles, June 2022.  
Author's photo.
- 34 fig. 1.18 h2o architects' Lutetian limestone apartment complex on Avenue Félix Faure in the 15th arrondissement of Paris, completed in 2018.  
Julien Lanoo, *Immeuble Félix Faure*, digital image, Archello, accessed July 23, 2022, <https://archello.com/fr/project/immeuble-felix-faure>.
- 36 fig. 1.19 Lutetian limestone apartment building by Berrault Pressacco on rue Oberkampf in the 11th arrondissement of Paris, completed 2017.  
Berrault Pressacco, *027 OBK Street Perspective*, digital image, Berrault Pressacco Website, accessed August 12, 2022, <https://berraultpressacco.com/work/obk>.
- 38 fig. 1.20 A crane lifts blocks of cut stone into piles of similar properties. The dark brown marks on the quarry walls are evidence of where water seeped through cracks in the Earth making contact with limestone strata, May 2022.  
Author's photo.
- 48 fig. 2.1 Artifact of Montreal's fortification wall footing stones hand-cut out of black crystalline limestone from Saint-Marc quarries in Quebec (1:1 scale, 15" L x 4.5" W x 8" H and 7.5" L x 4.5" W x 6.5" H approx. 70 lbs total).  
Photograph by Sara Fleiszig, commissioned by author.
- 49 fig. 2.2 Learning the process of "boning in," or making an uneven cut block of limestone perfectly square at the Verrecchia Endowment Fund residency, Versailles, May 2022.  
Author's photo.
- 50 fig. 2.3 Two blocks of limestone from Saint-Marc quarries alongside hand cutting tools to re-enact the making of Montreal's fortification wall footings, August 2022.

Author's photo.

- 51 fig. 2.4 A raft brings limestone from the islands off the shores of Montreal to be used to face the fortification ramparts under construction to the west (seen in left of painting).  
L.R. Batchelor, *Building the Walls at Montreal c. 1740*, April 1957, painting, no.1985-230 NPC, National Archives of Canada, Ottawa, Ontario.
- 52 fig. 2.5 Process sketches noting the relationship between natural compression between the limestone block's sedimentary layers and ease of carving.  
Sketch by author.
- 52 fig. 2.6 Components of Montreal's original fortification walls.  
Author's drawing informed by Phyllis Lambert and Alan Stewart (eds), *Opening the Gates of Eighteenth-Century Montreal*, (Montreal and Cambridge: Canadian Centre for Architecture and MIT Press, 1992), 29.
- 54 fig. 2.7 From cedar to limestone: the evolution of Montreal's fortification walls 1695-1744.  
Author's drawing informed by Phyllis Lambert and Alan Stewart (eds), *Opening the Gates of Eighteenth-Century Montreal*, (Montreal and Cambridge: Canadian Centre for Architecture and MIT Press, 1992), 21.
- 54 fig. 2.8 Régis Eroyan teaching the author to remove larger volumes of stone from the face of the limestone block, August 2022.  
Author's photo.
- 56 fig. 2.9 Plan of Montreal's stone fortifications by French engineer, Chaussegros de Léry, following precepts of French military engineer Sébastien Le Prestre de Vauban.  
Gaspard-Joseph Chaussegros de Léry, *Plan of the Town of Montreal*, 10 September 1725, pen and ink, colour wash on paper, no. CA M001 VM066-1-P042, Centre des Archives d'Outre-mer, Aix en Provence, France.
- 56 fig. 2.10 Plan and section showing components of Montreal's limestone fortifications.  
Author's drawing informed by Phyllis Lambert and Alan Stewart (eds), *Opening the Gates of Eighteenth-Century Montreal*, (Montreal and Cambridge: Canadian Centre for Architecture and MIT Press, 1992), 29.
- 57 fig. 2.11 Fortification wall footings at Parc du Champ-de-Mars, Old Montreal. The two lines of footings define the outline of the scarp and counterscarp with the ditch separating the two elements, June 2022.  
Author's photo.
- 57 fig. 2.12 Exterior and interior scarp elevations showing position of fortification wall footings.  
Author's drawing informed by Phyllis Lambert and Alan Stewart (eds), *Opening the Gates of Eighteenth-Century Montreal*, (Montreal and Cambridge: Canadian Centre for Architecture and MIT Press, 1992), 27.
- 58 fig. 2.13 Fortification wall footings at Parc du Champ-de-Mars, Old Montreal. A reconstructed corner stone contrasts the original corner stone, June 2022.  
Author's photo.

60 fig. 2.14 Author cutting the edges of the fortification wall stone to replicate the original cut texture, August 2022.

Author's photo.

62 fig. 2.15 Collage of fortification wall artifact as process, not object.

Collage by author; Photograph of artifact by Sara Fleiszig, commissioned by author; Plan of Montreal's fortifications sourced from Gaspard-Joseph Chaussegros de Léry, *Plan of the Town of Montreal*, 10 September 1725, pen and ink, colour wash on paper, no. CA M001 VM066-1-P042, Centre des Archives d'Outre-mer, Aix en Provence, France; Image of author making the fortification wall artifact, author's photo; Image of raft bringing limestone to Montreal's fortification wall project sourced from L.R. Batchelor, *Building the Walls at Montreal c. 1740*, April 1957, painting, no.1985-230 NPC, National Archives of Canada, Ottawa, Ontario.

62 fig. 2.16 Elevation of existing fortification wall footings at Parc Champs-de-Mars highlighting different sizes and forms of wall stones and corner stones.

Drawing by author.

64 fig. 2.17 Artifact of the new Notre-Dame Church of Montreal carved window mouldings cast in concrete (1:1 scale, 18" L x 11" W x 16" H and 16" L x 7" W x 18" H, approx. 290 lbs total).

Photograph by Sara Fleiszig, commissioned by author

66 fig. 2.18 Rounded greystone window mouldings and horizontal mouldings of Notre-Dame's towers.

Conrad Poirier, *Notre Dame Church*, 12 juillet 1946, photograph, no. AR1996:1001:170, Bibliothèque et Archives nationales du Québec, Montreal, Quebec.

66 fig. 2.19 Diagram of artifact for carved limestone window mouldings of Notre-Dame Church.

Author's drawing informed by James O'Donnell, *Elevation for masonry mouldings for the tower windows for Notre-Dame de Montréal*, 1826-1829, pen and ink over graphite, no. AR1996:1001:148, Canadian Centre for Architecture, Montreal, Canada; James O'Donnell, *Elevations for a tower and sections for decorative masonry details for Notre-Dame de Montréal*, 1826-1829, pen and black ink over graphite and graphite on paper, no. AR1996:1001:170, Canadian Centre for Architecture, Montreal, Canada.

67 fig. 2.20 CNC milling foam blocks for use as a concrete casting mould, November 2022.

Author's photo.

68 fig. 2.21 Map of Montreal in 1843 written in English, showing the expanded town following deconstruction of the fortification walls from 1802-1817.

Adolphus Bourne, *Map of the City of Montreal in 1843*, 1943, engraving, identifier: McGillLibrary-rbsc\_city-of-montreal\_G3454\_M65\_1843\_B6-16985, McGill University Library, Montreal, Quebec.

68 fig. 2.22 James O'Donnell's section drawings for the carved limestone mouldings of Notre-Dame Church's tower windows.

James O'Donnell, *Sections for masonry mouldings for the tower windows*

*for Notre-Dame de Montréal*, 1826-1829, pen and ink over graphite, no. AR1996:1001:150, Canadian Centre for Architecture, Montreal, Canada.

68 fig. 2.23 James O'Donnell's elevation drawings for the carved limestone mouldings of Notre-Dame Church's tower windows.

James O'Donnell, *Elevation for masonry mouldings for the tower windows for Notre-Dame de Montréal*, 1826-1829, no. AR1996:1001:148, pen and ink over graphite, Canadian Centre for Architecture, Montreal, Canada.

69 fig. 2.24 Stone masons and carvers shape limestone in Place D'Armes to construct the new Notre-Dame Church of Montreal seen in the background, foregrounded by the old Notre-Dame church c. 1830.

Robert Auchmuty Sproule, *Place D'Armes, Montreal, 1830*, etching, line and stipple engraving with watercolour on paper, no. 28306, National Gallery of Canada, Ottawa, Canada.

70 fig. 2.25 Casting concrete and rebar reinforcements to replicate carved window mouldings of Montreal's Notre-Dame Church, December 2022.

Author's photo.

71 fig. 2.26 Observing Notre-Dame Basilica under repair, July 2022.

Author's photo.

71 fig. 2.27 Observing greystone mouldings on facades of Notre-Dame Basilica, August 2022.

Author's photo.

72 fig. 2.28 Removing concrete casts from foam moulds, December 2022.

Author's photo.

72 fig. 2.29 Diagram of carved limestone window mouldings contrasting the uniformly cut stone walls of Notre-Dame Church of Montreal.

Author's drawing informed by James O'Donnell, *Elevation for masonry mouldings for the tower windows for Notre-Dame de Montréal*, 1826-1829, pen and ink over graphite, no. AR1996:1001:148, Canadian Centre for Architecture, Montreal, Canada; James O'Donnell, *Elevations for a tower and sections for decorative masonry details for Notre-Dame de Montréal*, 1826-1829, pen and black ink over graphite and graphite on paper, no. AR1996:1001:170, Canadian Centre for Architecture, Montreal, Canada.

74 fig. 2.30 Collage of Notre-Dame Church carved limestone moulding artifact as process, not object.

Collage by author; Photograph of artifact by Sara Fleiszig, commissioned by author; Image of Martineau quarry in Montreal sourced from Edgar Gariépy, *Montréal: Carrière Martineau et Rogers, coin des rues de Bellechasse et Papineau*, 22 October 1948, photograph, no. BM42-G1408, Archives of Montreal, Montreal, Quebec; Image of author casting the Notre-Dame artifact, author's photo; Image of Notre-Dame Basilica of Montreal sourced from *Basilique Notre-Dame de Montréal c. 1930*, n.d., photograph, (03Q,P428,S3,SS1,D14,P181), Bibliothèque et Archives nationales du Québec, Montreal, Quebec; Image of drawings for Notre-Dame Basilica's mouldings sourced from James O'Donnell, *Elevation for masonry mouldings for the tower windows for Notre-Dame de Montréal*, 1826-1829, no. AR1996:1001:148, pen and ink over graphite, Canadian Centre for Architecture, Montreal, Canada.

- 76 fig. 2.31 Artifact of a beam-to-wall detail of Habitat 67 units cast with pervious concrete and Freysinett post-tensioning cables (1:1 scale, 22" L x 27" W x 11.5" H, approx. 180 lbs).  
Photograph of artifact by Sara Fleiszig, commissioned by author.
- 77 fig. 2.32 Aerial photograph of Saint Helen's Island (center), Notre-Dame Island (left), and Cité du Havre (top) showing the gabion walls that formed dykes to delineate the limits of the new island being infilled.  
Image from Jean-Louis de Lorimier (ed.), *Expo '67 Memorial Album*, (Toronto: Thomas Nelson and Sons/Canada Limited, 1968), 40-41.
- 78 fig. 2.33 Aerial photograph of Notre-Dame Island showing the limestone quarry central to the island, formerly the island itself. Above Notre-Dame Island is the south end of the new Saint Helen's Island, where Swan Lake takes shape within the quarry that provided limestone for the site expansion, c. 1963-64.  
Image from Robert Fulford, *This Was Expo*, (Toronto: McClelland and Stewart, 1968), 11.
- 79 fig. 2.34 Saint Helen's Island, Notre-Dame Island, and Mackay Pier in 1963 showing locations of dykes built of limestone blasted from the Saint Lawrence River and made into gabion walls. The dykes would later be infilled with limestone quarried on Round Island (Isle Ronde) and Green Island (Ile Verte), rubble from the Montreal metro and Saint Lawrence Seaway excavations, and limestone quarried on the island of Montreal.  
Author's drawing informed by Edward Jae Hamilton, *Map of the construction of the Expo '67 Islands*, drawing, in Edward Jae Hamilton, *Ceci n'est pas un parc: Reconsidering the Island Site of Expo 67*, (Waterloo, ON: University of Waterloo, 2011), 35.
- 80 fig. 2.35 Saint Helen's Island, Notre-Dame Island, and Cité du Havre in 1967 following infilling with rubble and limestone. Round Island (Isle Ronde) and Green Island (Ile Verte) became quarries to supply limestone for the expansion project and later became water features, Dolphin's Lake and Swan Lake, on the expanded Saint Helen's Island.  
Author's drawing informed by Edward Jae Hamilton, *Map of the water features of the Expo Islands*, drawing, in Edward Jae Hamilton, *Ceci n'est pas un parc: Reconsidering the Island Site of Expo 67*, (Waterloo, ON: University of Waterloo, 2011), 43.
- 81 fig. 2.36 Two-track Montreal Metro tunnel revealing the limestone formation that spans the island. Excavation was done primarily on city-owned land and avoided interruption to conditions above ground.  
*The excavated tunnel*, n.d., photograph. in P. Laprise, *The Montréal Métro*, (Montreal: Planning Department, Montréal Urban Community, 1976), 16.
- 82 fig. 2.37 Mixing 3 parts limestone aggregate to 1 part Portland cement, January 2023.  
Author's photo.
- 83 fig. 2.38 Steel prefabrication moulds being removed from Habitat 67 reinforced concrete unit.  
Photograph of the Habitat 67 prefabrication process, 1966, Moshe Safdie Archive, Rare Books and Special Collections, McGill University, Montreal, Canada, accessed November 19, 2022. <https://cac.mcgill.ca/moshesafdie/habitat/constructionPhoto.php?stage=1>.
- 84 fig. 2.39 Complete pervious concrete cast in foam mould, January 2023.  
Author's photo.
- 84 fig. 2.40 Diagram of post-tensioned concrete beam to wall detail.  
Author's drawing informed by *Axometric Drawings and Detail for Precast Concrete Models, c. 1965*, (Montreal: Moshe Safdie Fonds, Canadian Architecture Collection, McGill University Library, 1965), in Réjean Legault, "The Making of Habitat 67: A Tense Pas de Deux between Moshe Safdie and August Komendant" in *Journal of the Society for the Study of Architecture in Canada* 46 no. 1, (Montreal: SSAC-SSEC, 2021), 39.
- 86 fig. 2.41 Habitat 67 seen from Old Montreal; the second mountain in Montreal's skyline is made of concrete, November 2020.  
Author's photo.
- 86 fig. 2.42 Typical precast concrete unit construction indicating post-tensioning cables and vertical section of beam-to-wall detail indicating the element rebuilt as artifact.  
Author's drawing informed by *Axometric Drawings and Detail for Precast Concrete Models, c. 1965*, (Montreal: Moshe Safdie Fonds, Canadian Architecture Collection, McGill University Library, 1965), in Réjean Legault, "The Making of Habitat 67: A Tense Pas de Deux between Moshe Safdie and August Komendant" in *Journal of the Society for the Study of Architecture in Canada* 46 no. 1, (Montreal: SSAC-SSEC, 2021), 39.
- 87 fig. 2.43 Collage of Habitat 67 beam-to-wall detail artifact as process, not object.  
Collage by author; Photograph of artifact by Sara Fleiszig, commissioned by author; Image of Francon quarry courtesy of Joshua MacDonald and Andrew Ashbury, September 2021; Image of author casting the Habitat 67 artifact, author's photo; Image of Habitat 67 sourced from *Habitat 67*, n.d., photograph, in Moshe Safdie, "Habitat '67 - Towards the Development of a Building System," *PCI Journal* 12, no. 1 (February, 1976), 60-66; Image of Notre-Dame Island quarryies sourced from Robert Fulford, *This Was Expo*, (Toronto: McClelland and Stewart, 1968), 11.
- 90 fig. 2.44 Artifact of limestone bas-reliefs from the facades of Palais de la Porte Dorée depicting a fisherman reeling in his nets (1:1.5 scale, 27" L x 26" W x 4.5" H, approx. 150 lbs).  
Photograph of artifact by Sara Fleiszig, commissioned by author.
- 91 fig. 2.45 Plan of the International Colonial Exhibition of Paris, 1931. The Vincennes woods and park were used to host the exhibition which had the slogan "Around the World in One Day."  
Albert Tournaire, *Plan de l'Exposition coloniale internationale*, 15 December 1928, pen and ink, colourwash on paper, National Archives of Paris, Palais de la Porte Dorée Website, accessed September 20, 2022, <https://monument.palais-portedoree.fr/en/the-palais-des-colonies/the-architectural-instructions-for-the-palais-de-la-porte-doree>.

- 92 fig. 2.46 Palais de la Porte Dorée, Paris, the only permanent pavilion of the 1931 Exposition, September 2022.  
Author's photo.
- 93 fig. 2.47 Alfred Janniot modeling the limestone bas-relief of Palais de la Porte Dorée while referencing a live model, demonstrating another form of extractivism taking form in the carving method itself.  
Photograph of Alfred Janniot carving while referencing a live model, [unnamed], n.d., L'illustration Newspaper, Palais de la Porte Dorée Website, accessed September 19, 2022, <https://monument.palais-portedoree.fr/les-decors/le-bas-relief-d-alfred-janniot>.
- 94 fig. 2.48 Limestone bas-relief of fishermen, Palais de la Porte Dorée limestone facade, Paris, September 2022.  
Author's photo.
- 94 fig. 2.49 Mesh from 3D scan of Palais de la Porte Dorée facade component depicting a fisherman reeling in his nets, Paris, 2022.  
Image by author, 3D scan produced using Polycam.
- 95 fig. 2.50 Observing the west facade of Palais de la Porte Dorée where the bas-reliefs depict the name of the French territory of Saint-Pierre et Miquelon in a ship's sails.  
Author's photo.
- 95 fig. 2.51 Half of the engraved north facade of Palais de la Porte Dorée titled, "The sons who have heard the calling of the Empire and his genius and made his name loved beyond the seas, France is grateful" (translated from French). Highlighted are the explorers and founders of the colonies of New France and Canada.  
Image by author informed by National Museum of Immigration History and Thierry Algrin (Architect) drone images, courtesy of Christine Piqueras.
- 95 fig. 2.52 (Page 97) West facade of Palais de la Porte Dorée depicting French colonies in the Americas and Africa.  
Image by author informed by National Museum of Immigration History and Thierry Algrin (Architect) drone images, courtesy of Christine Piqueras.
- 95 fig. 2.53 (Page 98) East facade of Palais de la Porte Dorée depicting French colonies in Oceania and Asian colonies.  
Image by author informed by National Museum of Immigration History and Thierry Algrin (Architect) drone images, courtesy of Christine Piqueras.
- 95 fig. 2.54 (Page 99) West half of the south facade of Palais de la Porte Dorée depicting French colonies in Africa.  
Image by author informed by National Museum of Immigration History and Thierry Algrin (Architect) drone images, courtesy of Christine Piqueras.
- 95 fig. 2.55 (Page 101) East half of the south facade of Palais de la Porte Dorée depicting French colonies in Asia.  
Image by author informed by National Museum of Immigration History and Thierry Algrin (Architect) drone images, courtesy of Christine Piqueras.
- 103 fig. 2.56 Mixing hydrated lime putty before slaking with an excess of water

for 2.5 months to gain structural strength, November 2023.

Author's photo.

- 103 fig. 2.57 CNC milling foam blocks based on 3D scan of Palais de la Porte Dorée facade for use as casting moulds, December 2022.  
Author's photo.
- 103 fig. 2.58 Adding slaked hydrated lime putty to sand, January 2023.  
Author's photo.
- 103 fig. 2.59 Casting sand and hydrated lime mortar in CNC-milled foam moulds, January 2023.  
Author's photo.
- 104 fig. 2.60 Cracks appearing in drying casts as they begin to lose their yellow colour, January 2023.  
Author's photo.
- 106 fig. 2.61 Collage of Palais de la Porte Dorée bas-relief artifact as process, not object.  
Collage by author. Photograph of artifact by Sara Fleiszig, commissioned by author; Image of artifact ingredients, sand and hydraulic lime, author's photo; Image of letter containing correspondence between quarrying company Civet, Pommier & Cie and the architects for Palais de la Porte Dorée courtesy of Christine Piqueras, Image of Palais de la Porte Dorée sourced from Exposition Coloniale Internationale - Paris 1931, Musée des Colonies Carte postale, Collection Musée national de l'histoire de l'immigration, accessed February 2nd, 2023, <https://monument.palais-portedoree.fr/programmation/visites-guidees/l-histoire-du-palais>; Image of Civet, Pommier & Cie quarries map sourced from Alagille (surveyor), *Detail of the plan of the land of Morthemer, domain of Normandoux*, November 1871, ink wash on paper and canvas, red annotations after 1908, accessed February 4th 2023, <https://inventaire.nouvelle-aquitaine.fr/dossier/carriere-de-normandoux/3719e7e0-43d7-4daa-9f29-93395f6567b6>; Image of Civet, Pommier & Cie quarries sourced from Kossuth (photographer), *Terce-Normandoux quarries (Vienne)*, November 1871, photograph, accessed February 4th 2023, <https://inventaire.nouvelle-aquitaine.fr/dossier/carriere-de-normandoux/3719e7e0-43d7-4daa-9f29-93395f6567b6>.
- 108 fig. 2.62 Vast amounts of vegetation has overtaken the Francon Quarry following its closure, creating a habitat for coyotes, deer, and bird life, August 2022.  
Author's photo.
- 109 fig. 2.63 A sign reading "Snow deposit closed to residents and public" (translated from French) sits outside of the gates leading into the Francon quarry, which has been adapted as a snow dump in winter, August 2022.  
Author's photo.
- 109 fig. 2.64 A Reddit post inquires: "What is this pit in the middle of the city?" showing the proximity of Francon quarry to the Saint-Michel borough, and revealing the quarry's mystifying qualities.  
[u/AcadianMan, What is this pit in the middle of the city?](https://www.reddit.com/r/Paris/comments/128j8kq/what_is_this_pit_in_the_middle_of_the_city/) digital image,

- Reddit, accessed February 2023, [https://www.reddit.com/r/montreal/comments/106naoj/what\\_is\\_this\\_pit\\_in\\_the\\_middle\\_of\\_the\\_city/](https://www.reddit.com/r/montreal/comments/106naoj/what_is_this_pit_in_the_middle_of_the_city/).
- 109 fig. 2.65 (Page 111) Francon quarry in operation producing cement and aggregate, October 1972.  
 Photograph of Francon quarry in operation, October 1972, no.VM94-B102-005, Archives of Montreal, Montreal, Quebec.
- 114 fig. 2.66 Two sills of Francon quarry walls showing evidence of varying extraction techniques given the vertical, human-made striations in the upper wall and jagged, uneven shaping surrounding it, August 2022.  
 Author's photo.
- 114 fig. 2.67 City of Montreal's fences lining the perimeter of the uppermost level of the quarry blocking views and access.  
 Author's photo.
- 115 fig. 2.68 After closing in the late 1970s, the Miron quarry became a landfill which is now covered by the Saint-Michel environmental complex neighbouring Francon quarry.  
 Image from "Historical Links in Stone," CGEN Archive, accessed March 17, 2022, <https://www.cgenarchive.org/montreal-stone.html>.
- 115 fig. 2.69 (Page 116) Top: Francon quarry as it exists today Bottom: Vivre Saint-Michel en Santé's final phase 3 proposal including social housing, a multifunctional elevated pathway, and a research centre amongst other community amenities.  
 Catherine Rousseau, *Phase 3 rehabilitation project*, digital image, in *Vivre Saint-Michel en Santé, Francon, Heart of our Neighbourhood: Rehabilitation Project of Francon Quarry*, June 2018, accessed August 12, 2022, <https://www.vivre-saint-michel.org/projets/francon-c%C5%93ur-de-notre-quartier/>.
- 117 fig. 2.70 Still from the short film at 01:29 depicting the current state of Francon quarry juxtaposed with limestone crushing processes in the neighbouring Miron quarry c. 1961; the colonial afterlife of the limestone quarrying industry in Saint-Michel and its life post-operation.  
 Drone images from opening sequence courtesy of Joshua MacDonald and Andrew Ashbury, animated by author; Sequence 1 of archival film sourced from "Dynamitage Carrière Lafarge," YouTube Video, 3:49, posted by "ygleblanc," 14 August 2007, <https://www.youtube.com/watch?v=YQSwXFt7ULO>; sequence 2 of archival film sourced from "In 1988, it was the last lap of the Miron quarry," CBC Radio Canada Archives Video, 2:53, 15 May 1961, <https://ici.radio-canada.ca/nouvelle/1097712/carriere-miron-histoire-depotoir-cirque-soleil-tohu-parc-frederic-back>.
- 134 fig. 3.1 Excavations at the Centre Block project at Parliament Hill, Ottawa, ON.  
 Image from "Latest progress on the Centre Block project." Government of Canada. Accessed January 4, 2023. <https://www.tpsgc-pwgsc.gc.ca/citeparlementaire-parliamentaryprecinct/rehabilitation/edificeducentre-centreblock/progres-progress-eng.html>.
- 142 fig. 3.2 Exhumed stones from the basements of historic buildings, sliced and crushed to be used as opus and granito's aggregates.  
 Image courtesy of Anna Saint-Pierre.
- 144 fig. 3.3 Textile printed with stones (brick, millstone, Carrara marble and slate).  
 Image courtesy of Anna Saint-Pierre.
- 146 fig. 3.4 Exhumed stones from the basements of historic buildings, sliced to reveal profiles when used as opus and granito's aggregates.  
 Image courtesy of Anna Saint-Pierre.
- 148 fig. 3.5 Limestone sculpture from the basement of Palais de l'Alma, eventually sliced and used as granito component.  
 Image courtesy of Anna Saint-Pierre.
- 149 fig. 3.6 "A visit to the cellar of the historic building of the Palais de l'Alma allowed us to select materials and sculptures deposited during restoration work that were otherwise intended for the dumpster. They were exhumed and used as materials to create a play area on the ground of the courtyard for the children of the nursery and the resident families. The excavated materials were cut into slices, sealed together with site concrete, then polished to reveal their profile."  
 Image courtesy of Anna Saint-Pierre.
- 157 fig. 4.1 Thesis defence exhibition.  
 Author's photo.
- 161 fig. 4.2 Detail of thesis defence exhibition materials: archival and process photos alongside artifacts and carving tools.  
 Photo courtesy of Shabaan Khokhar.
- 162 fig. 4.3 Thesis defence as an exhibition tour of all five artifacts and associated research materials.  
 Photo courtesy of Shabaan Khokhar.



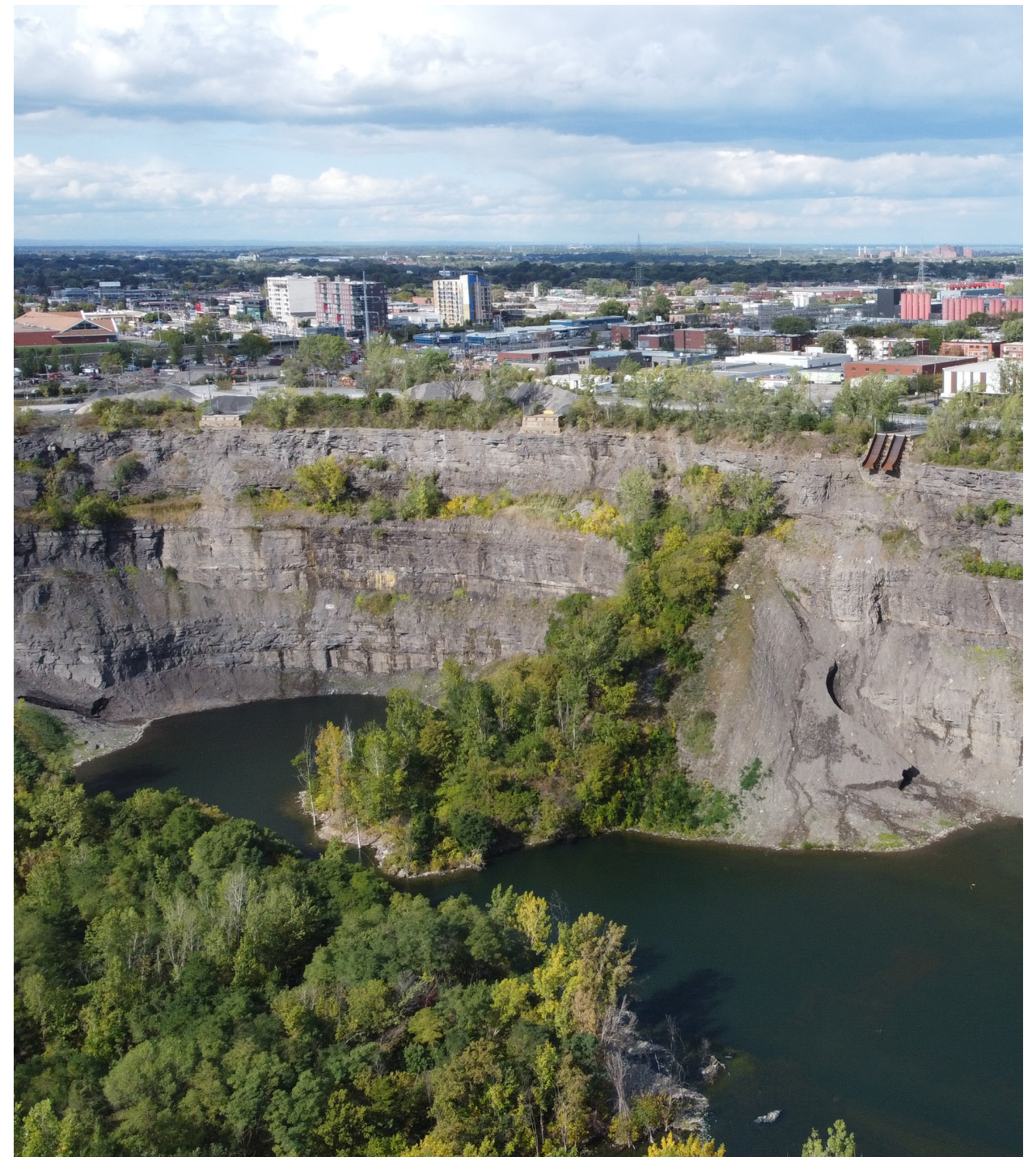


## Introduction

According to geologist Thomas Henry Clark, geology precedes and informs physiographic, racial, and linguistic settlement patterns, a concept he calls *geological control*. While surveying the island of Montreal in 1952, Clark concluded that what is “related to the geological controls is the racial development,” and “the French proportion of the population since 1865 has been predominant [...] even this can be said to have had a geological control.”<sup>1</sup> The relationship between the natural geologic formation of Montreal and the colonization of the island is then a result of *geological control*, or the recognition of desirable geologic properties for human settlement and territorial expansion. Clark goes on to describe how the emergence of Montreal as a metropolis of Canada follows early settlers’ attraction to its geologic features, which yielded rivers for use as trade routes and terraces formed by the sea in post-glacial times that “provided an incentive for the westward spread of the city, giving to dwellings and institutions a broader outlook and in all ways a more desirable site.”<sup>2</sup> While T.H. Clark proposes “geological controls” to define the relationship between the social and physiographic context of Montreal, Kathryn Yusoff posits the term “geologic life” to conceptualize the inseparability of human and nonhuman forces involved in extractive nation-building processes.

According to Yusoff, *geologic life* is a response to the colonial categorization of matter that equates marginalized people with inert, nonhuman geologic matter, where both are rendered as property and categorized as inhuman.<sup>3</sup> Yusoff explains that the consequence of this unequal assumption of power is “the formation of extractable territories and subjects,” wherein Indigenous dispossession of land and sovereignty is predicated on geologic disturbance and corresponding forced labour.<sup>4</sup> In Montreal, the colonial praxis of limestone transformation became a method for colonists to transfer the architectural identity of the Empire onto the landscape of the colony, upholding settler-social regimes through material and associated labour organizations, enacting a mode of *geologic life*. While *geological control* indicates settlers’ relationship to geology pre-extraction, *geologic life* describes how social divide becomes predicated on the economy of colonial extraction, where colonial life advances at the cost of severing Indigenous relations to land.

fig. 0.1 Aerial view of the Francon limestone quarry in the Saint-Michel neighbourhood of Montreal, September 2021.



Today, private corporations in tandem with the provincial government mine and quarry across traditional Indigenous territories in Quebec. The landscape continues to be a material resource for the settler-colonial state, perpetuating narratives historically structured towards accumulating wealth for the Empire. Upon first contact with present-day Quebec in 1541, Jacques Cartier and his crew of explorers thought they had found diamonds dispersed along the coast. Upon closer investigation, those “diamonds” proved to be quartz crystals and the territory was deemed worthless by explorers until their return in the seventeenth century.<sup>5</sup> Colonial powers have always viewed the Canadian landscape with an extractive lens. Today, the Government of Canada defines mineral exploration as “the search for materials in the Earth’s crust, where concentration and quantity allow for extraction and processing at a profit.”<sup>6</sup> Contemporary quarrying activity mirrors the initial appraisal of the territory by French explorers who sought to extract, accumulate, trade, and possess. Canada is currently recognized as a leading mining and quarrying nation worldwide, with Quebec producing the highest value of production of geologic resources and representing one fifth of the country’s mineral output for export on the world market.<sup>7</sup> Quebec, a leading producer of mineralogic resources, continues centuries of colonial material practices through mineral exploration and extraction on Indigenous territories, shaping settler space while undermining Indigenous sovereignty and relations to land.



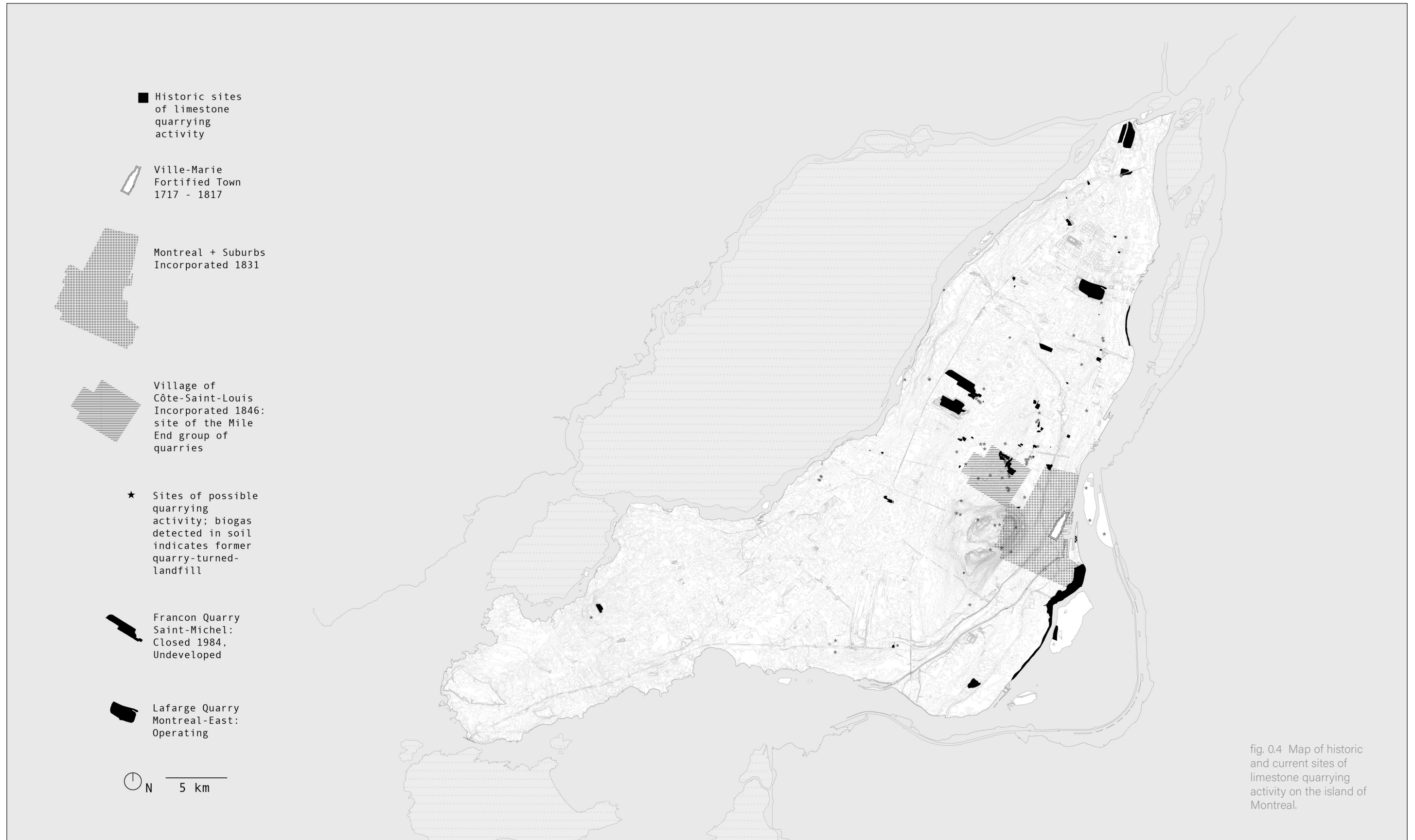
fig. 0.2 Operational quarry or mine in Southern Quebec observed from an airplane, August 2022.

fig. 0.3 Illustration of Montreal’s limestone fortifications built using a scaffolding system.



**Evolution of Colonialism Through Limestone in Montreal**

Regarding the geological landscape of France as an endless source of wealth and material identity, French colonists in Montreal took up limestone extraction as an extension of the relationship to land and ecology upheld in the Empire. Founded in 1642 as a religious outpost of France, the settlement became a successful trading port due to its strategic position on the relatively flat limestone formations at the confluence of the Saint Lawrence, Ottawa, and Richelieu rivers.<sup>8</sup> Houses and a protective palisade were first erected out of wood by Montreal’s inhabitants to maintain its prosperous position as a fur-trading post and to lay claims to Indigenous beaver trapping grounds.<sup>9</sup> Following deforestation and depletion of wood on the island, the colony sought to quarry limestone on Saint-Helen’s Island off the shores of Montreal to replace the decaying palisade and to fortify its settlement with cut limestone blocks.<sup>10</sup> Under the instruction of the king’s engineers, limestone walls were erected using traditional French fortification methods. The building of a large-scale limestone wall deployed dominant colonial material practices that would continue to be used across the island, alienating Indigenous communities through architectural production that physically blocked access to the urban centre, land, and waterways, and began to symbolize French culture.



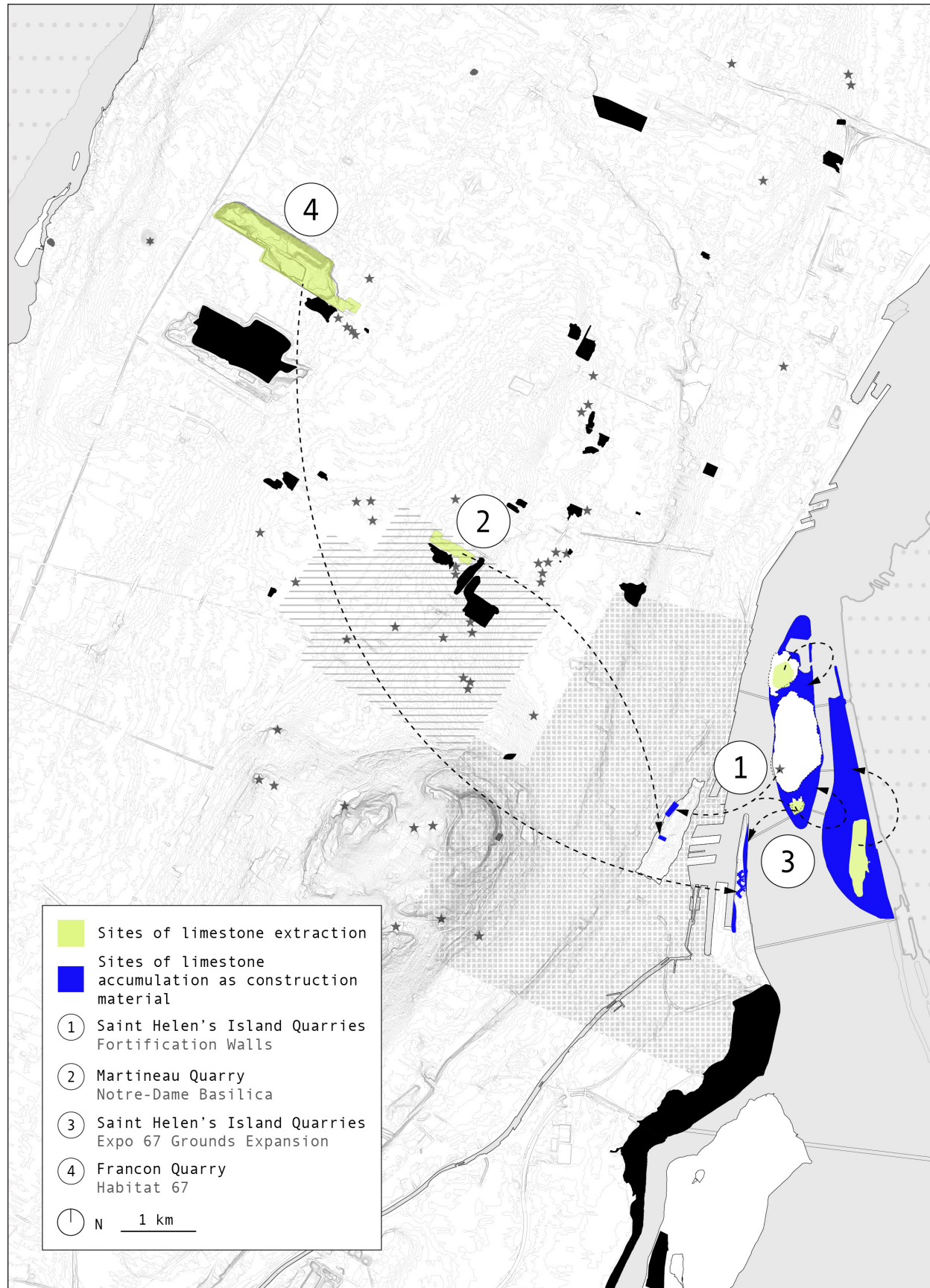
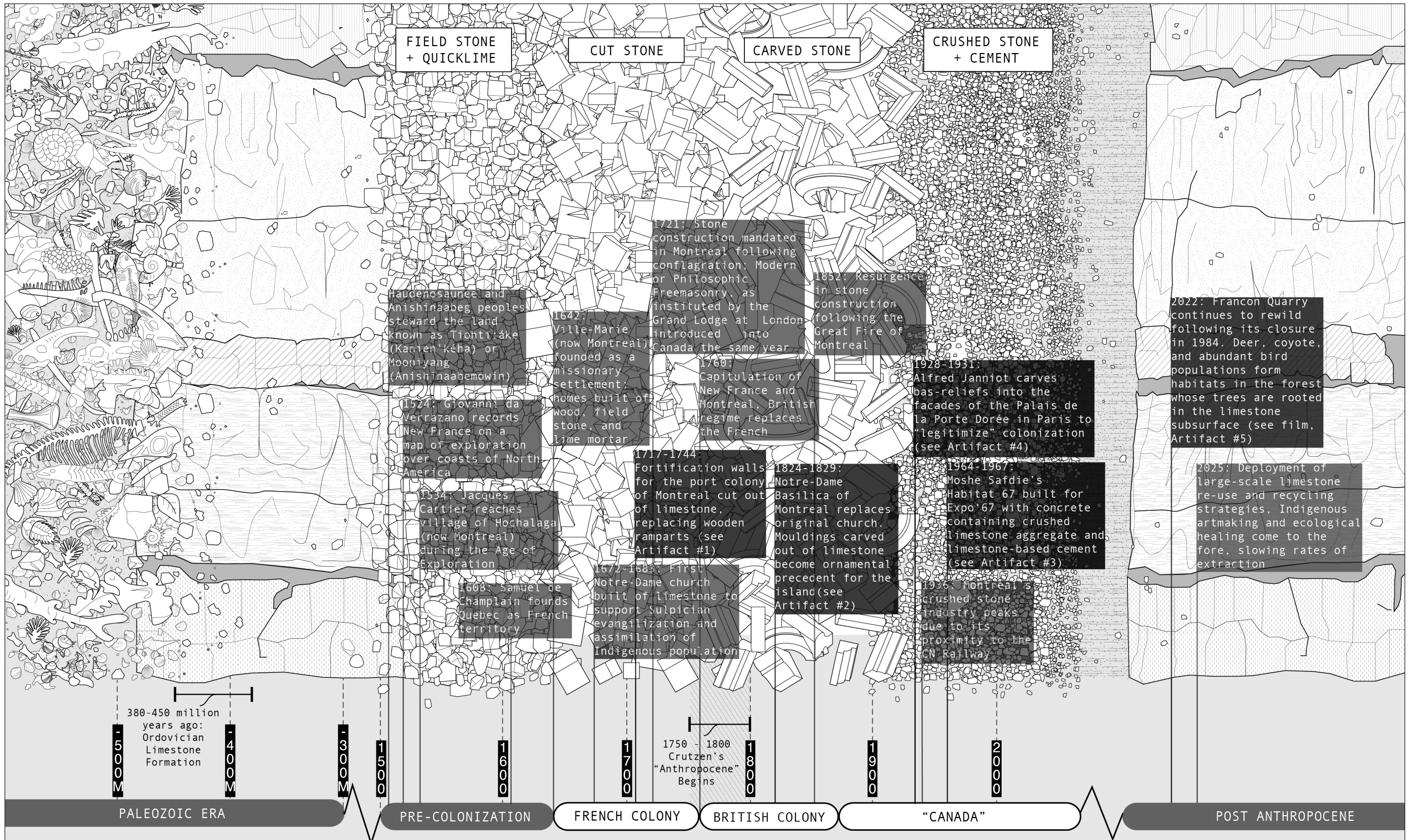


fig. 0.5 Map of Montreal illustrating the relationship between sites of extraction and sites where the limestone was transported for use as a building material, representing the four limestone material flows in Montreal centred in this research.

