A HOUSE OF THREE BIRDS*

*A series of experimental plots that investigate the translation of architectural ideas.

SAJITH SABANADESAN

A HOUSE OF THREE BIRDS*

by Sajith Sabanadesan

Bachelor of Science, McMaster University, 2008

Bachelor of Architectural Science, Ryerson University, 2012

A thesis

presented to Ryerson University

in partial fulfillment of the
requirements for the degree of
Master of Architecture
in the Program of Architecture

Toronto, Ontario, Canada, 2017

© Sajith Sabanadesan, 2017

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 authorize Ryerson University to lend this thesis to other institutions or individuals for the purpose of scholarly research

I further authorize Ryerson University to reproduce this thesis by photocopying or by other means, in total or in part, at the request of other institutions or individuals for the purpose of scholarly research.

I understand that my thesis may be made electronically available to the public.

A House of Three Birds*
Master of Architecture 2017
Sajith Sabanadesan
Architecture Program | Ryerson University

Abstract

Architecture and architectural drawings typically focus on known parameters – known programs, events, location, materials, known experiences. *A House of Three Birds** grapples with how to draw the unknown, the sublime, the liminal – the ineffable experience of architecture. Normative architectural drawings rely on creating what we see using conventions that allow for a clear understanding of their desired outcome, providing little interpretation of the author's meaning and intent. This design research focuses on providing a method of translation that engages the viewer within the space of the drawing, encouraging the drawing to become more than what is shown. No longer static, the drawing becomes a dynamic entity, generating and proliferating unexplored outcomes. This design research oscillates between the act and product of drawing to develop a series of experimental plots where one is not told how to participate, but is instead, inventing ways to participate.

Figure 01

Preface

My primary motive entering the Master of Architecture program was to push the boundaries of how I represent architecture. What initially began with a desire to present architectural images differently and to capture the ineffable experience of buildings, quickly developed into a design research about experimentation and speculation.

Figure 01: *Redefining Value*
Sajith Sabanadesan, 2015
Digital drawing printed on 24" x 36" mylar

Without a known outcome in mind, I set about creating a series of small investigations that originated with the first-year Master's studio project, *Redefining Value* (Figure 01). This project opened the door to how I would begin to think about architecture and more specifically, the architectural drawing. Instead of presenting known ideas or representing the world around us, the drawing is a tool for the generation and proliferation of ideas that could grow into one project or many.

*A House of Three Birds** is an investigation into the formation of architectural ideas. A method of working out the design of architecture to better engage with and communicate ideas. The normative use of drawing in architecture is that of a tool for constructing a known image where the drawing is evidence of a project and not evidence of the process of a project. The drawings created by architects have the potential capacity to become loaded with information and possibilities. Containing both the tools and hints for their unpacking, they retain the ability to stimulate discourse about architecture.

*A House of Three Birds** is a culmination of the past two years and the beginning of a long series of experimental plots that investigate and translate architectural ideas. The hope is that anyone interested in the speculative nature of architecture will be able to pick up the work presented here and translate it to their own experimental plots.

Acknowledgments

Firstly, I would like to thank my thesis supervisor Arthur Wigglesworth for opening the door to this design research in my first year of the M.Arch program. For constantly pushing and encouraging me to embrace the uncomfortable territory that I chose to operate in and for quelling my fears of failure when I would doubt this leap. Every conversation pushed me further and challenged my preconceived notions about architecture, something that I hope can continue informally as I moved forward.

To Garth Norbraten, for being passionate and invested in this journey with unwavering enthusiasm. Your vast knowledge and passion for all things architecture and design related is contagious.

I would also like to thank John Cirka, whose challenging questions and critiques lingered with me long after they were posed. Thank you to Frank Bowen and the DAS fabrication staff for guiding me when I would come to them with incoherent ideas to construct.

Lastly, my family; for their unwavering support, understanding and patience as I fumbled along this road and to my M.Arch cohort for the laughs and distractions that made the stressful days all the easier.

To my family.

Table of Contents

Author's Declaration	iii
Abstract	v
Preface	vii
Acknowledgments	ix
Dedication	xi
List of Figures	xiv
Introduction	1
Context	2
Design Research Proposal: A House of Three Birds*	3
Design Research Outline	5
1. Drawing	10
1.1 Drawing: act of	12
1.2 Drawing: product of	14
1.3 Drawing: the act and product of	16
Design Research: Reveries of Flight	20
Design Research: After the Blackbird Whistles	26
Design Research: The Eye of the Blackbird	31
2. Drawing Space	34
2.1 (Re)Presenting Space	34
2.1.1 Projecting Space	34
2.1.2 Abstracting Space	38
2.1.3 Abstraction and Representation	40
2.2 (Re)Configuring Space	42
2.2.1 Fracturing space	42
2.2.2 Infinite Space	46
2.2.3 Constructing Space	48
2.2.4 Space of Dreams	50
2.3 The Arrested Image	54
Design Research: Translation in Series	59

3. Drawing Speculation	64
3.1 Radical Drawings	65
3.1.1 Archigram	65
3.1.2 Superstudio	67
3.2 Subversive Drawings	69
3.2.1 Rem Koolhaas	69
3.2.2 Daniel Libeskind	71
3.2.3 Zaha Hadid	73
3.3 Dynamic Drawings	75
3.3.1 Bernard Tschumi	75
3.3.2 Coop Himmelb(l)au	77
3.4 Conclusion	79
Design Research: Shadows of Inflection	83
4. Constructing the Drawing	88
4.1. Proto-Formal Objects	88
4.2 Abstract Nature of Diagrams	91
4.3 Generative Forces of Mapping	95
4.4 Indeterminacy of Constructs	99
Design Research: Threshold(s) of Masks	105
Design Research: Wings of Transparency	110
5. A House of Three Birds*	116
Conclusion	130
Appendices	134
Appendix A	136
Appendix B	148
Appendix C	154
Appendix D	158
Works Cited	178
Works Considered	183