Following the first mass quarrying project that was of military necessity, quarries were established under Sulpician rule in the nineteenth century. The Sulpicians sustained their religious tenure over the island during the transition from French to British rule in 1760 by evolving land use practices into industrial modes of production, allowing the institution to lay claims to all extracted resources and profits from their trade, which including quarrying limestone.<sup>11</sup> To materialize their continued rights to governance and teaching of French Catholicism under British rule in the nineteenth century, the Sulpicians built and ornamented a monumental new church out of limestone. By the twentieth century, limestone quarries had spread across the eastern end of the island and were supplying vast amounts of building material at ever-increasing speeds locally and across the continent.<sup>12</sup> At Expo 67, the International and Universal Exposition in Montreal, limestone was once again quarried from Saint Helen's Island and the adjacent islands while excavation rubble from the city's modernizing endeavors was brought to the site to expand the Expo grounds. Additional aggregate and cement were produced locally at Francon quarry to provide the pavilion of Habitat 67 with a global material identity in precast concrete. The use of local limestone materials to expand and create territory for the Exposition and to evoke a placeless identity through concrete mirrors the territorial expansion of Canada during Confederation, which is at once a national and colonial endeavor.

As quarrying practices accelerated throughout the twentieth century, they could no longer exist "elsewhere" outside of the collective urban consciousness as the city began to develop near industrial limestone quarries. Following years of territorial tensions between city and quarry expansion, the City of Montreal acquired quarries for use as landfills and later as parks.<sup>13</sup> Today, the inoperative Francon quarry in the Saint-Michel neighbourhood represents one of the last sites where evidence of Montreal's limestone industry can be seen. Recent proposals for the site aim to conceal the city's extractive history beneath urban development,<sup>14</sup> raising questions of whether acknowledging the colonial afterlife of limestone at sites of extraction could inform Indigenous land reclamation processes. The evolution of colonial extractivism in Montreal takes on a social and ecological dimension, having been continuously initiated to maintain and restore colonial nationhood through limestone. From cutting to carving, carving to crushing, the form and urban identity of limestone has transformed while New France was ceded and exchanged between empires, evolving into the self-governing settler-state of Canada. When traced back to the land it came from, limestone has consistently sustained capitalist economies of empire and the Canadian nation-state.

fig. 0.6 (Page 9) Colonial afterlife of limestone in Montreal.



**Cultural Transfer Through Limestone**

The concept of the *cultural transfer* in this thesis refers to the flow of human knowledge and skill in quarrying and stone cutting that was exported from France in the seventeenth century, arriving in Montreal and activated when the settlement was designated a permanent French colony. Following the ceding of New France to Britain, this cultural transfer continued to rework the geology of Montreal as the Society of the Priests of Saint Sulpice were granted rights by the Crown to maintain jurisdiction to quarrying and architectural production. It was through this cultural transfer that Montreal could exist within France and then Britain, as both groups (French and British colonizers) and physical matter (limestone) crossed transformational frontiers consequentially leading towards the destruction and reworking of the landscape. From this colonial imaginary and material practice comes a way of framing resource extraction as a promise of the state, that in effect serves the prosperity of the settler population while negating the reality of Indigenous dispossession.

The concept of the cultural transfer was introduced by Michel Espagne and Michael Werner in the 1980s as a way of understanding circulatory processes between seemingly hegemonic cultures across the nineteenth century German and French border. Espagne describes the nuances of the process: "To transfer is not to transport, but rather to metamorphose, and the term is in no way reduced to the ill-defined and very banal question of cultural exchanges. It is less the circulation of cultural goods than their reinterpretation that is at stake."<sup>15</sup> In this sense, the cultural transfer takes on a global dimension and implies movement across culturally imposed boundaries. A cultural transfer can be understood as a passage taken by a person or matter-in-motion that adapts to new social and physical contexts throughout its journey, meanwhile preserving something about its cultural origins. Cultural transfers, although historically rooted in social transformations and movements, should also consider materiality and "acknowledge that the anthropocentric notion of the human as the prime mover of objects (in a broad sense) and creator of meaning is troubled by the agency of nonhuman life."<sup>16</sup> The cultural transfer centred in this research is the migration of French engineers and masons and their entanglements with the island's 450-million-year-old natural formation of limestone.<sup>17</sup>

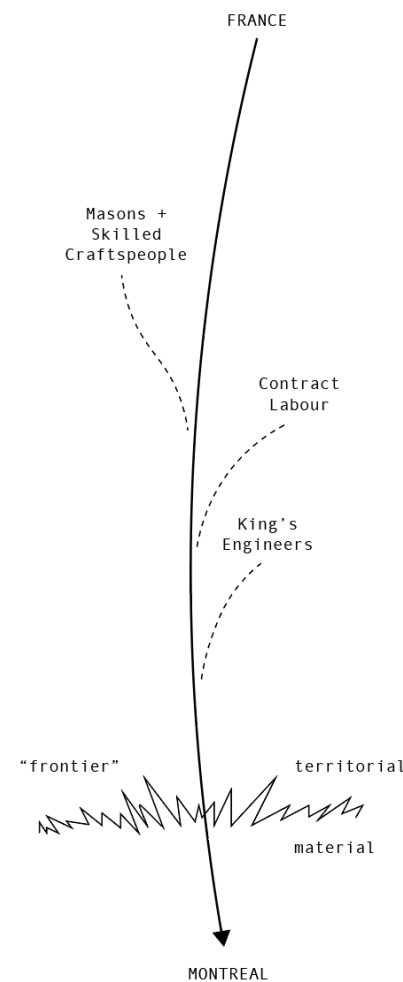


fig. 0.7 Michel Espagne's concept of the cultural transfer adapted to the cultural transfer between France and Montreal.

**Limestone Artifacts**

While studying sites where limestone was used to maintain and legitimize the French colonial nation-building project in Montreal, Quebec and Paris, France, I created five limestone artifacts that represent full-scale replicas of existing architectural elements to understand the process of a cultural transfer through limestone in Montreal since the seventeenth century. Each artifact evokes the French-colonial desire for economic exchange, permanence, and cultural continuum across continents; attributes of colonial extractivism that view the land as a resource to be exploited. The process of re-enacting the creation of each of the artifacts using varied fabrication processes allows for reflection on technological paradigm shifts that have adapted to the material over time, linked to the drive for capitalist accumulation and power. When viewed as isolated elements detached from their original sites within the city, full-scale replicas of wall elements, building ornaments, and bas-relief carvings express the material language of colonization, having undergone a transformation from natural geological strata within the Earth's crust into cultural objects at the behest of human hands. As a collection, the limestone artifacts exhibit a timeline of colonial extractivism in Montreal, wherein each artifact has the possibility to inform new networks of relations when put in conversation with one another. The process of making the five artifacts provides a lens through which to closely observe, interrogate, and develop new models for understanding extractive nation-building practices. Through cross-referencing my direct engagement with limestone materials with archival documentation and site observation, the artifacts attempt to demonstrate a mode of *geologic life* and limestone's social and ecological entanglements that are active in Montreal.

fig. 0.8 3D scans of three existing architectural limestone elements to model artifacts after: fortification wall footings, Notre-Dame church mouldings, Palais de la Porte Dorée bas-reliefs.

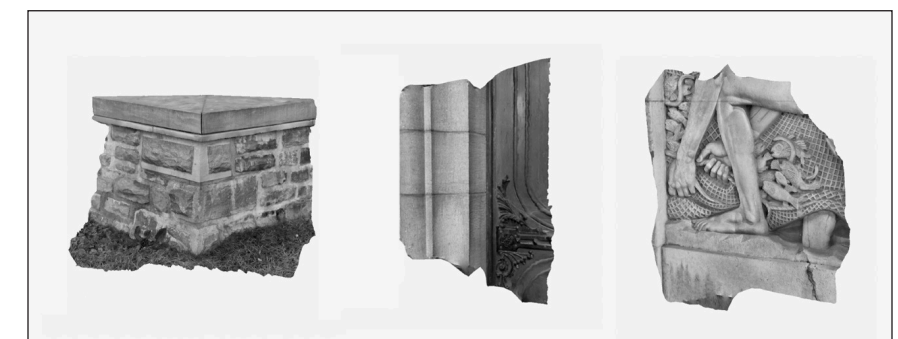




fig. 0.9 Francon quarry in operation, October 1972.

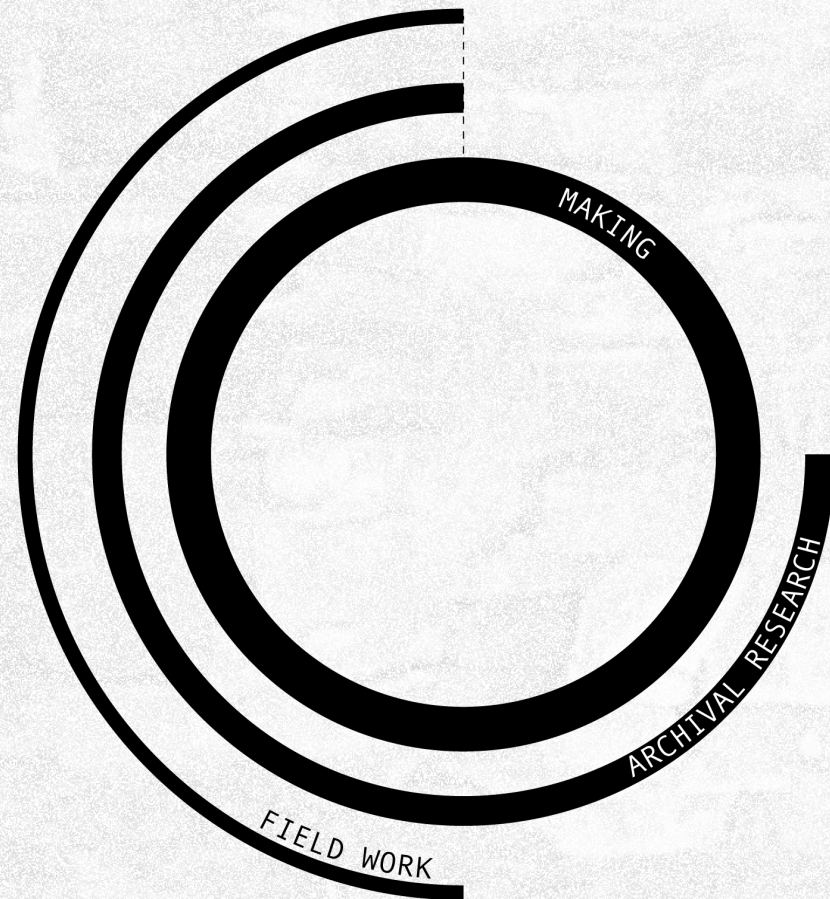
Chapter 1 of this document outlines my primary research methods which culminate in the process of making the five limestone artifacts to reflect on the historical context that led to their becoming as cultural objects. In a similar way to how Kathryn Yusoff pairs the terms “geologic” and “life” to conceptualize the inseparability of human and nonhuman forces involved in extractive nation-building processes, Chapter 2 of this document expands on how *geo-social* histories of the colonization of Montreal become naturalized through the *geo-physical* transformation of limestone. I then argue that both social and physical forces are intrinsic to the five limestone artifacts that I reconstructed for this thesis to challenge the notion that limestone is merely an inert, commodifiable product and rather a physical reflection of evolving societal values and colonial anxieties. In Chapter 3, this thesis concludes with conversations with the Dominion Sculptor of Canada and a Paris-based designer and researcher whose works provide tangible examples of moving beyond extractive material practices when spaces for collaborative exchange and creation of new material identities are formed.

## Endnotes • Introduction

- 1 T.H. Clark, "Geological Report 46: Montreal Area Laval and Lachine Map-Areas," Province of Quebec Department of Mines, (Montreal QC: Rédempti Paradis, 1952), 12.
- 2 Ibid.
- 3 Kathryn Yusoff, *A Billion Black Anthropocenes or None*, (Minneapolis MN: University of Minnesota Press, 2018), 3.
- 4 Ibid., 83.
- 5 "Cap-Aux-Diamants," Ville de Québec, l'accent d'Amérique, accessed July 11, 2022, <https://www.ville.quebec.qc.ca/citoyens/patrimoine/toponymie/fiche.aspx?IdFiche=377>.
- 6 "Minerals and the Economy," Natural Resources Canada, accessed July 17, 2022, <https://www.nrcan.gc.ca/our-natural-resources/minerals-mining/minerals-metals-facts/minerals-and-the-economy/20529#exploration>.
- 7 "A Wide Variety of Metals and Minerals within Easy Reach," Invest Quebec, accessed July 11, 2022, <https://www.investquebec.com/international/en/industries/mining/a-wide-variety-of-metals-and-minerals-within-easy-reach.html#:~:text=The%20main%20metals%20mined%20are,and%20platinum%20in%20the%20world>.
- 8 René Chartrand, *French Fortresses in North America 1535-1763: Québec, Montréal, Louisbourg and New Orleans* (Oxford, UK, New York, NY: Osprey Publishing, 2005), 32.
- 9 Ibid., 33.
- 10 Phyllis Lambert and Alan Stewart (eds.), *Opening the Gates of Eighteenth-Century Montreal* (Montreal and Cambridge: Canadian Centre for Architecture and MIT Press, 1992), 20.
- 11 Brian Young, *In Its Corporate Capacity: The Seminary of Montreal as a Business Institution 1816-1876* (Montreal and Kingston: McGill-Queens University Press), 7.
- 12 Limestone products such as cement and quicklime were also being exported to the United States, Dominican Republic, and Venezuela. See *The Canadian Mineral Industry in 1950* (Ottawa ON: Canada Department of Mines and Technical Surveys, 1952), 76, 96.
- 13 Monique Beaudin, "Site of Montreal's New Park Is a Dump, Literally," *Montreal Gazette*, January 29, 2012, <https://montrealgazette.com/news/local-news/site-of-montreals-new-park-is-a-dump-literally>.
- 14 Vivre Saint-Michel en Santé, *Francon, Le Pas de plus - À La Découverte d'un Site Exceptionnel de l'Est de Montréal*, YouTube, accessed February 17, 2023, <https://www.youtube.com/watch?v=TS8l09gTsgs&t=164s>.
- 15 Michel Espagne, "La Notion de Transfert Culturel," *Revue Sciences/Lettres [Online]*, accessed October 14, 2022, <https://journals.openedition.org/rsl/219?lang=fr>.
- 16 Manuela Rossini, "Cultural Transfer: An Introduction," *Word and Text: A Journal of Literary Studies and Linguistics* 4 no. 2 (2014): 6.
- 17 Although the cultural transfer centred in this research focuses on a definition of colonialism specific to the extractive history of Montreal, my early encounters with the notion of cultural transfer through limestone led me to discover the effects of limestone extraction in the Paris Basin that took place in the 1st century by the Romans. Evidence of limestone extraction pre-colonization of the Americas can be found at Arènes de Lutèce in the fifth arrondissement of Paris, where a Roman amphitheatre built of limestone historically housed gladiatorial combats was built and preserved, and today is used as a public park. This site represents a cultural transfer through limestone which continues to shape narratives of colonial oppression and violence, broadening the scope of the definition of colonialism being studied in this thesis.



# Re-enacting Colonial Limestone Transformation



To investigate the role of limestone in the colonial evolution of Montreal, collection of archival documents, in-situ material observation, and making became the three primary methods I used.

*How had limestone entered the nation-building project on the island of Montreal?*

*How were material decisions made by colonial authorities?*

*What colonial anxieties were being remedied through using limestone as a building material?*

These questions informed a constant dialogue between the making process and archival and site observations, where making the series of five artifacts shaped my understanding of the historical research, and the historical research continued to guide my approach to making. At each stage of the research process, engagement with stone carvers, archivists, historians, and architects shaped my knowledge of the contemporary and historic lives of limestone.

## Collection / Archives of Colonial Material Praxis

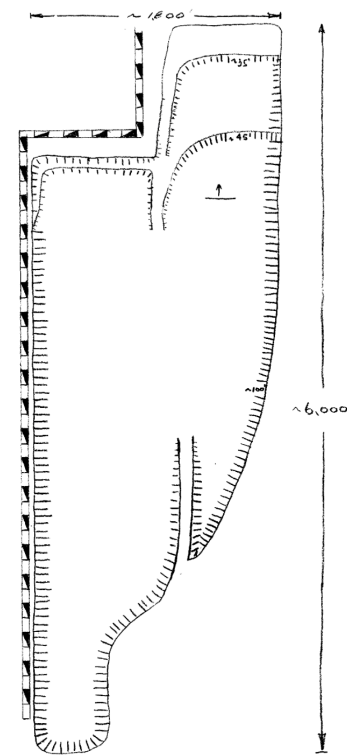
To become familiar with the geomorphology of Montreal and its ties to colonial material practices, I gathered a range of archival materials from specific time periods (the early eighteenth, mid-nineteenth, and late twentieth century) including settlement maps, drawings, films, and photographs in addition to geologic surveys and maps published between 1920-1970. From the geologic surveys, I gathered evidence of how geologists were simultaneously beholden to the evolving industry of limestone extraction and the development of geological education. Within the surveys, detailed descriptions of limestone formations and their properties such as hardness, colour, and appearance of fossils and impurities deduce which sites will produce the greatest profits for the industry, while the same geologic terrain provides "an excellent theatre for the instruction of students in geological methods."<sup>1</sup>

The names of the surveys themselves were very telling of the colonial reliance on limestone to support the economy of empire. A report published by the Quebec Bureau of Mines Department of Colonization, Mines, and Fisheries, aptly titled *Geological Sketch and Economic Minerals of the Province of Quebec, Canada*, describes how "local geological problems, mostly of an economic nature" would be solved by geologists who would travel by canoe or airplane to correct errors in geologic maps of the province to allow Quebec to capitalize on its mineral resources more efficiently.<sup>2</sup> Archival photographs and film of Montreal's limestone quarries helped to spatialize and provide depth to sites of extraction which were otherwise reduced to simplified representations in surveys, maps, and plans which posited limestone quarries as an endless resource being produced within a single delineated boundary. Referencing photographs and film also supplemented the surveys and maps with information pertaining to the movement of material, specific machinery employed to transform it, and the bodies assigned to extract it.<sup>3</sup>

In her book *Along the Archival Grain*, Ann Laura Stoler describes the importance of re-reading archival documents against languages of empire and the violence they condone: "If one were to characterize what has informed a critical approach to the colonial archives, it would be a commitment to the notion of reading colonial archives 'against their grain' of imperial history, empire builders, and the priorities and

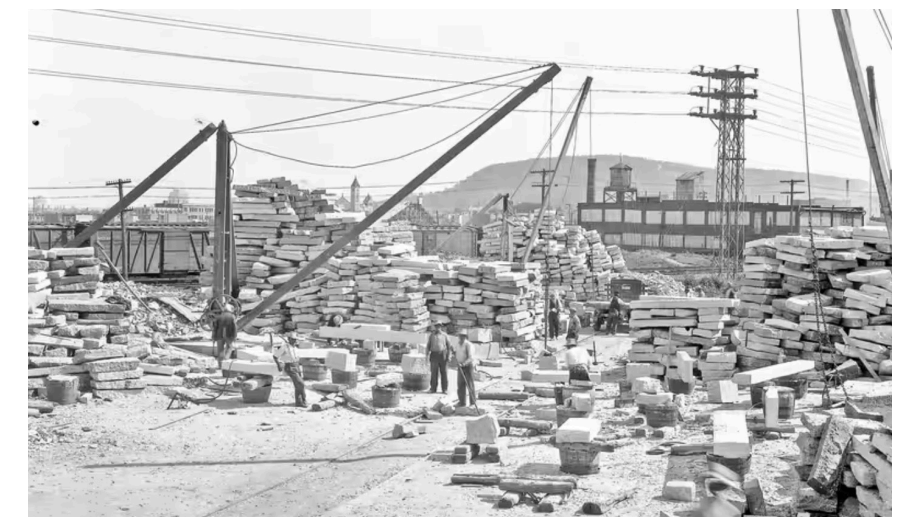
fig. 1.1 (Page 19) Diagram of research methods.

fig. 1.2 Francon quarry reduced to a single line within which endless amounts of material is produced.



perceptions of those who wrote them."<sup>4</sup> By providing insights into the imaginaries of colonial rule and revealing the link between who is in power and what infrastructures of empire are realized, the colonial archives I came in contact with provided a way to understand how the planning and deployment of material knowledge and craft surfaces as a form of power. They allowed me to examine what and who had been neglected in the colonial pursuit of architectural production in support of colonial nationhood. With each survey, limestone profile, map, drawing, and photograph comes information such as the cost of labour, the depth of a quarry's wall, and to what purpose the stone will serve as a building material; analyses imbued with a sense of urgency, celebration, and futurity about each architectural project that awaits materialization and bestows colonial bodies with material wealth. The archival documents I surfaced reveal the instruction to extract, creating the Empire through limestone. The following two research methods, in-situ material observation and making, supplement the collection of archival materials with an understanding of the life within limestone.

fig. 1.3 Quarry workers squaring limestone from the Mile End quarries, with Montreal's mountain visible in the background c. 1920.



## Observation / Field Notes Between the Empire and the Colony



fig. 1.4 Incision lines at the BPE Lecieux quarries in Oise, France, indicate preparations to extract blocks of Lutetian limestone. The shallow quarry wall in the background reveals that the strata of limestone sit directly beneath the alvar, May 2022.



fig. 1.5 Fortification wall footings at Parc du Champ-de-Mars, Old Montreal. A reconstructed corner stone contrasts the original corner stone, June 2022.

To describe the ineffable and constantly changing qualities of materials, Tim Ingold states that “To describe any material is to pose a riddle, whose answer can be discovered only through observation and engagement with what is there.”<sup>5</sup> In-situ observation of sites of limestone extraction and use in architectural projects became integral to my research methodology. I explored two geologic landscapes within this body of research, the first setting being the region surrounding Paris, France, where I visited exhibitions centring the theme of limestone extraction, toured an active limestone quarry, observed buildings and sites constructed using limestone between the first century to present day, and attended a limestone carving residency. The second landscape I studied was Montreal, Quebec, where I observed buildings and archeological sites constructed out of limestone between the early eighteenth and late twentieth century, toured an inactive limestone quarry, and worked with a local stone craftsman to create the first artifact in the series. The tangible experience of studying limestone firsthand provided me with intimate knowledge of the properties of the material from both geographic regions and about the broader body of knowledge pertaining to the manipulation of those material properties.

While archival surveys, maps, and drawings revealed the evolving industry of limestone extraction, they did not provide evidence of the way skills in quarrying and stone cutting had been applied to the making of various architectural elements and how the labour, cutting techniques, and movements registered in the material as it was shaped. By looking at the markings made on specific blocks of limestone, such as the textured engraving on the edges of the fortification wall stones, I was able to observe the way hand tools or machines had registered in the stone. By observing the orientation of specific stones, such as the arched and stacked window mouldings at Notre-Dame Basilica, I could assume in what direction sedimentation of the limestone beds had occurred in. The experience of observing limestone in the urban context also allowed me to decide which colonial projects and architectural emblems to centre in this research which tethered together the two seemingly distant landscapes I had explored. Not only did field work allow me to observe the context of limestone’s entry into a colonial system, but it led me to meeting many people who shared their immense knowledge of the material and the historical context that shaped it.

## Making / Materializing the Archive and Field Notes

Following the collection of archival documents and observation of sites of limestone's use as a building material in both the Empire and the "colony," my research methods shifted to the physical act of making. Following visits to quarries and to a series of architectural material exhibitions in Paris, France foregrounding physical models and the raw materials themselves, I became inspired to translate the archival documentation and physical experience of limestone I had acquired into tangible artifacts to understand their origins in the nation-building project of Montreal. A direct engagement with limestone reinforced my understanding of a cultural transfer through limestone and knowledge production in the craft of stone cutting primarily through re-introducing elements of labour into the making of each architectural emblem.

I chose four existing architectural limestone elements in the urban context of Montreal (fortification walls, Notre-Dame Basilica, Habitat 67, and Francon Quarry) and one in Paris, France (Palais de la Porte Dorée) that are emblematic of dominant colonial social and political values in stone over the past four centuries to inform the making of five corresponding artifacts. The sites are all well known, esteemed, opulent, and highly valued projects that are celebrated as historical landmarks in Montreal and Paris. Each of the four architectural projects are regarded as precedents that influenced building methods, typology, and carried forth a promise of urban identity through material. The presence of the quarry alongside the four architectural projects is equally as celebrated in the city of Montreal as a landmark, the source of material for many esteemed architectural projects, and a site for future intervention.



fig. 1.6 Author cutting the edges of the fortification wall stone; lines carved into the edges of the stone were meant to provide straight lines to guide the construction of the length of the walls, August 2022.

fig. 1.7 Casting concrete and rebar to replicate carved window mouldings of Montreal's Notre-Dame Basilica, December 2022.

In describing making as a process of *growth* rather than a *project*, Tim Ingold asserts that "even if the maker has a form in mind, it is not this form that creates the work. It is the engagement with materials."<sup>6</sup> The limestone artifacts I (re)created became simulations of the original artifacts, where the form has been replicated, but the fabrication methods and lime-based materials they are composed of differ from that of the original, offering a basis for material exploration. While separate approaches were taken to produce each artifact, certain considerations remained consistent. All the artifacts were created using limestone-based materials, they are all examples of the most technologically complex stone elements to have been cut, carved, and cast within each original project, and the process of making each artifact was consistently in dialog with archival research and in-situ observation of the existing elements. I attempted to replicate the original architectural elements using materials and skills that would mirror aspects of the process they were formed by originally.

fig. 1.8 Reaching the ideal consistency of pervious concrete, January 2023.

fig. 1.9 Three parts hydrated lime putty to four parts sand mortar kneaded by hand, January 2023.

fig. 1.10 Still from short film of limestone quarrying processes at Miron quarry in Montreal c. 1988.

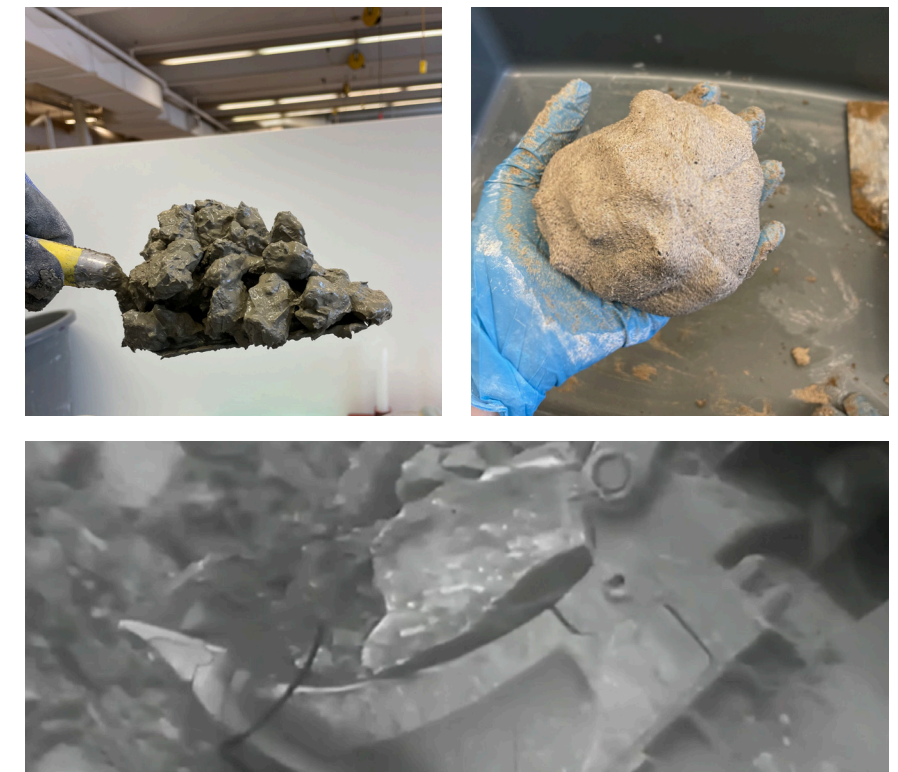




fig. 1.11 Palais de la Porte Dorée hydrated lime artifact following repairs to cracking; colour of the artifact becoming lighter after drying, February 2023.

For instance, the limestone fortification wall footing was produced alongside an expert stone carver in Montreal out of a limestone block quarried in Quebec using hand tools in a similar manner to which the original stones would have been cut, which became a direct demonstration of a cultural transfer and the most accurate “re-enactment” of any artifact in the series. I chose to cast the pair of artifacts representing the Notre-Dame Church mouldings in concrete to simulate the smoothness of the original mouldings, the colour of greystone found in Montreal, and the process of casting that was described to me while visiting the existing site. To make the Habitat 67 beam-to-wall detail, I cast pervious concrete to mirror the precast process used on the original project and to highlight the limestone-based aggregate and cement that would have originally been quarried in Montreal. Without the knowledge, resources, or skills in stone carving to produce the Palais de la Porte Dorée bas-relief by hand, I chose to cast the artifact using hydrated lime putty that I mixed with sand; a material decision that surfaced during my archival research having discovered that hydraulic lime had been used to affix the original stone reliefs to the original facade. Furthermore, the hydrated lime putty and sand mixture represents an historic mortar recipe that would have been used to face Montreal’s fortification walls,<sup>7</sup> reinforcing that research undertaken for each individual artifact inspired aspects of the making process for others. To represent the quarry, a mix of archival film and animation became the medium to express the dynamics of the quarry and to contrast the slow ecological reclamation of the site with the rapid pace of extraction. By the time each artifact was complete, I was able to trace connections between each of the artifacts based on my experience making them.

Making the five artifacts allowed me to challenge the assumptions I had regarding the original methods of extraction and anthropogenic transformation of limestone. I had expected to have a complete understanding of the fabrication methods and historical context of the original elements before I began making the artifacts, yet the further along I was in the making process the more questions I had about the context of the original elements’ becoming. When making the fortification wall footing, the material language of stone cutting was revealed to be in direct relation to the land the stone came from, where the sedimentary layers of formation affect their orientation

in the wall. While making the Notre-Dame Basilica artifact, the information gathered on site and the archival drawings I referenced made me challenge their original method of production: had they been cast or carved? When attempting to make the Habitat 67 artifact, further research on the required aggregate size for the original type of concrete used was needed before I could accurately represent aggregate in the artifact. Returning to the archival documentation and in-situ observation, I could trace where knowledge held by guilds of stone masons or by industry was taken for granted and not divulged in the plans for each project. I relied on the oral history and knowledge of stone carvers, historians, and experts in the field to supplement the process when I encountered gaps between the archive and making.

Working directly with elements of time, duration, weight, texture, hardness, and assorted states of limestone (including cut blocks, concrete, aggregate, cement, and hydrated lime) removed the abstraction and distance from the material that I encountered in the archive. The intimate experience of the metamorphosis of the material-cum-artifact allowed me to continuously surface archival documents that would inform the making process. The emergence of physical *artifacts*, rather than *objects*, from this process speaks to the traces of life found within the artifact and the former lives of the material itself as it continues down a trajectory of ever-changing form due to the involvement of natural or human agents.<sup>8</sup> It was through the process of creating the series of artifacts that intimate contact between body and material was made; the weight of a limestone block carried in two arms, the slow and heavy pour of a bucket of concrete into a mould, the cold and sticky texture of hydrated lime putty worked in the hands, and the reverberations of working with lime-based materials felt in my hands and muscles following their transportation to and transformation at sites of artifact fabrication. The dynamic properties of the lime-based materials and my own physical limitations towards those properties further informed what was possible to create and to represent of a much larger colonial quest and architectural project. As the maker of each artifact, I began to see limestone as an active member in the colonial project and collective material consciousness on the island of Montreal and as a physical prompt for rethinking dominant material cultures that stem from colonial institutions.



fig. 112 Hydrated lime material tests, January 2023.

The five limestone artifacts I created for this thesis embody *geological control* and *geologic life*, or the relationships that form upon identifying desirable properties of limestone that entice colonial forces to assign it a material use and value. To begin to understand how limestone became an active participant in the French colonization project on the island of Montreal, I use the concepts of *cultural transfer* and *colonial extractivism* to describe the alchemical and physical processes of transformation intrinsic to the stone's phase of existence as various construction materials. Each artifact I create represents how cultural values and settler imaginaries register in the stone through the symbolic, artistic, or mundane forms they take on and how human hands and technologies mediated such inscriptions. The resulting objects tell us something about the biophysical context in which the limestone was formed while revealing evidence of cultural and political values inscribed by hands, tools, and eventually machines to serve human modes of life and wealth transfer.



fig. 113 Crystalline limestone block from Saint-Marc quarries following the first cuts, August 2022.

## Resurgence / Legacies of the Paris Basin

“Terre” in French, which translates to land, earth, ground, soil, underworld, domain, or planet, can be interpreted at the material scale or at the global scale. The term at once captures the varying dimensions of what we consider elemental properties of isolated materials and their existence as geologically continuous strata spanning the entirety of the Earth’s surface. “Territoire” alternatively introduces anthropogenic intervention capable of transforming land into territory, wherein land is named, divided, exploited, and nature becomes a resource. *Terre* has recently surfaced as a central theme within exhibitions and installations in and around the city of Paris, France, which advocate for the use of load-bearing stone construction as a more sustainable and affordable alternative to concrete or steel. While carrying out field research in Paris, I visited three exhibitions demonstrating the advantages of extracting and designing with limestone in addition to visiting recent architectural projects that reflect the themes of the exhibitions. The exhibitions analyze limestone on a poetic and theoretical level and champion stone extraction as an ecologically and economically beneficial material of choice, focusing on the benefits of *terre* alone and neglecting the extractive dimension of *territoire*.

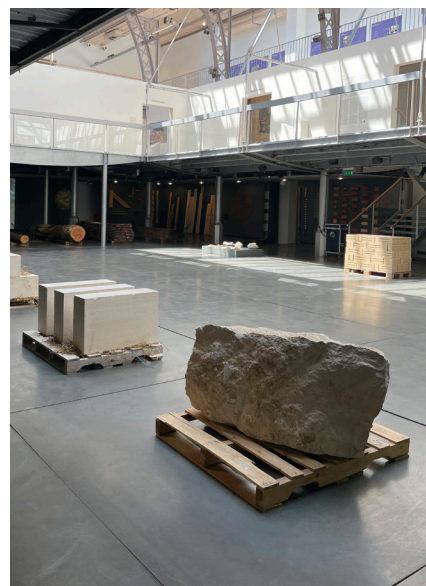


fig. 1.14 Limestone blocks represent one of Paris’ heritage materials at the exhibition *Resources: Filming Raw Material and Revealing Know-How*, Pavillon de l’Arsenal, May 2022.

fig. 1.15 The relationship between human settlement and the geology of the Paris Basin is represented in TVK’s *The Earth is an Architecture*, presented at lille3000, Lille Palace of Fine Arts, May 2022.

fig. 1.16 Lutetian limestone blocks, heritage material of the Paris Basin at *Bap! Biennale of Architecture and Landscape* in Versailles, June 2022.



A companion to past raw material-based exhibitions at Pavillon de L’Arsenal titled *Gypsum Plaster* (2022), *Fibra Architectures* (2019), *Stone* (2018), and *Terres de Paris: From the Matter to the Material* (2017), was the summer 2022 exhibition titled *Resources: Filming Raw Materials and Revealing Know-How*. While this exhibition presented an inventory of material transformations as they travel through various commodity chains, the associated films and artifacts were posited as pedagogical examples for understanding “the tools that will be used to begin a new phase in vernacular architecture.”<sup>9</sup> Meanwhile in Versailles, the exhibition *Élément Terre* took place as part of the Biennale of Architecture and Landscape which attempted to reconcile ecological preservation with the growing population and urban development required to sustain it. Earth and stone materials, sectional models of geological strata, and diagrammatic and cartographic depictions of their respective extraction sites call attention to the dependency humans have on geologic resources while simultaneously celebrating the vital materials’ return in contemporary design projects.<sup>10</sup> At the Contemporary Art Museum of Lille, TVK architects’ model of the geological strata of the Paris Basin was exhibited as part of the lille3000 Utopia event and depicted architecture as a geologic form emerging from human-to-land interactions. TVK’s exhibition was an extension of the office’s book titled *The Earth is an Architecture*, which aims to explore the correlation between human societies and the agential powers of nature to place humans outside of a position of control over geologic matter.<sup>11</sup> The three exhibitions I visited unraveled commodity chains and settlement patterns to expose ecological degradation and depletion of resources from the landscape surrounding Paris with the understanding that the same practices would not only persist, but would accelerate.



Common to all the exhibitions I visited were samples of wood, plant fibres, clay bricks, gypsum boulders, and limestone blocks extracted within the Paris Basin, the geological region that Paris is centered within. There is notable debate<sup>12</sup> amongst architects, engineers, and contractors as to which of the raw materials in question are most successful at reducing a building's carbon footprint while cutting down construction costs and providing the largest return in land value at the material's source.<sup>13</sup> Although each material is said to be found in abundance throughout the 99-kilometer radius surrounding Paris, the region has been facing shortages in raw construction materials which signals that a turn towards limestone as a "sustainable" alternative could just as easily lead to the material's exhaustion.<sup>14</sup> Fueling the shift towards using raw architectural materials in France was the new environmental law that requires public buildings to implement at least 50% wood or other natural materials in their design to reduce carbon emissions.<sup>15</sup> Although the policy would only apply to public buildings at this stage and places emphasis on bio-based materials like wood, the new policy has influenced various architectural developments and recent architectural competitions built in stone.



fig. 1.17 Limestone blocks amongst hay bales, gypsum plaster, and wood; the architectural heritage materials of the Paris Basin at *Bap! Biennale of Architecture and Landscape* in Versailles, June 2022.

fig. 1.18 h2o architects' Lutetian limestone apartment complex on Avenue Félix Faure in the 15th arrondissement of Paris, completed in 2018.



In h2o architects' recent book, *Building with Limestone in Paris*, the office recounts the process of designing a contemporary apartment building with load-bearing limestone following a competition for the project contract in 2018. Andrew Ayers, writing on behalf of h2o architects, characterizes limestone as having redemptive structural and carbon-reducing qualities as compared to its scarce mineral counterparts such as sand and gravel used in the production of cement and concrete. In the book, Ayers contemplates, "if concrete goes, what are the less carbon-heavy materials we might replace it with?"<sup>16</sup> Simply replacing materials that have been depleted with other "new" and "heroic" materials ignores the risk of overconsuming and repeating the pattern of material depletion and ecological degradation.

h2o architects describes their limestone housing complex on Avenue Félix-Faure in Paris' 15<sup>th</sup> arrondissement as "a play of simple volumes realized in just one material," asserting that "in areas where supplies are still abundant, quarried stone is the answer, at least where facades are concerned [...] in the form of load-bearing blocks laid one on top of the other."<sup>17</sup> The office argues that their choice to build with one of the Paris Basin's heritage materials reduces the project's CO<sub>2</sub> emissions by 60% compared to concrete, and by 35% over a 50-year life cycle.<sup>18</sup> These statistics exist amongst many others in a section of their book titled, *The ecological benefits of building with stone*, which outlines limestone's thermal, porous, and insulative properties which naturally adjust interior temperature, humidity, and sound levels according to the environmental conditions of the building's exterior. In the same chapter, Ayers admits that stone is an exhaustible resource unlike wood, but quickly recovers his stance towards limestone being the more sustainable building material considering it is 90% recyclable unlike concrete which is only 25% recyclable.<sup>19</sup>

Perhaps the most convenient argument used by architects building with massive stone in Paris is that the proximity of the quarries creates a cost and time efficient means of building production. TVK's *École-Évangile*, a mixed-use development at the La Villette Triangle in the 19<sup>th</sup> arrondissement, became one of Paris' largest load-bearing stone projects in 2022 advertising the use of locally quarried Lutetian limestone.<sup>20</sup> In Berrault Pressacco's brief for their social housing project at 62 rue Oberkampf in the 11<sup>th</sup> arrondissement built in 2017, they write: "there is a great need across the country and in the territory surrounding Greater Paris to engage in a redefinition of the concept of belonging."<sup>21</sup> The "concept of belonging" mentioned by Berrault Pressacco seems to be that of a material belonging that France is hoping to revitalize; extracting limestone for use as a building material not only supports the local economy but contributes to the architectural "genius loci" of the region. Berrault Pressacco's statement mirrors the sense of material belonging that was longed for by French colonizers in Quebec, whereupon colonization, the limestone material practices that emerged became a way of expressing home.

fig. 1.19 Lutetian limestone apartment building by Berrault Pressacco on rue Oberkampf in the 11<sup>th</sup> arrondissement of Paris, completed 2017.



Gilles Clément's notion of "deglobalization" becomes relevant to the greenwashing that is in effect with regards to limestone extraction in the Paris region. In *"The Planetary Garden" and Other Writings*, he remarks that "The world economy is out of control, and I think that we are going to move toward 'deglobalization' [...] which means localized consumption and manufacture of goods."<sup>22</sup> By positioning Lutetian limestone as a sustainable and local material, architects and developers in Paris are already advertising a mode of deglobalization where local economies are empowered by the return to hyper-local processing and consumption of resources. While local developers and architects continue to extract from local quarries and substantiate limestone's positive structural and economic qualities, the same quarries are supplying vast quantities of limestone for export on the world market. Saint Maximin in the Oise region has become the nexus for limestone extraction in France which is a direct result of the exhaustion and collapse of Paris' subterranean limestone quarries in 1776.<sup>23</sup>

While touring a quarry in Saint Maximin in June 2022, Dominique Lecieux of BPE Lecieux described to me that while much of the building material being extracted in Saint Maximin is used on heritage projects and new builds in the Paris region, increasing amounts of stone are being sent abroad for use on projects that seek to attain the same "prestigious" status symbol of that in Paris. The appeal of using Lutetian limestone on buildings internationally is said to be due to its structural properties, as is the case for Stanford's new science buildings, while exuding an image of wealth and luxury that attracts tourism, ultimately supporting settler institutions in the Americas.<sup>24</sup> As demands to match the imperial material identity of Paris abroad increase, the international export of Lutetian limestone from France exposes the contradiction within the argument that limestone extraction in the Paris Basin is mainly a local, sustainable practice. For deglobalization to make a substantial impact on repairing the environment, extractive economies and societies would have to become "enlightened by ecological necessity," adopting a new way of viewing material resources altogether and finding immaterial compensation for the loss of material possessions, according to Clément.<sup>25</sup>

fig. 1.20 A crane lifts blocks of cut stone into piles of similar properties. The dark brown marks on the quarry walls are evidence of where water seeped through cracks in the Earth making contact with limestone strata, May 2022.

Observing these recent architectural developments and exhibitions in Paris played a role in the outcome of my research by introducing urgent questions of what responsibility the "Empire" has towards recognizing its role in global resource extraction. The resurgence of limestone extraction in Paris signals a return to historical material practices that have had far reaches in other "extraction empires" that began as colonies of the French Empire.<sup>26</sup> Canada is a product of two extraction empires, those being France and Britain who transferred their dominant material cultures onto New France in the early seventeenth and eighteenth centuries. As a result, the settler state of Canada has become its own extraction empire, leading as one of the world's largest producers of mineral resources and spreading its own claims to territories abroad through its predatory mining industry.<sup>27</sup>



## Endnotes • Re-enacting Colonial Limestone Transformation

- 1 T.H. Clark, "Geological Report 46: Montreal Area Laval and Lachine Map-Areas," (Montreal: Department of Mines, Geological Surveys Branch, 1952), 8.
- 2 Quebec Bureau of Mines, *Geological Sketch and Economic Minerals of the Province of Quebec*, (Quebec City: Quebec Bureau of Mines Department of Colonization, Mines and Fisheries, 1927), 4.
- 3 Although the majority of research concerning labour linked to limestone focuses on the work of the artisan, mason, or stone carver, the most violent forms of labour often existed within Montreal's quarries. From the onset of colonization, habitants of the colony and Indigenous groups forced to reside in reserves were often forced to extract and transport limestone within minimally-paid or unpaid agreements and hazardous working conditions in support of maintaining colonial control over the island. Skilled stone workers such as the "Pieds-Noirs," quarry workers of late eighteenth and nineteenth century Montreal, were subject to the dangers of the quarrying practice and resided in direct proximity to the quarries in small wooden houses compared to the lavish stone houses of colonial authorities who lived in the town proper. The Pieds-Noirs were given a reputation amongst the town as a menacing group of workers. See "Pieds-Noirs' stone quarry workers," City of Montreal, April 11, 2019, <https://ville.montreal.qc.ca/memoiresdesmontrealais/pieds-noirs-les-travailleurs-des-carrieres-de-pierre>.
- 4 Ann Laura Stoler, *Along the Archival Grain: Epistemic Anxieties and Colonial Common Sense*, (Princeton, NJ: Princeton University Press, 2010), 46.
- 5 Tim Ingold, *Making: Anthropology, Archaeology, Art and Architecture*, (Abingdon, Oxon, and New York, NY: Routledge, 2013): 31.
- 6 Tim Ingold, *Making: Anthropology, Archaeology, Art and Architecture*, (Abingdon, Oxon, and New York, NY: Routledge, 2013): 22.
- 7 Old Montreal, *Discovering the Fortifications of Montreal and Its Building Sites*, (Montreal: City of Montreal, 2003), 1.
- 8 Christopher Tilley, "Materiality in Materials," *Archeological Dialogues* 14 no. 1 (2007): 18.
- 9 "Resources: Filming Raw Materials and Revealing Know-How," Pavillon de L'Arsenal, accessed October 10, 2022. <https://www.pavillon-arsenal.com/en/expositions/12395-ressources.html>.
- 10 "Élément Terre," L'Institut Paris Region, July 13, 2022, <https://www.institutparisregion.fr/amenagement-et-territoires/paysage/element-terre/>.
- 11 TVK, "The Lutetian Age," *The Earth Is an Architecture*, (Leipzig, Germany: Spector Books, 2021), 84.
- 12 Using stone as a structural or facade material allows for a 60% reduction in CO<sup>2</sup> whereas wood, a renewable resource, allows for a 40% reduction when compared to concrete as they do not require firing or additional products to be added. The argument being made for stone when compared to wood and concrete is that it has a longer life cycle due to its durability and ease of extraction, whereas wood releases CO<sup>2</sup> during decomposition. See Paul Miles, "The pros and cons of stone buildings," *Financial Times*, June 17, 2022, <https://www.ft.com/content/4164ec5a-130c-4f16-b0cb-ff8f0b406e07>.
- 13 h2o architects, *Building with Limestone in Paris* (Paris, France: Building Books, 2020) 12.
- 14 Following the implementation of France's law to implement 50% wood or other "natural" materials on all public projects, France saw major timber shortages as demand increased. The Oise region is also seeing stone becoming rapidly exhausted as demand for a "prestigious" material identity provided by Lutetian limestone abroad increases. See Marcus Fairs, "French architects face wood shortage with 'prices going up every week,'" *Dezeen*, June 7, 2021, <https://www.dezeen.com/2021/06/07/french-architects-wood-shortage-prices-up-lina-ghotmeh/>.
- 15 France's new environmental law to implement 50% wood or other raw materials is also a reaction to the Paris Olympics in 2024, and includes stone as an alternative to high embodied carbon materials like steel and concrete. See Tim Nelson, "France Wants All Public Buildings to Be Made of at Least 50% Wood by 2022," *Architectural Digest*, accessed June 11, 2022, <https://www.architecturaldigest.com/story/france-wants-all-public-buildings-to-be-made-of-at-least-50-wood-by-2022>.
- 16 h2o, *Building with Limestone*, 11.
- 17 Ibid.
- 18 Ibid., 58.
- 19 Ibid., 12.
- 20 "City/Cité Cultural and Professional Exchange Program," Cultural Services French Embassy in the United States, accessed February 8, 2022, <https://frenchhighereducation.org/grants-and-programs/14001-citycite-cultural-and-professional-exchange-program/internships>.
- 21 "Logements Rue Oberkampf, Paris 11," Berrault Pressacco Project Brief, 2017.
- 22 Gilles Clément, *The Planetary Garden and Other Writings*, edited by Sandra Morris (Philadelphia, PA: University of Pennsylvania Press, 2015), 87.
- 23 "Geology and the Quarries," Les Catacombes de Paris, accessed June 2, 2022, <https://www.catacombes.paris.fr/en/history/geology-and-quarries#:~:text=The%20Paris%20quarries%20were%20definitively,collapses%20in%20the%20city%20center>.
- 24 The allure of using Lutetian limestone on architectural projects abroad can be seen as another mode of "geological control." See John Lichfield, "The Stones of Paris," *Independent*, September 22, 2007, <https://www.independent.co.uk/news/world/europe/the-stones-of-paris-403115.html>; Dana Edwards, "Stanford buildings get new Parisian look," *The Stanford Daily*, November 2, 2010, <https://stanforddaily.com/2010/11/02/stanford-buildings-get-new-parisian-look/>.
- 25 Clément, *The Planetary Garden*, 88.
- 26 Pierre Bélanger ed. *Extraction Empire: Undermining the Systems, States, & Scales of Canada's Global Resource Empire, 2017-2017* (Cambridge MA: MIT Press, 2018).
- 27 Yves Engler, "Canada's Mining Industry Is Spreading Havoc Around the World – With Justin Trudeau's Support," *Jacobin*, July 5, 2021, <https://jacobin.com/2021/05/canada-mining-industry-justin-trudeau#:~:text=Canada%20is%20home%20to%2075,and%20violations%20of%20human%20rights>.

## Artifacts of Limestone's Colonial Afterlife

"An unending stream of gold and silver, I thought, must have flowed into this court perpetually to keep the stones coming and the masons working; to level, to ditch, to dig and to drain. But it was then the age of faith, and money was poured liberally to set these stones on a deep foundation, and when the stones were raised, still more money was poured in from the coffers of kings and queens and great nobles to ensure that hymns should be sung here and scholars taught. Lands were granted; tithes were paid. And when the age of faith was over and the age of reason had come, still the same flow of gold and silver went on; fellowships were founded; lectureships endowed; only the gold and silver flowed now, not from the coffers of the king but from the chests of merchants and manufacturers, from the purses of men who had made, say, a fortune from industry, and returned, in their wills, a bounteous share of it to endow more chairs, more lectureships, more fellowships in the university where they had learnt their craft. Hence the libraries and laboratories; the observatories; the splendid equipment of costly and delicate instruments which now stands on glass shelves, where centuries ago the grasses waved and the swine rootled."

Virginia Woolf  
*A Room of One's Own*, 1929<sup>1</sup>

The first three artifacts in the series embody how limestone extraction in Montreal was taken up by colonial forces to 1) provide economic security to the settlement by constructing fortification walls in the early eighteenth century, 2) provide authority to religious forms of governance through ornamentation of a new Notre-Dame Church in the mid-nineteenth century, and 3) to symbolize modernity and innovation through constructing the precast concrete units of Habitat 67 following two hundred and fifty years of evolving colonial material practices in relation to limestone. This series of three artifacts represents the evolution of colonial extraction of limestone in Montreal and the accelerating modes of production that adapted to the material over time. These three architectural and infrastructural projects are still widely celebrated in Montreal today as precedents for architectural style and innovation that continuously inform the city's historical consciousness. To challenge the neo-colonial ideology that links limestone extraction to "progress," the process of making the first three artifacts exposes what was at stake when authorities of the French and Canadian state laid claims to territory through limestone extraction, distancing Indigenous communities from access and relation to land.

The final two artifacts, bas-reliefs from the Palais de la Porte Dorée (Palace of the Golden Gate) in Paris and archival film and animation of the Francon quarry wall in Montreal, study the reverberations of these extractive settlement practices within the colony and the Empire that began under French-colonial rule. These two artifacts embody conflicting values; in both cases the marks made in the limestone represent historical values, yet the space that they have carved out carries potential to inform decolonial social and material practices in the present. The Palais de la Porte Dorée was originally built to legitimize colonization in the eyes of the French population, and limestone became the material with which to civilize bas-relief carvings of the colonies of the Empire on its facades. The Francon quarry in Montreal represents a monument to the legacy of colonial extraction, having opened in the early twentieth century during the rise of industry following centuries of limestone quarrying on the island. At both sites, the most overt signs of colonial violence to the human and nonhuman subjects of colonial extraction are surfaced in tandem. Here, the diasporic practice of limestone extraction between France and New France can be seen as continuous, where the sites and human labour inscribed within them become what Kathryn Yusoff might call "ghosts of geology's epistemic and material modes of categorization and dispossession."<sup>2</sup>

The Palais de la Porte Dorée in Paris and the Francon quarry in Montreal represent two sites that historically reflected and instilled colonial values through the markings inscribed on their walls. Today, these sites are being challenged, posing a basis for discussion on how to invert the colonial narratives that led to their becoming. The collections, curation techniques, and events offered at the National Museum of Immigration History within the Palace of the Golden Gate are being introduced from a critical and decolonial perspective that better reflects the reality and lived experience of their diverse audiences, "highlighting its architecture and reappropriating its original story so that it can be more efficiently debated."<sup>3</sup> Meanwhile, the City of Montreal and borough of Saint-Michel continue to offer urban and architectural proposals for the site of Francon quarry, raising questions in this body of research for how to address its extractive colonial history in the wake of Land Back Montreal and the City of Montreal's strategy to conceal historic quarries beneath parks and neighbourhoods. While the site of Francon quarry awaits another major transformation into an extension of the Saint-Michel borough, it provides the city with a snow dump and police training site and habitats of deer and coyote with a forested habitat. The final two artifacts, bas-reliefs from the Palais de la Porte Dorée and film of the Francon quarry wall, lend themselves to a plural understanding of the consequences of colonial extractivism within the colony and the Empire, in addition to depictions of a *decolonial* afterlife of limestone.



fig. 2.1 Artifact of Montreal's fortification wall footing stones hand-cut out of black crystalline limestone from Saint-Marc quarries in Quebec (1:1 scale, 15" L x 4.5" W x 8" H and 7.5" L x 4.5" W x 6.5" H approx. 70 lbs total).

## Cutting / Fortification Wall Footings and the Militarization of the Port Colony, 1717

"Frontiers make wildness, entangling visions and vines and violence; their wildness is both material and imaginative. This wildness reaches backward as well as forward in time, bringing old forms of savagery to life in the contemporary landscape. Frontiers energize old fantasies, even as they embody their impossibilities."

Anna Lowenhaupt Tsing  
*Friction: An Ethnography of Global Connection*<sup>4</sup>

While carrying out field work in Paris, France to study the colonial origins and material practices of limestone extraction, I visited several exhibitions centring the use of Lutetian limestone as a construction material and the architectural identity it provided the Paris Basin. At an exhibition titled *Visible Invisible*, a component of the Architecture and Landscape Biennale hosted at the Versailles School of Architecture, massive blocks of limestone were displayed alongside a series of raw materials extracted from the surrounding region. Straw bales and sawn wooden logs alongside piles of powdered gypsum and clay accounted for the remaining materials which historically became emblematic of French nationhood. I had come to Paris to learn about the origins of French-colonial extraction with the ambition of touring a local limestone quarry as a component of the research, but I had been turned down by many operations due to the high rate of production throughout the spring and summer. I reluctantly took note of the company whose name was listed on the plaque below the exhibition's stone display and inquired the next day to see whether a tour of their operations might be possible. The response I received from Verrecchia<sup>5</sup> was too good to be true: the public was not permitted to tour the quarries due to a period heightened production, but would I be interested in joining their limestone carving artist residency in Versailles?

On the journey from Paris to the residency each day, it was inevitable to walk past the Palace of Versailles. From a distance, I could make out the shimmering gold gates and roofs of the palace, and the grand statue of the Sun King, Louis XIV, the longest reigning



monarch of France who initiated the colonization of "New France" in the seventeenth century. At the residency, a skilled stone craftsman, Bruno Combernoux, taught us the basic skills of cutting and shaping limestone from large blocks that arrived on site direct from Verrecchia's quarries in Nogent-sur-Oise, 40 kilometres outside of Paris. Having limited time to spend alongside the other artists who would remain at the residency throughout the summer, I expressed my hopes for applying what I had learned in Versailles to my thesis research which would resume in Montreal. Bruno responded by sharing the name of his colleague, Régis Eroyan, a stone craftsman who he had met at school in France who might be available to mentor me during my time in Montreal. Suddenly the series of events that had led me to participate in the limestone carving residency in the first place felt serendipitous. Bruno's seemingly strong connection to colleagues in Quebec heightened my curiosity surrounding relationships that exist within the French stone cutting profession.



fig. 2.2 Learning the process of "boning in," or making an uneven cut block of limestone perfectly square at the Verrecchia Endowment Fund residency, Versailles, May 2022.

fig. 2.3 Two blocks of limestone from Saint-Marc quarries alongside hand cutting tools to re-enact the making of Montreal's fortification wall footings, August 2022.



When I reached Montreal to continue my research and further my skills in stone cutting, I realized that the work I had started in Versailles that resumed in Montreal represented a cultural transfer of knowledge operating through limestone. Régis generously offered to assist me in re-enacting the process of carving a limestone fortification wall footing in Montreal which we worked on for the remainder of the summer. During our meetings, Régis recounted stories from his extensive educational career in France; the same organization of craftsmen and artisans that Bruno had attended. Les Compagnons du Devoir et du Tour de France (The Companions of Duty and the Tour of France) is a worker's association in France comprised of craftsmen and artisans skilled in stone cutting dating from the Middle Ages.<sup>6</sup> The ten-year apprenticeship program requires taking a "tour of France" and, if preferred, other locations abroad to acquaint stone cutters with the properties of stone from various regions of France and beyond. Migration is therefore embedded within the French stone cutting education.<sup>7</sup> The knowledge I absorbed at the stone cutting residency in Versailles along with the lessons Régis passed down to me from his education in France were transmitted into the limestone block we carved to resemble a cornerstone of Montreal's original fortification wall footings.

The establishment of a resource frontier in Montreal can be understood through a long history of violent extractions of raw materials by the French state beginning in the seventeenth century. Alongside the extraction of raw building materials, or "resources," followed the displacement of people, flora, and fauna as infrastructures of exclusion were developed, maintained, and eventually expanded. The paradox between colonial progress by way of extraction and the predacious displacement of Indigenous peoples and ecologies that followed is what Kathryn Yusoff would define as "world-building and world-shattering."<sup>8</sup> Here, "world-building" describes the inverse operations of accumulation and exhaustion of geologic matter that serve the settler-colonial state, simultaneously "world-shattering" as portals of exposure to the violent reverberations of extractive material practices are opened, placing the greatest burden on the Indigenous stewards of the land. Indigenous communities became subject to contradictory relationships with colonizers as they became reliant on the fur trade which they were granted entry into while being forced into battle over land to extract furs from, becoming further displaced from the expanding urban condition in the process. The fortification walls were meant to propagate a new French civilization from the inside while enacting systematic segregation from the outside. The emergent desire to fortify and secure the settlement of Montreal with limestone walls was a consequence of the extraction and depletion of two naturally occurring flora and fauna of the island: beaver and cedar trees.

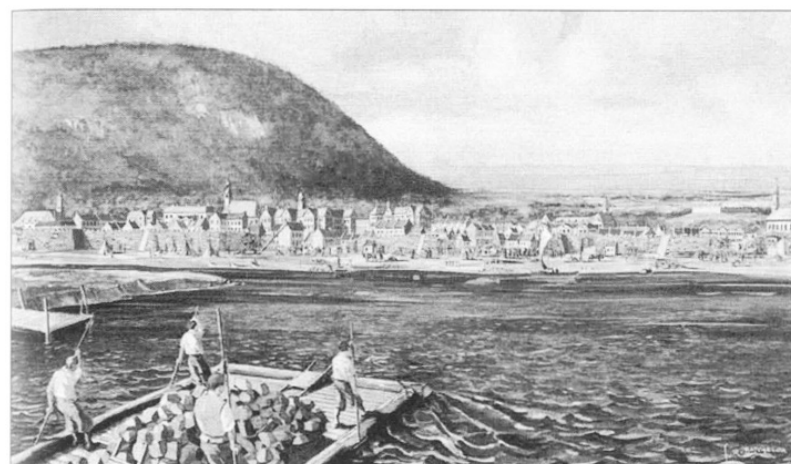


fig. 2.4 A raft brings limestone from the islands off the shores of Montreal to be used to face the fortification ramparts under construction to the west (seen in left of painting).

fig. 2.5 Process sketches noting the relationship between natural compression between the limestone block's sedimentary layers and ease of carving.

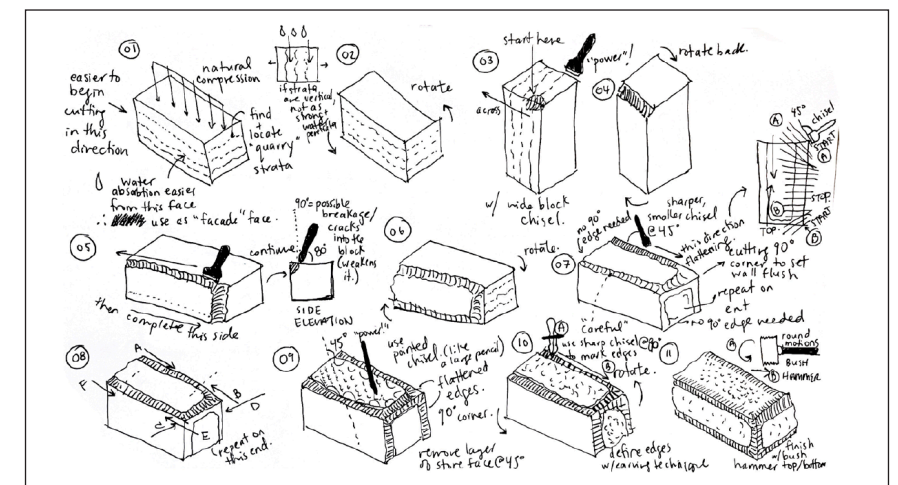
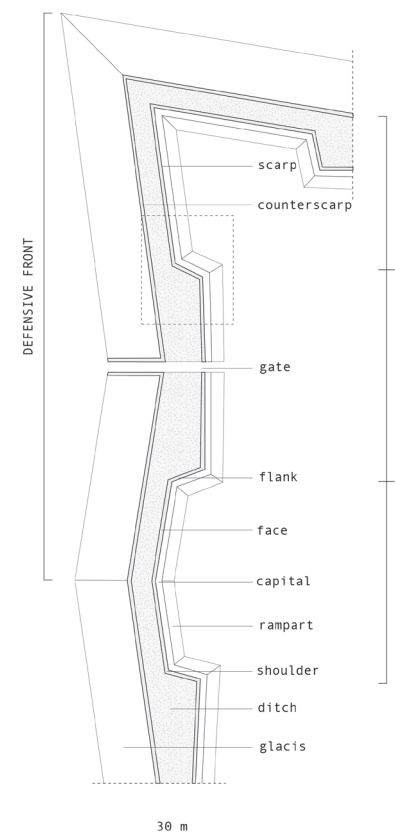


fig. 2.6 Components of Montreal's original fortification walls.



Montreal was founded as a French colony during the Iroquois Wars, also known as the Beaver Wars, that emerged from competition over access to beaver trapping grounds. The Iroquois had depleted the beaver in their territory to survive amongst the increasingly competitive resource-based economy that had been imposed on them and other Indigenous groups by French colonial powers.<sup>9</sup> To gain access to greater hunting grounds that had been assumed as French territory, the Iroquois entered into a series of conflicts with French settlers, motivating the French to fortify their colony with wooden palisades to secure their settlement.<sup>10</sup> At this time, the French were at peace with Britain and did not intend to build fortifications to defend against European-style warfare, therefore the walls were built from cedar posts sourced from forests on the island. From 1687 to 1689, a wooden palisade was built to define the settlement which materially allowed for modifications to be made to the border it defined over the next twenty years.<sup>11</sup> Over time, the wooden palisade did not provide the settlement with security against invasion by the British-American armies and their Iroquois allies which would be required to succeed as a French colony, and eventually the cedar posts began to decay. Having already exhausted the cedar forests on the island, repairs to the wooden palisades became more expensive for French settlers as wood resources became scarce. The persistent threat of attacks and the desire to permanently secure the settlement drove French authorities to issue an ordinance to the King of France for permission to construct a masonry wall around the settlement.<sup>12</sup>

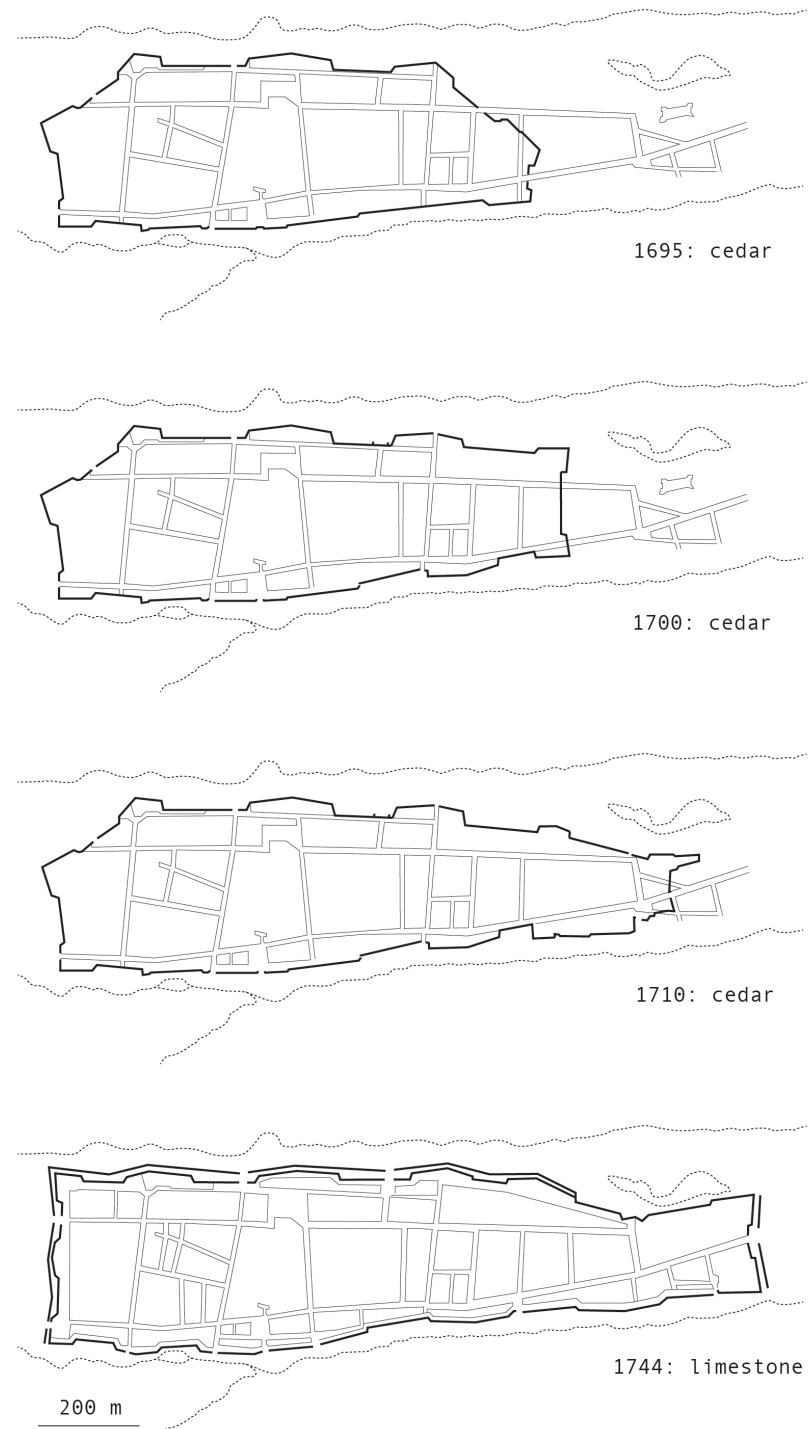


fig. 2.7 From cedar to limestone: the evolution of Montreal's fortification walls 1695-1744.

Following the Great Peace of Montreal in 1701 between the Five Haudenosaunee Nations and the French, and the Treaty of Utrecht in 1713 between France and Britain promising peace between the two nations, France and their colonies obtained an increase in resources<sup>13</sup> and the king obliged to commencing work on Montreal's stone fortifications.<sup>14</sup> Boisberthelot de Beaucour, a French military engineer, began planning the town's fortifications between 1713 to 1715, and a small segment of masonry wall was built by the townspeople according to his specifications. Almost one year later, French military engineer Gaspard-Joseph Chaussegros de Léry took over the planning of Montreal's fortifications. Chaussegros de Léry had been trained in France by Sébastien Le Prestre de Vauban, who had revolutionized defence tactics and siege warfare, having written treatises on how to fortify cities.<sup>15</sup> According to Vauban's principles, Chaussegros de Léry orchestrated the construction of Montreal's masonry fortifications, taking into account the plan of the former palisade, local topographic features, and direct access to the Saint Lawrence River to maintain an economic presence along trade routes. The militarization of Montreal initiated new organizations of labour to quarry, cut, and construct the stone ramparts.

fig. 2.8 Régis Eroyan teaching the author to remove larger volumes of stone from the face of the limestone block, August 2022.



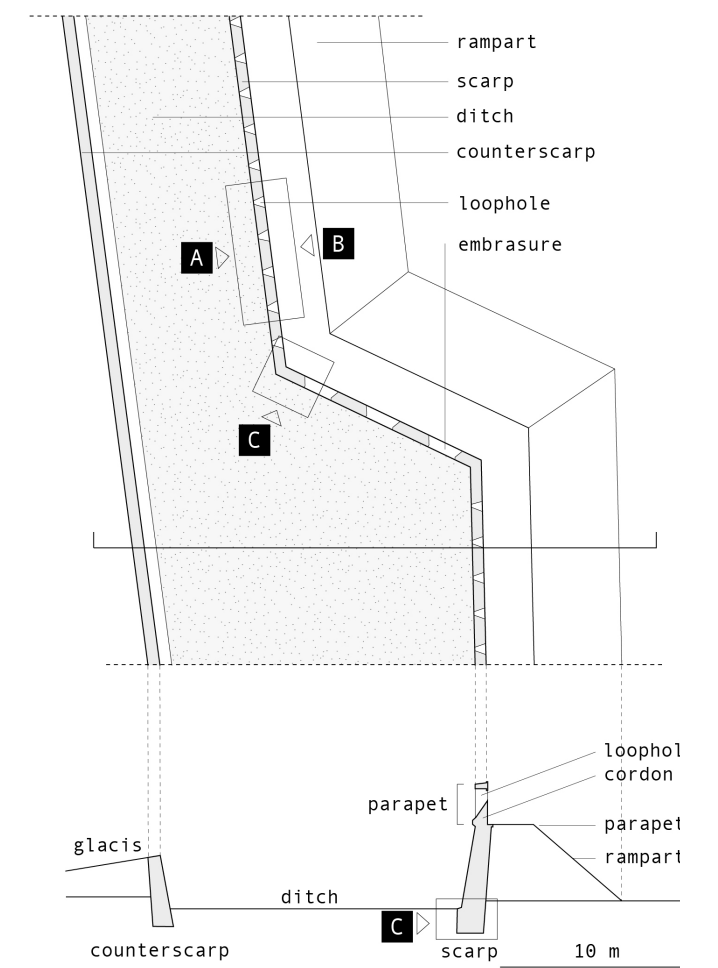
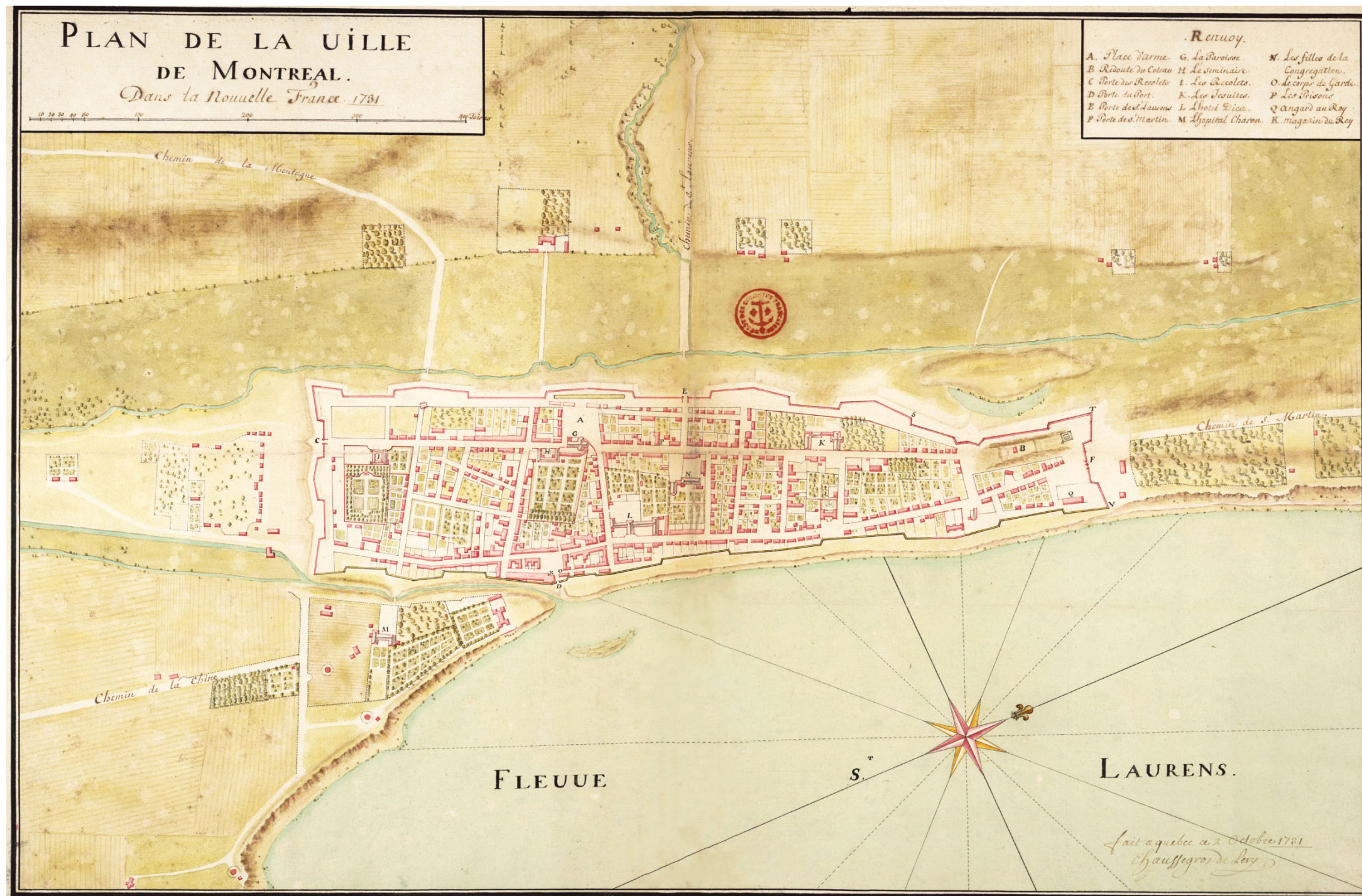


fig. 2.9 Plan of Montreal's stone fortifications by French engineer, Chaussegros de Léry, following precepts of French military engineer Sébastien Le Prestre de Vauban.

fig. 2.10 Plan and section showing components of Montreal's limestone fortifications.

Construction of the fortification walls was governed by Chaussegros de Léry and his assistants from 1717 to 1744, with townspeople and those living outside of the fortified city being employed to construct the 3,500-meter-long wall. The limestone itself was quarried on the islands<sup>16</sup> off the shore from Montreal and brought to site by boat.<sup>17</sup> The majority of funding for quarry and masonry labour was drawn from taxes imposed on metropolitan France by the king to gather funds for the project's completion.<sup>18</sup> Today in Old Montreal, traces of the fortification walls can be found in many forms, including archeological excavations carried out by the Montreal Museum of Archaeology and History, and recent paving treatments given to roads and plazas delineating the footprint of the fortification wall footings which is most prevalent at Parc du Champ-de-Mars and Place Jacques Cartier.<sup>19</sup>



fig. 2.11 Fortification wall footings at Parc du Champ-de-Mars, Old Montreal. The two lines of footings define the outline of the scarp and counterscarp with the ditch separating the two elements, June 2022.

fig. 2.12 Exterior and interior scarp elevations showing position of fortification wall footings.

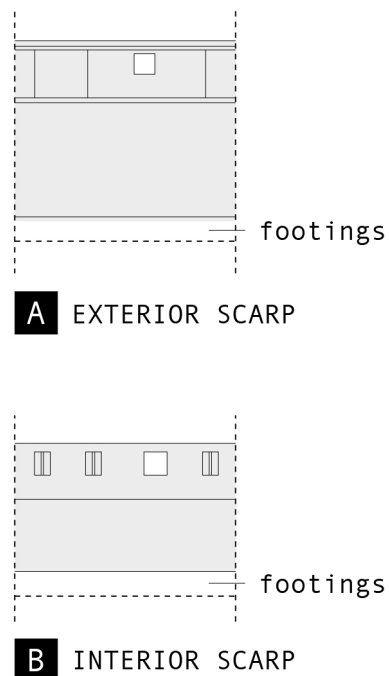


fig. 2.13 Fortification wall footings at Parc du Champ-de-Mars, Old Montreal. A reconstructed corner stone contrasts the original corner stone, June 2022.

My initial exploration of Parc du Champs-de-Mars in Old Montreal informed my approach to representing the militarization of the colonial port town in my research. The park contains archeological remnants of Montreal's original fortification wall footings recovered between 1986 and 1991 to be presented during the celebration of Montreal's 350<sup>th</sup> anniversary since its founding as a French colony. Further landscape restoration was undertaken including a limestone crown and lighting feature to "reaffirm the meaning of the city's history in the public's collective imagination."<sup>20</sup> While observing the archeological remains at Parc du Champs-de-Mars, I noticed that the type of stones used throughout the length of the walls differed from the stones used to treat the corners of the footings where the wall bends to adapt to the topography of the site to form bastions. The cornerstones are distinguishable by their uniform height and by the cutting technique that was used to define a border around the faces of the stones. New cornerstones appear to have been added to the walls recently to replace the original eighteenth-century cornerstones

that had been irreparable or lost during the restoration project, having a lighter colour and consistent texture. The remaining stones in the wall are randomly sized and placed, possessing no unique cut marks. Seeing as the most attention had been paid to cutting the cornerstones of Montreal's fortification wall footings, I decided to re-enact the process of cutting a singular cornerstone to uncover how the stone cutting method I had observed in the wall had been taken up to respond to the social and ecological underpinnings of that historical moment in time.

I began to work with Régis to cut a block of limestone in the same fashion as the original cornerstones of the fortification wall footings. Régis provided me with two blocks of crystalline greystone from the Saint Marc quarries in Quebec, possessing similar properties to the grey crystalline and black limestone that would have been used to build the original walls.<sup>21</sup> Régis insisted that to replicate the cornerstone it would be necessary to cut one of them and place a second rough-cut stone flush against its carved edges, the same way the masons had intended to use the straight cut lines on the cornerstones. When I asked Régis why the cornerstones would have been shaped and detailed differently than the rest of the stones in the wall and what the purpose of the border detailing was, he responded, "It's fast work, and these lines set the rest of the wall." The "fast work" that Régis described made sense when observing the wall; most stones appeared to have been minimally shaped following their extraction from an informal quarry on Saint Helen's Island.

The second part of Régis' explanation also made sense when observing the corner stones; the lines that are cut into each of the corner blocks would have acted as guides to level and plumb the remaining stones in the wall. I realized that the skills in stone cutting he was passing down to me were the product of over eight hundred years of knowledge in French stone cutting drawn from the original French guilds. Régis seemed to be in conversation with the stone with every cut he made; he could predict the trajectory of where debris would land once he cut it from the block, and he taught me how to read the stone's sedimentary layers which told us something about where the stone had formed 450 million years ago.

fig. 2.14 Author cutting the edges of the fortification wall stone to replicate the original cut texture, August 2022.

These lines also determined how to cut into the limestone, as cutting in the same direction as the sedimentary layers took less force for me to remove material, whereas exerting force perpendicular to the beds required more force to be used. I felt physically in dialogue with the natural growth process of the stone as I manipulated the material using hand tools and relatively simple cutting techniques that felt far more complex to execute than I had expected.



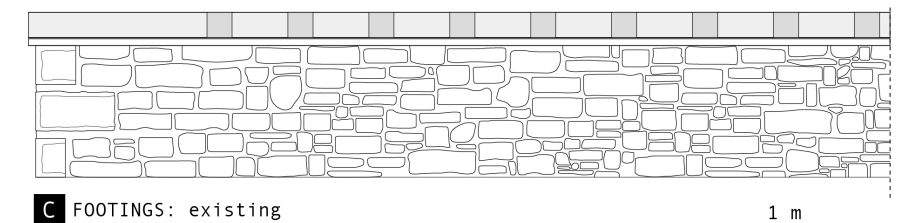


fig. 2.15 Collage of fortification wall artifact as process, not object.

The act of squaring and cutting straight lines into the cornerstones of the fortifications had originally been in direct dialogue with the uneven topography of the site, where sinuous folds in the 3,500 meters of limestone wall had to adapt to the uneven terrain and abutting waterways encountered by colonial authorities in their quest to secure the territory. The size and weight of each of the stones had to be such that they could be carried, shaped, and placed on the wall by a single mason, and the cornerstones make up the largest of the stones in the wall. Even the relatively small stone that Régis had provided for this project was difficult for me to move while carving it on a table, and feeling the weight of the stone as it travelled from Régis' backyard to my studio desk in Cambridge helped me to comprehend the enormous scale and weight of the project felt by those who worked on the original walls, as well as the ecological toll the extraction of the stone for the fortifications had taken.

The work on the walls that ensued for twenty-seven years under the guidance of Chaussegros de Léry meant that a particular skill set be activated to quarry and cut the largest volume of quarried stone that had been produced in the colony at the time. The knowledge and skill in stone cutting used to develop the first stone fortifications introduced a power imbalance the same way that the introduction of rifles and European weaponry had created a cultural divide amongst the French and Indigenous groups across the territory. In her book, *Does Skill Make Us Human*, Natasha Iskander argues that skill has the capacity to translate into real and observable markers of social difference: "Like all social categories, representations of skill structure economic and social interactions, political identities and coalitions, and power relations."<sup>22</sup> On the island of Montreal, the imported skills in cutting, carving, and quarrying limestone from France have created a visible cultural identity in the urban context, which stands in great contrast to the original cultural landscape.

fig. 2.16 Elevation of existing fortification wall footings at Parc Champs-de-Mars highlighting different sizes and forms of wall stones and corner stones.



## Carving / Notre-Dame Church Mouldings and the Reassertion of Sulpician Rule, 1824



fig. 2.17 Artifact of the new Notre-Dame Church of Montreal carved window mouldings cast in concrete (1:1 scale, 18" L x 11" W x 16" H and 16" L x 7" W x 18" H, approx. 290 lbs total).

In Phyllis Lambert and Alan Stewart's edited book, *Opening the Gates of Eighteenth Century Montreal*, Lambert remarks at the stylistic precedent the new Notre-Dame Church's limestone mouldings set for the city: "The organizational effort required to produce such a large, all-cut stone building, which introduced carved mouldings to Montreal, was unprecedented, and remained unequalled for half a century."<sup>23</sup> When I asked Phyllis Lambert, architect and expert on the history of greystone in Montreal, about the carved limestone mouldings of Montreal's Notre-Dame Church, she described how the church had been built with great urgency. The Sulpicians did not take the time to find an architect in France to design the project, but instead hired the Irish-American architect James O'Donnell from the neighbouring metropolis of New York. Like Montreal's fortification walls, the use of limestone to build the new Notre-Dame Church became an answer for continued French-colonial reign over Montreal, providing a means to expand the congregation, accumulate wealth for the institution, and reflect dominant French religious ideologies. My conversation with Lambert inspired me to produce a replica of the carved limestone mouldings of the church to understand the political underpinnings of the shift towards industrial land-use practices and limestone carving methods during the transition from French to British rule.