List of Figures

Cover: *Discarded Fragments*

Source: Sajith Sabanadesan

Figure 01: *Redefining Value*, 2015

Source: Sajith Sabanadesan

Figure 02: *Musei Wormiani Historia*

Source: "Ole Worm's cabinet of curiosities, from "Museum Wormianum," 1655. Accessed April 16, 2017. <http://www.sil.si.edu/Exhibitions/wonderbound/crocodiles.htm>

Figure 03: *Spatial Pollination*

Source: Sajith Sabanadesan

Figure 04: *House of Three Birds*

Source: Sajith Sabanadesan

Figure 05: *Migratory Patterns*

Source: Sajith Sabanadesan

Figure 06: *Crossing the Liminal*

Source: Sajith Sabanadesan

Figure 07: *Reveries of Flight*

Source: Sajith Sabanadesan

Figure 08: *House of Three Birds*

Source: Sajith Sabanadesan

Figure 09: *The Blossoming of Perspective*, 2007, Penelope Haralambidou

a) *Undressing*

Source: Keate, Andy. *The Blossoming of Perspective*. Accessed August 1, 2017. <http://discovery.ucl.ac.uk/9770/1/9770.pdf>

b) *Folding Model of Stereovision*, 2007

Source: Keate, Andy. *The Blossoming of Perspective*. Accessed August 1, 2017. <http://discovery.ucl.ac.uk/9770/1/9770.pdf>

Figure 10: *Threshold(s) of Masks*

Source: Sajith Sabanadesan

Figure 11: *Wings of Transparency v.01*

Source: Sajith Sabanadesan

Figure 12: *Wings of Transparency*

Source: Sajith Sabanadesan

Figure 13: *Threshold(s) of Masks*

Source: Sajith Sabanadesan

Figure 14: *Reveries of Flight*

Source: Sajith Sabanadesan

Figure 15: *Reveries of Flight*
Source: Sajith Sabanadesan

Figure 16: *Reveries of Flight*
Source: Sajith Sabanadesan

Figure 17: *Reveries of Flight*
Source: Sajith Sabanadesan

Figure 18: *After the Blackbird Whistles*
Source: Sajith Sabanadesan

Figure 19: *After the Blackbird Whistles*
Source: Sajith Sabanadesan

Figure 20: *After the Blackbird Whistles*
Source: Sajith Sabanadesan

Figure 21: *Eye of the Blackbird*
Source: Sajith Sabanadesan

Figure 22: *Holy Trinity*, Masaccio, 1425
Source: *Holy Trinity* by Masaccio. Accessed August 1, 2017.
https://commons.wikimedia.org/wiki/File:Masaccio_trinity.jpg

Figure 23: *Reconstruction of the Temple of Jerusalem*, William of Tyre 1276
Source: *Reconstruction of the Temple of Jerusalem*, by William of Tyre. Accessed August 1, 2017. <http://www.visual-arts-cork.com/famous-paintings/apotheosis-of-st-ignatius.htm>

Figure 24: *Brunelleschi Optical Instrument*, Jim Anderson
Source: "Brunelleschi and the Re-Discovery of Linear Perspective." Accessed August 1, 2017.
<https://maitaly.wordpress.com/2011/04/28/brunelleschi-and-the-re-discovery-of-linear-perspective/>

Figure 25: *Treatise on Measurement*, 1532, Albrecht Durer
a) *The Drawing of a Woman Lying* by Albrecht Durer
Source: "Der Zeichner des liegenden Weibes." Accessed August 1, 2017.
<https://upload.wikimedia.org/wikipedia/commons/0/00/DURER2.png>

b) *The Draughtsman of the Lute* by Albrecht Durer
Source: The Met Accessed August 1, 2017.
<http://www.metmuseum.org/art/collection/search/387741>

Figure 26: *The Principles of Parallel Projection*, 1761, Daniel Fournier
Source: Jon Schramm. Accessed August 1, 2017.
<http://www.jonschramm.com/Images/daniel-fournier.png>

Figure 27: *Origin of Painting*, David Allen, 1773
Source: "The Origin of Painting." Accessed December 6, 2017.
<https://projectionsystems.wordpress.com/2009/09/06/the-origin-of-painting/>

Figure 28: *Origin of Painting*, Karl F. Schinkel, 1830

Source: "The Origin of Painting." Accessed December 6, 2017.

<https://projectionsystems.wordpress.com/2009/09/06/the-origin-of-painting/>

Figure 29: *Carceri (Imaginary Prisons)*

a) *Title Page Carceri (Imaginary Prisons)*, 1745-1750, Giovanni Battista Piranesi

Source: "Piranesi's Imaginary Prisons." Accessed August 1, 2017.

<http://www.italianways.com/piranesis-imaginary-prisons/>

b) *The Man on the Rack (Imaginary Prisons)*, 1745-1750, Giovanni Battista Piranesi

Source: "Piranesi's Imaginary Prisons." Accessed August 1, 2017.

<http://www.italianways.com/piranesis-imaginary-prisons/>

c) *The Round Tower (Imaginary Prisons)*, 1745-1750, Giovanni Battista Piranesi

Source: "Piranesi's Imaginary Prisons." Accessed August 1, 2017.

<http://www.italianways.com/piranesis-imaginary-prisons/>

d) *The Staircase with Trophies (Imaginary Prisons)*, 1745-1750, Giovanni Battista Piranesi

Source: "Piranesi's Imaginary Prisons." Accessed August 1, 2017.