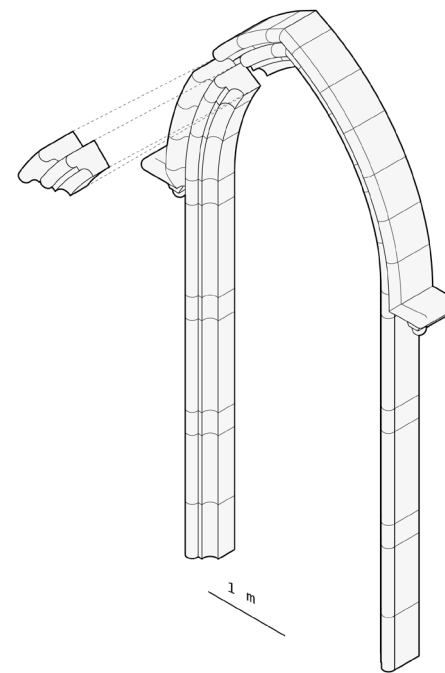
Before becoming a merchant trading port, Montreal was a colony named Ville-Marie. The Société Notre-Dame de Montréal was formed in Paris in 1639 after the French government had founded Quebec City and Trois Rivières in New France.<sup>24</sup> The purpose of the Society was to expand French settlement in the Americas while gathering wealthy and distinguished members of French society to carry out the colonial project of converting the Indigenous peoples of New France to Catholicism and to assimilate them into French culture. As Linda Tuhiwai Smith states, "For missionaries there was the huge and exciting minefield of lost and fallen souls who needed rescuing. The savagery, abhorrence and 'despicability' of the natives challenged their very vocabulary."<sup>25</sup> In addition to the merchant traders who were granted abundant opportunities to accumulate wealth from the newly acquired French territory, religious groups saw benefit in expanding their parishes by evangelizing Indigenous groups.





fig. 2.18 Rounded greystone window mouldings and horizontal mouldings of Notre-Dame's towers.

fig. 2.19 Diagram of artifact for carved limestone window mouldings of Notre-Dame Church.



Led by Parisian priest Jean-Jacques Olier and French noblemen Jérôme Le Royer de La Dauversière and Pierre Chevrier Baron de Fancamp, the Society's evangelizing mission would remain active in France as religious authorities were to grant consent to choices made by the governing individuals in Montreal.<sup>26</sup> The French explorer Paul de Chomedey de Maisonneuve and French nurse Jeanne Mance joined the Society and together in 1642 founded the island of Montreal as French territory. Maisonneuve's role was to govern the colony, while Mance was responsible for opening a hospital and schools for colonists and the Indigenous population forced into assimilation on the island.<sup>27</sup> Twenty years after its founding, membership numbers and resources available to the Société Notre-Dame de Montreal were dwindling, and it was decided that the Society should be dissolved. The seigneurie of Montreal was then transferred by the King of France to the Society of the Priests of Saint Sulpice in Paris in 1657 to be led once again by Jean-Jacques Olier.<sup>28</sup>

The Sulpicians had an enormous influence on the reworking of the landscape of Montreal through the planning of streets and buildings of the settlement and by imposing land use structures in the town and countryside. It was at this moment that the raw materials of nature began to be shaped into "civilized" forms that would reflect French culture and societal values on a much larger scale. Reputed for its wealth, members of the all-male Sulpician Society in Paris and Montreal were chosen from the highest orders of French society, including sons of judges, doctors, landowners, and government officials.<sup>29</sup> This institutional framework meant that the Society could remain independent, absorbing wealth from its members rather than from the king or greater public. Throughout their reign in Montreal during the French regime, as many as forty-five members of the Society would lead infrastructural projects in the colony having built the first cedar fortifications and an Indigenous mission, hospitals, schools, and the colony's first parish church out of limestone.<sup>30</sup>

Following the British conquest of New France in 1760, the institution had to rebuild itself after losing members of the parish who had been ordered to liquify their Canadian assets and return to France.<sup>31</sup> The Sulpicians were permitted official continuation of their rights to jurisdiction over the island of Montreal by the Crown, who recognized the possessions and land holdings of the seminary.<sup>32</sup> The Quebec Act of 1774 further extended the exclusive religious tenure of the Sulpicians in Montreal by giving official tolerance to the practice and teachings of Catholicism under British rule, allowing the size of the parish to grow in the nineteenth century.<sup>33</sup> During this period, Canadian-born priests and a new wave of French settlers in the early nineteenth century helped to transition the Society into new labour organizations to fuel its sources of wealth, legal status, and membership count. This transitioned the Society and the colony into modes of production likened to industrial capitalism,<sup>34</sup> where the seignery's abundant wealth was drawn from agricultural and infrastructural projects on the island.

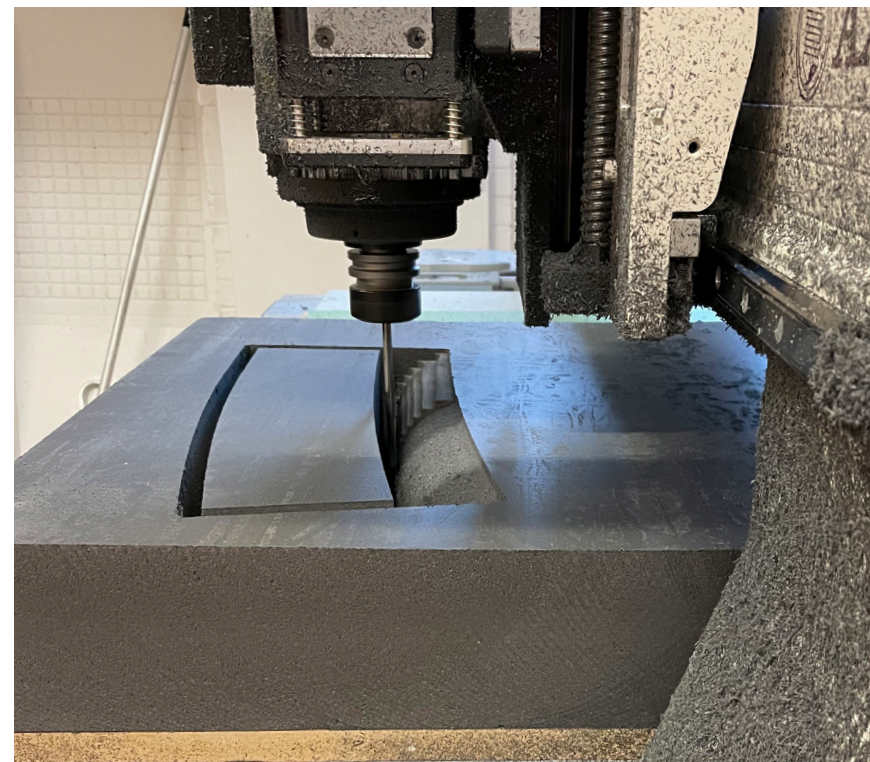


fig. 2.20 CNC milling foam blocks for use as a concrete casting mould, November 2022.

fig. 2.21 Map of Montreal in 1843 written in English, showing the expanded town following destruction of the fortification walls from 1802-1817.

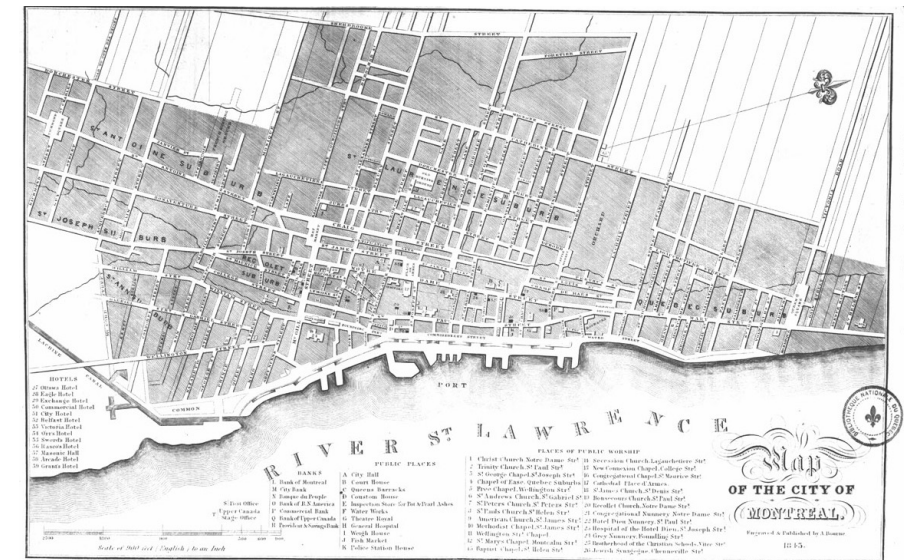
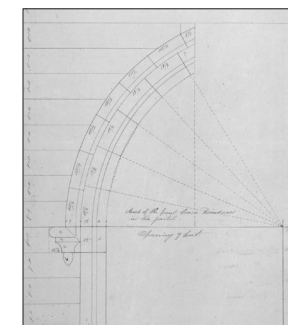
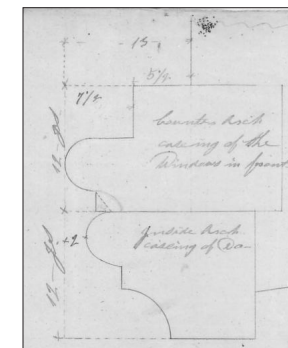


fig. 2.22 James O'Donnell's section drawings for the carved limestone mouldings of Notre-Dame Church's tower windows.

fig. 2.23 James O'Donnell's elevation drawings for the carved limestone mouldings of Notre-Dame Church's tower windows.



The seminary's property relations began to shift during this time, but their control over the extraction of resources remained consistent. The Sulpicians controlled seigneurial "reserves," to extract and disperse resources for direct consumption by the colony including institutional sites, fishing sites, docks, forests, pastures, and quarries.<sup>35</sup> Alternatively, lands deemed to be "conceded" included individual concessions of agricultural land or tenant holdings owned by the seignery, yet the seigneur held rights to extract building materials such as timber, sand, and stone from these properties without compensation to the tenant.<sup>36</sup> To isolate the Indigenous population from urban life and rights to jurisdiction, the Sulpicians planned their first mission outside of Montreal in Sault-au-Récollet and later moved the mission to Oka. Amongst other land rights which were contested by the Indigenous population forced to reside in Oka, "the Sulpicians retained control over housing, land concessions, milling, forest, and fishing privileges."<sup>37</sup> It was through these extractive systems of Empire that Montreal's geology continued to serve as a mode of dispossession and an instrument of assimilation of Indigenous communities into French civilization.

To accommodate the growing parish of a projected population of 9,000,<sup>38</sup> the original Notre-Dame Church that had been constructed by the master French mason Francois Bailli was replaced by a larger, more ornate church in the neo-Gothic style, breaking from a well-established religious style in Quebec.<sup>39</sup> During the old church's demolition, the front facade built in a "Jesuit" Medieval style was carefully dismantled and rebuilt to ornament the Monastery of the Récollets in Montreal, one of the first major stone re-use projects to take place on the island.<sup>40</sup> The remaining deconstruction materials were "scattered," with only the bell tower left intact in Place d'Armes until its deconstruction in 1843.<sup>41</sup> The Sulpicians hired the architect James O'Donnell from New York to design the new church, bearing no time to hire an architect directly from France. Gabriel Lamontagne

fig. 2.24 Stone masons and carvers shape limestone in Place D'Armes to construct the new Notre-Dame Church of Montreal seen in the background, foregrounded by the old Notre-Dame church c. 1830.



fig. 2.25 Casting concrete and rebar reinforcements to replicate carved window mouldings of Montreal's Notre-Dame Church, December 2022.



was appointed master mason and John Redpath the master stonecutter of the project, representing the divergent crafts of cutting versus carving limestone.<sup>42</sup> After arriving in Montreal, O'Donnell spent just six days visiting Montreal's limestone quarries and surveying the new site of the church before arriving at his preliminary plans.<sup>43</sup>

Tasked with the problem of designing a church two to three times larger than any other in North America, O'Donnell ordered that construction costs be kept to a minimum.<sup>44</sup> By the time the new church had been completed in 1829, it had cost less to construct than the Commissioners' Churches in England, the lowest costing institutional buildings at the time.<sup>45</sup> To achieve such low costs, the Sulpicians employed habitants of Montreal to quarry and transport limestone to the building site<sup>46</sup> and to conduct masonry work which began to shift from artisanship to an industrial mode of production founded in wage labour in the early nineteenth century.<sup>47</sup> To minimize construction costs further, the reduced size and uniformity of the cut stones "made both quarrying and the laying of the stone faster and much cheaper."<sup>48</sup>

The dark grey limestone for the new Notre-Dame Church was reported to have been sourced in the Mile End group of quarries, most notably in the Martineau quarry,<sup>49</sup> and it can be assumed that the Sulpicians continued to quarry limestone from Montreal's mountain as they had for numerous other building projects.<sup>50</sup> Mirroring the function of seigneurial land reserves and quarries, the Sulpician mission in Oka was often drawn from as a source of labour, where Indigenous groups were employed to "increase the value of the seigneurial domain."<sup>51</sup> It was here that the geology of Montreal and the Indigenous population of New France were forced into cultural assimilation and assigned a material colonial difference to that of the Sulpicians and French colonists.

Looking up at the facade of the Notre-Dame Basilica, I tried to decipher how the mouldings had been shaped and inset against regularly dimensioned cut stone.<sup>52</sup> When asked about the limestone facade, one tour guide believed that the mouldings had been cast using ground limestone dust. Without any evidence of how the rounded mouldings had been made, I moved forward based on the tour guide's casting theory. I would later learn that the mouldings were in fact carved.

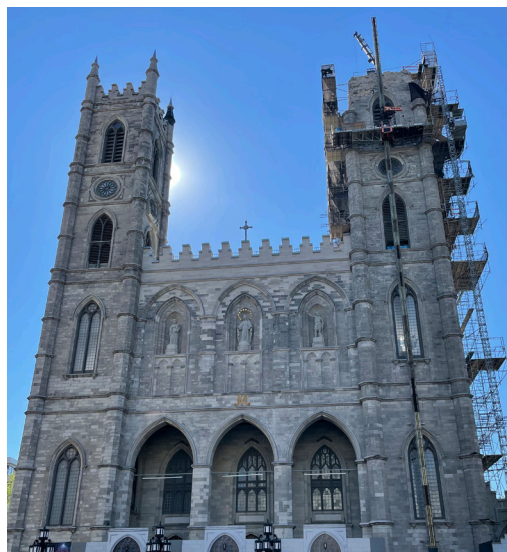


fig. 2.26 Observing Notre-Dame Basilica under repair, July 2022.

fig. 2.27 Observing greystone mouldings on facades of Notre-Dame Basilica, August 2022.

fig. 2.28 Removing concrete casts from foam moulds, December 2022.



fig. 2.29 Diagram of carved limestone window mouldings contrasting the uniformly cut stone walls of Notre-Dame Church of Montreal.



The tour guide's theory of a paradigm shift from carving to casting intrigued me, and with my understanding of the mouldings being a stylistic and architectural precedent for the town, it would make sense that they were also fabricated using new technology. To replicate the process of casting two stones from the church's window mouldings, I used a 3D scan taken on site and James O'Donnell's drawings gathered from the Canadian Centre for Architecture's archives to model a casting mould. The decision to use concrete to cast the two mouldings was due to its limestone-based composition of aggregate and cement, and its colour which would match the appearance of the mouldings made of "limestone dust" observed on site. Throughout the making process, I became skeptical about the use of casting to produce the mouldings. How would these casts be reinforced? How would they be fastened to the rest of the facade? No indications of steel or other reinforcement could be seen in the archival drawings. It was following the completion of the moulding artifact that I contacted Notre-Dame Basilica one last time and had my suspicion validated: the mouldings had been carved by hand. Had I learned of the carving process in advance of their production, the making process would have entailed extensive lessons in carving limestone or casting the mouldings in sedimentary layers likened to that of the stone's natural sedimentary layers.



fig. 2.30 Collage of Notre-Dame Church carved limestone moulding artifact as process, not object.

Given that the craft of carving limestone and the reciprocal process of extracting it from local quarries were both transitioning to industrial modes of production during the period of the Notre-Dame's reconstruction, the casting method I employed to create the pair of mouldings conjures an evolution towards faster, more efficient methods of architectural production. The limestone mouldings signal a shift from the artisanal craft pre-conquest to industrial material practices post-conquest, where the increased skill level required to carve limestone did not equate to a higher cost of habitant labour. Rather, this contradictory relationship between the increasing cultural value of architectural production and the decreasing value of labour assigned to create it is an example of Jason Moore's concept of "cheap nature," where evolving material practices contribute to "rendering the work of many humans – but also of animals, soils, forests and all manner of extra-human nature – invisible or nearly so."<sup>53</sup> The rebuilding of the Notre-Dame Church and the role of limestone in creating new organizations of land, labour, social divisions, and material practices can then be understood as a materialization of the promise of the Quebec Act of 1774, allowing the values of the "ancien régime" to exist through limestone under the guise of British rule.

## Casting / Habitat 67 Precast Concrete and the Growth of Industry, 1964



fig. 2.31 Artifact of a beam-to-wall detail of Habitat 67 units cast with pervious concrete and Freysinett post-tensioning cables (1:1 scale, 22" L x 27" W x 11.5" H, approx. 180 lbs).

In 1867, Quebec was one of the first provinces to join the "Dominion of Canada," a British federation including New Brunswick, Nova Scotia, and Ontario that eventually expanded under a nation-building exercise to include the remaining provinces and territories under Confederation.<sup>54</sup> The slow but steady expansion of the Canadian state was underlined by massive infrastructural negotiations and colonial dispossession of Indigenous territory, forging colonial material connections across the continent through the introduction of the Canadian Pacific Railway.<sup>55</sup> One hundred years after Confederation, the 1967 International and Universal Exposition (Expo 67) in Montreal took place from April 27th to October 29th, becoming a highlight of Canada's centennial year while mirroring the nationalist sentiments felt in Canada one hundred years earlier.<sup>56</sup> Meanwhile in Quebec, the Quiet Revolution was emerging as the Front de Libération du Québec (FLQ) ushered in an era of separatism.<sup>57</sup> To meet the demands of the industrial life of the continent, Montreal's limestone industry had entered the age of aggregate.<sup>58</sup>

Contrasting the Canadian and Quebecois patriotism felt throughout the 1960s, the proposal for Expo 67 initiated by Van Ginkel Associates<sup>59</sup> drew on legacies of nineteenth century World's Fairs "to conceive of sufficiently heroic structures," while aiming to "reject the most enduring symbols of world exhibitions: the nation-state and its emblematic architecture."<sup>60</sup> By re-instituting the idea of an "International Exposition," Expo 67 attracted over 50 million visitors to the site of Saint Helen's Island and adjacent sites off the shores of Montreal's Old Port with the theme "Man and His World."<sup>61</sup> The theme of the Expo engendered a new societal and political consciousness by introducing architectural feats of technology and innovation within its pavilions, supporting the Van Ginkels' goal of encapsulating internationalism and "one world-ness."<sup>62</sup> A vision of newness, utopianism, and modernism was meant to erase the nationalistic symbolism that had been traditionally used for pavilions at World's Fairs, and the Van Ginkels intended to promote architecture that invoked the same ideology. The influence of the modernist movement affirmed the Expo's thematic development in showcasing the dominance of Western knowledge and human technology which held the power to "improve" and reshape the environment.

In preparation for Expo 67, the City of Montreal undertook a major construction project on its ports and islands on the Saint Lawrence River. While other sites on the island of Montreal were considered as grounds for the Expo, Pierre Dupuy, Canadian diplomat and writer, remarked that a site on the Saint Lawrence River would be best suited because "It was through [the Saint Lawrence River] that civilization arrived in the country."<sup>63</sup> Mirroring Confederation's territorial expansionism and the French-colonial quarrying endeavors of the eighteenth century, Saint Helen's Island and its smaller adjacent islands were once again quarried for limestone to expand the exposition site.<sup>64</sup> Ile Ronde (Round Island) and Ile Verte (Green Island), the small islands flanking Saint Helen's Island, were quarried for limestone and rubble by way of blasting, contributing to a 15-kilometer-long dyke of gabion walls outlining the perimeter of the new islands which were to be filled in with additional rubble.<sup>65</sup>

In August 1963, the filling in of the new island began. The Saint Lawrence River was dredged for infill material first, followed by truck loads of excavation material from the Montreal metro and Saint Lawrence Seaway being brought to the site to form the new island.<sup>66</sup> The initial 60-kilometer-long Montreal metro system began construction in 1963, coinciding with the changes taking place on the Expo grounds. Three types of excavations were used to create Montreal's metro tunnels, of which a two-track tunnel excavated



fig. 2.32 Aerial photograph of Saint Helen's Island (center), Notre-Dame Island (left), and Cité du Havre (top) showing the gabion walls that formed dykes to delineate the limits of the new island being infilled.

entirely of rock was deemed the most economical and used for seventy percent of the tunnels.<sup>67</sup> The limestone and rubble from the metro construction was continuously brought to the Expo grounds to be dumped as infill on the growing island, providing a means to drive down the Expo's costs.<sup>68</sup> Expo 67 and the coinciding urban redevelopments in Montreal imparted modernist ideologies while maintaining a dominant francophone culture, where "the idea of a North American Paris was very pronounced [and] it reflected a notion of French civility that was not current in the United States."<sup>69</sup>

fig. 2.33 Aerial photograph of Notre-Dame Island showing the limestone quarry central to the island, formerly the island itself. Above Notre-Dame Island is the south end of the new Saint Helen's Island, where Swan Lake takes shape within the quarry that provided limestone for the site expansion, c. 1963-64.



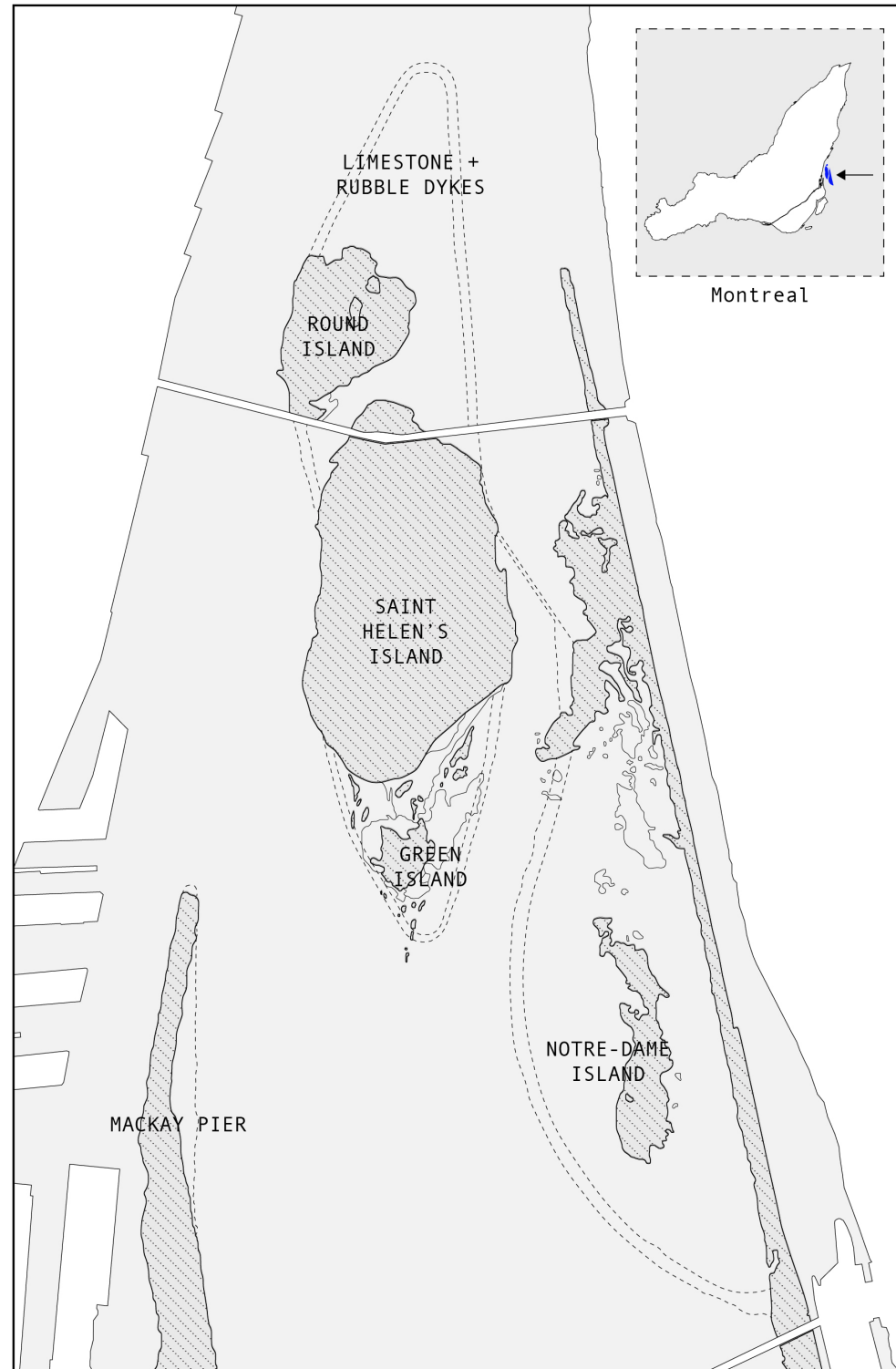


fig. 2.34 Saint Helen's Island, Notre-Dame Island, and Mackay Pier in 1963 showing locations of dykes built of limestone blasted from the Saint Lawrence River and made into gabion walls. The dykes would later be infilled with limestone quarried on Round Island (Isle Ronde) and Green Island (Ile Verte), rubble from the Montreal metro and Saint Lawrence Seaway excavations, and limestone quarried on the island of Montreal.

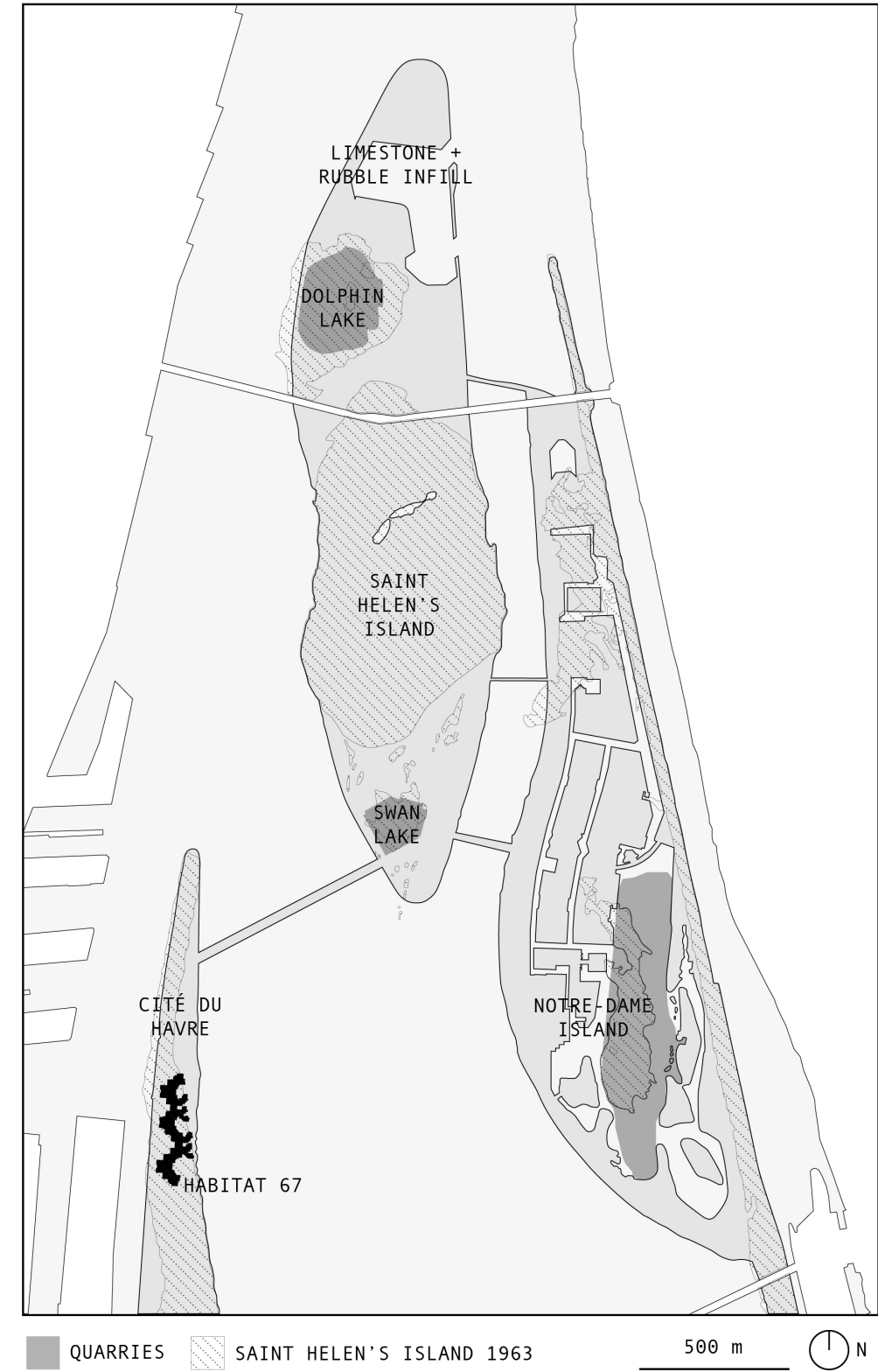


fig. 2.35 Saint Helen's Island, Notre-Dame Island, and Cité du Havre in 1967 following infilling with rubble and limestone. Round Island (Isle Ronde) and Green Island (Ile Verte) became quarries to supply limestone for the expansion project and later became water features, Dolphin's Lake and Swan Lake, on the expanded Saint Helen's Island.



In his reflections on the preparations for Expo 67, Pierre Dupuy recounts, "More than twenty-five million tonnes of earth and stone were transported to the scene, not to mention the quantities brought from the bottom of the Saint Lawrence."<sup>70</sup> In 1965, truckloads of rubble and limestone from local quarries were brought to Mackay Pier on a 24-hour basis to widen the site in preparation to implement pavilions for the Expo.<sup>71</sup> Mackay Pier was then renamed "Cité du Havre," which would connect by bridge to Saint Helen's Island.<sup>72</sup> The vast movement of limestone aggregate and rubble across the island throughout the 1960s provided opportunities to further transform the urban environment, while at the same time signalling technological shifts in architectural production to sustain urban and architectural perceptions of progress.



fig. 2.36 Two-track Montreal Metro tunnel revealing the limestone formation that spans the island. Excavation was done primarily on city-owned land and avoided interruption to conditions above ground.

fig. 2.37 Mixing 3 parts limestone aggregate to 1 part Portland cement, January 2023.



One of the pavilions and architectural spectacles to be implemented on the expanded Cité du Havre site was Habitat 67, a new high-density vision for low-cost urban housing using prefabricated and modular units. An equally important figure in the development of Habitat 67 alongside the architect Moshe Safdie was August Komendant, the structural engineer responsible for proposing prestressed, precast, and post-tensioned concrete as the primary structural component of the project. Introducing Komendant to the project influenced important material decisions that in effect continued to transform the geologic landscape of Montreal. Komendant had been trained in Dresden, Germany where he learned advanced concrete construction techniques before working on a series of esteemed concrete engineering projects which according to Safdie made him the best fit for the experimental housing project in Montreal.<sup>73</sup>

Although Expo authorities were willing to allow the steel industry to contribute to the project, it was Komendant who concluded that since "the house units have to resist torsional, compressive and tensile stresses, the only material which can be used economically is concrete."<sup>74</sup> This decision was made in favour of the Committee of Canadian Cement Companies who funded the project's feasibility study,<sup>75</sup> while supporting the steel industry by using Freyssinet steel cables and Stressteel rods to counteract tension.<sup>76</sup> Komendant's description of the project's precast, post-tensioned structure was followed by material specifications for what he called the "new reinforced concrete," which would phase out cast-in-place concrete through the implementation of prefabricated cages and parts.<sup>77</sup>

Following the major infilling project on Cité du Havre, the site began to transform further with the addition of an on-site prefabrication factory for Habitat 67 built by the concrete subcontractors, Francon Ltd, where the concrete units would be precast in steel moulds, post-tensioned, rolled by custom travel-lifts to the building site, and stacked by crane.<sup>78</sup> This process relied on 20,000 cubic meters of concrete to be driven to site by truck,<sup>79</sup> of which the aggregate and cement were locally quarried at National Quarries Ltd, formerly Francon Quarry, in Montreal's Saint-Michel neighbourhood.<sup>80</sup> The emphasis on on-site prefabrication and locally sourced concrete aggregate and cement to producing the concrete was meant to lower the high cost of construction, which was a constant challenge for Safdie and Komendant to accommodate having already reduced the scope of the project from the original proposal that was six times the size of what was eventually realized.<sup>81</sup> The limestone aggregate and cement that contributed to the building of Habitat 67 and the site of Cité du Havre captures the nationalist sentiments of the Exposition having been extracted locally, while simultaneously forging an architectural identity free of nationalist symbolism.

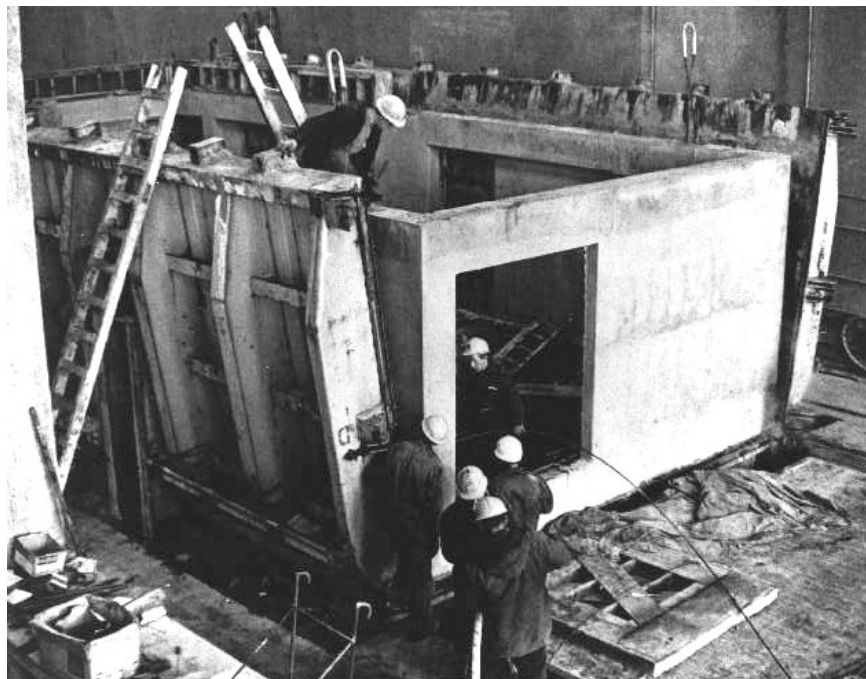
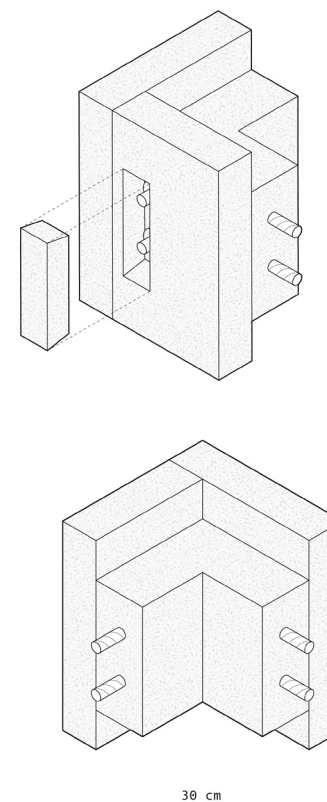


fig. 2.38 Steel prefabrication moulds being removed from Habitat 67 reinforced concrete unit.

fig. 2.39 Complete pervious concrete cast in foam mould, January 2023.



fig. 2.40 Diagram of post-tensioned concrete beam to wall detail.



Just months before the design development phase of Habitat 67 began, Quebec's Ministry of Natural Resources published a report on their observations at the site of National Quarries Ltd. The report outlined the production rates of aggregate, asphalt, and premixed concrete amongst other limestone products, while addressing concerns regarding the limited land the quarry had left to expand onto. Engineer Henri Rinfret regretfully declared, "these lands are now built up with houses and the quarry can only expand at the northwest corner or along the north facade [...] As a last resort, we can always deepen the quarry."<sup>82</sup>

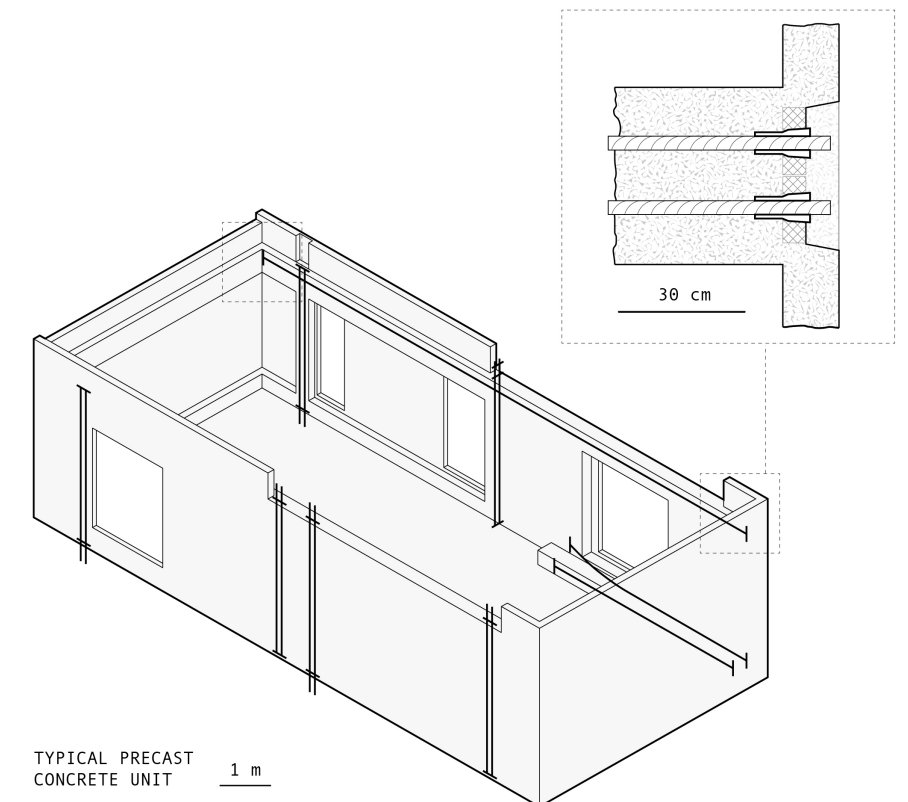
Themes of territorial expansion and mass production that arose on many levels during the production of Expo 67 were equally felt at the site of the quarry, where three million tons of crushed limestone were being produced each year to support Montreal's modernization efforts.<sup>83</sup> While the "new reinforced concrete" that Komendant had proposed for the project was becoming recognized as a precedent for the future of concrete,<sup>84</sup> the quarrying practices that had begun in the eighteenth century were evolving to meet the demands of the architectural mass-production in the city. At an absolute global moment in history, local materials supported the making of a new international identity.



fig. 2.41 Habitat 67 seen from Old Montreal; the second mountain in Montreal's skyline is made of concrete, November 2020.

As the mass production of housing echoed the mass production of limestone in Montreal's quarries, the material began to lose its historical symbolic value. Aggregate and cement bear no inscriptions of human labour or natural formation, losing connection to the land it was extracted from and becoming unrecognizable during the crushing process. The artifact I made of a beam-to-wall detail from a Habitat 67 unit becomes equally as unrecognizable when viewed alongside the more symbolic architectural limestone artifacts from earlier centuries. I mixed Portland cement and limestone aggregate into a pervious concrete mixture to highlight the limestone-based components that provide strength and structural support to concrete, excluding sand from the traditional recipe. The partnership between steel Freyssinet post-tensioning cables and concrete seen in the artifact marks a shift towards minimizing structural systems which made it possible to construct walls with at a thickness of only five inches.

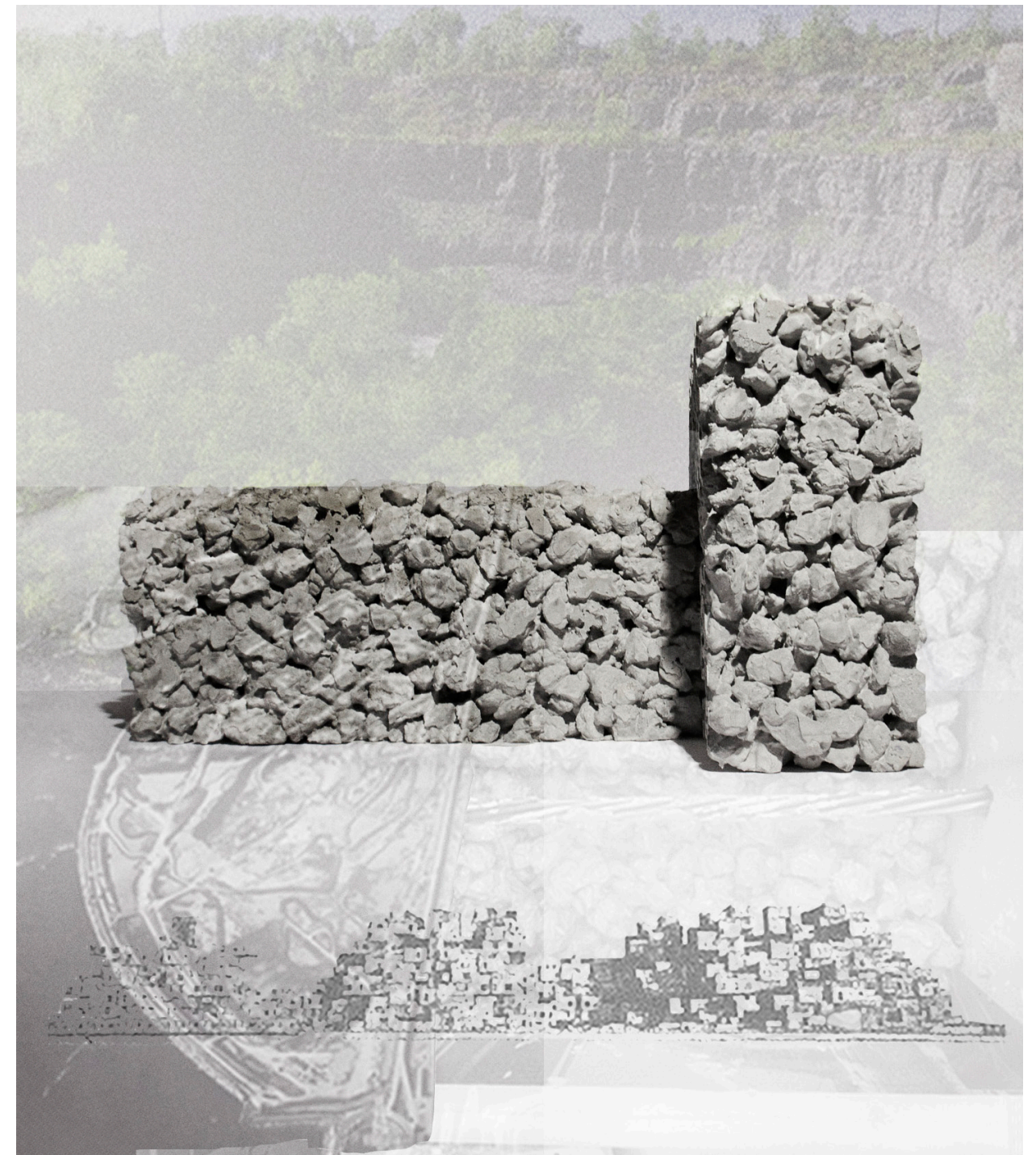
fig. 2.42 Typical precast concrete unit construction indicating post-tensioning cables and vertical section of beam-to-wall detail indicating the element rebuilt as artifact.



After constructing a casting mould for the artifact, the making process became a mindless exercise of mixing and pouring, and little consideration for the lime-based materials was required other than for the consistency of the pervious concrete. Having mistakenly purchased a bag of high-strength concrete to make the Notre-Dame Church artifact with, I had taken note of the size of aggregate present in the mix and compared it to the smaller granules of aggregate in the non-structural, smooth-finish sand mix I used on the final Notre-Dame artifact. This observation guided my decision to use aggregate with a larger diameter to best represent the high-strength precast concrete used on Habitat 67. Once removed from its mould, the pervious concrete artifact was less fragile than I had expected, having unyielding properties. This shaped my understanding of how knowledge of the sedimentation strata of limestone and the direct engagement with stone in the quarries and building site during the construction of Habitat 67 became obsolete. Methods of quarrying and concrete construction beginning at the turn of the twentieth century continued to reflect dominant Western technology and material practices, where equipment and machinery were industrially mass-produced, leading to the reduction of manual labour in quarries and on construction sites.<sup>85</sup> The quarries that once supplied Montreal with dimensional blocks of limestone free of cracks and defects became depleted as the turn to crushing aggregate and processing of Portland cement for use in concrete emerged as the prevailing quarrying practice.<sup>86</sup>

Though limestone extraction in twentieth century Montreal was not driven by economic exchange with the French Empire, the extraction economy of the Canadian state can be understood as an extension of over 250 years of colonial material practices initiated at the onset of colonization, providing a distinct material culture for the settler-colonial state. Following the success of Habitat 67 and the creation of a national icon, Safdie Architects was commissioned to produce further Habitat projects internationally: in New York, Puerto Rico, Israel, Rochester, Tehran, and Qinhuangdao amongst other cities.<sup>87</sup> The neo-colonial objective of Habitat 67 to be reproduced at a global scale transports extractive colonial material practices elsewhere, conjuring an image of a cultural transfer.

fig. 2.43 Collage of Habitat 67 beam-to-wall detail artifact as process, not object.



## Exhibiting / Palais de la Porte Dorée Bas-Reliefs and the "Legitimization" of Colonization, 1928



fig. 2.44 Artifact of limestone bas-reliefs from the facades of Palais de la Porte Dorée depicting a fisherman reeling in his nets (1:1.5 scale, 27" L x 26" W x 4.5" H, approx. 150 lbs).

How did evidence of Montreal's colonial limestone transformation exist in the "Empire" of France? In other colonies, the French Empire extracted human labour and non-human materials such as lead, oil, coal, and copper for direct use and consumption in France. But in Montreal, geologic resources such as limestone never physically travelled from Montreal to France in the same way that material riches from merchant trade such as furs were transported to the Empire. Limestone instead provided the colony of Montreal with a sense of permanence, protection, and civilizing power which allowed it to prosper as a major trading port and eventually as a metropolis. This knowledge made it challenging for me to consider how to uncover physical evidence of the effects limestone in New France had on the Empire. While carrying out field work in Paris, I visited the site of the 1931 Colonial Exposition to uncover, in-situ, any physical expressions of these effects which led me to studying the limestone facades of Palais de la Porte Dorée.

The Palais de la Porte Dorée (Palace of the Golden Gate), which now houses the Musée National de l'Histoire de l'Immigration (National Museum of Immigration History), was built as a permanent hall for the International Colonial Exposition of 1931. From May 6th to November 15th, 1931, the Bois de Vincennes in Paris became the site of the last international World's Fair dedicated to international colonialism, a tradition that had been upheld to exalt European and North American civilizing power since the late nineteenth century by nations worldwide.<sup>88</sup> The exhibition attracted 33 million visitors with the slogan, "Around the world in one day," who flocked to the spectacle of two hundred pavilions depicting various French colonies and foreign territories.<sup>89</sup> The Palais de la Porte Dorée was unique insofar as it was planned to be the only permanent structure that would represent France and its colonies, with the remaining temporary pavilions being modeled after Indigenous architectural styles, such as the temples of Angkor or the Sudanese mud *tata*.<sup>90</sup>

Marcel Olivier, the delegate general of the Exposition, distilled the exhibition's mission to legitimize colonization and to present the success of international colonization: "Colonization is legitimate. It is beneficial. These are truths that will be inscribed for a few more months on the walls of the pavilions of Vincennes."<sup>91</sup> This statement was invoked in the architectural style of the pavilions themselves, which aimed to convince the French public of their own "civilizing instinct" through architectural spectacle.<sup>92</sup> Of all the pavilions built for the Exposition, the Palais de la Porte Dorée was given the greatest responsibility to evoke the combined spirit of both nationalism and colonial desire.

fig. 2.45 Plan of the International Colonial Exhibition of Paris, 1931. The Vincennes woods and park were used to host the exhibition which had the slogan "Around the World in One Day."

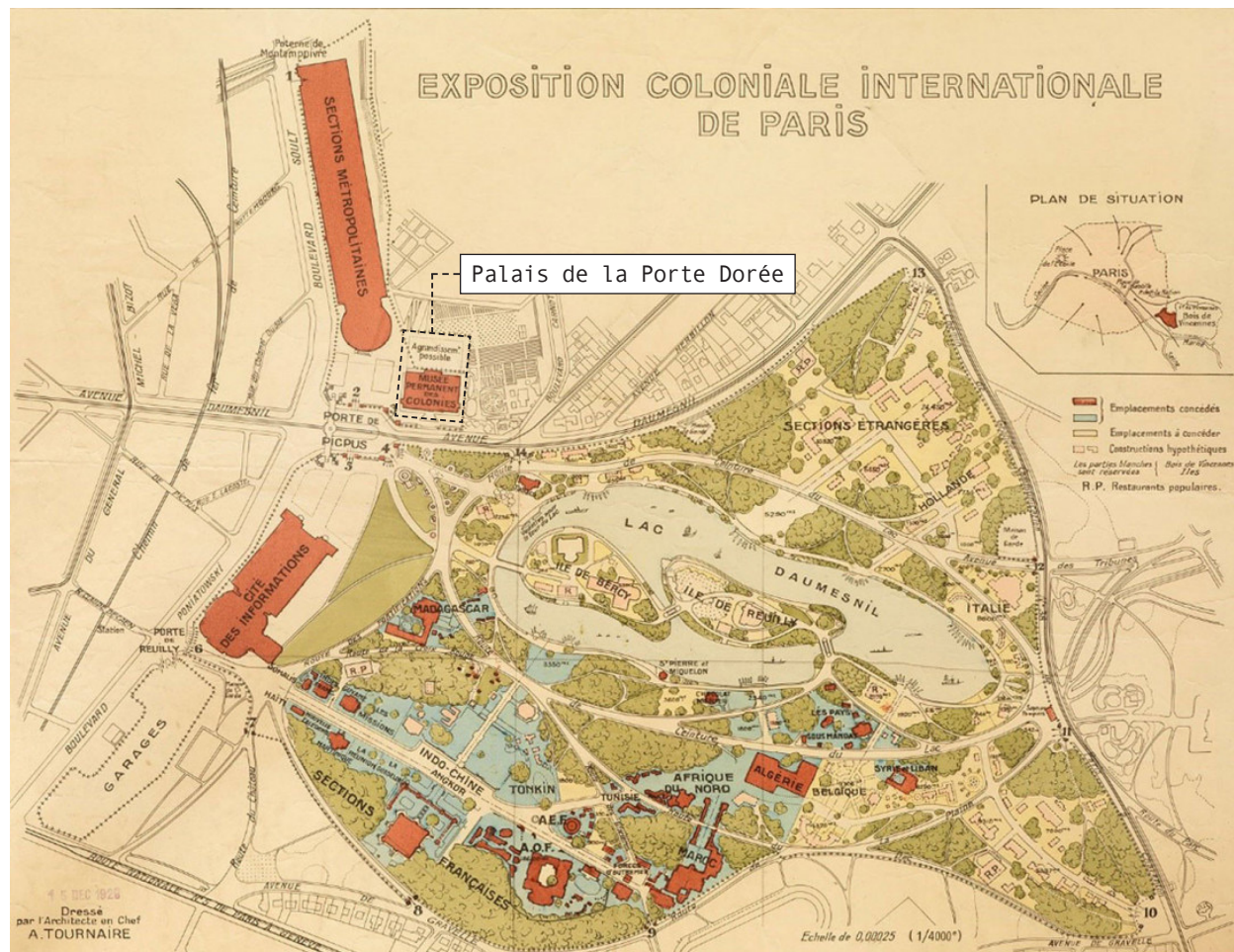


fig. 2.46 Palais de la Porte Dorée, Paris, the only permanent pavilion of the 1931 Exposition, September 2022.

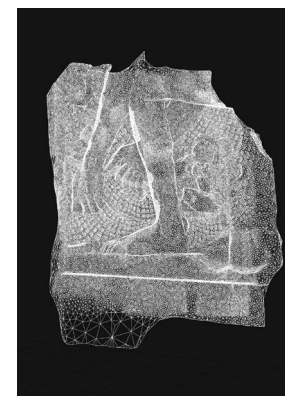
To accomplish this duality spatially, the architecture of the Palais de la Porte Dorée attempted to incorporate aspects of the racially-based hierarchy set out to differentiate the various other pavilions; those of the colonies were representative of "native" architectural styles, whereas the metropolitan pavilions were built in the Art Deco style that originated in France.<sup>93</sup> This rigid distinction amongst pavilions had to be synthesized in the design of Palais de la Porte Dorée to "evoke far-off countries while remaining in harmony with the atmosphere of Paris."<sup>94</sup> To represent the colonies whose culture was perceived by the French to be lacking civilization alongside the metropolitan world of Paris, Beaux-Arts trained architect Albert Laprade and Prix-de-Rome-winning French sculptor Alfred Janniot combined a classical architectural approach with the adornment of limestone bas-reliefs depicting allegory of the French colonial empire.<sup>95</sup> Patricia Morton describes the various phases of Janniot's carving process that began in 1928: "Janniot devoted the first year to drawing the composition at various scales, another year to making a clay model of the whole at half scale, and the third year to sculpting the stone with his assistants."<sup>96</sup> The bas-relief carvings were assigned the responsibility of depicting what the French perceived as primitive life in the colonies alongside civilized life in Paris, and French limestone was chosen as the facade material that would provide the museum with civilizing qualities.



fig. 2.47 Alfred Janniot modeling the limestone bas-relief of Palais de la Porte Dorée while referencing a live model, demonstrating another form of extractivism taking form in the carving method itself.

fig. 2.48 Limestone bas-relief of fishermen, Palais de la Porte Dorée limestone facade, Paris, September 2022.

fig. 2.49 Mesh from 3D scan of Palais de la Porte Dorée facade component depicting a fisherman reeling in his nets, Paris, 2022.



The facades therefore invoke many layers of the conceptual notion of colonial extractivism; over two hundred and fifty human and animal figures extracting food, materials, and other goods that would provide wealth for the Empire under conditions of forced labour and slavery were carved into the facade, while the limestone itself had been extracted to supply material for the 1300 square meter bas-relief.<sup>97</sup> A disturbing photograph of Janniot modeling the bas-reliefs out of clay before realizing them in limestone reveals an additional mode of colonial extractivism within the imposed hierarchy of power between France and its colonies playing out in the method of carving itself. The photograph portrays Janniot as a master craftsman whose genius resulted in the museum's opulent sculpted facades, while the black woman next to him poses naked and vulnerable to Janniot's gaze as the material and the woman are both understood as primitive objects to extract from and to civilize. Here, skill in stone carving is seen as the work of individual genius to contrast the vulnerable posture of his racialized subject, mirroring how the Art Deco style of carving advertises principles of French culture as being superior to the artistic and architectural crafts of the colonies. The larger-than-life scale of the carvings of human and animal figures and the ten-centimeter depth of the relief that produces definition through shadow means that the allegory is legible to passersby from a great distance, conjuring the image of a limestone billboard that advertises the validity of colonization. By portraying the conquest of colonial territories in a material that would instill the civilizing power of France in its visitors, the architecture of the exhibition hall mirrors how the material practices of extraction were used to civilize the Indigenous peoples and their culture on the island now known as Montreal.

To capture the many forms of life expressed in the limestone facades, I chose to re-create an existing bas-relief depicting a fisherman reeling in his nets as fish struggle to escape from his grasp. While the colonies of "New France" and their ambassadors are represented in Janniot's facade, I chose not to represent them in the artifact I was creating for two reasons: first, the portrayal of New France is void of any expression of vulnerability that was evident in the other carvings, and second, engravings of the names of colonial dignitaries of New France on the northern facade were inaccessible during my visit. The

names of "Saint-Pierre et Miquelon," the islands off the southern coast of Newfoundland which today represent the last remaining French territory in Canada, are inscribed 12 meters up the south-west façade of the building within the sails of a ship crossing the Atlantic Ocean; the only reference to New France in Janniot's bas-reliefs.<sup>98</sup> A direct replica of this reference to New France seemed trivial when contrasted to the overwhelmingly lifelike depiction of colonized and racialized bodies, animals, and plants that covered the facades. The bas-relief of the fisherman I had encountered next to the grand entrance to the museum showed signs of the physical strain of forced labour in his muscles and the grasp of his hand on the fishing net which transpired onto the fish he had caught. The fisherman's and other labourers' participation in the extraction of resources under French colonial rule was understood by visitors of the Colonial Exposition in 1931 as their *association* rather than *assimilation* as a "good savage" in the French regime.<sup>99</sup>



fig. 2.50 Observing the west facade of Palais de la Porte Dorée where the bas-reliefs depict the name of the French territory of Saint-Pierre et Miquelon in a ship's sails.

fig. 2.51 Half of the engraved north facade of Palais de la Porte Dorée titled, "The sons who have heard the calling of the Empire and his genius and made his name loved beyond the seas, France is grateful" (translated from French). Highlighted are the explorers and founders of the colonies of New France and Canada.

fig. 2.52 (Page 97) West facade of Palais de la Porte Dorée depicting French colonies in the Americas and Africa.

fig. 2.53 (Page 98) East facade of Palais de la Porte Dorée depicting French colonies in Oceania and Asian colonies.

fig. 2.54 (Page 99) West half of the south facade of Palais de la Porte Dorée depicting French colonies in Africa.

fig. 2.55 (Page 101) East half of the south facade of Palais de la Porte Dorée depicting French colonies in Asia.

JACQUES CARTIER 1491-1557

JEAN-FRANCOIS DE LA ROQUE, SIEUR DE ROBERVAL X-1561

SAMUEL DE CHAMPLAIN 1567-1635

JEAN TALON 1625-1694

FRANCOIS DE MONTMORENCY LAVAL 1622-1700

LOUIS DE BUADE DE FRONTENAC 1620-1698

FRANCOIS GASTON MARECHAL ET DUC DE LEVIS 1720-1787

PIERRE LEMOYNE D'IBERVILLE 1642-1706

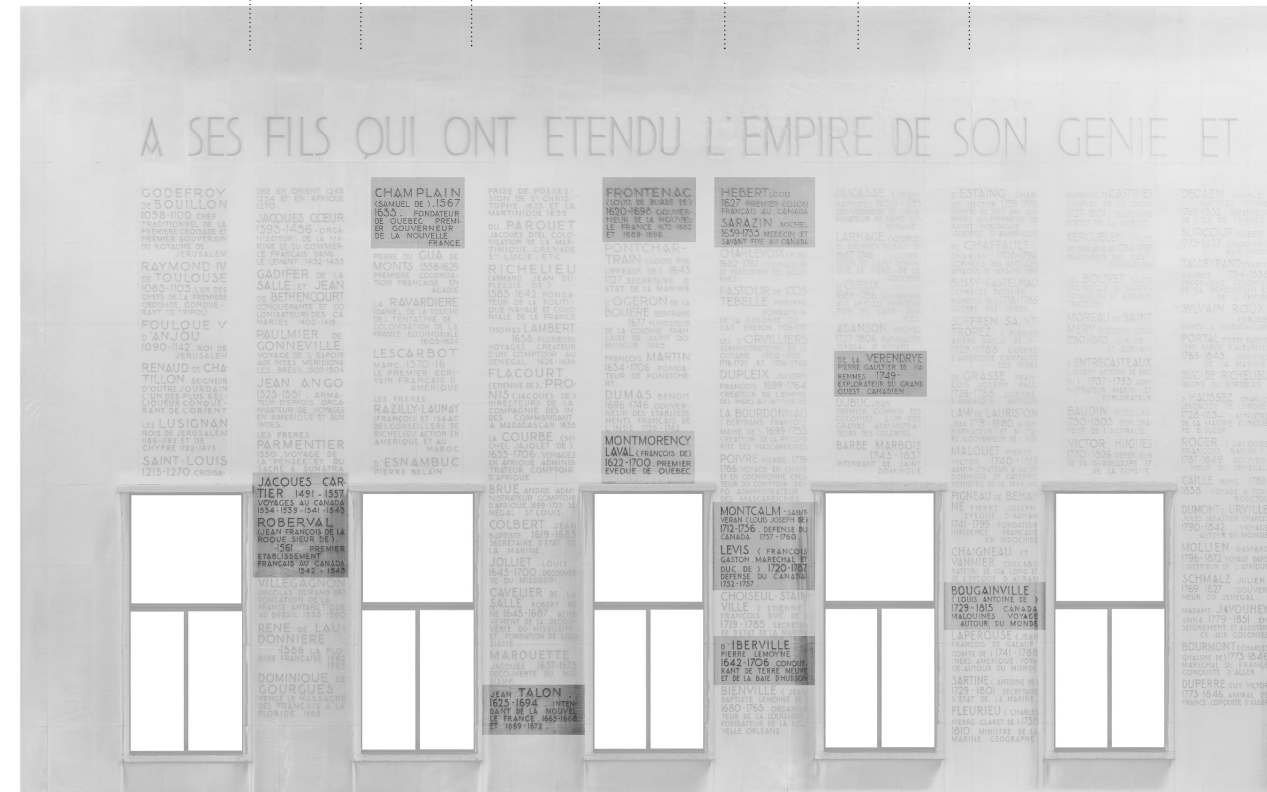
LOUIS HEBERT 1627

MICHEL SARAZIN 1659-1755

SAINT-VERAN MONTCALM 1712-1756

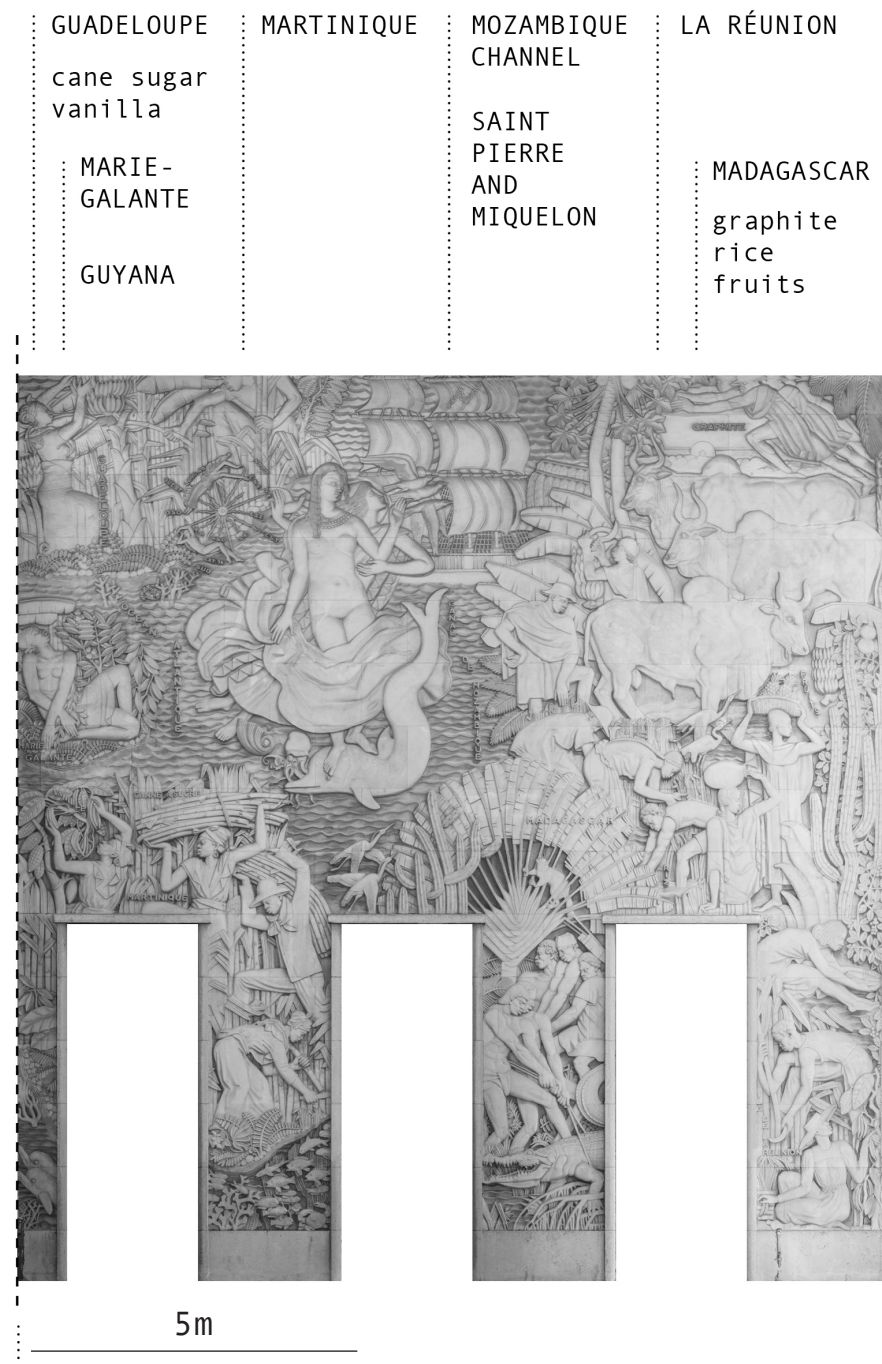
PIERRE GAULTIER DE VARENNES DE LA VERENDRYE 1749-X

LOUIS ANTOINE DE BOUGAINVILLE 1729-1815

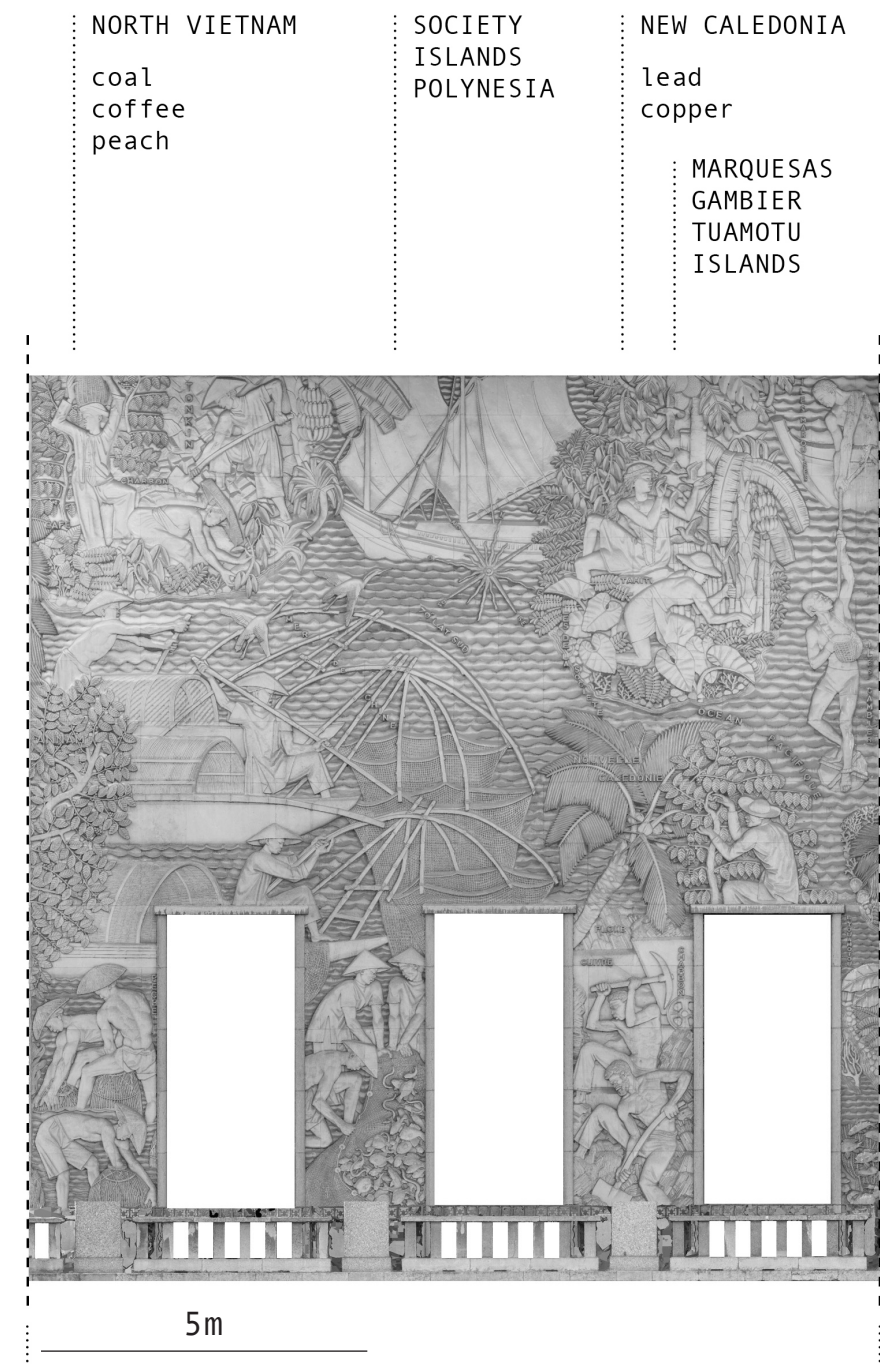


5m





THE AMERICAS + AFRICA (West Facade)



OCEANIA + ASIA (East Facade)

MOROCCO  
 SUDAN  
 SENEGAL  
 agricultural fertilizer  
 grains  
 wool  
 coffee  
 peanuts  
 cacao  
 cotton

IVORY COAST  
 DAHOMEY  
 ALGERIA  
 wood  
 kola nut  
 palm oil  
 grape vine

UBANGI  
 TUNISIA  
 CONGO  
 CHAD  
 carpet  
 rubber

GABON  
 LE HAVRE  
 France's  
 first major  
 slave-trading  
 port

PORTE  
 CAILHAU,  
 BORDEAUX  
 France's  
 second  
 largest  
 port of  
 the African  
 slave trade

CERES  
 goddess of  
 agriculture  
 POMONA  
 goddess of  
 fruit trees,  
 gardens, and  
 orchards



AFRICA (South Facade)

5 m

MARSEILLE

France's exchange port for Southern Europe, the Middle East, North Africa and Asia

SOUTH VIETNAM

rice  
coffee  
corn  
pepper

CAMBODIA

rice paddy  
rubber  
cotton  
silk  
rice  
tea

LAOS

oil  
art



ASIA (South Facade)

5 m

The choice of lime-based material for the bas-relief component mirrored methods of repair and connection of the limestone panels to the Palais de la Porte Dorée facades. Having found correspondence between the architect Laprade and the limestone quarries supplying limestone for the colonial project in 1929, I noticed that the quarry company had recommended the use of hydraulic lime, a highly caustic powdered form of limestone produced at high heat,<sup>100</sup> to both repair and affix the limestone panels to the facade of the building.<sup>101</sup> Without the stone carving skills to re-enact the carving of the ornate bas-relief segment, I decided to cast the artifact using lime putty, a combination of water and hydrated lime, a variant of hydraulic lime which has re-integrated moisture to produce a less caustic and more commercially viable product.<sup>102</sup> Following the two-month slaking process, the hydrated lime putty was mixed with sand to create a traditional lime mortar not typically used in casting projects, but which I experimented with to understand the limits of the material before casting the mortar into CNC-milled moulds.



fig. 2.56 Mixing hydrated lime putty before slaking with an excess of water for 2.5 months to gain structural strength, November 2023.



fig. 2.57 CNC milling foam blocks based on 3D scan of Palais de la Porte Dorée facade for use as casting moulds, December 2022.

fig. 2.58 Adding slaked hydrated lime putty to sand, January 2023.

fig. 2.59 Casting sand and hydrated lime mortar in CNC-milled foam moulds, January 2023.

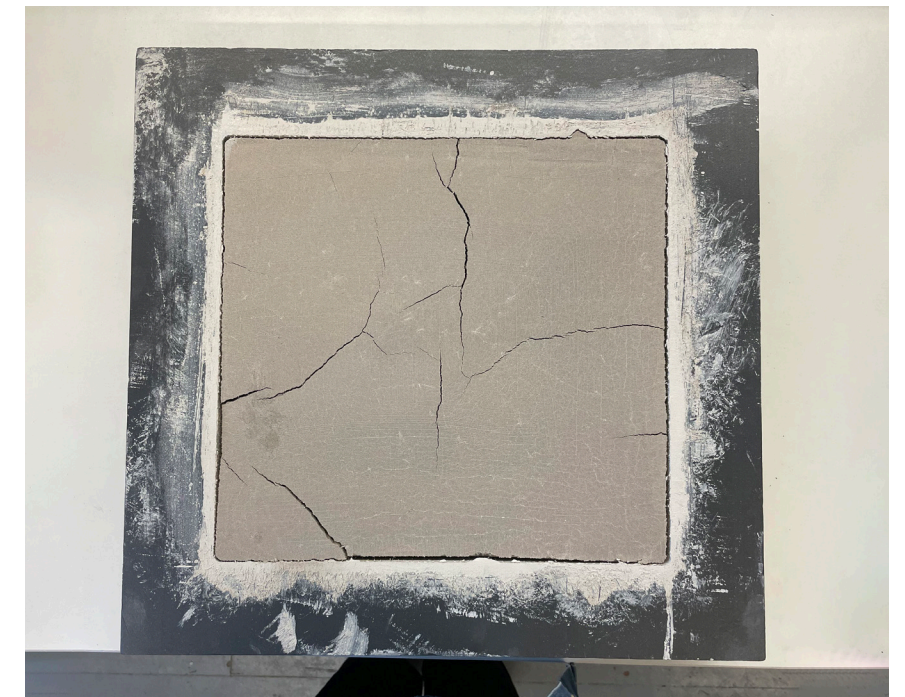


fig. 2.60 Cracks appearing in drying casts as they begin to lose their yellow colour, January 2023.

The introduction of sand into the white lime putty produced the “slightly grainy and yellow” properties of the limestone that had been chosen by the quarrying company Civet, Pommier & Cie in their correspondence to Laprade, until the artifact had fully dried and turned back to white three weeks after being removed from its mould.<sup>103</sup> Throughout the drying process, large cracks appeared in the casts which I repaired on multiple occasions using the same mortar recipe I had concocted the entirety of the artifact with. My method of repair simulated historical repair work on the original bas-relief facade that would arise when the settling foundation produced hairline cracks in the limestone panels. The concept of repair is also relevant to the social programming the institution and museum is undertaking. Where once depictions of the extractions of bodies forced into labour and subject to colonial crimes and violence was “passed over in silence,”<sup>104</sup> the institution of the Palais de la Porte Dorée is now dedicated to reconciling its violent colonial past and uses the pavilion and its limestone bas-reliefs as a platform for engaging with topics of decolonization through its social events, publications, and the museum’s programming.



fig. 2.61 Collage of Palais de la Porte Dorée bas-relief artifact as process, not object.

The 1931 Colonial Exposition grounds in Paris historically offered its visitors a “retrospective” component relating to the history of French-colonial activities in addition to a “synthesis” section focused on the hybrid of French colonial culture and Indigenous culture within each of the colonies that would inform their future under the French regime.<sup>105</sup> The colonial understanding of cultural “synthesis,” which was the antithesis of the reality of life in the colonies, is now being redefined as decolonial approaches to telling the story of France’s colonial history and of its immigrants are being initiated. The Palais de la Porte Dorée and Musée National de l’Histoire de l’Immigration have been confronting the colonial history inscribed on their facades and are using this history to inform new ways of telling the story of France’s immigrants.<sup>106</sup> In this sense, the limestone bas-reliefs that were initially conceived as being materially and socially permanent allegories now evoke what is at stake if history is not actively re-written and understood from a decolonial perspective. Chapter 4 of the book *De la violence coloniale dans l’espace public (Colonial violence in the public space)* titled “#Décolonisons!” (“#Let’s Decolonize!”) provides a guide for how to decolonize Palais de la Porte Dorée alongside two other monuments at the site of Paris’ “Golden Triangle.” All three monuments have a violent history of assuaging and celebrating the oppression of Indigenous groups and cultures dehumanized by French colonizers but now hold potential as sites for social change given their position as public institutions.<sup>107</sup>



fig. 2.62 Vast amounts of vegetation has overtaken the Francon Quarry following its closure, creating a habitat for coyotes, deer, and bird life, August 2022.

## Extracting / Francon Quarry Wall and the Mutating Quarry Effect, 2022

"Extraction is a cornerstone of capitalism, colonialism, and settler colonialism. It's stealing. It's taking something, whether it's a process, an object, a gift, or a person, out of the relationships that give it meaning, and placing it in a nonrelational context for the purposes of accumulation."

Leanne Betasamosake Simpson  
*Creative Combat: Indigenous Art, Resurgence, and Decolonization*<sup>108</sup>

In conversation with Norman Matchewan, band councillor of the Algonquins of Barriere Lake, he described the attempts of mining corporations to extract mineral resources from Barriere Lake's ancestral territory in Northern Quebec. He recalled having to explain to Copper One Inc. that if they pursued their plans to extract "resources" from their territory, the community's air and water would be polluted and the community would become sick. In her book, *Grounded Authority*, Shiri Pasternak describes the ongoing claims to jurisdiction made by the Canadian state in Barriere Lake's unceded territory, and how the constant encroachment of settler authority challenges the community's entitlement to economic and social autonomy. Pasternak asserts that "those who cannot internalize settler law but are physically subject to extraction become object instead to the increasingly militarized armed tactics of the state."<sup>109</sup> These early encounters learning about the impacts of settler extractivism on Indigenous territory shaped my understanding of the cultural implications of resource extraction.

As the Canadian nation-state has become its own "extraction empire"<sup>110</sup> following centuries of raw material extraction to support distant empires, pervasive mineral exploration continues to expand into urban peripheries and out of the collective urban consciousness. During his geologic exploration over the island of Montreal in search for economic limestone formations, T.H. Clark stated, "the continued growth of the city will necessitate the discontinuance of heavy blasting. Quarrying activity will eventually migrate elsewhere."<sup>111</sup> In Montreal, industrial limestone quarrying practices have historically

shifted *elsewhere* to remain imperceptible to the town. Starting at Saint Helen's Island off the shores of Montreal in the eighteenth century, exploitation of limestone quarries migrated to the base of Montreal's mountain and to the Mile End district, dispersing towards the eastern end of the island throughout the eighteenth and nineteenth century to remain at a distance from the urban core.<sup>112</sup> The city's largest industrial quarries eventually opened in the suburbs of Saint-Michel and East Montreal in the early twentieth century where limestone quarries could no longer exist *elsewhere*.

Francon quarry<sup>113</sup> in the Saint-Michel district became one of the country's largest limestone quarries, producing 1500 tons of crushed stone per hour<sup>114</sup> and five million tons of crushed stone over the course of its operation, becoming a symbol of the modern city.<sup>115</sup> Crushed stone and cement were transported by truck across the island and by train to locations across Canada and beyond for use as concrete building materials, agricultural fertilizer, railroad ballast, and road metal.<sup>116</sup> While the quarry workers experienced injuries blasting, cutting, lifting, and crushing the stone, becoming fatal in some instances,<sup>117</sup> the residents living in direct proximity to the quarries suffered from the inescapable and harmful plumes of dust, airborne rocks from mismanaged blasts, and pollution from the processing plants and trucks at the quarry site.<sup>118</sup> Tensions between quarry expansion and urban expansion were felt at the limits of the quarry wall as backyards of homes became overtaken by the encroachment of the vertical rock face. Due to increasing environmental concerns following sixty years of heightened operation, the Francon quarry was closed and acquired by the City of Montreal in 1984.<sup>119</sup>



fig. 2.63 A sign reading "Snow deposit closed to residents and public" (translated from French) sits outside of the gates leading into the Francon quarry, which has been adapted as a snow dump in winter, August 2022.

fig. 2.64 A Reddit post inquires: "What is this pit in the middle of the city?" showing the proximity of Francon quarry to the Saint-Michel borough, and revealing the quarry's mystifying qualities.

fig. 2.65 (Page 111) Francon quarry in operation producing cement and aggregate, October 1972.

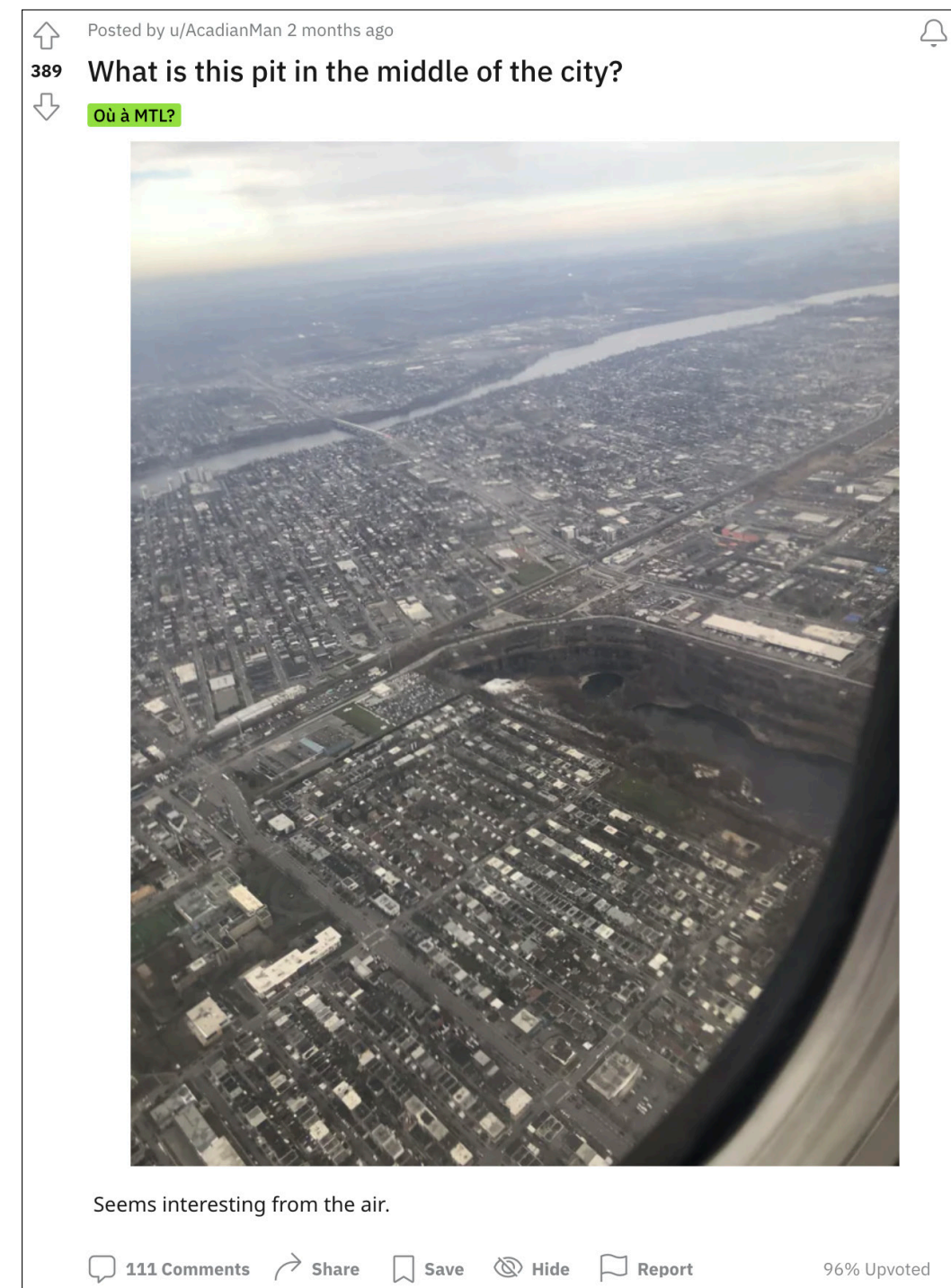








fig. 2.66 Two sills of Francon quarry walls showing evidence of varying extraction techniques given the vertical, human-made striations in the upper wall and jagged, uneven shaping surrounding it, August 2022.

Following many unsuccessful attempts to enter the site of Francon quarry, I arrived one afternoon to find the entry gates open. I reluctantly started down the inner road that I had become familiar with from studying maps and Google Earth images of the quarry. On my way down the road into the quarry's basin, a member of the Public Works Department of the City of Montreal offered me a tour of the site, warning me of the hazards I would encounter if I carried on unattended. Driving through the quarry in a Public Works vehicle, he explained to me how the quarry is currently used as a storage site for the City; Public Works resources, snow removal equipment, and some quarrying machinery was scattered throughout the site. Francon quarry is also used by the City as a snow storage facility in winter<sup>120</sup> and by the Montreal police department who detonate bombs in the quarry as a component of their training.<sup>121</sup> Glacial mounds of snow were still melting in the quarry during my visit on one of the hottest days of the summer, contributing garbage to the "extremely toxic" lake my tour guide warned me not to approach. We stopped to observe the bands of limestone and the various scars and markings on the walls and sills made by quarrying machinery. Driving back out of the quarry, I noticed deer in the forested area ahead. "Deer and coyote live in these forests, but traps have been set to remove the coyote," my tour guide explained. Far from a desolate wasteland, the inoperative quarry was active with many forms of life and nonlife. I recognized the growth of vegetation and the habitats they supported as a symbol of reclamation, meanwhile understanding the quarrying activity had simply migrated *elsewhere*.