<http://www.italianways.com/piranesis-imaginary-prisons/t>

Figure 30: *Santa Maria del Priorato Altar Piece*, Giovanni Battista Piranesi, 1764-1766

a) Rear View

Source: Photography: Jacopo Benci. "The Image and the Narrative." Accessed August 1, 2017.

http://www.imageandnarrative.be/inarchive/thinking_pictures/images/small08.jpg

b) Ornament Detail on Altar

Source: Photography: Jacopo Benci. "The Image and the Narrative." Accessed August 1, 2017.

<https://jacopobenci.wordpress.com/2013/02/08/giovanni-battista-piranesi-13/>

c) Rear View

Source: Photography: Jacopo Benci. "The Image and the Narrative." Accessed August 1, 2017.

<https://jacopobenci.wordpress.com/2013/02/01/giovanni-battista-piranesi-7/>

Figure 31: *Woman Walking Downstairs*, Eadweard Muybridge, 1887

Source: "Female nude motion study by Eadweard Muybridge." Accessed April 30, 2017

[https://commons.wikimedia.org/wiki/File:Female_nude_motion_study_by_Eadweard_Muybridge_\(2\).jpg](https://commons.wikimedia.org/wiki/File:Female_nude_motion_study_by_Eadweard_Muybridge_(2).jpg)

Figure 32: *Nude Descending the Staircase No.2*, Marcel Duchamp, 1887

Source: "Muybridge horse gallop." Accessed April 30, 2017

https://commons.wikimedia.org/wiki/File:Muybridge_horse_gallop.jpg

Figure 33: *The Bride Stripped Bare by her Bachelors, Even (The Large Glass)*, Marcel Duchamp, 1915

a) Nine Shots Detail

Source: Benci, Jacopo. "The Image and the Narrative." Accessed August 1, 2017.

http://www.imageandnarrative.be/inarchive/thinking_pictures/images/small08.jpg

b) Chocolate Grinder Detail

Source: Benci, Jacopo. "The Image and the Narrative." Accessed August 1, 2017.

http://www.imageandnarrative.be/inarchive/thinking_pictures/images/small08.jpg

c) Malic Molds and Shattered Glass Detail

Source: Benci, Jacopo.. "The Image and the Narrative." Accessed August 1, 2017.
http://www.imageandnarrative.be/inarchive/thinking_pictures/images/small08.jpg

d) *The Bride Stripped Bare by Her Bachelors, Even (The Large Glass)*

Source: Benci, Jacopo.. "The Image and the Narrative." Accessed August 1, 2017.
http://www.imageandnarrative.be/inarchive/thinking_pictures/images/small08.jpg

Figure 34: *Malevich* at Tate Modern

Source: Hemingway, Olivia. "Five ways to look at Malevich's Black Square." August 28, 2014.
 Accessed September 10, 2017. <http://www.tate.org.uk/context-comment/articles/five-ways-look-Malevich-Black-Square>

Figure 35: *Architekton Gota*, Kazimir Malevich 1923

Source: "Suprematism in architecture: Kazimir Malevich and the arkhitektonts." Accessed August 1, 2017.
<https://thecharnelhouse.org/2014/03/12/suprematism-in-architecture-kazimir-malevich-and-the-arkhitektonts/>

Figure 36: *Architekton Gota*, Kazimir Malevich 1923

Source: "Suprematism in architecture: Kazimir Malevich and the arkhitektonts." Accessed August 1, 2017.
<https://thecharnelhouse.org/2014/03/12/suprematism-in-architecture-kazimir-malevich-and-the-arkhitektonts/>

Figure 37: *Malevich's Tektonik*, Zaha Hadid, 1976-1977

Source: "Zaha Hadid Architects: Malevich's Tektonik." Accessed April 11, 2017.
http://www.zaha-hadid.com/wp-content/files_mf/cacheth_65d1300db123ce22f6e2569fb36764f8_771_malev_rend_01.jpg

Figure 38: *Proun Room*, El Lissitzky, 1923

Source: "Replicas and Reconstructions in Twentieth-Century Art." Accessed March 24, 2017.
<http://www.tate.org.uk/research/publications/tate-papers/08/replicas-and-reconstructions-in-twentieth-century-art>

Figure 39: *Globetrotter (In Time)*, El Lissitzky, 1923

Source: "Victory Over the Sun – El Lissitzky's Drawings for Suprematist Automatons." Accessed March 24, 2017.
<http://www.tate.org.uk/art/artworks/lissitzky-victory-over-the-sun-65387/6>

Figure 40: Ivan Chernikov

a) *Colombus Monument, Foundations of Contemporary Architecture*, 1925-1930

Source: "Yakov Chernikov: an architect of his time." Accessed July 24, 2017.
<http://www.bdonline.co.uk/yakov-chernikhov-an-architect-of-his-time/5040301.article>

b) *Composition no. 16 Illusion, Architectural Fantasies*, 1929-1933

Source: "Yakov Chernikov: an architect of his time." Accessed July 24, 2017.
<http://www.bdonline.co.uk/yakov-chernikhov-an-architect-of-his-time/5040301.article>

c) *Composition no.21, Combination of Skyscraper Shapes, Architectural Fantasies*, 1929-1933

Source: "Yakov Chernikov: an architect of his time." Accessed July 24, 2017.
<http://www.bdonline.co.uk/yakov-chernikhov-an-architect-of-his-time/5040301.article>

Figure 41: *The Garden of Earthly Delights*, Hieronymus Bosch, 1490

Source: "Bosch, The Garden of Earthly Delights." Accessed August 3, 2017.

<https://www.khanacademy.org/humanities/renaissance-reformation/northern/hieronymus-bosch/a/bosch-the-garden-of-earthly-delights>

Figure 42: *Italian Piazza*, Giorgio de Chirico, 1913

Source: "Italy's squares in Giorgio de Chirico's Works." Accessed April 10, 2017.

<http://www.italianways.com/italys-squares-in-giorgio-de-chiricos-works/>

Figure 43: *Human Condition*, Rene Magritte, 1913

Source: "Rene Magritte The Human Condition." April 10, 2017.

<https://www.renemagritte.org/the-human-condition.jsp>

Figure 44: *Endless House*, Frederick Kiesler, 1950

a) Frederick Kiesler constructing Endless House model

Source: "Yakov Chernikov: an architect of his time." Accessed July 24, 2017.

<http://www.bdonline.co.uk/yakov-chernikhov-an-architect-of-his-time/5040301.article>

b) *Endless House* Sketch

Source: "Yakov Chernikov: an architect of his time." Accessed July 24, 2017.

<http://www.bdonline.co.uk/yakov-chernikhov-an-architect-of-his-time/5040301.article>

c) Exterior view of Endless House model

Source: "Yakov Chernikov: an architect of his time." Accessed July 24, 2017.

<http://www.bdonline.co.uk/yakov-chernikhov-an-architect-of-his-time/5040301.article>

Figure 45: *The Arrested Image*, Robin Evans, 2000

Source: "The Projective Cast." Accessed December 6, 2017.

<http://www.suckerpunchdaily.com/2013/07/03/the-projective-cast/>

Figure 46: *Translation in Series*

Source: Sajith Sabanadesan

Figure 47: *A Walking City*, Archigram, 1964

Source: "Text/Hypertext: Informational Flows and the Space of Place The Textual City"

Accessed August 3, 2017. <http://www.bauarchitecture.com/research.texthypertext.shtml>

Figure 48: *Plug-In City: Maximum Pressure Area*, Peter Cook, 1964

Source: "AD Classics: The Plug-In City/ Peter Cook, Archigram." Accessed August 3, 2017.

<http://www.archdaily.com/399329/ad-classics-the-plug-in-city-peter-cook-archigram>

Figure 49: *Continuous Monument: New York*, Superstudio, 1969

Source: Accessed June 16, 2017.

http://socks-studio.com/img/blog/superstudio9_905.jpg, <http://socks-studio.com/2011/03/02/superstudio-italian-radical-architects/>

Figure 50: *Continuous Monument: Alpine Lakes*, Superstudio, 1969

Source: MOMA Superstudio. Accessed July 23, 2017.

<https://www.moma.org/media/>

[WtsiZisIjExNzMs5l0sWylwiwiY29udmVydCslitiZXNpemUgMTQ0MHgNDQwXHUwMDNIllId.jpg?sha=b9d88133394cd7d1](https://www.moma.org/collection/works/938?locale=en&sha=b9d88133394cd7d1), <https://www.moma.org/collection/works/938?locale=en>

Figure 51: *Continuous Monument: New York Extrusion Project*, Superstudio, 1969

Source: MOMA Superstudio. Accessed July 23, 2017.

<https://www.moma.org/media/W1siZiIsIjExNzM5Il0sWylwliwiY29udmVydCsliliyZXNpemUgMTQ0MHgxNDQwXHUwMDNlIl1d.jpg?sha=b9d88133394cd7d1>, <https://www.moma.org/collection/works/938?locale=en>

Figure 52: *Exodus, or Voluntary Prisoners of Architecture: The Strip (Aerial Perspective)*, Rem Koolhaas, 1972

Source: "Exodus, or the voluntary prisoners of architecture." Accessed June 16, 2017.

<http://socks-studio.com/img/blog/Exodus1-800x597.jpeg>, <http://socks-studio.com/2011/03/19/exodus-or-the-voluntary-prisoners-of-architecture/>

Figure 53: *Exodus, or Voluntary Prisoners of Architecture: Training the New Arrivals (Axonometric projection)*, Rem Koolhaas, 1972

Source: "Exodus, or the voluntary prisoners of architecture." Accessed June 16, 2017.

<http://socks-studio.com/img/blog/Exodus1-800x597.jpeg>, <http://socks-studio.com/2011/03/19/exodus-or-the-voluntary-prisoners-of-architecture/>

Figure 54: *Exodus, or Voluntary Prisoners of Architecture: The Strip*, Rem Koolhaas, 1972

Source: "Exodus, or the voluntary prisoners of architecture." Accessed June 16, 2017.

<http://socks-studio.com/img/blog/Exodus1-800x597.jpeg>, <http://socks-studio.com/2011/03/19/exodus-or-the-voluntary-prisoners-of-architecture/>

Figure 55: *Micromegas: Dance Sounds*, Daniel Libeskind, 1979

Source: "Micromegas." Accessed September 16, 2016.

<http://libeskind.com/work/micromegas/>

Figure 56: *Micromegas: Dream Calculus*, Daniel Libeskind, 1979

Source: "Micromegas." Accessed September 16, 2016.

<http://libeskind.com/work/micromegas/>

Figure 57: *The World (89 Degrees)*, Zaha Hadid, 1983

Source: "ArchDaily: The Creative Process of Zaha Hadid." Accessed July 23, 2017.

<http://www.archdaily.com/798362/the-creative-process-of-zaha-hadid-as-revealed-through-her-paintings>

Figure 58: *Victoria City Aerial*, Zaha Hadid, 1988

Source: "ArchDaily: The Creative Process of Zaha Hadid." Accessed July 23, 2017.

<http://www.archdaily.com/798362/the-creative-process-of-zaha-hadid-as-revealed-through-her-paintings>

Figure 59: *Vision for Madrid*, Zaha Hadid, 1992

Source: "ArchDaily: The Creative Process of Zaha Hadid." Accessed July 23, 2017.

<http://www.archdaily.com/798362/the-creative-process-of-zaha-hadid-as-revealed-through-her-paintings>

Figure 60: *The Manhattan Transcripts Project, New York, New York, Episode 4: The Block*, Bernard Tschumi, 1970-1981

Source: "Socks Studio Manhattan Transcripts." Accessed June 16, 2017.