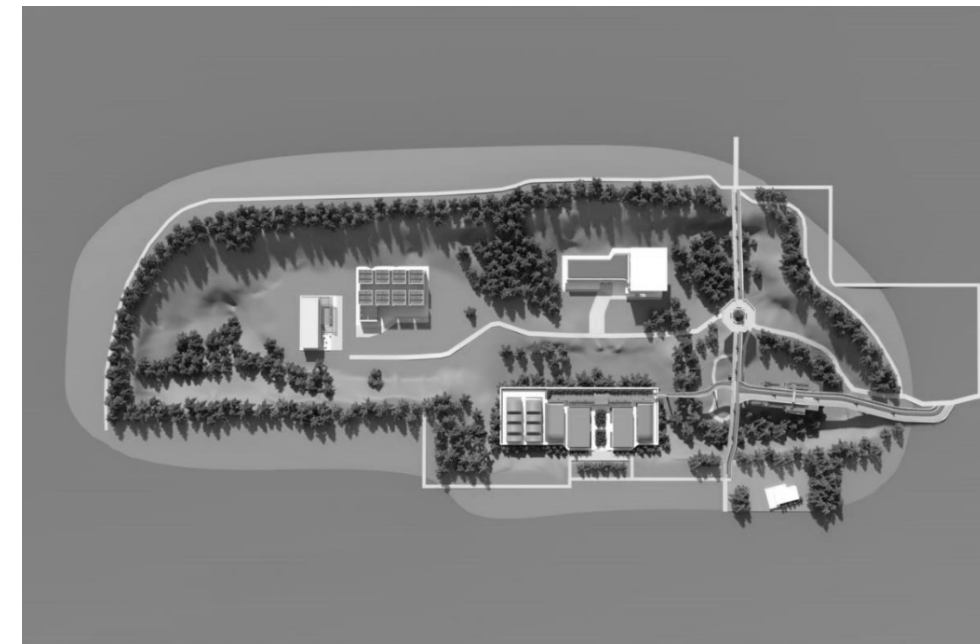
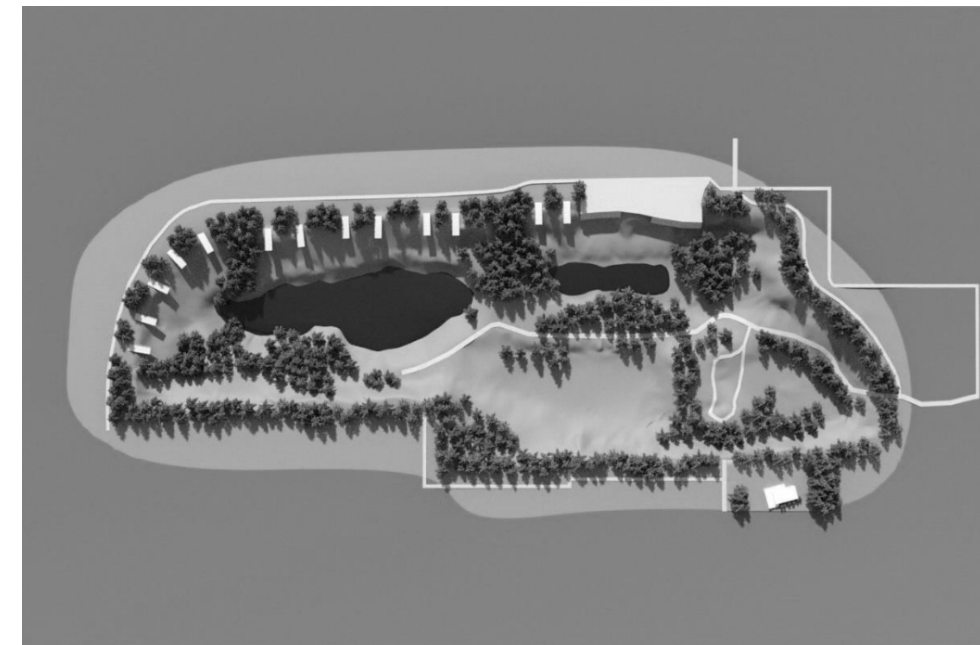
fig. 2.67 City of Montreal's fences lining the perimeter of the uppermost level of the quarry blocking views and access.

Vivre Saint-Michel en Santé, a community forum for members of the Saint-Michel borough, sees Francon quarry becoming an urban space where affordable housing and community amenities could be implemented to “shake off the reputation that Saint-Michel is nothing but a huge rubbish dump.”<sup>122</sup> The community of Saint-Michel has rallied against the City’s plans to create a permanent Public Works facility in the quarry,<sup>123</sup> proposing that it become an extension of the community much like Francon quarry’s neighbouring park, the Saint-Michel Environmental Complex. The Saint-Michel Complex was formerly the site of the Miron limestone quarry, becoming a landfill after being acquired by the City of Montreal in the 1960s. Today, the Saint-Michel Complex is the second largest green space in Montreal, having been converted into an urban park that collects biogas from the soil that rests above the former landfill.<sup>124</sup> The complex represents the concealed history of Montreal’s quarrying industry that exists below many of Montreal’s parks and neighbourhoods<sup>125</sup> that sits in stark contrast to the adjacent cavity of the inoperative Francon quarry.



fig. 2.68 After closing in the late 1970s, the Miron quarry became a landfill which is now covered by the Saint-Michel environmental complex neighbouring Francon quarry.

fig. 2.69 (Page 116) Top: Francon quarry as it exists today Bottom: Vivre Saint-Michel en Santé’s final phase 3 proposal including social housing, a multifunctional elevated pathway, and a research centre amongst other community amenities.



To create an artifact that would represent the dynamics of the operative and post-operative quarry and the physical absence of limestone, I created a “non-artifact” by animating drone images of Francon quarry and juxtaposing the animation with archival film of quarrying processes at the neighbouring Miron quarry in 1961. The opening sequence depicts the current state of the Francon quarry to foreground the vegetative reclamation of the site while the archival film of the blasting and processing of limestone in the Miron quarry calls attention to the contrasting scales of time between limestone's slow formation that can be read in the quarry walls and rapid anthropogenic extraction and transformation.

fig. 2.70 Still from the short film at 01:29 depicting the current state of Francon quarry juxtaposed with limestone crushing processes in the neighbouring Miron quarry c. 1961; the colonial afterlife of the limestone quarrying industry in Saint-Michel and its life post-operation.



Ann Stoler defines “intimacy” as a relation between colonial authorities and their colonially-imposed subjects to form “transfer points of power.”<sup>126</sup> She states that although uncomfortable, “Refocusing on the intimate opens to what haunts those social relations, to the untoward, to the strangely familiar that proximities and inequalities may produce.”<sup>127</sup> By emphasizing the uneven power relations and grounds for contestation in the collective understanding of infrastructure rather than concealing them and repeating patterns of silent oppression, Stoler posits that “conditions of possibility and relations” can emerge.<sup>128</sup> Although mining and quarrying corporations continue their geologic exploration and extractive endeavors *elsewhere* in support of infrastructures of the Canadian nation-state, the rewilding vegetation and animal habitat that has already established itself at Francon quarry sets forth the beginnings of an “intimacy” shared between the violent colonial past inscribed in the quarry's walls and life after extraction.

Francon quarry and its appropriation by the City of Montreal as a Public Works storage site where emergent wildlife are trapped and removed and where police presence perpetuates institutional violence represents the afterlife of empire that racialized the Indigenous population, destroyed ecologies, and established dominant colonial economies. These ongoing symptoms of colonialism continue to resist the development of nascent ecologies and the collective action of the citizens of Saint-Michel to extend equitable housing and community amenities into the site of the quarry. Francon quarry is one of the last remaining sites where the extractive colonial history tangibly linked to limestone is still visible on the island of Montreal.<sup>129</sup> In the wake of Land Back Montreal, these extractive histories raise questions of who the stakeholders of Francon quarry's redevelopment project should be.<sup>130</sup> On contested quarry sites where the land has quite literally been taken away to uphold settler colonial space and economic control, can recognition of their role in extractive colonial histories inform a decolonial afterlife of limestone in Montreal?

**Endnotes • Cutting / Fortification Wall Footings and the Militarization of the Port Colony, 1717**

- 1 Virginia Woolf, *A Room of One's Own*, (New York NY: The Fountain Press, 1929), 11.
- 2 Kathryn Yusoff, *A Billion Black Anthropocenes or None*, (Minneapolis, MN: University of Minnesota Press, 2018), xii.
- 3 "The Monument," Palais de La Porte Dorée, accessed September 26, 2022, <https://www.palais-portedoree.fr/en/the-institution/the-monument>.
- 4 Anna Lowenhaupt Tsing, *Friction: An Ethnography of Global Connection* (Princeton NJ: Princeton University Press, 2005), 29.
- 5 The Verrecchia Endowment Fund, the philanthropic project through which the residency was organized and funded, supplied an immense library of stone cutting tools, limestone, and expert guidance to "transmit to young people a new energy in ancestral professions." See "Verrecchia Endowment Fund: Introduction," accessed June 24, 2022, <https://fondsdedotationverrecchia.org/a-propos/>.
- 6 Hugh Schofield, "The French apprentices thriving on medieval roots," BBC News, December 17, 2017, <https://www.bbc.com/news/world-europe-42365048>.
- 7 René Guénon, "Pilgrimages," *Studies in Freemasonry & the Compagnonnage*, edited by Henry D. Fohr, Cecil Bethell, and Michael Allen, 1st English Edition, (Hillsdale, NY: Sophia Perennis, 1964), 60.
- 8 Kathryn Yusoff, "Mine as Paradigm," E-Flux Architecture, June 2021, <https://www.e-flux.com/architecture/survivance/381867/mine-as-paradigm/#:~:text=The%20mine%20is%20paradigmatic%20because,earth%20for%20ever%20and%20ever>.
- 9 Zach Parrott and Tabitha Marshall, "Iroquois Wars," The Canadian Encyclopedia, July 2019, <https://www.thecanadianencyclopedia.ca/en/article/iroquois-wars>.
- 10 Daniel P. Barr, *Unconquered: The Iroquois League at War in Colonial America* (Westport, CT: Praeger Publishers, 2006), 42.
- 11 Phyllis Lambert and Alan Stewart (eds.), *Opening the Gates of Eighteenth-Century Montreal* (Montreal and Cambridge: Canadian Centre for Architecture and MIT Press, 1992), 19.
- 12 Ibid., 20.
- 13 Following the Great Peace of Montreal in 1701, France gained rights to military expansion in New France, and French colonial authorities in New France gained rights to negotiate trades and territorial agreements with the region's First Nations. See "The Great Peace of Montréal," Pointe-À-Callière, accessed December 12, 2022, <https://pacmusee.qc.ca/en/stories-of-montreal/article/the-great-peace-of-montreal/>.
- 14 Lambert and Stewart (eds.), *Eighteenth-Century Montreal*, 20.
- 15 Nathalie Clerk, "Gaspard Chaussegros de Léry," *Journal of the Society for the Study of Architecture in Canada* 32 no. 2 (2007): 72.
- 16 The limestone quarried for the fortification wall project is presumed to have been extracted from Saint Helen's Island. See L.R. Batchelor, *Building the Walls at Montreal c. 1740*, April 1957. Painting. National Archives of Canada, no.1985-230 NPC.

- 17 René Chartrand, *French Fortresses in North America 1535-1763: Québec, Montréal, Louisbourg and New Orleans* (Oxford, UK, New York, NY: Osprey Publishing, 2005), 33.
- 18 Lambert and Stewart (eds.), *Eighteenth-Century Montreal*, 28.
- 19 "Fortifications and Building Sites," Discovering the Fortifications of Montreal and Its Building Sites, Old Montreal, accessed October 8, 2022, <https://www.vieux.montreal.qc.ca/fortif/eng/tracesa.htm>.
- 20 Canadian Society of Landscape Architects, "Restoration and Enhancement of the Archaeological Remains of Montreal's Fortification Walls," accessed July 21, 2022, <https://www.csla-aapc.ca/awards-atlas/restoration-and-enhancement-archaeological-remains-montreal-fortification-walls>.
- 21 Old Montreal, "Fortifications and Building Sites."
- 22 Natasha Iskander, *Does Skill Make Us Human? Migrant Workers in 21st-Century Qatar and Beyond* (Princeton, NJ: Princeton University Press, 2021), 9.

**Endnotes • Carving / Notre-Dame Church Mouldings and the Reassertion of Sulpician Rule, 1824**

- 23 Phyllis Lambert and Alan Stewart (eds.), *Opening the Gates of Eighteenth-Century Montreal* (Montreal and Cambridge: Canadian Centre for Architecture and MIT Press, 1992), 84.
- 24 Government of Quebec, "Société Notre-Dame de Montréal," Directory of Heritage Culture of Quebec, accessed May 13, 2022, <https://www.patrimoine-culturel.gouv.qc.ca/rpcq/detail.do?methode=consulter&id=15945&type=pge>.
- 25 Linda Tuhiwai Smith, *Decolonizing Methodologies: Research and Indigenous Peoples*, 3rd ed, (London, New York and Dublin: Bloomsbury Publishing Plc, 2021), 91.
- 26 Government of Quebec, "Société Notre-Dame de Montréal."
- 27 Ibid.
- 28 Society of the Priests of Saint Sulpice, "Montreal and Saint Sulpice," General Saint Sulpice, accessed June 6, 2022, <https://www.generalsaintsulpice.org/en/news/64-montreal-and-saint-sulpice>.
- 29 Brian Young, *In Its Corporate Capacity: The Seminary of Montreal as a Business Institution 1816-1876* (Montreal and Kingston: McGill-Queens University Press), 6.
- 30 Ibid., 7.
- 31 Ibid., 39.
- 32 Ibid., 171.
- 33 Lambert and Stewart (eds.), *Eighteenth-Century Montreal*, 82.
- 34 Young, *In Its Corporate Capacity*, 7.
- 35 Ibid., 62.
- 36 Ibid., 70.
- 37 Ibid., 18.

- 38 Lambert and Stewart (eds.), *Eighteenth-Century Montreal*, 82.
- 39 Jean-Claude Marsan, *Montreal in Evolution: Historical Analysis of the Development of Montreal's Architecture and Urban Environment* (Montreal: McGill-Queen's University Press, 1990), 101.
- 40 Marsan, *Montreal in Evolution*, 104.
- 41 Franklin Toker, *The Church of Notre Dame in Montreal: An Architectural History*. 2nd ed. (Montreal: McGill-Queens University Press, 1991), 52.
- 42 Toker, *The Church of Notre Dame*, 43.
- 43 Ibid., 29.
- 44 Ibid., 29.
- 45 Ibid., 59.
- 46 Young, *In Its Corporate Capacity*, 160.
- 47 Ibid., 100.
- 48 Toker, *The Church of Notre Dame*, 40.
- 49 Jeff Yates, "The Hidden Legacy of Montreal's Old Quarries," *Métro*, April 28, 2016, <https://journalmetro.com/actualites/montreal/955646/lheritage-cache-des-anciennes-carrieres/>.
- 50 Young, *In Its Corporate Capacity*, 64.
- 51 Ibid., 21.
- 52 I use "basilica" to describe the current status of the Notre-Dame Church after being designated a minor basilica by the Pope in 1982.
- 53 Jason W. Moore, "The Capitalocene Part I: on the nature and origins of our ecological crisis," *The Journal of Peasant Studies* 44 no. 3 (2017): 600.

**Endnotes • Casting / Habitat 67 Precast Concrete and the Growth of Industry, 1964**

- 54 "1867 - The Dominion of Canada Is Created on July 1," Legislative Assembly of British Columbia, accessed December 3, 2022, <https://www.leg.bc.ca/dyl/Pages/1867-Dominion-of-Canada-Created-July-1.aspx#:~:text=1867%20%2D%20The%20Dominion%20of%20Canada%20is%20Created%20on%20%80%8B%E2%80%8B%E2%80%8B%E2%80%8B,Canada%20on%20July%201%2C%201867.>
- 55 Deborah Cowen, "Following the Infrastructures of Empire: Notes on Cities, Settler Colonialism, and Method," *Urban Geography* 41 no. 4 (2019): 3.
- 56 Adrian Gamble, "Expo 67 a Hallmark of Canadian Optimism and National Pride," *Skyrise Cities*, April 17, 2017, <https://skyrisecities.com/news/2017/04/expo-67-hallmark-canadian-optimism-and-national-pride.26520>.
- 57 "Nationalist Passions: Canadians Toast Their Country While Quebecers Embrace Their Own Nation," CBC Learning, accessed January 26, 2023, <https://www.cbc.ca/history/SECTIONSE1EP16CH1LE.html>.

- 58 While geologist M.F. Goudge analyzed the limestone industry and "industrial life" of Canada during the rise of industry in the early twentieth century, limestone products such as cement and quicklime were also being exported to the United States, Dominican Republic, Venezuela, and other countries. See *The Canadian Mineral Industry in 1950* (Ottawa ON: Canada Department of Mines and Technical Surveys, 1952), 76, 96; M.F. Goudge, *Limestones of Canada: Their Occurrence and Characteristics Part III Quebec* (Ottawa ON: Department of Mines and Technical Surveys, 1935), ix.
- 59 Van Ginkel Associates were leaders in developing proposals for the Mackenzie Valley Pipeline project, an extractive infrastructure of the Canadian nation-state. See Jordan Kinder, Endriana Audisho, and Michael Moynihan "In absence of...everyday truths," Canadian Centre for Architecture, accessed July 25, 2022, <https://www.cca.qc.ca/en/articles/72631/in-absence-of-everyday-truths>.
- 60 Inderbir Singh Riar, "Expo 67, or the Architecture of Late Modernity," Doctoral Thesis (New York NY: Columbia University, 2014), 2.
- 61 "Expo 67," Parc Jean-Drapeau, accessed September 28, 2022, <https://www.parcjeandrapeau.com/en/expo-67-universal-exposition-montreal/#:~:text=The%201967%20International%20and%20Universal,million%20visitors%20in%20six%20months.>
- 62 Riar, "Expo 67," 6.
- 63 Pierre Dupuy, "Souvenirs D'Expo 67," *Perspectives, La Presse* 14 no. 7, February 12, 1972, 3.
- 64 Edward Jae Hamilton, "Ceci n'est Pas Un Parc: Reconsidering the Island of Site of Expo 67," Master's Thesis (Waterloo, ON: University of Waterloo, 2011), 38.
- 65 Yves Jasmin, *La Petite Histoire d'Expo 67: L'Expo 67 Comme Vous Ne l'avez Jamais Vue* (Montreal, QC: Éditions Québec/Amérique, 1997), 55.
- 66 Hamilton, "Ceci n'est Pas Un Parc," 39.
- 67 P. Laprise, *The Montréal Métro* (Montreal QC: Planning Department, Montréal Urban Community, 1976), 3, accessed December 27, 2022, <https://numerique.banq.qc.ca/patrimoine/details/52327/3446607>.
- 68 Riar, "Expo 67," 62.
- 69 André Lortie, ed., "Learning from Montreal," In *The 60s: Montreal Thinks Big* (Montreal QC: Canadian Centre for Architecture, 2004), 152.
- 70 Dupuy, "Souvenirs," 3.
- 71 Craig Baird, "Expo 67," Canada: Canadian History Ehx, accessed September 13, 2022, <https://canadaehx.com/2022/05/14/expo-67/>.
- 72 Lucette Lupien and Liliane Racine, "Cité Du Havre: A Neglected Gem," Montreal QC, 2019, 8.
- 73 Réjean Legault, "The Making of Habitat 67: A Tense Pas de Deux between Moshe Safdie and August Komendant," *Journal of the Society for the Study of Architecture in Canada* 46 no. 1 (2021): 36.

- 74 August Komendant, "Komendant, Letter to Safdie, April 11, 1964," *August Komendant Archival Collection*.
- 75 Legault, "The Making of Habitat 67," 34.
- 76 Jan Komocki, "Structural Design of Habitat '67," *PCI Journal* 12 no. 1, (1967): 67.
- 77 Legault, "The Making of Habitat 67," 36.
- 78 Riar, "Expo 67," 363.
- 79 "Habitat 67," Canadian Precast Prestressed Concrete Institute, accessed November 27, 2022, [https://www.cpci.ca/en/about\\_us/project\\_month/may\\_2009/](https://www.cpci.ca/en/about_us/project_month/may_2009/).
- 80 "Francon, Heart of Our Neighbourhood: Rehabilitation Project of Francon Quarry," *Vivre Saint Michel en Santé*, Montreal QC, 2018, 1.
- 81 Legault, "The Making of Habitat 67," 38.
- 82 Henri Rinfret, *Quarry Exploitation Report GM 14186: National Quarries Ltd* (Quebec QC: Ministry of Natural Resources, 1964), 4.
- 83 Ibid.
- 84 Legault, "The Making of Habitat 67," 42.
- 85 Description of quarrying and wet process of making cement in Goudge, *Limestones of Canada*, 113.
- 86 "Stone Quarries 1964," Dominion Bureau of Statistics: Manufacturing and Primary Industries Division, Ottawa ON, 1968, accessed November 28, 2022, [https://publications.gc.ca/collections/collection\\_2018/statcan/26-217/CS26-217-1964-eng.pdf](https://publications.gc.ca/collections/collection_2018/statcan/26-217/CS26-217-1964-eng.pdf).
- 87 "Habitat of the Future," Safdie Architects, accessed February 2, 2023, <https://www.safdiearchitects.com/practice/habitat-of-the-future>.

**Endnotes • Exhibiting / Palais de la Porte Dorée Bas-Reliefs and the "Legitimization" of Colonization, 1928**

- 88 Pap Ndiaye, "The Colonial Exhibition of 1931," Palais de La Porte Dorée, accessed September 22, 2022. <https://monument.palais-portedoree.fr/le-contexte-colonial/l-exposition-coloniale-de-1931>.
- 89 Dialla Konate, "In the Bois de Vincennes, the Thorny Dossier of Abandoned Colonial Remains," *Télérama*, June 15, 2022, <https://www.telerama.fr/sortir/vestiges-des-expositions-coloniales-au-bois-de-vincennes-est-ce-ainsi-que-l-histoire-s-oublie-7010907.php>.
- 90 Patricia A. Morton, "National and Colonial: The Musée Des Colonies at the Colonial Exposition, Paris, 1931," *The Art Bulletin* 80 no. 2 (1998): 357.
- 91 Marcel Olivier, *Le Livre d'or de l'Exposition Coloniale Internationale de Paris 1931*, edited by Exposition coloniale, (Paris: Librairie Ancienne Honoré Champion, 1931), 11. Accessed online September 9, 2022, <https://numba.cirad.fr/ark:/12148/bpt6k1100257w/f13.item.textelimage>.
- 92 Morton, "National and Colonial," 362.
- 93 Ibid., 360.

- 94 Ibid., 363, quoting Albert Laprade, "Mementos," ANP, Fonds Laprade, only available in archives.
- 95 Association Alfred Auguste Janniot, "Alfred Auguste Janniot 1889-1969," accessed September 27, 2022. [http://www.janniot.com/accueil\\_ev.html](http://www.janniot.com/accueil_ev.html).
- 96 Morton, "National and Colonial," 367.
- 97 Ibid.
- 98 Newfoundland & Labrador, "5 Really Cool Things about Saint-Pierre and Miquelon," Newfoundland & Labrador Canada, accessed April 1, 2022, <https://www.newfoundlandlabrador.com/trip-ideas/travel-stories/5-really-cool-things-about-saint-pierre-and-miquelon>.
- 99 Paul A. Silverstein, "Mi-Sauvage, Mi-Barbare: The Modern Politics of Berber Autochthony," *Etnofoor* 22 no. 2 (2010): 14.
- 100 Patrick Webb, "Hydrated Lime vs Hydraulic Lime," Traditional Building, May 13, 2020, <https://www.traditionalbuilding.com/opinions/hydrated-vs-hydraulic-lime>.
- 101 Civet, Pommier & Cie, "Correspondence between Albert Laprade and Civet, Pommier & Cie Quarries," Paris, France, 1929, Palais de la Porte Dorée Archives courtesy of Christine Piqueras.
- 102 EuLA, "Hydrated Lime: Properties," Hydrated Lime: A Proven Additive for Durable Asphalt Pavements, accessed October 9, 2022, [https://britishlime.org/documents/2011\\_12\\_EuLA\\_Aspalt\\_literature\\_review\\_UK.pdf](https://britishlime.org/documents/2011_12_EuLA_Aspalt_literature_review_UK.pdf).
- 103 Civet, Pommier & Cie, "Correspondence," Palais de la Porte Dorée Archives.
- 104 Ndiaye, "The Colonial Exhibition of 1931."
- 105 Ibid.
- 106 Farah Nayeri, "In a Palace of Colonialism, a 'Quiet Revolutionary' Takes Charge," *New York Times*, March 17, 2021, <https://www.nytimes.com/2021/03/17/arts/design/pap-ndiaye-palais-de-la-pont-doree-immigration-museum.html>.
- 107 Françoise Vergès and Seumboy Vrainom: €, *De La Violence Coloniale Dans l'espace Public: Visite Du Triangle de La Porte Dorée à Paris*, (Marseille, France: Shed Publishing, 2021), 118.

**Endnotes • Extracting / Francon Quarry Wall and the Mutating Quarry Effect, 2022**

- 108 Jarrett Martineau, "Creative Combat: Indigenous Art, Resurgence, and Decolonization," Doctoral Dissertation (Victoria, BC: University of Victoria 2015), 106.
- 109 Shiri Pasternak, *Grounded Authority: The Algonquins of Barriere Lake Against the State*, (Minneapolis and London: University of Minnesota Press, 2017), 234.
- 110 In Pierre Bélanger's edited book, *Extraction Empire*, Canada is centred as a global resource empire. See Pierre Bélanger ed. *Extraction Empire: Undermining the Systems, States, & Scales of Canada's Global Resource Empire, 2017-2017* (Cambridge MA: MIT Press, 2018).

- 111 T.H. Clark, "Geological Report 46: Montreal Area Laval and Lachine Map-Areas," Province of Quebec Department of Mines, (Montreal QC: Rédempti Paradis, 1952), 7.
- 112 Yves Desjardins, "Chapter 2: From the Bélair Tannery to Côte-Saint-Louis Village," Mile End Memories, February 20, 2014, <http://memoire.mile-end.qc.ca/en/chapitre-2-de-la-tannerie-des-belair-au-village-de-cote-saint-louis/>.
- 113 Francon Quarry was named after James Franceschini who acquired it in 1929, combining the first syllable of his last name and the first syllable of "concrete" to form "Francon." Originally named Dupré Quarries and eventually National Quarries Ltd., the quarry underwent many changes to ownership. See "Francon Quarry 1920s to 1980s," The Archive Scavenger, accessed May 28, 2022, <https://lefarfouilleurdarchives.wordpress.com/portfolio/carriere-francon/>.
- 114 Henri Rinfret, *Quarry Exploitation Report GM 14186: National Quarries Ltd* (Quebec QC: Ministry of Natural Resources, 1964), 3.
- 115 Violet Jolivet and Marie-Noëlle Carré, "Urban Metabolism and Pericentral Neighborhoods in Metropolisation: The Example of the Saint-Michel District in Montreal," *CyberGeo: European Journal of Geography*, accessed November 7, 2022, <https://journals.openedition.org/cybergeogeo/28067?lang=en>.
- 116 *The Canadian Mineral Industry in 1950* (Ottawa ON: Canada Department of Mines and Technical Surveys, 1952), 76.
- 117 L.S.-A. Proulx, *Report on Mining Operations in the Province of Quebec During the Year 1920* (Quebec QC: Department of Colonization, Mines and Fisheries, 1921) 101.
- 118 Catherine Trudelle, JL Klein, J.-M. Fontan, and D.-G. Tremblay, "Urban Conflicts and Socio-Territorial Cohesion: Consensus Building and Compromise in the Saint-Michel Neighbourhood in Montreal," *Canadian Journal of Urban Research* 24 no. 2 (2015): 142.
- 119 Jolivet and Carré, "Urban Metabolism and Pericentral Neighborhoods."
- 120 40% of the city's total snowfall is transported by dump truck to Francon Quarry each winter. See Sacha Obas, *Where Does All the Snow Go?* Beside Magazine, accessed August 7, 2022, <https://beside.media/stories/where-does-all-the-snow-go/>.
- 121 Descriptions provided to me by a member of Montreal's public works department.
- 122 Vivre Saint-Michel en Santé, *Francon, Le Pas de plus - À La Découverte d'un Site Exceptionnel de l'Est de Montréal*, YouTube, accessed February 17, 2023, <https://www.youtube.com/watch?v=TS8l09gTsgs&t=164s>.
- 123 Sacha Obas, "St-Michel Residents Demonstrate over City's Plans for Francon Quarry," Montreal Times, November 9, 2019, <https://mtltimes.ca/montreal/st-michel-residents-demonstrate-over-cityaes-plans-for-francon-quarry/>.
- 124 Monique Beaudin, "Site of Montreal's new park is a dump, literally," Montreal Gazette, January 29, 2012, <https://montrealgazette.com/news/local-news/site-of-montreals-new-park-is-a-dump-literally>.
- 125 Rue des Carrières in the Rosemont district represents another example amongst many of an entire neighbourhood razed over by the City of Montreal following the end of quarrying activity in Mile End. See Isabelle Caron, "Des mémoires "à excaver" interpréter la présence des carrières de pierre grise à Montréal," *Journal of the Society for the Study of Architecture in Canada* 27 no. 3-4 (2002): 18.
- 126 Ann Laura Stoler (ed.), "Intimidations of Empire: Predicaments of the Tactile and Unseen," *Haunted by Empire: Geographies of Intimacy in North American History* (Durham and London: Duke University Press, 2006), 7.
- 127 Ibid., 14
- 129 Lafarge Quarry in Montreal-East remains active, with blasting season commencing in the spring each year. Lafarge Quarry was owned by the same operators as Francon Quarry, becoming an affiliate limestone production site. See "Lafarge Montreal East quarry," mindat.org, accessed October 22, 2022, <https://www.mindat.org/loc-107067.html>.
- 130 Land Back Initiatives on unceded Mohawk territory in Montreal and Kahnawake continue to challenge development proposals and settler encroachment on their ancestral territory. See Ka'nhehsí:io Deer, "What Land Back Means for This Reclamation Camp," CBC News, July 18, 2021, <https://newsinteractives.cbc.ca/longform/what-land-back-means-for-this-reclamation-camp-in-kahnawake/>.
- 128 Ibid., 13.

## Disrupting Extractive Futures



"Things are different for this Kwezens. She has already spent seven years immersed in a nest of Nishnaabeg intelligence. She already understands the importance of observation and learning from our animal teachers, when she watches the squirrel so carefully and then mimics its actions. She understands embodiment and conceptual thought, when she then takes this observation and applies it to her own situation – by making a cut in the maple tree and using a cedar shunt. She relies upon her own creativity to invent new technology."

Leanne Betasamosake Simpson

*Land as pedagogy: Nishnaabeg intelligence and rebellious transformation, 2014<sup>1</sup>*

Spaces of knowledge production became an underlying constant to this body of research as they have historically influenced colonial material ideologies, and currently have potential to inform decolonial material practices. The impacts that spaces of design and knowledge production have on material practices and relations to land are explored in David Fortin's concept of the "Design Lodge." The Design Lodge explores how spaces for architectural production and learning can begin to incorporate spiritual aspects to shift away from object- and human-centred design and to reconcile our relationship with the land. Fortin compares the First Nations and Métis lodge with the lodge of the settler Freemasons and asks how the dissemination of knowledge from within these two types of spaces has informed similar spiritual and material practices amongst both groups. Fortin describes that "One of the closest links between Freemasonry and Indigenous ceremony is evidenced by the Midewiwin of the Chippewas, also known as the Grand Medicine Society, who similarly developed lodges that, like the Freemasons, include a series of degrees that act as spiritual thresholds, while the construction and occupation of their "lodges" are also intimately linked to their teachings."<sup>2</sup> Material practices emerge as both a similarity and a point of departure between both cultural groups, as stone extraction becomes less about reciprocal relationships with land when contrasted with the harvesting of wood for the Indigenous ceremonial lodge.

Fortin's broader definition of the Design Lodge as a space where design knowledge is shared in relation to community and land sets forth a prompt for understanding how the architect's relationship with material could begin to encompass all life and non-life if only the spaces where design is taught deprioritized material as commodity.<sup>3</sup> In the work of John-Philippe Smith, Dominion Sculptor of Canada, and Anna Saint-Pierre, designer and doctoral researcher, spaces of collaboration and learning become integral to their respective practices. For John-Philippe Smith, working directly with members of the Indigenous Peoples Sculptors Program will inform future work on the Centre Block project amongst other stone works at Parliament. While the title and work of Dominion Sculptor is inherently extractive, suggesting control and power over the geologic and the creation of

dominant colonial material practices, these collaborations between Indigenous sculptors and Smith's team will inform new material identities going forward. Anna Saint-Pierre's work asks us to consider how material memory can be transformed through material re-use, and provides a precedent for breaking down and transforming geologic materials that have historically reflected patriarchal values in France.

If Chapter 2 of the thesis institutes a reminder of the effects of colonial extractivism, Chapter 3 asserts resistance to extractive futures which is presently evolving in various forms. I was interested in speaking to John-Philippe Smith and Anna Saint-Pierre as their work provides tangible examples of adjusting material practices to transform societal values inscribed in stone and of the importance of creating space for collaborative knowledge production. Following investigations into the extractive colonial history between France and "New France," understanding what initiatives are presently taking place to move beyond extraction within the "extraction empires" of Canada and France became an important dimension to explore. The following two conversations position stone as having potential to inform processes of decolonization and reconciliation when various cultural voices are in dialog and non-extractive design approaches are developed.



fig. 3.1 Excavations at the Centre Block project at Parliament Hill, Ottawa, ON.

## A Conversation with John-Philippe Smith, Dominion Sculptor of Canada

The act of carving stone is one of permanence. When telling the story of an entire country, how can stone represent a constantly evolving history, and what cultural context gets included? In the following conversation, John-Philippe Smith, Dominion Sculptor of Canada, describes his stone cutting education<sup>4</sup> and involvement in the Centre Block project at Parliament Hill in Ottawa. The project will be Canada's largest and most complex rehabilitation project involving the restoration, refurbishment, and replacement of approximately 365,000 structural and ornamented building stones.<sup>5</sup> John-Philippe explains his vision for a more equitable collaboration amongst his in-house team of stone carvers and members of the House of Commons' Indigenous Peoples Sculpture Program.<sup>6</sup> Out of this collaboration would come contributions to the Centre Block building's traditional heritage carvings and to the new Parliament Welcome Centre, which offers a modern infrastructure and further creative possibilities for the sculptors.

**Madeleine Reinhart: Did you spend any time in France throughout your education, or was it a component of your education in Canada to visit France to learn from their techniques?**

John-Philippe Smith: The reason I went to France was really because I felt that I was kind of limited here in Canada. I came to it in Canada understanding that there was a lot of knowledge I didn't have access to. There's a visa that you can get to go work in France, Visa Vacances-Travailes, and you have up until you're 35 years old to do it. And I was just turning 35, so I said, OK, this is my chance, I've got to go. I got the visa, went to France, and I spent about two weeks walking around Paris trying to find a job site. I had a list of the top five companies I wanted to work for, number one was Atelier Jean-Loup Bouvier, and I was like, they're top in the country, I'm not even going to approach them. There's a bit of an interesting story there, how I actually ended up working with them, but I did. I ended up working with them in Avignon, and my experience there was just absolutely mind blowing. You could see and feel a craft that was so well nurtured and based on hundreds of years of knowledge that is being passed down. [In Canada], I'd worked on projects, and you know, oftentimes they'd say, "Oh, yeah, we worked on this wing of this building. It's from the 60s, that's from the 70s." [In France], you're talking in hundreds of years. This is from the 14th century; this is from the 16th. And they have their tools, they say, "these tools are specific to this period." The knowledge base there, it was unreal. But interestingly enough, they explained to me that within France's history, they've had periods where the trade disappeared as well, time and time again, and they've had to rediscover it as well.

**I wanted to ask you about the stone rehabilitation component of the Centre Block project. It sounds like a huge project, and I was reading that there were 365,000 stones that were being rehabilitated and I was wondering, is most of that really refurbishing existing material or is a lot of that being replaced?**

Yeah. The focus is always to preserve and maintain as much of the original fabric as possible. It's only on a very last-case scenario where you would look at replacing the stone, very much to basically maintain as much of the original fabric so there's not that much replacement that happens.

**I understand that part of this project entails representing the Indigenous peoples of Canada through stone. I'm wondering what you're imagining for the future of that component of the project.**

A part of my work is also looking at new works. And that's been the role of the Dominion Sculptor from its inception in the 1930s. When the architect [John Andrew] Pearson designed and created the Parliament buildings as we have it today, the idea was to leave the blocks in the interior uncarved. There were literally thousands of blocks that are part of the architecture and at their base, they're architectural features, so whether it's a voussoir or a keystone or a label stop, they all have a function. But they had projections that were left square, and it looked kind of odd, but they were earmarked for future carvings. So along comes the Dominion Sculptor, and at the time it was [Cléophas] Sousy, and he had a team of carvers and they started carving all kinds of different things that relate to the Crown, to the provinces, to flora and fauna. And that program has continued generation after generation. And today, there are only 188 original blocks from the Pearson era that remain uncarved.

So at this time, thanks to the Centre Block project, there's a great opportunity here. We're looking at different ways to carve some of these blocks and particularly the ones that are in very hard-to-reach areas and prioritizing those. Understanding that there have been Indigenous works that have been incorporated in the building through the Indigenous Peoples Sculpture program...a bit of history on that. In the late 1970s, the Member of Parliament, Métis Member of Parliament, [Walter] "Wally" Firth, proposed to the speaker at the time, James Jerome, to create the Indigenous Peoples Sculpture program, and the idea was to integrate pieces that were created by Indigenous carvers directly into the walls of Parliament. So that has happened, and they earmarked ten tympanum stones over some of the doorways in the House of Commons foyer. Nine have been carved to date. So that leaves one.

There are limitations with the blocks that remain, not only for that particular block. I mean, how does the program continue after? A lot of the blocks that are left with 188 are very small blocks and they're kind of hard to see, so you can't really carve these big themes or

these bigger or more elaborate pieces. So right now, we're looking at different opportunities in the totality and also the opportunities that we may be presented in the new architecture underneath the Parliamentary Welcome Center. But, moving forward for my team and the program, the one thing that I always really cherish the most for myself personally in the trade, was being able to learn and collaborate with people from all over the place. When I learned about the Indigenous Peoples Sculpture Program, one thing that I kind of found was unfortunate is that the stones were sent to the Indigenous carvers, they would carve them in their studio, and they would send [the stones] back to Parliament, and there was never a discussion or the opportunity to share with the carvers on Parliament or with the Indigenous carvers. The piece showed up and it went in the wall, and they never met. So moving forward for me, I think it's really important that any pieces that are done as part of the base building structure be done in a collaborative environment where we can meet, number one, and have a discussion and see how we can develop some really amazing, exciting projects together.

With that, we've developed an initiative where we will be hiring Indigenous carvers as part of our team to come on board and be part of the of the Dominion Sculpture team and work together, and once these opportunities arise, then there would definitely be opportunity for them and other Indigenous artists as well to draw from their own art and create some pieces that are really going to be important for the future of the building, for sure. I think it's possibly the most exciting time since the original construction. There's just so much opportunity right now, it's hard to keep track of. But I think having carvers as part of the team as well as looking to also bring on independent carvers or artists and Indigenous artists as well to collaborate for design and new works is really the path forward.

**When you mentioned the 188 remaining blocks that are in the Centre Block building, I'm wondering if you're limited to those blocks on this project or if there's an opportunity to have further carvings that are collaborative, between Indigenous sculptors and your team. And I'm wondering how much time you think it would take to complete that project of those 188 blocks. It seems like there could be a whole evolution that takes place over the next century even, because it's been over a century since the building was initially built.**

The 188 blocks, given that they're part of the original Pearson program, a decorative program, there's no way that I'm going to be carving all of them within my tenure. They're going to be wanting to keep some for the future generations. So we'll carve some where it makes sense to carve them because we've got scaffold right at the ceiling level, that's not going to happen again for maybe another 100 years so let's carve those. And then after that, we'll see what opportunities present themselves with those pieces in particular, but I will say that there are tremendous opportunities for securing the future of the program with uncarved blocks in other spaces and that's something that we're actively looking at now. This is going to be quite a long project. I believe I keep hearing ten years before the building's done, but the idea also is to keep in mind that we will start some of the conservation and replacement work. There are a lot of exterior pieces that need replacement and we carve those, we basically replicate what was there. But with the new opportunities, we'll probably start with some of them for sure, but also to keep in mind that once the restoration project is done, the Dominion Sculpture Program continues as it always has, so we will continually look at ways to secure blocks for the future. We're continuing the carving process to be able to continue to tell the story of Canada as it as it progresses.

**On that note of this evolving story of our country, how do you decide what cultural context gets carved into stone? It seems like the act of carving into stone is something that is so permanent. Because our story is evolving so much, are there components that will be replaced or edited? And for future stones, how do you decide what to represent?**

Those are some very big questions and stuff that we're actively looking at, and it's not left up to me. There's a lot of people that are partners that are consulted with and we look at this very closely. Carving and stone is something that's very permanent and if you look back historically it's been used as something by all kinds of different civilizations for different purposes, for creating a mark or a place of passage like, "We were here," kind of thing, or "This who we were at this particular time." Now Canada is a different place than it was in the 1920s when this building was being constructed, so there's a lot of different views and different perspectives and different engagement and collaboration opportunities that we need to do and that we want to do and that probably should have been done a long time ago for sure...well that *definitely* should have done a long time ago. Really all I can say is that it's really moving in a positive direction, and I'm really excited about it and we're doing what we can in our team to kind of prepare for this, and that includes having Indigenous artists as part of our team and part of that design process to be working and sharing together.

The idea again that comes back to sharing is, it's always been the importance of craft fellowship. I feel like there's a way of coming together there, that's just an appreciation that artists or craftspeople have between each other based on the knowledge of like, "Hey, this is how you work a piece of raw material from planet Earth, and this is how I work a raw material from planet Earth." And, "Oh, I like that chisel," and "That's kind of cool what you're doing there with this," so that's the most exciting part for me. And this is experience that I've had personally working in Europe or even in Southeast Asia, just meeting some of the carvers there, that fascinates me, and I think that there's a great opportunity here to work with Indigenous people, the Indigenous artists, and have conversations and just say, "Hey, what are you doing?" and just coming together and making something that's really unique and beautiful.

**You just mentioned that while you're collaborating with other stone carvers, whether you're in Europe or Southeast Asia or in Canada, this sense of collaboration allows you to learn new techniques or new tools. And I'm wondering what the outcome is of what you're carving. When you're carving for the Parliament, for example, what kind of creative freedom do you have to carve something that *you* envision versus following a style that needs to be preserved within the heritage buildings.**

So pieces that are within Centre Block and I would say these 188 blocks, it's difficult because it's a very Gothic building, like it's just Gothic ornamentation everywhere, and different Dominion sculptors have pushed the boundaries to a certain extent. But then we have the Indigenous Peoples Sculpture Program. Those are pieces that absolutely have nothing to do with Gothic architecture, but they do fit in quite nicely. So that'll be interesting to see how and what we can do within the limited parameters of those particular stones, again the size and location. But I also think that what's really exciting is the new spaces, because these are modern, contemporary spaces where we're not restricted so much or feel the weight of having to carve in the Gothic style. They drop that off and leave that at the door and you've got a whole new kind of world ahead of you, or a whole new canvas, rather. And what is that going to look like? I still don't know. We're looking at different ideas for different styles and moving forward, but certainly, whatever it is, it'll be something that for me will definitely be important to collaborate with Indigenous people to figure that out and have them be part of that process.



fig. 3.2 Exhumed stones from the basements of historic buildings, sliced and crushed to be used as opus and granito's aggregates.

## A Conversation with Anna Saint-Pierre, Designer and Doctoral Researcher

In the research of Anna Saint-Pierre, buildings themselves become quarries, providing a direct resource for in-situ recycling of deep-time materials like granite and limestone at the end of a building's lifecycle. Anna is a designer and doctoral researcher based in Paris, France, and through her studies in design at École nationale supérieure des Arts Décoratifs (EnsAD), she has researched the preservation of architectural materials and the positive cultural implications of re-use as opposed to extraction. In an urban environment such as Paris where restoration of heritage buildings is a constant concern, Anna proposes a reinterpretation of what is considered architectural "heritage." Through the transformation of materials sourced directly at the demolition site into hybrid materials that introduce new construction and fabrication methods, a sense of material belonging in the urban context is maintained, while the need for new materials to be extracted is minimized. While many architects in Paris are returning to limestone construction to support the local quarrying industry and to shift away from building with carbon-intensive materials like concrete, Anna Saint-Pierre argues for an even more local and less carbon intensive method she calls "in-situ recycling."<sup>7</sup>

**Madeleine Reinhart: I'd like to begin by speaking about the concept of heritage, both at the architectural and material scale. Your work is mostly based in Paris, where there is an abundance of so-called "heritage materials," and so much architectural work is about preserving a sense of the past, even when a new building is proposed. I'm wondering if you could describe how your research has led you to find a balance between preserving urban heritage while proposing a new and hybrid way to represent the city's material identity.**

Anna Saint-Pierre: In fact, I worked with these topics of research when I was in Master's, but in textile and material design in the School of the Decorative Arts of Paris. I started by observing that if you begin by decontextualizing the building, completely removing it from its environment or the space that would have surrounded it, we can call upon the knowledge of geologists, historians, and sociologists to identify its date of construction and its site of construction thanks to the learned study of the building's materials and their composition, precisely because we know that during a certain period of time, we used the material that we had under our feet in the region. After that period, we opened channels like railroad networks, train lines, or sea transport which allowed us to seek materials at a further distance.