<http://socks-studio.com/img/blog/manhattan-transcripts-01.jpg>, <http://socks-studio.com/img/blog/manhattan-transcripts-01.jpg>

Figure 61: *The Manhattan Transcripts Project, New York, New York, Episode 4: The Block*, Bernard Tschumi, 1970-1981

Source: "Socks Studio Manhattan Transcripts." Accessed June 16, 2017.

<http://socks-studio.com/img/blog/manhattan-transcripts-01.jpg>, <http://socks-studio.com/img/blog/manhattan-transcripts-01.jpg>

Figure 62: *The Manhattan Transcripts Project, New York, New York, Episode 4: The Block*, Bernard Tschumi, 1970-1981

Source: "Socks Studio Manhattan Transcripts." Accessed June 16, 2017.

<http://socks-studio.com/img/blog/manhattan-transcripts-01.jpg>, <http://socks-studio.com/img/blog/manhattan-transcripts-01.jpg>

Figure 63: *Formuttation*, Wolf D. Prix, Helmut Swiczinsky, 1981,

Source: "MOMA: Wolf Prix." Accessed. July 23, 2017.

<https://www.moma.org/media/W1siZiIsIjYxMTUiXSxbInAiLCJjb252ZXJ0IiwilXJlc2I6ZSAxNDQweDE0NDBcdTAwM2UiXV0.jpg?sha=4bdf43646f9938e6>, <https://www.moma.org/collection/works/516?locale=en>

Figure 64: *Open House Sketch*, Wolf D. Prix, Helmut Swiczinsky, 1983

Source: "MOMA: Wolf Prix." Accessed. July 23, 2017.

<https://www.moma.org/media/W1siZiIsIjYxMTUiXSxbInAiLCJjb252ZXJ0IiwilXJlc2I6ZSAxNDQweDE0NDBcdTAwM2UiXV0.jpg?sha=4bdf43646f9938e6>, <https://www.moma.org/collection/works/516?locale=en>

Figure 65: *Shadows of Inflexion*

Source: Sajith Sabanadesan

Figure 66: *House of Three Birds*

Source: Sajith Sabanadesan

Figure 67: *House for Three Birds*

Source: Sajith Sabanadesan

Figure 68: *House VI, Transformation I*, Peter Eisenman, 1972-1975

Source: Eisenman Architects: House VI. Accessed August 01, 2017.

<http://www.eisenmanarchitects.com/house-vi.html>

Figure 69: *House VI, Transformation VIII*, Peter Eisenman, 1972-1975

Source: Eisenman Architects: House VI. Accessed August 01, 2017.

<http://www.eisenmanarchitects.com/house-vi.html>

Figure 70: *House VI, Transformation XII*, Peter Eisenman, 1972-1975

Source: Eisenman Architects: House VI. Accessed August 01, 2017.

<http://www.eisenmanarchitects.com/house-vi.html>

Figure 71: *Spatial Pollination v.03*

Source: Sajith Sabanadesan

Figure 72: *The Central California History Museum Competition*, Perry Kulper, 2000

Source: Perry Kulper Revisited. Accessed September 16, 2017.

<https://dprbcn.wordpress.com/2009/10/15/perry-kulper-revisited/>

Figure 73: *Site Plan v.01*, Perry Kulper, 2014

Source: Perry Kulper Revisted. Accessed September 16, 2017.

<https://dprbcn.wordpress.com/2009/10/15/perry-kulper-revisited/>

Figure 74: *The Central California History Museum Competition*, Perry Kulper, 2000

Source: Perry Kulper Revisted. Accessed September 16, 2017.

<https://dprbcn.wordpress.com/2009/10/15/perry-kulper-revisited/>

Figure 75: *Migratory Patters v.01*

Source: Sajith Sabanadesan

Figure 76: *Migratory Patters v.03*

Source: Sajith Sabanadesan

Figure 77: *Form:uLA/Bryan Cantley*

a) *Mobile Gatherspace*

Source: Metalocus. Image: ©Bryan Cantley. Accessed April 10, 2017.

<https://www.metalocus.es/es/noticias/bryan-cantley-geometrias-sucias-imperfecciones-mecanicas>

b) *Placemaker/Seedplanter*

Source: Form:uLA. Image: ©Bryan Cantley. Accessed April 10, 2017.

<http://plusarchitekt.tumblr.com/page/14>

Figure 78: *Pantomime Pollinator v.01*

Source: Sajith Sabanadesan

Figure 79: *Pantomime Pollinator v.02*

Source: Sajith Sabanadesan

Figure 80: *Threshold(s) of Masks*

Source: Sajith Sabanadesan

Figure 81: *Threshold(s) of Masks*

Source: Sajith Sabanadesan

Figure 82: *Wings of Transparency*

Source: Sajith Sabanadesan

Figure 83: *Wings of Transparency*

Source: Sajith Sabanadesan

Figure 84: *Wings of Transparency*

Source: Sajith Sabanadesan

Figure 85: *Wings of Transparency*

Source: Sajith Sabanadesan

Figure 86: *Wings of Transparency*

Source: Sajith Sabanadesan

Figure 87: *A House of Three Birds*

Source: Sajith Sabanadesan

Figure 88: *A House For Three Birds*

Source: Sajith Sabanadesan

Figure 89: *A House For Three Birds*

Source: Sajith Sabanadesan

Figure 90: *Spatial Pollination v.02*

Source: Sajith Sabanadesan

Figure 91: *Discarded Fragments*

Source: Sajith Sabanadesan

Figure 92: *Choreographing Flight*

Source: Sajith Sabanadesan

Figure 93: *Fantasy Flights v.03*

Source: Sajith Sabanadesan

Figure 94: *Fantasy Flights v.04*

Source: Sajith Sabanadesan

Figure 95: *Milestone 01 Presentation Board*

Source: Sajith Sabanadesan

Figure 96: *Milestone 02 Gallery layout*

Source: Sajith Sabanadesan

Figure 97: *Milestone 03 Presentation*

Source: Sajith Sabanadesan

Figure 98: *Final Presentation Gallery*

Source: Photography: Ryan Sissourath

Figure 99: *Initial Sketches*

Source: Sajith Sabanadesan

Figure 100: *Narrative Series*

Source: Sajith Sabanadesan

Figure 101: *Spatial Pollination v.01*

Source: Sajith Sabanadesan

Figure 102: *Threshold(s) of Masks Process*

Source: Sajith Sabanadesan

Figure 103: *Pantomime Flights Process*

Source: Sajith Sabanadesan

Figure 104: *Wings of Transparency Process*

Source: Sajith Sabanadesan

Figure 105: *House for Three Birds*

Source: Sajith Sabanadesan

Figure 106: *Spatial Pollination v.02*

Source: Sajith Sabanadesan

Figure 107: *Spatial Pollination v.03*

Source: Sajith Sabanadesan

Figure 108: *Discarded Fragments v.02*

Source: Sajith Sabanadesan

Figure 109: *Migratory Behaviour v.03*

Source: Sajith Sabanadesan

Figure 110: *Fantasy Flights v.02*

Source: Sajith Sabanadesan

Figure 111: *Pantomime Pollinator Process*

Source: Sajith Sabanadesan

A House of Three Birds*

Figure 02

Figure 02: *Musei Wormiani Historia*
Musei Wormiani, 1655

Introduction

Context

To engage with the topic of drawing at a time when technology is dominating the field of architecture may seem somewhat odd. The introduction of computer programs such as AutoCAD, Revit, and CATIA have revolutionized the way one produces and therefore thinks about the architectural drawing.¹ The results of these programs have been the standardization of the architectural drawing, bringing about a change and decrease of use in the traditional role of drawing. However, modern architectural drawing, with its precedents in tools and media available since the Renaissance, remains valuable, and its potential applications have in fact increased.

During the Renaissance, the drawing became a tool for translating the three-dimensional space that surrounds us onto the two-dimensional space of the paper. The development of printing allowed for the proliferation of drawing as a method distributed by the likes of Palladio and Durand.² Perspective and orthographic drawing together would form the basis for the construction of buildings and be a primary tool of the architect.

It was not until the 20th Century that we began to see architectural drawings of an experimental nature that were first introduced by Giovanni Battista Piranesi and Claude Ledoux two hundred years prior. The invention of photography and the camera exploded preconceived notions of space and expanded the possibilities of drawing. Throughout history, various art movements have sought to conceive of new ways to describe space. These movements experimented with, and translated ideas across visual mediums to convey notions of vision, time, simultaneity, fragmentation, transparency and dream-like scenarios through the drawing.

Simultaneously, the architectural drawing has co-opted the techniques of other visual mediums, allowing it to become a speculative tool. One only has to refer to Superstudio's *Continuous Movement*, Zaha Hadid's *The Peak*, the *Micromegas* of Daniel Libeskind or Bernard Tschumi's *The Manhattan Transcripts*. More recently, the topic of drawing has gained further recognition as a tool for speculative exploration through the publications *Drawing Architecture* (2013) and the recent 2017 conference, *Drawing Futures* held by The Bartlett School of Architecture. These events presented explorations of architectural drawing using the latest technologies and media available. Through the narrative drawings of CJ Lim's *London Short Stories* to *Augmented Landscapes* of Smout Allen, avant-garde architects are pushing the drawing to new heights and possibilities by deploying the technologies

Figure 03

available and implementing them through the lens of the drawing.

These drawings break away from the Cartesian notion of space and the need for rational and justified descriptors to embrace uncharted, extreme concepts of space. As Peter Eisenman famously noted, the architecture exists in the space of the drawing. Drawn images do not have to lead to buildable work, but rather provoke and spark creative thought, embracing the unknown and unintended.

Design Research Proposal: A House of Three Birds*

In determining a design vehicle through which to operate, the "house" presented the most accessible scale in which to explore the ideas put forth in this design research. The project, titled *A House of Three Birds**, was named as such so that one could engage in the design research without limiting the scope of architectural possibilities presented, as well as to provide a tether for the basis of exploration. Although the house is a flexible type that can evoke many terms and ideas, it still comes with preconceptions. The term "house" already puts forward many preconceived notions to the architect, for instance, dwelling, sleeping, eating, habits, behavior and so on, profoundly influencing the design.³ To address this naming problem, the term "*of Three Birds*" was introduced. Inspired by Wallace Stevens' *Thirteen Ways of Looking at a Blackbird*, "*of Three Birds*," it is intended to offset these constraints of convention. The lines:

*I was of three minds,
Like a tree
In which there are three blackbirds.⁴*

Figure 03: *Spatial Pollination*
Marker and Ink on Vellum

Figure 04: *House of Three Birds*
Experimental Plots

evoke a specific imagery to the reader, but they have numerous possible meanings. *A House of Three Birds** serves as an umbrella term for the projects within this design research. While not focusing on specific housing typologies, or on the design of a deployable house, the title serves as the basis for the generating of ideas. Adapting this approach to design research helps to continually frame the project as one with numerous possibilities.

The work presented in *A House of Three Birds** repositions the drawing as the primary demonstration of architectural thinking. The drawing, in this context, encompasses the many modes of architectural representation available in contemporary design. Drawings, photographs, digital media, models, and constructs are all manifestations of a single platonic archetype that, when viewed through the lens of the drawing, has the potential to push the boundaries of normative architecture.⁵ The methods implemented in this task are akin to that of a cultural geographer or detective. An ongoing set of experimental plots is developed to engage with architectural ideas where each of the works produced acts as evidence of an unknown crime, a Cabinet of Curiosities (Figure 02).