My hypothesis is to say that if we were to do the same thing with the demolition of a building at the construction site - let's imagine that we have a building that has disappeared and that we have just these demolition bins and fragments of the building - in the same way, we will be able to restore it with the knowledge of the building's date of construction, its place of construction, and even perhaps its form with the processes of anastylosis, the archaeological technique of using fragments to recompose a building. From there, I continued and went to the sites and gathered, in French we say "fragments," and I brought them out from the rubble and back to the studio. The School of Decorative Arts is a design workshop, and I transformed the fragments with the idea to make something born from the rubble, from the rubble comes a new materiality which would have properties of textiles. These projects were my first projects, but these are still things that interest me a lot. But the idea I had was in relation to heritage. We are in an era of demolition, of the Anthropocene era, where entire buildings are being demolished even if things on the same site are only changing a little bit, where suddenly we are in

an era of "built memory"<sup>8</sup> where the memory of what was built is completely destroyed and what we are left with is rubble. Hence, the notion of "built memory" is reduced to the smallest scale of building materials, which is essentially the rubble material.

In my opinion, the notion of heritage is also expressed in the choice of materials. This connects to what I said earlier, that is to say that we can create an architecture thanks to these rubble materials. It involves architectural forms and therefore it creates atmospheres, and this is what is also imprinted in our memories. And there's another theme of heritage which is quite problematic in France. This is because heritage is linked to the question of patriarchy, the question of the "fatherland," therefore of the nation and the desire to glorify a fatherland. France is suddenly at the center of this history that is glorified, and the rest is discarded. These are topics that interest me a lot in my work, precisely to question this notion of heritage and to say that we can find qualities in other types of architecture that improve the very meaning of heritage.



fig. 3.3 Textile printed with stones (brick, millstone, Carrara marble and slate).



**The question of patriarchy and nationhood through material are themes that arise in my research as well, where limestone in Montreal becomes a colonial tool that is glorified in the same way as you just described. This brings me to my next question. When I was in Paris last summer, I noticed that limestone, gypsum, and other natural materials were popular amongst architectural exhibitions, and that many new buildings are being constructed with single materials like limestone, such as École-Evangile by TVK or Berrault Pressacco's housing project on rue Oberkampf. There is recognition in Paris and across France of the negative impact that the architectural industry has on the environment, yet a return to the extraction of culturally significant materials is still being celebrated. What do you foresee as the main challenge in convincing the industry that extraction is not the answer, and that re-use and recycling methods should be considered a primary building method?**

Well, that's quite a question! To which I don't have an answer. [Laughs] No, but I do... In my research work, I have identified a historical period in France where we have marginalized the techniques of reuse. In terms of actual numbers, we have very few statistics regarding the use of recycled materials, particularly related to the nineteenth century or the previous centuries. We don't have details on how much more reused materials are used than materials extracted directly from the ground in the nineteenth century, but in the twentieth century, after the Second World War, so in 1945, there was a whole period of great post-war reconstruction, which coincides with building techniques that have somewhat transformed the way of building.

After the war, the implementation of construction techniques that does not allow for dismantling begins. They used the type of cement that you see associated with bricks, for example, in an irreversible way rather than the lime mortar which allowed for deconstruction. And then there is also the influence of the architectural theories of the modernists, of Le Corbusier. Even if they were quite theoretical before the war, after the war, a space was created to discuss the bombings and their effects which allowed these theories to be put into practice. In the larger region of Le Havre a lot was bombed, but there was also a lot of space that was deemed to be toxic and so everything was razed and rebuilt. In Marseille, during the war, a whole section of the Old Port was demolished and Fernand [Pouillon], who was a

famous architect, built an entire housing development. In sum, we see an entire culture of this sort. But later the building codes changed and no longer favoured reuse. The architects and project managers have started to be more tempted by the idea, but they are beginning to understand that reuse may involve higher costs. This is because it likely involves employing old techniques, practices, and tools that no longer exist.

And then in terms of the industry; I think there is a lot of pressure to focus on the local, in terms of prioritizing autonomy when it comes to building materials, with the goal of not having to seek out resources elsewhere. From my perspective, I feel like it means that we are more likely to look for materials locally. We're going to look for local quarries, but not for very long necessarily, because it challenges the principle of an industrial economy. Often, there is this idea that in the past we used materials that were more "noble," even if this is debatable. I'm working on a project where there is a whole floor in mosaic which is magnificent, the question becomes whether to remove it and lay down a material that will cost the same — as you know there is always the issue of value and cost. So there is an ecological argument that can be advanced as well as an argument that relates to the quality of the materials. Both can be defended in my view.



fig. 3.4 Exhumed stones from the basements of historic buildings, sliced to reveal profiles when used as opus and granito's aggregates.

**I imagine that the architectural education is also a huge component, and the workshops that you organize with students to discover new ways of producing building materials is very inspiring. My next question for you is about how architects often reference the “genius loci” or cultural identity that architectural materials provide cities. In Paris, Lutetian limestone has become a heroic material that is greatly valued by society. Your work makes a strong argument that the same sense of “material belonging” can be achieved through recycling materials directly on-site, and I think you could even say it is even more culturally significant to re-use materials that have already had so many lives; from their original state as geologic strata to their movement and transformation into a building material, and then to be transformed once again into a hybrid material of old and new creates such a powerful material history. Could you speak to how this sense of material belonging informs the emphasis your research has on recycling or “quarrying” materials in-situ?**

With this type of approach, the in-situ reuse of the deposits of demolition is a bit like the mode of extraction, even if it can be problematic to use this type of term, because it's borrowing from a whole other culture. But what is interesting is that, from the material perspective, it is going to generate shifts according to the tools and methods that we are going to use, a little bit like in a quarry. As a result, the new methods will become inscribed in the new material that we will produce. For example, if we decide to remove a brick wall and to reuse the bricks, we might use a method of careful removal, but if we decide to deconstruct it with explosives, we will have brick dust and so on. If we use what we call a “crusher,” it will make fragments. So, there's a bit of this thing of inscribing the transformation of the material at the construction site and the mutation of the place in the material. Something that I also find interesting is that it is also a way of speaking about this moment which is extremely violent, because it often involves using huge amounts of energy, which is super significant because it makes the building site a site of incredible metamorphosis.

In the buildings made of stone it's true that there is something very direct which is perhaps also why it is celebrated. One really reads the strata of the stones and places them as they are naturally laid in beds to respect their direction of sedimentation. When we find fossils, we have a very direct knowledge between what happens during

the geologic transformation and in the building. There is another demolition material which also interests me which is concrete, but it requires a more specialized knowledge, perhaps because we can work it to a scale that is smaller. But this is just a guess because I haven't worked with it yet. If we slice concrete, we will be able to find its composition. In the same way, we are going to be able to discover its origin and make up, but it is a little less obvious. It is more subtle and requires gathering more knowledge which is perhaps less well known because concrete for a long time was not considered a heritage material, therefore it was not studied from a historical point of view, whereas today there are also specific programs on the restoration of places, so we are beginning to have more knowledge on this material.

**Have you experimented with limestone in Paris in a similar way, given its abundant use as a facade material, or do less limestone buildings get demolished seeing as they are considered “heritage”?**

That's very interesting, because it's true and I think it would deserve more in-depth research work. If we generalize, the core of the city center is preserved. Since these are sites with older buildings that are often better appreciated, they are part of the UNESCO heritage districts. The more you move away from the city center, the more you go towards materials that are more transformed, that are more modern. The cycle of demolition and reconstruction is much more frequent there, so there are fewer buildings made of limestone being demolished.

I had done a project with the School of Architecture of Versailles which is in the small stables of the castle of Versailles. It is a historical building



fig. 3.5 Limestone sculpture from the basement of Palais de l'Alma, eventually sliced and used as granito component.



fig. 3.6 "A visit to the cellar of the historic building of the Palais de l'Alma allowed us to select materials and sculptures deposited during restoration work that were otherwise intended for the dumpster. They were exhumed and used as materials to create a play area on the ground of the courtyard for the children of the nursery and the resident families. The excavated materials were cut into slices, sealed together with site concrete, then polished to reveal their profile."

which is [UNESCO] classified, and they restored the entire roof and the high elements which are built out of limestone. In doing so, all the old slate roofs were thrown out and replaced with new ones. More consideration should have been given to those ancient materials. In addition, the slate quarry where the original slate came from in France had closed, so a Spanish quarry supplied the slate for the roofs of the small stables. But there was also a lot of limestone being removed, and some with super beautiful ornaments. In general, it gets thrown away and often goes to landfills or gets crushed and used to cover roadways and that kind of thing. I think you're right that it is demolished less, but sometimes it still does, especially on heritage sites where there are sculptures. I'm going to do a screen share.

I'm working on a project for the Chamber of Notaries with an architectural firm called Senzu, we haven't communicated too much about the project because we are tendering for the companies, but it is something that is in progress. So you see, these are the elements of the facade that will be reintroduced. We did a site survey of the different blocks according to their stone type because what's also incredible is that we don't use the same stones for the same purpose depending on the period. We had to retrace the origin of the materials and we cut them into slices to make a sort of open book [terrazzo] parcel on the ground. The most interesting part is to find the profiles of the bas-relief carvings of the facade, so it becomes clearer when it is sliced.

I did this in connection to another project for a nursery school in an historic building at Palais de l'Alma. In the basement of the building there were plenty of materials including a limestone sculpture. In the end everything was used incrementally and reintroduced into the project with the idea of being able to identify the profile of the stones. You can see here some of the limestone materials. There are plenty of other ways to appreciate these materials, but I think it's funny that it's always heritage sites that are [UNESCO] classified and frankly, I've never had any other opportunities to work with this type of material. Each time, it's on heritage sites where we've maybe removed the spandrels under the windows, whereas a concrete building isn't the same at all. There should be the same attention for concrete.

#### Endnotes • A Conversation with John-Philippe Smith

- 1 Leanne Betasamosake Simpson, "Land as Pedagogy: Nishnaabeg Intelligence and Rebellious Transformation," *Decolonization: Indigeneity, Education & Society* 3 no. 3 (2014): 6.
- 2 David Fortin, "The Design Lodge: A lexical shift towards life-centred architectural pedagogy," *Enquiry The ARCC Journal for Architectural Research* 19 no. 1 (September 2022): 52.
- 3 In 1939, T.H. Clark and Léo Morin, geology professors from the University of Quebec in Montreal, proposed that the Martineau limestone quarry become Montreal's first geologic park. Rather than observing rock samples and fossils in museums, the public would acquire an in-situ education of the city's geology where the Chazy, Black River, and Trenton formations, once the most sought-after beds of building stone in the city become visible, converting a space of extraction into a space for geologic and material education. See Isabelle Caron, "Des mémoires "à excaver" interpréter la présence des carrières de pierre grise à Montréal," *Journal of the Society for the Study of Architecture in Canada* 27 no. 3-4 (2002): 22.

#### Endnotes • A Conversation with Anna Saint-Pierre

- 4 See Appendix for full conversation and more information regarding John-Philippe Smith's stone carving education and experience working with his team at the Parliament.
- 5 "About the Centre Block Project," Government of Canada, accessed January 9, 2022, <https://www.tpsgc-pwgsc.gc.ca/citeparlementaire-parliamentaryprecinct/rehabilitation/edificeducentre-centreblock/apropos-about-eng.html>.
- 6 The Indigenous Peoples Sculpture Program was established in 1978 with the aim to diversify Canada's cultural heritage in Centre Block. See "Indigenous Peoples Sculpture Program," House of Commons Canada, accessed January 15, 2023, [https://www.ourcommons.ca/About/HistoryArtsArchitecture/heritage\\_spaces/foyer/stone/indigenous/indigenous-e.htm](https://www.ourcommons.ca/About/HistoryArtsArchitecture/heritage_spaces/foyer/stone/indigenous/indigenous-e.htm).
- 7 See Appendix for full conversation.
- 8 "Built memory" is a direct translation of the French "mémoire bâti."



## Conclusion

Throughout my architectural education and professional experience, I have become accustomed to developing design proposals for sites that I bear no personal connection to, having rarely been given the chance to visit sites in person more than once, if at all. I chose to research limestone in the French-colonial context of Montreal because it felt familiar after living in Montreal and Paris for extended periods of time, while at the same time presenting the unfamiliar challenge of thinking through contested landscapes by foregrounding material. Thinking through limestone allowed me to become more attuned to the expanded entanglements construction materials have to political systems of governance, Indigenous land rights, and the organization of labour to extract, transport, and assemble materials. This research also brought to my attention the inherently extractive state of the architecture industry and of many architects who, like me and my experience as an intern architect, typically have little or no relationship to the land they are designing for and extracting materials from. In the context of this research, Gaspard-Joseph Chaussegros de Léry, the engineer for Montreal's fortification walls, James O'Donnell, the architect of Montreal's Notre-Dame Basilica, and August Komendant, the structural engineer for Habitat 67, were all experiencing the landscape and limestone of Montreal for the first time. The impact of specifying materials without knowledge of their expanded relationships with land, people, and other species has consequences towards Indigenous communities whose lives are dependent on their relations with the land.

In each case study centred in this research, men of European descent consistently direct processes of extraction, material specification, and architectural production that reflect colonial ideologies and protect colonial and neo-colonial nationhood. Not only has the instruction to extract and to shape the stone historically relied exclusively on the labour of men, but the resulting material language expressed by the architecture itself often results in dominant, austere, and masculine expressions linked to colonial quest for power instigated by male authorities. The patriarchal identity upheld through the use of limestone construction materials in Montreal and Paris, or the "fatherland" as Anna Saint-Pierre refers to it, touches on the gendered dimension of stone's material practices and the material identity it

often reflects to a broader society. Uncovering the many ways that patriarchal ideologies fed into the use of limestone as a construction material was reflected in my research through the process of making the five artifacts. During my own experience working with various limestone materials and touring quarries to make each of the artifacts, I was often subject to prejudiced perspectives of male stone cutters, salesmen, and quarry workers who expressed disbelief in my eagerness to learn about and work directly with stone. Due to the immense weight of the limestone products and the completed artifacts, I often relied on others to assist me in lifting and transporting them, mirroring the heavy labour historically undertaken in large part by men in the quarrying and construction industry.<sup>1</sup> The substantial weight of stone constitutes one of the primary properties of the material that leads to the gendering of its associated material practices, while broader issues related to the exclusion of women from the labour force until the mid-twentieth century meant stone cutting and associated construction and design practices were historically reserved for men.<sup>2</sup>

The impacts of who is quarrying and shaping stone, their cultural background, and the material's potential for re-use become visible in the work of John-Philippe Smith and Anna Saint-Pierre. Both conversations in Chapter 3 raise questions of how the historical identity of stone can be re-written through actively involving skillsets of culturally diverse stone cutters in architectural and artistic projects and through rethinking existing stone projects in the context of material re-use. In the work of Anna Saint-Pierre, stone is ground into rubble materials that can express a more fluid materiality once mixed into terrazzo and concrete-like materials which can be cast and used in various applications that stand in contrast to the colonial use of stone. When thinking of ways that stone can be re-used outside of slicing or grinding it into aggregate, careful considerations for how existing blocks of stone can be re-carved and re-faced in an editing process similar to that of Roman "spoila" could be considered as a method of keeping the form of buildings intact while altering the expressions of carvings or bas-reliefs that historically served to sever social relations between various cultural groups.<sup>3</sup> How would the architectural identity of stone change if diverse voices were consistently in dialogue during

fig. 4.1 Thesis defence exhibition.



the quarrying and stone-cutting process? What new architectural expressions would occur if existing stone works historically rooted in sustaining colonial life could be reconfigured, re-carved, or ground to rubble to be re-cast? As John-Philippe Smith notes, this new identity is yet to be discovered.<sup>4</sup>

While reinforcing my understanding of reciprocal land and material relationships, studying the political life of limestone in Montreal also forced me to grapple with my place as a settler architecture student. Although my allegiance lies with non-extractive, decolonial material practices and pedagogies, it was necessary to examine the history of colonial material practices to understand the role limestone has played in informing various social-ecological relationships leading into the present. The research methods I employed allowed me to uncover the layered reality of the city during a moment of Indigenous resurgence, where sites of limestone extraction and construction are at once relics of an imperial past and sites from which to contemplate the (neo) colonial present. My uncomfortable confrontations with the reality of the extractive urban condition allowed me to enter conversations with land defenders, activists, artists, architects, designers, and researchers dedicated to finding approaches to resisting legacies of colonial extractivism. These conversations inspired me to imagine ways of reusing existing limestone-based materials to inform decolonial material identities, shift from individualist working methods towards collective design practices, and to use my own position and agency as a designer to challenge extractive material practices. Rather than projecting my own vision for shifting material practices towards non-extractive approaches through a design proposal or rejecting the use of limestone and its byproducts altogether, I prioritized observing and listening to the meaningful work of others who are already taking action to move beyond extraction.

The efforts of Norman Matchewan and the Algonquins of Barriere Lake to resist extractive encroachment on Algonquin territory discussed in the Francon quarry case study in Chapter 2 alongside the work of John-Philippe Smith and Anna Saint-Pierre discussed in Chapter 3 represent resistance to extraction and colonial-material logics; important yet small-scale efforts compared to the immense

work required to counter the social-ecological harm taking place at the global scale. Reflecting on the five artifacts and associated time periods within this research, the case studies centring the Palais de la Porte Dorée in Paris and the Francon quarry in Montreal emerge as key spaces where limestone provides a platform for social and ecological reclamation of land and material. Pap Ndiaye, the new director of the Palais de la Porte Dorée appointed in 2021, continues to advocate for enhancing the museum's public programming to confront issues of immigration and France's colonial legacy, challenging the messages permanently inscribed on its limestone facades.<sup>5</sup> At the Francon quarry, the self-organized community group Vivre Saint-Michel en Santé continues to rally for their remediation and redevelopment proposal to be considered by the City of Montreal, echoing the years preceding the quarry's closure when the community protested the harmful effects the quarrying operations had on their health.<sup>6</sup> Through these conversations and site observations, I came to realize that there is no simple answer for how to move beyond extraction, and no single "sustainable" or "eco" material that will provide a solution. These conversations and sites demonstrate life beyond extraction through collective action and advocacy while in certain cases maintaining aspects of existing limestone elements as a reminder of their extractive history.

Finding an approach to making and representing the artifacts in this body of research was challenging due to the risk that they would be perceived as finished objects rather than as a process. By re-creating limestone artifacts that reference time periods spanning the seventeenth to twenty-first century, it would be reasonable to assume that evolutionary themes of colonial progress would arise, but instead, the artifacts attempt to convey the troubling and systemic use of limestone to impose colonial power. Engagement with limestone provided me with tangible experience sourcing and transforming materials, which was often challenging due to the weight, toxic properties, and lack of knowledge for how it would react throughout the transformation process. I consistently relied upon the knowledge of skilled craftspeople and suppliers who make regular contact with the materials to inform me of their properties and how to best work with those properties to shape the material.



Oftentimes, the outcome of the material applications I inquired about with suppliers was unknown, yet they were able to provide me with various possibilities for beginning the process. For instance, before using hydrated lime for the Palais de la Porte Dorée artifact, I contacted several suppliers of quicklime, hydraulic lime, and hydrated lime to ask if these materials could be cast at specific thicknesses. Though the suppliers had not encountered casting applications of the materials, they informed me of the caustic properties of each of the powdered versions of limestone and informed me that hydrated lime would be safest to use. Once I had completed the experimental process of making the Palais de la Porte Dorée artifact, I shared the results with the suppliers. Making artifacts using a range of materials with properties unbeknownst to me was challenging but necessary to understand their historical uses, limits, and sources and to instill the importance of sharing material knowledge. By placing archival documentation and site observation in dialogue with the process of making, direct engagement with limestone became a powerful tool to question the harmful legacy of its use as a construction material.

fig. 4.2 Detail of thesis defence exhibition materials: archival and process photos alongside artifacts and carving tools.



Following the development of this research, I am left to question the future of the architectural education and industry and their potential to shift beyond extraction as spaces of knowledge production pertaining to architectural materials. What if designers directly engaged with materials throughout the design process to uncover where they come from, where their associated material practices originate, and whose cultures they have historically reflected? How would this begin to change the cultural identity

of architectural materials we encounter in our cities? If the natural formation and sedimentation of limestone is already an important quality to consider when designing with limestone, perhaps the social formations surrounding the extraction and production of limestone could be investigated just as closely.

As discussed in the Introduction, T.H. Clark's notion of *geological control* and Kathryn Yusoff's concept of *geologic life* become ways of recognizing the geologic forces humans depend on in our everyday experience of the urban environment. *Geological controls* describe the properties of geologic materials that are desirable for colonial settlement and territorialization, while *geologic life* subsequently describes how humans are exploited and racialized by colonial powers as colonial life becomes mobilized by geologic matter.<sup>7</sup> Although these terms can be interpreted as destructive relations between land and people, they can also serve as prompts to recognize how dependency on geologic materials can bring architects and designers into closer contact with the land and people who shape them.



fig. 4.3 Thesis defence as an exhibition tour of all five artifacts and associated research materials.

## Endnotes • Conclusion

- 1 Few quarrying reports I surfaced listed the gender of their workers, save for a 1964 survey of stone quarrying operations across Canada, where all 2,355 quarry workers were reported to be male in 1964, while the only 4 female workers were listed as working in the "Dressing Works" department of the operations. See "Stone Quarries 1964," Dominion Bureau of Statistics: Manufacturing and Primary Industries Division, Ottawa ON, 1968, accessed November 28, 2022, [https://publications.gc.ca/collections/collection\\_2018/statcan/26-217/CS26-217-1964-eng.pdf](https://publications.gc.ca/collections/collection_2018/statcan/26-217/CS26-217-1964-eng.pdf), page U-6.
- 2 Eleanor Milne became the first female Dominion Sculptor of Canada in 1961, being the only female amongst 20 male counterparts competing for the position. See "Eleanor Milne," Workers History Museum, accessed January 12, 2023, <https://workershistorymuseum.ca/eleanor-milne/>.
- 3 Stones originally carved to depict religious or mythical allegory were often re-carved or roughly re-cut to erase former cultural or religious affiliations for use in new architectural works in Rome. These repurposed stones were called "spolia" and were specifically used as ornamentation stones in buildings. See Dale Kinney, "Spolia from the Baths of Caracalla in Sta. Maria in Trastevere," *The Art Bulletin* 68, no. 3 (1986): 379–97.
- 4 Architects and designers in Canada have been considering ways of creating a "pan-Indigenous" material identity to unify the language of the architecture, centre Indigenous voices and design practices, and to create an identity distinct from American architecture. See Jennifer Hahn, "It's time to forge a "pan-Canadian" design identity based on Indigenous values says Andrew King," *Dezeen*, November 23, 2021, <https://www.dezeen.com/2021/11/23/canadian-indigenous-design-andrew-king/>.
- 5 "Appointment of Pap Ndiaye to General Management," Palais de la Porte Dorée, March 1, 2021, <https://www.palais-portedoree.fr/actualites/nomination-de-pap-ndiaye-a-la-direction-generale>.
- 6 The protests and petitions of Saint-Michel citizens dates back to the early 1960s. See Violet Jolivet and Marie-Noëlle Carré, "Urban Metabolism and Pericentral Neighborhoods in Metropolisation: The Example of the Saint-Michel District in Montreal," *CyberGeo: European Journal of Geography*, accessed November 7, 2022, <https://journals.openedition.org/cybergeo/28067?lang=en>.
- 7 I am interpreting T.H Clark's concept of *geological control* and Kathryn Yusoff's concept of *geologic life* within the context of this thesis, while their definitions of the concepts deal with settlement patterns and racialization through the geologic in many forms within and outside of colonial associations.

## Bibliography

- "1867 - The Dominion of Canada Is Created on July 1" n.d. Legislative Assembly of British Columbia. Accessed December 3, 2022. <https://www.leg.bc.ca/dyl/Pages/1867-Dominion-of-Canada-Created-July-1.aspx#:~:text=1867%20%2D%20The%20Dominion%20of%20Canada%20is%20Created%20on%20July%201&text=%E2%80%8B%E2%80%8B%E2%80%8B%E2%80%8B%E2%80%8B,Canada%20on%20July%201%2C%201867.>
- Association Alfred Auguste Janniot. n.d. "Alfred Auguste Janniot 1889-1969." [Www.Janniot.Com](http://www.janniot.com). Accessed September 27, 2022. [http://www.janniot.com/accueilc\\_ev.html](http://www.janniot.com/accueilc_ev.html).
- Baird, Craig. 2022. "Expo 67" Canada: Canadian History Ehx. Accessed September 13, 2022. <https://canadaehx.com/2022/05/14/expo-67/>.
- Barr, Daniel P. 2006. *Unconquered: The Iroquois League at War in Colonial America*. Westport, CT: Praeger Publishers.
- Beaudin, Monique. "Site of Montreal's New Park Is a Dump, Literally." *Montreal Gazette*, January 29, 2012. <https://montrealgazette.com/news/local-news/site-of-montreals-new-park-is-a-dump-literally>.
- Bélanger, Pierre, ed. 2018. *Extraction Empire: Undermining the Systems, States, & Scales of Canada's Global Resource Empire, 2017-2017*. Cambridge MA: MIT Press.
- Berrault Pressacco. 2017. "Logements Rue Oberkampf, Paris 11." Project Dossier. Paris, France.
- Canadian Society of Landscape Architects. "Restoration and Enhancement of the Archaeological Remains of Montreal's Fortification Walls." Accessed July 21, 2022. <https://www.csla-aapc.ca/awards-atlas/restoration-and-enhancement-archaeological-remains-montreals-fortification-walls>.
- Caron, Isabelle. 2002. "Des Mémoires 'à Excaver' Interpréter la Présence Des Carrières de Pierre Grise à Montréal." *Journal of the Society for the Study of Architecture in Canada* 27 (3-4): 14-28. <https://bibliomontreal.uqam.ca/bibliographie/notice/4VU8952C>.

- Les Catacombes de Paris. "Geology and the Quarries." Accessed June 2, 2022. <https://www.catacombes.paris.fr/en/history/geology-and-quarries#:~:text=The%20Paris%20quarries%20were%20definitively,collapses%20in%20the%20city%20center.>
- Chartrand, René. 2005. *French Fortresses in North America 1535-1763: Québec, Montréal, Louisbourg and New Orleans*. Oxford, UK, New York, NY: Osprey Publishing.
- City of Montreal. 2020. "Reconciliation Strategy 2020-2025." Montreal, Quebec.
- "City/Cité Cultural and Professional Exchange Program." Cultural Services French Embassy in the United States. Accessed February 8, 2023. <https://frenchhighereducation.org/grants-and-programs/14001-citycite-cultural-and-professional-exchange-program/internships>.
- Civet, Pommier & Cie. 1929. "Correspondence between Albert Laprade and Civet, Pommier & Cie Quarries." Paris, France.
- Clark, T.H. 1952. "Geological Report 46: Montreal Area Laval and Lachine Map-Areas." Montreal, Quebec.
- Clément, Gilles. 2015. *"The Planetary Garden" and Other Writings*. Edited by Sandra Morris. Philadelphia, PA: University of Pennsylvania Press.
- Clerk, Nathalie. 2007. "Gaspard Chaussegros de Léry." *Journal of the Society for the Study of Architecture in Canada* 32 (2): 69–85.
- Cowen, Deborah. 2019. "Following the Infrastructures of Empire: Notes on Cities, Settler Colonialism, and Method." *Urban Geography* 41 (4): 1–17.
- Deer, Ka'nnehsí:io. "What Land Back Means for This Reclamation Camp." CBC News. July 18, 2021. <https://newsinteractives.cbc.ca/longform/what-land-back-means-for-this-reclamation-camp-in-kahnawake/>.
- Desjardins, Yves. "Chapter 2: From the Bélair Tannery to Côte-Saint-Louis Village." Mile End Memories. February 20, 2014. <http://memoire.mile-end.qc.ca/en/chapitre-2-de-la-tannerie-des-belair-au-village-de-cote-saint-louis/>.
- Dominion Bureau of Statistics. 1968. "Stone Quarries 1964." Ottawa, Ontario. [https://publications.gc.ca/collections/collection\\_2018/statcan/26-217/CS26-217-1964-eng.pdf](https://publications.gc.ca/collections/collection_2018/statcan/26-217/CS26-217-1964-eng.pdf).
- Dupuy, Pierre. 1972. "Souvenirs D'Expo 67." *Perspectives, La Presse* 14 (7). <https://numerique.banq.qc.ca/patrimoine/details/52327/2719037>.
- Edwards, Dana. "Stanford Buildings Get New Parisian Look." *The Stanford Daily*. November 2, 2010. <https://stanforddaily.com/2010/11/02/stanford-buildings-get-new-parisian-look/>.
- "Eleanor Milne." Workers History Museum. Accessed January 12, 2023. <https://workershistorymuseum.ca/eleanor-milne/>.
- "Élément Terre." L'Institut Paris Region. July 13, 2022. <https://www.institutparisregion.fr/amenagement-et-territoires/paysage/element-terre/>.
- Engler, Yves. "Canada's Mining Industry Is Spreading Havoc Around the World — With Justin Trudeau's Support." *Jacobin*. July 5, 2021. <https://jacobin.com/2021/05/canada-mining-industry-justin-trudeau#:~:text=Canada%20is%20home%20to%2075,and%20violations%20of%20human%20rights.>
- EuLA. "Hydrated Lime: Properties." Hydrated Lime: A Proven Additive for Durable Asphalt Pavements. Accessed October 9, 2022. [https://britishlime.org/documents/2011\\_12\\_EuLA\\_Aspphalt\\_literature\\_review\\_UK.pdf](https://britishlime.org/documents/2011_12_EuLA_Aspphalt_literature_review_UK.pdf).
- "Expo 67" Parc Jean-Drapeau. Accessed September 28, 2022. <https://www.parcjeandrapeau.com/en/expo-67-universal-exposition-montreal/#:~:text=The%201967%20International%20and%20Universal,million%20visitors%20in%20six%20months.>
- Fairs, Marcus. "French Architects Face Wood Shortage with 'Prices Going up Every Week.'" *Dezeen*. June 7, 2021. <https://www.dezeen.com/2021/06/07/french-architects-wood-shortage-prices-up-lina-ghotmeh/>.
- Fortin, David T. 2022. "The Design Lodge: A Lexical Shift towards Life-Centred Architectural Pedagogy." *Enquiry The ARCC Journal for Architectural Research* 19 (1): 47–61.

- "Francon Quarry 1920s to 1980s." The Archive Scavenger. Accessed March 7, 2022. <https://lefarfouilleurdarchives.wordpress.com/portfolio/carriere-francon/>.
- Gamble, Adrian. "Expo 67 a Hallmark of Canadian Optimism and National Pride." Skyrise Cities. April 17, 2017. <https://skyrisecities.com/news/2017/04/expo-67-hallmark-canadian-optimism-and-national-pride.26520>.
- Goudge, M.F. 1935. "Limestones of Canada: Their Occurrence and Characteristics Part III Quebec." Ottawa, Ontario.
- "The Centre Block Project." Government of Canada. October 20, 2022. <https://www.tpsgc-pwgsc.gc.ca/citeparlementaire-parliamentaryprecinct/rehabilitation/edificeducentre-centrebloc/apropos-about-eng.html>.
- Government of Quebec. "Société Notre-Dame de Montréal." Directory of Heritage Culture of Quebec. Accessed May 13, 2022. <https://www.patrimoine-culturel.gouv.qc.ca/rpcq/detail.do?methode=consulter&id=15945&type=pge>.
- Guéron, René. 1964. "Pilgrimages." In *Studies in Freemasonry & the Compagnonnage*. Trans., Henry D. Fohr, Cecil Bethell, and Michael Allen, 1st English Edition, 59–64. Hillsdale, NY: Sophia Perennis .
- h2o architects. 2020. *Building with Limestone in Paris*. Paris, France: Building Books.
- "Habitat 67." Canadian Precast Prestressed Concrete Institute. Accessed November 27, 2022. [https://www.cpci.ca/en/about\\_us/project\\_month/may\\_2009/](https://www.cpci.ca/en/about_us/project_month/may_2009/).
- Hahn, Jennifer. "It's time to forge a "pan-Canadian" design identity based on Indigenous values says Andrew King." Dezeen. November 23, 2021. <https://www.dezeen.com/2021/11/23/canadian-indigenous-design-andrew-king/>.
- Hamilton, Edward Jae. 2011. "Ceci n'est Pas Un Parc: Reconsidering the Island of Site of Expo 67." Master's Thesis, Waterloo ON: University of Waterloo.
- "Indigenous Peoples Sculpture Program." House of Commons Canada. Accessed January 14, 2023. <https://www.ourcommons.ca/>

- About/HistoryArtsArchitecture/heritage\_spaces/foyer/stone/indigenous/indigenous-e.htm.
- Ingold, Tim. 2013. *Making: Anthropology, Archaeology, Art and Architecture*. Abingdon, Oxon and New York: Routledge.
- Iskander, Natasha. 2021. *Does Skill Make Us Human? Migrant Workers in 21st-Century Qatar and Beyond*. Princeton, NJ: Princeton University Press.
- Jasmin, Yves. 1997. *La Petite Histoire d'Expo 67: L'Expo 67 Comme Vous Ne l'avez Jamais Vue*. Montreal QC: Éditions Québec/Amérique.
- Jolivet, Violet, and Marie-Noëlle Carré. 2017. "Urban Metabolism and Pericentral Neighborhoods in Metropolisation: The Example of the Saint-Michel District in Montreal." *CyberGeo: European Journal of Geography*, 1–23. <https://journals.openedition.org/cybergeogeo/28067?lang=en>.
- Kinney, Dale. "Spolia from the Baths of Caracalla in Sta. Maria in Trastevere." *The Art Bulletin* 68, no. 3 (1986): 379–97. <https://doi.org/10.2307/3050973>.
- Komendant, August. 1964. "Komendant, Letter to Safdie, April 11, 1964." *August Komendant Archival Collection*. Montreal.
- Komocki, Jan. 1967. "Structural Design of Habitat '67." *PCI Journal* 12 (1): 67–70.
- Konate, Dialla. "In the Bois de Vincennes, the Thorny Dossier of Abandoned Colonial Remains." *Télérama*. June 15, 2022. <https://www.telerama.fr/sortir/vestiges-des-expositions-coloniales-au-bois-de-vincennes-est-ce-ainsi-que-l-histoire-s-oublie-7010907.php>.
- "Lafarge Montreal East Quarry." Mindat.Org. Accessed October 21, 2022. <https://www.mindat.org/loc-107067.html>.
- Lambert, Phyllis, and Alan Stewart (eds.). 1992. *Opening the Gates of Eighteenth-Century Montreal*. Montreal and Cambridge: Canadian Centre for Architecture and MIT Press.
- Laprise, P. 1976. *The Montréal Métro*. Montreal QC: Planning Department, Montréal Urban Community. <https://numerique>.

- banq.qc.ca/patrimoine/details/52327/3446607.
- Legacey, Erin-Marie. 2019. *Making Space for the Dead: Catacombs, Cemeteries, and the Reimagining of Paris, 1780–1830*. Ithaca, NY: Cornell University Press.
- Legault, Réjean. 2021. "The Making of Habitat 67: A Tense Pas de Deux between Moshe Safdie and August Komendant." *Journal of the Society for the Study of Architecture in Canada* 46 (1): 30–50.
- Liboiron, Max. 2021. *Pollution Is Colonialism*. Durham and London: Duke University Press.
- Lortie, André, ed. 2004. "Learning from Montreal." In *The 60s: Montreal Thinks Big*. Montreal: Canadian Centre for Architecture.
- Lupien, Lucette, and Liliane Racine. 2019. "Cité Du Havre: A Neglected Gem." Montreal, Quebec.
- 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.
- Martineau, Jarrett. 2015. "Creative Combat: Indigenous Art, Resurgence, and Decolonization." Doctoral Dissertation, Victoria, BC: University of Victoria.
- Miles, Paul. 2022. "The Pros and Cons of Stone Buildings." *Financial Times*. June 17, 2022. <https://www.ft.com/content/4164ec5a-130c-4f16-b0cb-ff8f0b406e07>.
- Monture, Phil. 2010. "Land Rights: A Global Solution for the Six Nations of the Grand River." Ohsweken, ON.
- Moore, Jason W. 2017. "The Capitalocene Part I: on the nature and origins of our ecological crisis." *The Journal of Peasant Studies* 44 (3): 594-630.
- Morton, Patricia A. 1998. "National and Colonial: The Musée Des Colonies at the Colonial Exposition, Paris, 1931." *The Art Bulletin* 80 (2): 357–77.
- "Nationalist Passions: Canadians Toast Their Country While Quebecers Embrace Their Own Nation." CBC Learning.
- Accessed January 26, 2023. <https://www.cbc.ca/history/SECTIONSE1EP16CH1LE.html>.
- Nayeri, Farah. "In a Palace of Colonialism, a 'Quiet Revolutionary' Takes Charge." *New York Times*. March 17, 2021. <https://www.nytimes.com/2021/03/17/arts/design/pap-ndiaye-palais-de-la-pont-doree-immigration-museum.html>.
- Ndiaye, Pap. "The Colonial Exhibition of 1931." Palais de La Porte Dorée. Accessed September 22, 2022. <https://monument.palais-portedoree.fr/le-contexte-colonial/l-exposition-coloniale-de-1931>.
- Nelson, Tim. "France Wants All Public Buildings to Be Made of at Least 50% Wood by 2022." *Architectural Digest*. February 12, 2020. <https://www.architecturaldigest.com/story/france-wants-all-public-buildings-to-be-made-of-at-least-50-wood-by-2022>.
- Newfoundland & Labrador. "5 Really Cool Things about Saint-Pierre and Miquelon." Accessed April 1, 2022. <https://www.newfoundlandlabrador.com/trip-ideas/travel-stories/5-really-cool-things-about-saint-pierre-and-miquelon>.
- Obas, Sacha. "St-Michel Residents Demonstrate over City's Plans for Francon Quarry." *Montreal Times*. November 9, 2019. <https://mtltimes.ca/montreal/st-michel-residents-demonstrate-over-cityaes-plans-for-francon-quarry/>.
- Obas, Sacha. "Where Does All the Snow Go?" *Beside Magazine*. Accessed August 6, 2022. <https://beside.media/stories/where-does-all-the-snow-go/>.
- Old Montreal. "Fortifications and Building Sites." Discovering the Fortifications of Montreal and Its Building Sites. Accessed October 8, 2003. <https://www.vieux.montreal.qc.ca/fortif/eng/tracesa.htm>.
- Olivier, Marcel. 1931. *Le Livre d'or de l'Exposition Coloniale Internationale de Paris. 1931*. Edited by Exposition coloniale. Paris: Librairie Ancienne Honoré Champion. <https://numba.cirad.fr/ark:/12148/bpt6k1100257w/f13.item.textelimage>.
- Parrott, Zach, and Tabitha Marshall. "Iroquois Wars." *The Canadian*

- Encyclopedia. Accessed November 15, 2022. <https://www.thecanadianencyclopedia.ca/en/article/iroquois-wars>.
- Pasternak, Shiri. 2017. *Grounded Authority: The Algonquins of Barriere Lake Against the State*. Minneapolis and London: University of Minnesota Press.
- Pavillon de L'Arsenal. "Resources: Filming Raw Materials and Revealing Know-How." Accessed October 10, 2022. <https://www.pavillon-arsenal.com/en/expositions/12395-ressources.html>.
- "'Pieds-Noirs,' stone quarry workers." City of Montreal. April 11, 2019. <https://ville.montreal.qc.ca/memoiresdesmontrealais/pieds-noirs-les-travailleurs-des-carrieres-de-pierre>.
- Proulx, L.S.-A. 1921. "Report on Mining Operations in the Province of Quebec During the Year 1920." Quebec City, Quebec.
- Quebec Bureau of Mines. 1927. "Geological Sketch and Economic Minerals of the Province of Quebec." Quebec City, Quebec.
- Riar, Inderbir Singh. 2014. "Expo 67, or the Architecture of Late Modernity." Doctoral Thesis, New York NY: Columbia University.
- Rinfret, Henri. 1964. "Quarry Exploitation Report GM 14186: National Quarries Ltd." Quebec City, Quebec.
- Safdie Architects. "Habitat of the Future." Safdie Architects. Accessed February 2, 2023. <https://www.safdiearchitects.com/practice/habitat-of-the-future>.
- Schofield, Hugh. "The French Apprentices Thriving on Medieval Roots." BBC News. December 17, 2017. <https://www.bbc.com/news/world-europe-42365048>.
- Silverstein, Paul A. 2010. "Mi-Sauvage, Mi-Barbare: The Modern Politics of Berber Autochthony." *Etnofoor* 22 (2): 13–29.
- Simpson, Leanne Betasamosake. 2014. "Land as Pedagogy: Nishnaabeg Intelligence and Rebellious Transformation." *Decolonization: Indigeneity, Education & Society* 3 (3): 1–25.
- Society of the Priests of Saint Sulpice. "Montreal and Saint Sulpice." General Saint Sulpice. Accessed June 5, 2022. <https://www.generalsaintsulpice.org/en/news/64-montreal-and-saint-sulpice>.
- Stoler, Ann Laura. 2010. *Along the Archival Grain: Epistemic Anxieties and Colonial Common Sense*. Princeton, NJ: Princeton University Press.
- Stoler (ed.), Ann Laura. 2006. "Intimidations of Empire: Predicaments of the Tactile and Unseen." In *Haunted by Empire: Geographies of Intimacy in North American History*. Durham and London: Duke University Press.
- Taekema, Dan. "Six Nations Traditional Government Wants Moratorium on Development of Haldimand Tract." CBC News. April 20, 2021. <https://www.cbc.ca/news/canada/hamilton/haldimand-tract-development-moratorium-1.5993081>.
- "The Canadian Mineral Industry in 1950." 1952. Ottawa, Ontario.
- "The Great Peace of Montréal." Pointe-à-Callière. Accessed December 11, 2022. <https://pacmusee.qc.ca/en/stories-of-montreal/article/the-great-peace-of-montreal/>.
- "The Monument." Palais de La Porte Dorée. Accessed September 26, 2022. <https://www.palais-portedoree.fr/en/the-institution/the-monument>.
- Tilley, Christopher. 2007. "Materiality in Materials." *Archaeological Dialogues* 14 (1): 16–20.
- Toker, Franklin. 1991. *The Church of Notre Dame in Montreal: An Architectural History*. 2nd ed. Montreal: McGill-Queens University Press.
- Trudelle, Catherine, JL Klein, J.-M. Fontan, and D.-G. Tremblay. 2015. "Urban Conflicts and Socio-Territorial Cohesion: Consensus Building and Compromise in the Saint-Michel Neighbourhood in Montreal." *Canadian Journal of Urban Research* 24 (2): 138–57.
- Tsing, Anna Lowenhaupt. 2005. *Friction: An Ethnography of Global Connection*. Princeton NJ: Princeton University Press.
- Tuhiwai Smith, Linda. 2021. *Decolonizing Methodologies: Research*

and *Indigenous Peoples*. 3rd ed. London, New York and Dublin: Bloomsbury Publishing Plc.