Design Research Outline

We experience buildings both through our senses and with our imagination and often struggle to describe the feelings we have in spaces that affect us emotionally. It is this ineffable quality of spatial experience that this design research engages with. In recognizing the various visible and invisible forces that create space, the drawing allows for numerous levels of interpretation and analysis. The unfolding of shapes, the choreographic movement of lines and collision of forms present within the drawing affects the architect's relationship with, and interpretation of, architecture.

Drawing's dual-nature as both the demonstration of architectural thinking and as the artifact is presented in the first chapter, *Drawing*, providing the basis for the design research. Serving as the outward expression of a mental idea, drawing links the mind of the architect with the designed object. The first three design research projects that follow *Drawing* explore this expression.

Drawing Space presents the traditional roles of drawing as the primary means of representation and communication in architectural practice since the Renaissance. It highlights the predominance of linear perspective and orthographic projection in architectural drawing, and deals with their rejection with the advent of new technologies such as the camera and photography at the turn of the 20th century. *Transition in Series* builds upon the automatic drawing introduced at the end of the chapter.

Figure 05: *Migratory Behaviour*
Digital drawing printed on Mylar
24 x 36in.

Drawing Speculation dives into the speculative nature of the drawing by avant-garde architects who redefine the imagery of architectural drawings by co-opting the available media for critical and provocative purposes.⁶ *Shadows of Inflexion* presents the first experimentation with hybrid constructs, as it speculates on the nature of space.

Constructing the Drawing presents and expands upon various methodologies and techniques implemented in this design-research; recognizing that the designed object exists in the space of the drawing in between the act of and product of drawing. The drawing is no longer static but instead is a dynamic entity that generates and proliferates many unexplored outcomes. In working this way, a variety of forms and solutions that are not solely geometric shapes and lines manifest themselves to the architect. These ideas are further advanced in *Threshold(s) of Masks* and *Wings of Transparency*.

The final chapter, *A House of Three Birds**, serves as the consolidation of the projects introduced throughout the book to present an alternative method for engaging with architectural ideas. This method would explore how the drawing can articulate what is, and speculates on what is to come.

Notes

- 1 Laura Allen and Luke Caspar Pearson, eds. *Drawing Futures: Speculations in Contemporary Drawing for Art and Architecture*, (London: UCL Press, 2016), 3.
- 2 Ibid., 3.
- 3 Perry Kulper, "The Precision of Promiscuity," *OFFRAMP* 09, (2015): 1.
- 4 Wallace Stevens, "Thirteen Ways of Looking at a Blackbird," *The Collected Poems of Wallace Stevens*, Wallace Stevens Chris Beyers and John N. Serio, (New York: Random House, 2015).
- 5 CJ Lim, "London Short Stories: Drawing Narratives, in *Drawing Architecture*, ed. Neil Spiller, (Bognor Regis: John Wiley & Sons Ltd, 2013), 104.
- 6 Anthony Dunne and Fiona Raby, *Speculative Everything*, (Cambridge: The MIT Press, 2013), 6.

WU
JULY

Figure 06

1. Drawing

Drawing constantly creates, shapes and describes space through the hand of the creator. In architecture, drawing has been long affiliated with the design and construction of buildings, providing the necessary information for the development of the built object. However, not all drawings achieve this, as many drawings represent what is already available, highlighting what is known. The predominant practice in architecture is for the most intense activity to be the construction and manipulation of the built object, with the drawing being subservient to studies that privilege the final work.¹ This misalignment of activity in the design process is noted by Juhani Pallasmaa when he writes, "A sense of certainty, satisfaction and finality that arises too early in the [design] process can be catastrophic."² Reaching a specific conclusion in the design process too hastily eliminates the numerous and potentially more suitable design outcome possibilities. Drawings in architecture are 'projective' in that they have an intended utility beyond the drawing itself - their role is to represent a future concrete realization. They can be used as the outward expression of an idea, or as a method by which ideas can be translated from the mind onto the space of the drawing. Rather than being only a direct representation of the object to be built, the drawing can also bear evidence of the creative process. It can encourage modes of thinking and operating that will produce knowledge about the architecture itself, as it leads toward the built object³

Figure 06: *Crossing the Liminal*
Pencil on vellum
11 x 17 in.

The drawing can be viewed as having two aspects: the act itself and its resulting product. The act of drawing provides structure for the architect's thoughts, creating a reality of its own: ideas from the mind are translated into the space of the drawing, with the final product being a visual representation of that reality.⁴ By generating marks on paper, a homogenous, blank two-dimensional surface is converted into what is perceived as three-dimensional (sometimes abstracted) space, providing reference points for future marks.⁵ These marks become the basis for analysis and evaluation, offering knowledge and creating a framework for engagement by the designer and spectator.

Regarding the drawing, Dalibor Vesely writes that:

[They] offer a unique insight into the constructive possibilities on the boundary of actual and imaginary space – in other words, an insight into the representative power of our imagination, challenged by the conceptual power of invention. The transition from actual to imaginary space, from the geometrical representation of actual spatial relationships to their formal equivalents, is in essence a transition from the space of real possibilities to the space of possible realities."⁶

The drawing exists in two realities: the physical reality of the act itself and the imaginary reality that it suggests.⁷ Recognizing that the drawing's nature simultaneously exists in these realities expands the potential for architectural design and conception. Through the act of drawing, one is bringing forth ideas that are imagined, while the product of this act realizes and expands on these ideas, thereby offering possibilities for their further development.