TVK. 2021. *The Earth Is an Architecture*. Leipzig: Spector Books.

Vergès, Françoise, and Seumboy Vrainom: €. 2021. *De La Violence Coloniale Dans l'espace Public: Visite Du Triangle de La Porte Dorée à Paris*. Marseille, France: Shed Publishing.

Vivre Saint-Michel en Santé. 2018. "Francon, Heart of Our Neighbourhood: Rehabilitation Project of Francon Quarry." Montreal, Quebec.

Vivre Saint-Michel en Santé. 2022. *Francon, Le Pas de plus - À La Découverte d'un Site Exceptionnel de l'Est de Montréal*. Montreal, Quebec: YouTube. <https://www.youtube.com/watch?v=TS8l09gTsgs&t=164s>.

Webb, Patrick. "Hydrated Lime vs Hydraulic Lime." Traditional Building. May 13, 2020. <https://www.traditionalbuilding.com/opinions/hydrated-vs-hydraulic-lime>.

Woolf, Virginia. 2004. *A Room of One's Own*. Harlow, England: Penguin Books.

Yates, Jeff. "The Hidden Legacy of Montreal's Old Quarries." Métro. April 28, 2016. <https://journalmetro.com/actualites/montreal/955646/lheritage-cache-des-anciennes-carrieres/>.

Young, Brian. 1986. *In Its Corporate Capacity: The Seminary of Montreal as a Business Institution 1816-1876*. Montreal and Kingston: McGill-Queens University Press.

Yusoff, Kathryn. 2018. *A Billion Black Anthropocenes or None*. Minneapolis, MN: University of Minnesota Press.

Yusoff, Kathryn. 2021. "Mine as Paradigm." E-Flux Architecture. June 2021. <https://www.e-flux.com/architecture/survivance/381867/mine-as-paradigm/#:~:text=The%20mine%20is%20paradigmatic%20because,earth%20for%20ever%20and%20ever>.



## Appendix

### Full Conversation with John-Philippe Smith, Dominion Sculptor of Canada

**Madeleine Reinhart: I wanted to start by talking about your stone carving education, what drove you into stone carving and where you studied.**

John-Philippe Smith: I'll start right from the start. I grew up in a very artistic household. Both my parents weren't professional artists or working artists, but they did art all the time. And myself and my brother, my sister, that's really all we did. Lots of drawing. My dad sculpted wood. You know you're moving through school and taking lots of art classes and then you keep being told that the future is in computer science, right? So don't bother going to take a trade. So, I felt a lot of pressure to go to university and to get a job that is not in the arts because the arts were not considered a place where you could find steady work. I ended up going to the University of Ottawa taking Physical Geography and Geology and I enjoyed that. My first job was working at the Chateau Laurier as a doorman and valet, and then after graduating, I stuck with Fairmont Hotels and worked with them for eight years. It brought me to downtown Toronto in one of the big high-rise towers there and the little cubicle office at the head office, and I really wasn't happy there. It was a great job, great company, but it really wasn't *me* or what I felt like I could do with my life. I really wanted to go back and do something with my hands because that's kind of what I did as a child, and I grew up on a farm with my dad and we were always outside fixing things or working on stuff.

Somebody that I was working with was thinking about getting into masonry and I was like, oh, masonry. That's interesting. And then I came across the Heritage Masonry program in Perth, Ontario, and I looked into that, and it took about a year to decide whether I would leave this career or not. I had a lot of anxiety about it, but then I went for it and at that time the program was two years and a lot more in-depth than it is currently. During that time, I learned all about heritage stone masonry, heritage architecture in Canada, brick block, building rubble walls - that was first year. But right away I was really interested in the sculptural element, the carved element, so I started tinkering with stuff and then the second year you get into stone cutting. Stone cutting was really interesting to me because I could see this as a way to get to actually being paid to do art as a tradesperson, you know, stone cutting would lead to stone carving. So as soon as I graduated, I was super focused on finding the best people in the country that did this type of work and there were only a few but I pestered them long and hard, and I was very lucky to have some good people to learn from after college.

**You mentioned that you moved from stone cutting into carving. These two terms are so nuanced and I'm wondering if you could describe the difference. Does everyone begin by cutting and doing masonry work and then have the option to move into stone carving, which is more sculptural?**

If you look at it from within a strictly architectural context, you would traditionally start as a stonecutter or what's also known as a banker mason. A "banker" is the table where a stonecutter works, and the reason it's called a banker, that goes back to The Middle Ages or the Gothic Period when a stonecutter will be working on a large work site particularly in France. At the end of the week, they would get paid at their table and it became known as "la banque," or "the banker." And the reason this is the way they would get paid is that the head mason or the foreman would say, "Ok, what pieces did you do?" and the stonecutter would point out this one, this one, this one, and the way you would be able to tell is because they had engraved their "mason's mark" or "marque de tâcheron." So today when we're working on historical buildings, if we pull a stone on the wall on the top bed, you will see the mason's mark. It's a mark that is given to you and stays with you for your whole career. The stonecutter, his focus is creating all the components of a building that are considered dimensional stone, and that means anything that you can set out geometrically and execute using a template.

The moment that you jump out of that and go into creating a free-formed object, that is the stone carver. In Europe, there's a very defined line. A stonecutter can work on a piece that contains a sculptural element, but they won't finish the sculptural element. They'll do all the stone cutting around it and then that then goes to the carver and the carver carves the piece. It's a very methodical approach to deconstructing a moulding and being able to set it out so that it's perfectly repeated around the building. Sometimes you look at the most complex Gothic mouldings, you look at them, and it's like, how could they possibly all match up so perfectly? It has everything to do with the geometry, the templates, the process of stone cutting, which is fundamentally broken down to one step, and that one step is being able to create a flat surface. The first thing you learn as a stonecutter, is the process of creating a flat surface, called "boning-in." And then you go back to Medieval Times. This is all part of what made the guilds so powerful is this knowledge that they kept secret, and it basically starts with boning-in. Once you have that knowledge, you can create a 90-degree flat surface, then another 90-degree flat surface off that, ultimately creating a perfect cube. That is your basis for using that stone for architectural purposes, but then you can do a chamfer using a flat surface,

you can do a fillet, a cavetto, an ovolo of all these different shapes using a flat surface and then once you take that to its extreme, you can create the most incredibly geometrically complex stones that you would often see in vaults.

So that's a stonecutter, a stone carver can have a different mindset where they can see something three-dimensionally and they're not using templates or guides or references and they can just carve direct. However, stone carvers traditionally have done models first, something that I do all the time. I do a model first and then once you get it perfect, you can cast it in plaster, and then that plaster model goes right next to you and then you can copy it in the stone.

**Because you referenced these Medieval guilds and how the educational practice translated from French practices, did you spend any time in France throughout your education and was it a component of your education in Canada to visit France to learn from their techniques?**

The reason I went to France was really because I felt that I was kind of limited here in Canada. The trade, it's basically this road that I chose to take that was grown over, and my colleagues here had traveled that same road. The trade was quite prolific here in Canada, mostly with Europeans, stone carvers, and stonecutters that came here with the First World War. If I take Ottawa as an example, there was work happening on a lot of buildings here, particularly on Parliament that had just burnt, and a lot of the younger masons, they're headed off to war. And then with wars what happens is, unfortunately, you have a push on development of materials. So, concrete came more into play, glass, metal; these industries were built up to supply a certain demand and then once a war passes, then it's like, well, what we can do then? You go into different industries and that really affected architecture, so the trade died off. I came to it in Canada understanding that there was a lot of knowledge I didn't have access to. There's a visa that you can get to go work in France, Visa Vacances-Travaillés, and you have up until you're 35 years old to do it. And I was just turning 35, so I said, OK, this is my chance, I've got to go. I got the visa, went to France, and I spent about two weeks walking around Paris trying to find a job site. I had a list of the top five companies I wanted to work for, number one was Atelier Jean-Loup Bouvier, and I was like, they're top in the country, I'm not even going to approach them. I wouldn't even know what to say if I came across them. There's a bit of an interesting story there, how I actually ended up working with them, but I did. I ended up working with them in Avignon, and my experience there was just absolutely mind blowing. You could see and feel a craft that was so well nurtured and based on hundreds of years of knowledge that is being passed down.

[In Canada], I'd worked on projects, and you know, oftentimes they'd say, "Oh, yeah, we worked on this wing of this building. It's from the 60s, that's from the 70s." [In France], you're talking in hundreds of years. This is from the 14th century; this is from the 16th. And they have their tools, they say, "these tools are specific to this period." The knowledge base there, it was unreal. But interestingly enough, they explained to me that within France's history, they've had periods where the trade disappeared as well, time and time again, and they've had to rediscover it as well. For instance, they would go and do massive restoration projects on some cathedrals and one wing of the cathedral had the most exquisite sculptures, but on the other side it was completely rudimentary and not very developed. They look back in the history and there would have been a plague that lasted seven years, so that was a loss of knowledge. That particular atelier had an interesting approach where they had Les Compagnons, which is the training school that is very old and very traditional. They would bring in Compagnons that were stonemasons and that had a knack for stone carving, but also students from art schools that had just an arts background but that were good sculptors, so they meshed the two together to make the most solid crew. So I was learning both sides. I was learning from the artistic side of it, the sculptural side of it, the side that you would see for instance in sculptures in the Louvre, from amazing sculptures like Carpeaux or Houdon. A bunch of them had that knowledge of the Royal Academy des Beaux-Arts in Paris, so it's trade and art coming together.

**Do you see the same types of groups coming together in Canada when you're working on a larger project, for example, and is there any organization like the Compagnons [du Devoirs] in Canada that you might gather together to work on a larger building or a larger project?**

Well, this internal team here is quite particular. There are very few places in the world that have their own in-house team of carvers, let alone masons. We've got plumbers and electricians here as well and so on and so forth. Eleven of the biggest cathedrals in England have a fellowship together and they all have their own in-house teams. There's a lot of good reasons for that. And the other one, which is my favorite, is the cathedral in Strasbourg. That is actually where the guild started in Strasbourg. There's a little building just beside the cathedral, when you look at Medieval guilds, that's really the coming together of Germany and France. They're at that that city right on the border. But as far as any kind of group like that in Canada, no, there's nothing that's really established other than the city of Ottawa which is quite particular given all the work that happens on the precinct.

I had mentioned before that the trade kind of died off, and what happened is that there was decades and decades of decades of either no maintenance or bad maintenance that took place to the point now where the buildings are in such a state that it's not just a question of coming back and repointing joints, it's a question of actually physically carrying down sections and rebuilding them, because on West Block they tore down an entire tower and rebuilt stone for stone. What that does is it actually creates this kind of community of stonemasons that make a living off of working on the precinct and we all know each other and there's probably a couple hundred of us and everybody goes to the same pub, so it's just organically created this this community and some of us are French Canadian, some of them are Europeans, there are some French that came over, mostly English, a couple Scots. Online now you can basically talk and share information with anybody around the world. There's a gentleman here who I would say is without a doubt the best stone mason in the country, he's the most knowledgeable and for sure the most experienced and he works as a foreman now for one of the local companies and he started this group called The Stonemasons Guild on Facebook and it's exploded. That's become our little community or group where we have access to what's going on in England and it's actually been taken over by a lot of English and Brits that talk in that forum so it's really interesting to be part of that and stay connected.

**Do you hear about new technologies and practices that are coming into play and then adopt that here as well? Is it a platform for sharing knowledge?**

Yeah, it's a sharing of tools, types of stone, types of projects and new technology, and another thing too is safety. That's a big concern for us. A lot of the stones we work are high in silica content. Now, you're doing work on limestone, so there's trace amounts in limestone for the most part so it's not really a concern there, but with sandstones and granites that is a concern, so those are parts of the discussion. But the trade, at its base, if you want to do great exceptional work that is in keeping with the heritage structure, it comes down to using hand tools at the end of the day and using the same hand tools and replicating those same tool marks or those same finishes that were done, you know, originally. But with regards to sculpture, and even stone cutting too now, with the coming development of CNCs that is definitely something that is discussed from time to time. I would say by far and large there is a dark cloud that hangs over [CNC milling] because some people see it as a way of destroying the trade because you're moving towards not using hand tools or crafting with your hands anymore. And once you stop doing that, the the path grows over you're going to basically lose that knowledge. If you don't practice it every day,

then the trade is not nurtured every day and it does have a significant impact on the trade. I'm a big defender of the craft and the trade, trying to rediscover it here in Canada and then being dropped into an environment where it's so rich and just incredible. In fact, the place where I worked in France, they had already gone through the whole CNC thing where the CNC came along and they played around with it and surely enough they found that quickly their own personal skills dropped, and they became disinterested in the work. Now CNCs will sculpt the piece, but the carver then has to go back and give it life. Basically, you're re-carving little components, doing some undercutting, basically dragging a chisel over the stone to make it look like it has some life. But I can assure you it's very far from setting out a sculpture from just a block that's on six sides to then just dragging a chisel over a sculpture. For me, it's heartbreaking. I have no interest in doing that. So there are some places where the CNCs are warranted and useful, but I think when it comes to heritage structures, then you have stones that are so unique, in some ways [the CNC] really doesn't have a place.

**It does sound like it's very hands-on and that the knowledge has been maintained since the Middle Ages, which is incredible. But I'm wondering then how that translates at the quarry and what your relationship is with the quarry. I guess that's an abstract question, but I'm just thinking about these technologies that have been used to extract stone over time and how those have changed compared to how the stone gets carved by humans at the site where it's being translated into an architectural material.**

Certainly the trade of quarry person has evolved significantly, and nobody extracts stones by hand anymore or large blocks that I know of, and if you look at the tools that somebody that worked in the quarry would use, they're very much like a stonecutter's tools, but bigger. For instance, a stonecutter has three fundamental tools, that is a point chisel, claw chisel, and flat chisel. And you know when I talked about boning-in, when you want to get the most bulk off to get to that flat surface, you would use a point. And when you're getting close to that surface, you would then go to something that has a bit less impact. The more points you have the less direct impact you have at a certain point. So, with a punch it's like all the energy goes in that one little point. Boom! You explode off and a lot of stone comes off. Or I'm getting too close to my surface, then I'll go to a three-toothed claw, and it's taking the same swing but it's taking off less material. You're being safer and then you go to a five-point claw and seven-point claw and at the end you just use your flat chisel just to shave off. Somebody that worked in a quarry would have used the same tools but much bigger so everything would have been on a handle. You would have a punch

chisel and it would have been a big pick on an axe handle and they would have used either a limestone axe or crandall hammer which is specific to sandstone. That's not the way anymore. The technology has changed a lot. There's a lot of different methods for quarrying different types of stone; granite extraction versus marble extraction versus limestone extraction that has defined beds is very different. But anything for dimensional stone or building stone and you just wouldn't use dynamite, for sure you want to limit the fracturing. If you do use explosives, it's very controlled and very limited. But back to your question, I kind of lost it.

**Sure, I'm interested in what you were talking about in terms of the kind of hand tools that you're accustomed to using as a stone cutter and how to preserve and pass down the knowledge especially through hand cutting and through oral education and working directly with the material as opposed to CNCing, for example, which kind of mediates the person from the material and distances them. It just seems that people have become so much more distanced from the material at the quarry, but not necessarily at the point at which the material gets shaped into an architectural component.**

So the quarry operations, at the end of the day everybody's there to make money. They're going to look at the latest and best technology and oftentimes they're completely disconnected from actually even getting out of their loaders or whatever machine they're sitting in to actually go and touch the stone, and sure there's somebody going around marking the beds and which blocks to extract. So the blocks are extracted by whichever means. Sometimes it's a wire saw, sometimes it's different types of explosives. Sometimes it's loaders that kind of go between the beds and pop the beds off and then those are basically sent to fabrication shops or sometimes the quarry will have their own fabrication shop. I used to have a fabrication shop before I was Dominion Sculptor, and basically you just get on the phone and you call up the quarry and you say, "I'd like this quarry block or these dimensions or I'd like them slabbed two sides, so they'll send you like a slice of bread, but it's stone, to whatever thickness you want. Our saw could cut sixteen inches, so oftentimes we would order slabs that were sixteen inches in depth and then from there we would use these big, large saws. That would then allow us to cut blocks, six sided, perfectly.

This is the idea of the boning-in process, now we don't we don't have to do it anymore for creating the base block that you would then apply templates to. Now there have been two tools that we use a lot that have kind of replaced the hand tools, and that would be a diamond blade grinder, that's a flush mount so that doesn't have an arbor underneath, you can set it flat on the stone and

you can do cuts. We use that quite extensively for roughing out, and also the hammer has kind of been replaced with an air gun or air pistol, same chisels, but it's just pneumatic. At the end of the day, you could teach somebody how to go straight to the grinder and straight to pneumatic tools, but if they had never had that experience of using hand tools to create chamfers, fillets, boning-in, all of that, it's really a hindrance on how they understand the process later on down the road. It's like skipping a step because the same steps or the same approach that I would take using a grinder to create a flat surface is very much informed by the hands-on boning-in process. If I'm teaching somebody, the first thing I'll teach them is hand tools and the traditional approach.

#### **What drives your process of choosing stone for these projects?**

Well, for now, I do some stone cutting when it's necessary, but I've moved more from stone cutting and stone carving, which I still do, towards sculpting. There's the other part of it where you're creating the models and you're creating the artistic vision for new pieces. You're kind of always thinking, "OK, well what am I going to carve this in," and there's different parameters that I would use for selection, like where is it going? Is it interior, exterior, where is it going to be viewed from? What's the building made out of? A lot of these things will dictate where you can go with the stone. Is it locally available? How available is it? But at the end of the day, for me, I want to do the best as possible, so what's the best carvable material and what can I do the most detail with? What can I really push a sculpture and bring it to life in? If that's the case, I would personally lean towards some of my favorites, which would be a lot of the softer French limestones which you probably came across if you're doing research on Paris. It would be a Saint-Maximin, That's a stone that I worked when I was in France and it's very prolific for Paris in particular. It's a very good stone but there are other amazing stones like Lavoux. And then marbles as well, depending on what you're doing, if I was having to do a bust of somebody then I would consider maybe using a marble.

#### **Coming back to the question of the quarry, are there processes that you use to choose where the stone is extracted? And is there a certain amount of research that you have to do into the practices that are taking place at the quarry in order to choose which stones get used on these projects in Canada?**

Oftentimes in in the conservation world, the guiding principle is to always go back to the original quarry and use exactly the same material. If you can't, oftentimes the quarry unfortunately is no longer being exploited, you have to find a stone that's very similar because that's stone then has to be integrated

into a wall that has a different type of stone around it, and they need to basically act in the same way. Whether it's developing a patina or the freeze thaw cycles, that all affects the stones in a different way and there should be some compatibility there for sure, because there is some incompatibility between certain types of stone. That's the number one thing. That's the number one rule when you're working on a conservation project. Otherwise, if you're working on a new project, ideally you look for stones that have all of the different qualities that I described earlier, like the workability, appearance, availability is a big one, and then ideally what's closest to home.

Unfortunately, in Canada, speaking as a stone carver, we're very limited in the types of stone that we have available to us, and you look at the size of this country and you think "Wow, there must be the most amazing stones everywhere." But a lot of it is granite, and granite is a great material if you want to carve it, and I definitely don't want to carve it. [Laughs] I have carved it and it's not fun. All my respect and props to granite carvers, they're really tackling something that's very difficult. It's not so much carving the stone as much as pulverizing it. You'll probably notice this in your research, you'll see a lot of stone that comes from the US. You'll see a lot of stone that comes from Europe that was used as ballasts and ships and would go back with different cargo. So there really aren't that many great Canadian stones, unfortunately, for architectural purposes. There are some that are good for doing stone cutting, but when it comes time to do stone carving, aren't the best. For instance if you look in Montreal, you probably heard about "la pierre de Saint Marc." Saint Marc limestone is used a lot. It's a very close equivalent to the original limestone quarries from "la pierre grise de Montreal" or the limestones that came from around Montreal area, but if you go look in Old Montreal or even some of the newer carvings in in Saint Marc, you just cannot get that extra level of refinement or detail that every carver really wants to achieve, it's nothing like the French limestones out of France or England.

#### **I wanted to ask you about the stone rehabilitation component of the Centre Block project. Could you describe in a broader sense what this project entails right now at the Parliament?**

With regards to the masonry conservation, it's very much a continuation of conservation projects that have taken place throughout the precinct on West Block and East Block. Center Block was the second Center Block, the first one burnt, so it's a bit different, but not all that different from East Block and West Block. The construction is very similar and the problems are very similar. The stones are the same. I'm talking exterior, so exterior stones are the same. The

construction is the same, a lot of the mouldings are the same. The carvings vary a little bit. There's a bit of a difference there in the style. And the architecture is very similar. There's a scaffold over a whole facade and the masons work from an area of 4 feet by 4 feet. And they'll take the stones out and create an opening and they'll record, number, and label all the stones, they reconsolidate the core, and then they'll rebuild that section, and they'll move over and do that again in a different area where it's where it's most needed. If there's any cut stone or dimensional stone, this is stuff that the stonecutter would have done that needs replacing because it's deteriorated or fractured, then that gets done as well. There's cleaning that happens as well. It's laser cleaning. This is all part of the rehabilitation process for exterior masonry.

**The Centre Block project sounds like a huge project, and I was reading that there were 365,000 stones that were being rehabilitated and I was wondering, is most of that really refurbishing existing material or is a lot of that being replaced?**

Yeah. The focus is always to preserve and maintain as much of the original fabric as possible. It's only on a very last-case scenario where you would look at replacing the stone, very much to basically maintain as much of the original fabric so there's not that much replacement that happens.

**Maybe this is more of an interior question rather than exterior, but I understand that part of this project entails representing the Indigenous peoples of Canada through stone. I'm wondering what you're imagining for the future of that component of the project.**

A part of my work is also looking at new works. And that's been the role of the Dominion Sculptor from its inception in the 1930s. It was really focused on stone and on new works and it's not till later that we've drifted into the conservation aspect. When the architect [John Andrew] Pearson designed and created the Parliament buildings as we have it today, the idea was to leave the blocks in the interior uncarved. There were literally thousands of blocks that are part of the architecture and at their base, they're architectural features, so whether it's a voussoir or a keystone or a label stop, they all have a function. But they had projections that were left square, and it looked kind of odd, but they were earmarked for future carvings. So along comes the Dominion Sculptor, and at the time it was [Cléophas] Sousy, and he had a team of carvers and they started carving all kinds of different things that relate to the Crown, to the provinces, to flora and fauna. And that program has continued generation after generation. And today, there are only 188 original blocks from the Pearson era that remain uncarved. So at this time, thanks to the Centre Block project, there's

a great opportunity here. The building is closed, there's nobody occupying it, so it's a great time to go in there and make some noise. We're looking at different ways to carve some of these blocks and particularly the ones that are in very hard-to-reach areas and prioritizing those. Understanding that there have been Indigenous works that have been incorporated in the building through the Indigenous Peoples Sculpture program...a bit of history on that. In the late 1970s, the Member of Parliament, Métis Member of Parliament, [Walter] "Wally" Firth, proposed to the speaker at the time, James Jerome, to create the Indigenous Peoples Sculpture program, and the idea was to integrate pieces that were created by Indigenous carvers directly into the walls of Parliament. So that has happened, and they earmarked ten tympanum stones over some of the doorways in the House of Commons foyer. Nine have been carved to date. So that leaves one.

There are limitations with the blocks that remain, not only for that particular block. I mean, how does that program continue after? A lot of the blocks that are left with 188 are very small blocks and they're kind of hard to see, so you can't really carve these big themes or these bigger or more elaborate pieces. So right now, what we're doing is we're looking at different opportunities in the totality and also the opportunities that we may be presented in the new architecture underneath the Parliamentary Welcome Center. But, moving forward for my team and the program, the one thing that I always really cherish the most for myself personally in the trade, was being able to learn and collaborate with people from all over the place. And that is still something that drives me. And when I learned about the Indigenous Peoples Sculpture Program, one thing that I kind of found was unfortunate is that the stones were sent to the Indigenous carvers, they would carve them in their studio, and they would send [the stones] back to Parliament, and there was never a discussion or the opportunity to share with the carvers on Parliament or with the Indigenous carvers. The piece showed up and it went in the wall, and they never met. So moving forward for me, I think it's really important that any pieces that are done as part of the base building structure be done in a collaborative environment where we can meet, number one, and have a discussion and see how we can develop some really amazing, exciting projects together.

With that, we've developed an initiative where we will be hiring Indigenous carvers as part of our team to come on board and be part of the of the Dominion Sculpture team and work together, and once these opportunities arise, then there would definitely be opportunity for them and other Indigenous artists as well to draw from their own art and create some pieces that are really going to be important for the future of the building, for sure. I think it's possibly the most

exciting time since the original construction. There's just so much opportunity right now, it's hard to keep track of. But I think having carvers as part of the team as well as looking to also bring on independent carvers or artists and Indigenous artists as well to collaborate for design and new works is really the path forward.

**When you mentioned the 188 remaining blocks that are in the Centre Block building, I'm wondering if you're limited to those blocks on this project or if there's an opportunity to have further carvings that are collaborative, like you just mentioned, between Indigenous sculptors and your team. And I'm wondering how much time you think it would take to complete that project of those 188 blocks. It seems like there could be a whole evolution that takes place over the next century even, because it's been over a century since the building was initially built.**

The 188 blocks, given that they're part of the original Pearson program, a decorative program, there's no way that I'm going to be carving all of them within my tenure. They're going to be wanting to keep some for the future generations. So we'll carve some where it makes sense to carve them because we've got scaffold right at the ceiling level, that's not going to happen again for maybe another 100 years so let's carve those. And then after that, we'll see what opportunities present themselves with those pieces in particular, but I will say that there are tremendous opportunities for securing the future of the program with uncarved blocks in other spaces and that's something that we're actively looking at now. I don't have any idea of the scope or where they'll go exactly, but that's where I really see opportunities for addressing larger, more important themes, because that will entail us being able to then work with architects and partners to say, "Hey, this is an idea, we need stone this size and it should go there," and all kind of things. You have that say, whereas now we're kind of limited to these little canvases that are in funny little areas within the building. This is going to be quite a long project. I believe I keep hearing ten years before the building's done, but the idea also is to keep in mind that we will start some of the conservation and replacement work. There are a lot of exterior pieces that need replacement and we carve those, we basically replicate what was there. But with the new opportunities, we'll probably start with some of them for sure, but also to keep in mind that once the restoration project is done, the Dominion Sculpture Program continues as it always has, so we will continually look at ways to secure blocks for the future. We're continuing the carving process to be able to continue to tell the story of Canada as it progresses.

**On that note of this evolving story of our country, how do you decide what cultural context gets carved into stone? It seems like the act of carving into stone is something that is so permanent. Because our story is evolving so much, are there components that will be replaced or edited? And for future stones, how do you decide what to represent?**

Those are some very big questions and stuff that we're actively looking at, and it's not left up to me. There's a lot of people that are partners that are consulted with and we look at this very closely. Carving and stone is something that's very permanent and if you look back historically it's been used as something by all kinds of different civilizations for different purposes, for creating a mark or a place of passage like, "We were here," kind of thing, or "This who we were at this particular time." Now Canada is a different place than it was in the 1920s when this building was being constructed, so there's a lot of different views and different perspectives and different engagement and collaboration opportunities that we need to do and that we want to do and that probably should have been done a long time ago for sure...well that *definitely* should have done a long time ago. Really all I can say is that it's really moving in a positive direction, and I'm really excited about it and we're doing what we can in our team to kind of prepare for this, and that includes having Indigenous artists as part of our team and part of that design process to be working and sharing together. The idea again that comes back to sharing is, this goes back for me, it's always been the importance of craft fellowship. I feel like there's a way of coming together there, like that's just an appreciation that artists or craftspeople have between each other based on just the knowledge of like, "Hey, this is how you work a piece of raw material from planet Earth, and this is how I work a raw material from planet Earth." And, "Oh, I like that chisel," and "That's kind of cool what you're doing there with this," so that's the most exciting part for me. And this is experience that I've had personally working in Europe or even in Southeast Asia, just meeting some of the carvers there, that fascinates me, and I think that there's a great opportunity here to work with Indigenous people, the Indigenous artists, and have conversations and just say, "Hey, what are you doing?" and just coming together and making something that's really unique and beautiful. It's more sharing that is what I'm big on. I love to talk about... obviously, I've been sitting here for an hour and I'll just talk probably about the same thing, but I just love that part of the craft and the trade and that's what excites me the most and I think there's a lot of really great opportunities and we'll see where it goes. It's just going to be an evolution. But I think at the end of the day, whatever comes of it, it's going to be something pretty amazing.

**You just mentioned that while you're collaborating with other stone carvers, whether you're in Europe or Southeast Asia or in Canada, this sense of collaboration allows you to learn new techniques or new tools. And I'm wondering what the outcome is of what you're carving. When you're carving for the Parliament, for example, what kind of creative freedom do you have to carve something that *you* envision versus following a style that needs to be preserved within the heritage buildings.**

So pieces that are within Centre Block and I would say these 188 blocks, it's difficult because it's a very Gothic building, like it's just Gothic ornamentation everywhere, and different Dominion sculptors have pushed the boundaries to a certain extent. But then we have the Indigenous Peoples Sculpture Program. Those are pieces that absolutely have nothing to do with Gothic architecture, but they do fit in quite nicely. So that'll be interesting to see how and what we can do within the limited parameters of those particular stones, again the size and location. But I also think that what's really exciting is the new spaces, because these are modern, contemporary spaces where we're not restricted so much or feel the weight of having to carve in the Gothic style. They drop that off and leave that at the door and you've got a whole new kind of world ahead of you, or a whole new canvas, rather. And what is that going to look like? I still don't know. We're looking at different ideas for different styles and moving forward, but certainly, whatever it is, it'll be something that for me will definitely be important to collaborate with Indigenous people to figure that out and have them be part of that process.



Full Conversation with Anna Saint-Pierre, Designer and Doctoral Researcher

**Madeleine Reinhart: I'd like to begin by speaking about the concept of heritage, both at the architectural and material scale. Your work is mostly based in Paris, where there is an abundance of so-called "heritage materials," and so much architectural work is about preserving a sense of the past, even when a new building is proposed. I'm wondering if you could describe how your research has led you to find a balance between preserving urban heritage while proposing a new and hybrid way to represent the city's material identity.**

Anna Saint-Pierre: OK, so this is going to be a broad answer because it's true that it really touches on my research subject. In fact, I worked with these topics of research when I was in Master's, but in textile and material design in the School of the Decorative Arts of Paris. I started by observing that if you begin by decontextualizing the building, completely removing it from its environment or the space that would have surrounded it, we can call upon the knowledge of geologists, historians, and sociologists to identify its date of construction and its site of construction thanks to the learned study of the building's materials and their composition, precisely because we know that during a certain period of time, we used the material that we had under our feet in the region. After that period, we opened channels like railroad networks, train lines, or sea transport which allowed us to seek materials at a further distance.

My hypothesis is to say that if we were to do the same thing with the demolition of a building at the construction site - let's imagine that we have a building that has disappeared and that we have just these demolition bins and fragments of the building - in the same way, we will be able to restore it with the knowledge of the building's date of construction, its place of construction, and even perhaps its form with the processes of anastylosis, the archaeological technique of using fragments to recompose a building. It's this idea of intellectual projection that fascinates me, to say that you have a fragment of matter and that you can imagine where it comes from, this is really the starting point to my work. From there, I continued and went to the sites and gathered, in French we say "fragments," and I brought them out from the rubble and back to the studio. The School of Decorative Arts is a design workshop, we have a lot of workshops based on transformation, and I transformed the fragments with the idea to make something born from the rubble, from the rubble comes a new materiality which would have properties of textiles. This was linked to my training as a textile designer, therefore a lightness, a flexibility, a smoothness which allows them to move and to be able to be a little deformed and to follow the evolution of the building.

These projects were my first projects, but these are still things that interest me a lot. But the idea I had was in relation to heritage. We are in an era of demolition, of the Anthropocene era, where entire buildings are being demolished even if things on the same site are only changing a little bit, where suddenly we are in an era of “built memory” where the memory of what was built is completely destroyed and what we are left with is rubble. Hence, the notion of “built memory” is reduced to the smallest scale of building materials, which is essentially the rubble material.

In my opinion, the notion of heritage is also expressed in the choice of materials. This connects to what I said earlier, that is to say that we can create an architecture thanks to these rubble materials. It involves architectural forms and therefore it creates atmospheres, and this is what is also imprinted in our memories. And there's another theme of heritage which is quite problematic in France. This is because heritage is linked to the question of patriarchy, the question of the “fatherland,” therefore of the nation and the desire to glorify a fatherland. France is suddenly at the center of this history that is glorified, and the rest is discarded. These are topics that interest me a lot in my work, precisely to question this notion of heritage and to say that we can find qualities in other types of architecture that improve the very meaning of heritage.

**The question of patriarchy and nationhood through material are themes that arise in my research as well, where limestone in Montreal becomes a colonial tool that is glorified in the same way as you just described. This brings me to my next question. When I was in Paris last summer, I noticed that limestone, gypsum, and other natural materials were popular amongst architectural exhibitions, and that many new buildings are being constructed with single materials like limestone, such as École-Evangile by TVK or Berrault Pressacco's housing project on rue Oberkampf. There is recognition in Paris and across France of the negative impact that the architectural industry has on the environment, yet a return to the extraction of culturally significant materials is still being celebrated. What do you foresee as the main challenge in convincing the industry that extraction is not the answer, and that re-use and recycling methods should be considered a primary building method?**

Well, that's quite a question! To which I don't have an answer. [Laughs] No, but I do... In my research work, I have identified a historical period in France where we have marginalized the techniques of reuse. In terms of actual numbers, we have very few statistics regarding the use of recycled materials, particularly related to the nineteenth century or the previous centuries. We don't have details on how much more reused materials are used than materials extracted

directly from the ground in the nineteenth century, but in the twentieth century, after the Second World War, so in 1945, there was a whole period of great post-war reconstruction, which coincides with building techniques that have somewhat transformed the way of building.

On the one hand, a lot of military equipment was used in civil engineering. You see bulldozers and tools that had been industrialized in great mass during the war, notably in the United States, that arrived in Europe and that are tools that the industry of demolition and deconstruction could employ. So we're going to wipe the slate clean of what has existed. Then we started to use a lot of concrete in France, there's really a huge culture of concrete. I don't know how it happened in Montreal, but in any case, the French state relied on concrete to build quickly.

After the war, the implementation of construction techniques that does not allow for dismantling begins. They used the type of cement that you see associated with bricks, for example, in an irreversible way rather than the lime mortar which allowed for deconstruction. And then there is also the influence of the architectural theories of the modernists, of Le Corbusier. Even if they were quite theoretical before the war, after the war, a space was created to discuss the bombings and their effects which allowed these theories to be put into practice. The Havre is a case in point, not a negative example, but a historical one along with other spaces that were bombed or deemed to be unsafe.

In the larger region of Le Havre a lot was bombed, but there was also a lot of space that was deemed to be toxic and so everything was razed and rebuilt. In Marseille, during the war, a whole section of the Old Port was demolished and Fernand [Pouillon], who was a famous architect, built an entire housing development. In sum, we see an entire culture of this sort. This is also a period that coincides with the beginning of the Anthropocene. But it's true that visually and architecturally speaking, there is more reuse of materials in [Pouillon's] projects, whereas before it was something completely new. In Haussmann's work, reuse was a very common practice. There was a lot of reuse of stone, it was something very frequent. But later the building codes changed and no longer favoured reuse. The architects and project managers have started to be more tempted by the idea, but they are beginning to understand that reuse may involve higher costs. This is because it likely involves employing old techniques, practices, and tools that no longer exist.

And then in terms of the industry; I think there is a lot of pressure to focus on the local, in terms of prioritizing autonomy when it comes to building materials,

with the goal of not having to seek out resources elsewhere. The whole idea of national autonomy is that it changes the way these issues are thought about a little bit. From my perspective, I feel like it means that we are more likely to look for materials locally. We're going to look for local quarries, but not for very long necessarily, because it challenges the principle of an industrial economy. I don't exactly know how to advance the ecological argument, although I feel that that the ecological question and recycled materials do have a historical value. Often, there is this idea that in the past we used materials that were more "noble," even if this is debatable. I'm working on a project where there is a whole floor in mosaic which is magnificent, the question becomes whether to remove it and lay down a material that will cost the same — as you know there is always the issue of value and cost. So there is an ecological argument that can be advanced as well as an argument that relates to the quality of the materials. Both can be defended in my view.

If we do want to defend the use of certain materials that, as you say, we have glorified, like stone, then one option is to obtain them from one of Haussmann's buildings rather than throwing that stone away. Stone is a material that is perceived in a positive way by both builders and clients who value its unique properties.

**I imagine that the architectural education is also a huge component, and the workshops that you organize with students to discover new ways of producing building materials is very inspiring. My next question for you is about how architects often reference the "genius loci" or cultural identity that architectural materials provide cities. In Paris, Lutetian limestone has become a heroic and identifiable material that is greatly valued by society. Your work makes a strong argument that the same sense of "material belonging" can be achieved through recycling materials directly on-site, and I think you could even say it is even more culturally significant to re-use materials that have already had so many lives; from their original state as geologic strata to their movement and transformation into a building material, and then to be transformed once again into a hybrid material of old and new creates such a powerful material history. Could you speak to how this sense of material belonging informs the emphasis your research has on recycling or "quarrying" materials in-situ?**

With this type of approach, the in-situ reuse of the deposits of demolition is a bit like the mode of extraction, even if it can be problematic to use this type of term, because it's borrowing from a whole other culture. But what is interesting is that, from the material perspective, it is going to generate shifts according to the tools and methods that we are going to use, a little bit like in a quarry. As a

result, the new methods will become inscribed in the new material that we will produce. For example, if we decide to remove a brick wall and to reuse the bricks, we might use a method of careful removal, but if we decide to deconstruct it with explosives, we will have brick dust and so on. If we use what we call a "crusher," it will make fragments. So, there's a bit of this thing of inscribing the transformation of the material at the construction site and the mutation of the place in the material. Something that I also find interesting is that it is also a way of speaking about this moment which is extremely violent, because it often involves using huge amounts of energy, which is super significant because it makes the building site a site of incredible metamorphosis.

Being able to make this time visible in the final material, and that it will produce patterns, different textures and so on is quite interesting. There is this history there, and it's a bit like what I was saying at the beginning about being able to study an architecture with knowledge of materials in geology or in history in the same way. It takes a lot of knowledge, but we can perhaps give thanks to the stamping of a brick or maybe has it been found its original geological region. In the buildings made of stone it's true that there is something very direct which is perhaps also why it is celebrated. One really reads the strata of the stones and places them as they are naturally laid in beds to respect their direction of sedimentation. When we find fossils, we have a very direct knowledge between what happens during the geologic transformation and in the building. There is another demolition material which also interests me which is concrete, but it requires a more specialized knowledge, perhaps because we can work it to a scale that is smaller. But this is just a guess because I haven't worked with it yet. If we slice concrete, we will be able to find its composition. In the same way, we are going to be able to discover its origin and make up, but it is a little less obvious. It is more subtle and requires gathering more knowledge which is perhaps less well known because concrete for a long time was not considered a heritage material, therefore it was not studied from a historical point of view, whereas today there are also specific programs on the restoration of places, so we are beginning to have more knowledge on this material.

**Yes and with concrete, I find it interesting that there is an emphasis on the debate around embodied carbon. I'm also familiar with your work with "granito," a hybrid terrazzo material created using recycled granite that gets repurposed as flooring and protective surface materials. Can this method of fabrication also be used to create structural materials or facade materials?**

Granito is basically terrazzo. It is a facing, or a coating, therefore it serves to protect a surface and cover what needs to be hidden in a building. It is a

secondary material which could maybe be used on the facade but is mostly used on prefabricated parts. After, what is possible is to make polished concrete. And this is somewhat in line to what I explained before, about working on a recycled concrete facade for example, where we could also incorporate more noble materials like marble, quartz, and whatever else we want. It has to be structurally viable. For instance, we could have made a concrete with crushed granite. I think that it would have required a lot of research and testing in a laboratory, which was not possible on the building sites I was working on during my research, but within the framework of a research on the longer term, I think that it is completely feasible. And besides, these are things that are studied by granite quarries, precisely to use for all their quarrying goals. In fact, now they are making aggregates and they are looking to see if they can make concrete, so it is part of the things that are studied closely today.

So, I think that we could have made [granito] structural, but that it would be necessary to have the financial means to make it possible. Unfortunately, for the moment, there are not always the means there to realize the idea, but I think that it is very possible and would work well. I had done tests with a cement manufacturer precisely to make concrete with this characteristic and to prove we could have done it and could make a slab, a concrete floor with the material mixed in that would have avoided affixing layers of materials. Even if we are in a building where there is a heated floor embedded, we would be obliged to have a coating, but in another project, it could be approached differently. It's possible to do structural work, it's just that it requires time and resources.

**Have you experimented with limestone in Paris in a similar way, given its abundant use as a facade material, or do less limestone buildings get demolished seeing as they are considered "heritage"?**

That's very interesting, because it's true and I think it would deserve more in-depth research work. If we generalize, the core of the city center is preserved. Since these are sites with older buildings that are often better appreciated, they are part of the UNESCO heritage districts. The more you move away from the city center, the more you go towards materials that are more transformed, that are more modern. The cycle of demolition and reconstruction is much more frequent there, so there are fewer buildings made of limestone being demolished.

What is interesting is that I had done a project with the School of Architecture of Versailles which is in the small stables of the castle of Versailles. It is a historical building which is [UNESCO] classified, and they restored the entire roof and

the high elements which are built out of limestone. In doing so, all the old slate roofs were thrown out and replaced with new ones. More consideration should have been given to those ancient materials. In addition, the slate quarry where the original slate came from in France had closed, so a Spanish quarry supplied the slate for the roofs of the small stables. But there was also a lot of limestone being removed, and some with super beautiful ornaments. In general, it gets thrown away and often goes to landfills or gets crushed and used to cover roadways and that kind of thing. I think you're right that it is demolished less, but sometimes it still does, especially on heritage sites where there are sculptures. I'm going to do a screen share.

I'm working on a project for the Chamber of Notaries with an architectural firm called Senzu, we haven't communicated too much about the project because we are tendering for the companies, but it is something that is in progress. So you see, these are the elements of the façade that will be reintroduced. We did a site survey of the different blocks according to their stone type because what's also incredible is that we don't use the same stones for the same purpose depending on the period. We had to retrace the origin of the materials and we cut them into slices to make a sort of open book [terrazzo] parcel on the ground. The most interesting part is to find the profiles of the bas-relief carvings of the facade, so it becomes clearer when it is sliced.

I did this in connection to another project which becomes a bit repetitive, but it was a project for a nursery school in an historic building at Palais de l'Alma. In the basement of the building there were plenty of materials including a limestone sculpture which we used, too. In the end everything was used incrementally and reintroduced into the project with the idea of being able to identify the profile of the stones. You can see here some of the limestone materials.

That's one way I've explored it but there are many others. There are plenty of other ways to appreciate these materials, but I think it's funny that it's always heritage sites that are [UNESCO] classified and frankly, I've never had any other opportunities to work with this type of material. Each time, it's on heritage sites where we've maybe removed the spandrels under the windows, whereas a concrete building isn't the same at all. There should be the same attention for concrete.