1.1 Drawing: act of

Drawing (verb)

1: an act or instance of drawing; especially: the process of deciding something by drawing lots

2: the art or technique of representing an object or outlining a figure, plan, or sketch by means of lines

Figure 07: *Reveries of Flight*
Marker and ink on mylar

Figure 08: *House of Three Birds*
Process Study

The act of drawing in architecture is a method for engaging with, conveying, and constructing ideas about architecture. The drawing not only presents what is around us, but also presents the potential of what could be. Operating between imagination and reality, the construction of the drawing is not solely a series of geometric shapes, or a representation of a known image or symbol. Nor is it be viewed exclusively as a set of abstract forms. Robin Evans writes that we never work with the thing itself, but rather are always working at it through some intervening medium, almost always the drawing.⁸ The drawing becomes the territory in which to engage with the idea, allowing the architect to translate and convey what may not otherwise be seen.

The discussion about the drawing and the mind holds latent potential that cannot be intellectualized but is instead discovered through the act of constructing the drawing.⁹ Perry Kulper describes this potential promise of latency:

"The promise of latency entails a imaginative occupation of the "construction lines," a kind of x-rayed vision of the marks occupying what's "not there" in the space of the drawing, envisioned through the layered representations. Behind the coded and sometimes indecipherable or hieroglyphic marks lies something that is nascent – about which I might remain ignorant – but nonetheless full of potential."¹⁰

How one chooses to construct the drawing and present architectural ideas reveal "weighted" ways of thinking that can suggest relationships within the drawing.

Figure 09a

Figure 09b

When discussing the drawings of Penelope Haralambidou, Brigid McGee describes them as “works in themselves, the drawings’ own method is crucially ‘post-critical’; exploration or even argument, the margins become [tree-like], forcing the center to enlarge, pushing in and up and beyond.”¹¹ *Blossoming of Perspective* is a study of thinking and representing the drawing. Using the work of Marcel Duchamp’s *Given*, Haralambidou analyzes Duchamp’s work to create an alternative understanding of visual space that critiques the traditional method of architectural design that relies on a Cartesian understanding of space and the use of linear perspective. Using the drawing as a critical method and research tool, Haralambidou explores ideas of representation, dimensionality, vision and criticism.¹² The work consists of drawings, models, collages, constructs and various mixed-media work that combines her ideas with the work of others to develop new work, furthering the discourse and serving as sites for unrefined, exploratory ideas.¹³

The artifacts produced in *Blossoming of Perspective*, are not that of a built object. Rather, they represent something unbuilt and a tool for studying space (Figures 9a and 9b). The exhibition for the *Blossoming of Perspective* is a drawing of sorts as well. The way the work is curated invites the spectator to probe them, furthering their construction. The spectator can move around the drawings, viewing them from multiple perspectives with the backdrop of the room serving as part of the drawing and interacting with them. This engagement is also present in much of Duchamp’s work such as *The Large Glass* discussed in Chapter 2. The arrangement shown within the room is in dialogue with the artifacts, challenging the mythology that engagement with the drawing exists solely on the paper and in the individuals’ response to it. This method of exploration and presentation highlights the “importance of not knowing, during,”¹⁴ allowing the designer to think “through” their work. Ineffable ideas reveal themselves through forensic, detective-like investigation of the drawing.

Figure 09: *The Blossoming of Perspective*
Penelope Haralambidou, 2007
a) Undressing
b) Folding model of stereovision

Figure 10: *Threshold(s) of Maks*
Process Study
Ink on mylar
24 x 36 in.

Figure 11: *Wings of Transparency v.01*
Wire frame construct

Figure 12: *Wings of Transparency*
Wire frame and metal mesh construct

1.2 Drawing: product of

Drawing (noun)

1. a picture or diagram made with a pencil, pen, or crayon rather than paint, especially one drawn in monochrome:

Ideas, known and unknown, are formulated through the medium of drawing, breeding opportunities for speculation in design. Revealing the latent and ineffable ideas within the drawing requires a post-creative evaluation of the product of the act of drawing. This endeavor views the drawing through an archeological or palimpsestial lens, uncovering the intelligences produced by the work and inquiring how these intelligences can be translated and expanded upon. These ideas are not fixed, but rather are often unclear, chaotic fragments that encourage creativity. To critically analyze this work, one must look beyond known rationale and familiarity - towards imagination, ambiguity, and hidden meaning; toward the aspects the defy rationality.

Figure 10

Figure 11

Figure 12

This engagement requires approaching the drawings from a different perspective in order to find the translational mode. This mode consists of engaging with elements that are not representative of any known image, symbol, icon, or convention. David Ross Scheer writes that:

*Architectural ideas originate in the mind of an individual designer whose ideas may be hermetic and meaningful only to her. As a means of incorporating non-spatial ideas into a design, such drawings often represent many things in addition to ideas about built form. They may even have no obvious reference to it.*¹⁵

Once produced, the drawing, like the text, becomes “flattened” to the spectator. All of the information is present within the drawing - a prototype for potential forms and spaces. This is best described by Peter Cook:

*The key thing about the drawing is it doesn't have to be literal. You can draw something, and say that it has a certain atmosphere; that it might do something; or you might come upon it in an odd way; or a variety of types of materiality. Whereas the working drawing is showing: 'This is what it is'; 'That is what it is made of' -- end of conversation. With what you two do there isn't an 'end of conversation' -- it's probably only the beginning of a conversation.*¹⁶

Sparking further discussions between ideas and design speculations, the results of drawing exist as objects in their own right. In the act of drawing, there is both intent and dreamlike exploration. Viewing the product of drawing recognizes the intent and dreamlike exploration of the act of drawing, but also ignores them. Roland Barthes, in *Death of the Author*, describes the power of the author and reader when writing and viewing works. Barthes argues that the focus should be on the work itself and not on the author's intent or background. With this viewpoint in mind, a multiplicity of meanings and interpretations become available. The author is the mediator of ideas in the text and not the originator. The intent of the author can be muddled in translation from the author, to text, to reader. Therefore, the author should be removed from any analysis of his work, resulting in the work being analyzed and interpreted by itself. As with writing, the drawing can also be perceived in a similar way. The intent of the architect and the actual effect can be dissimilar, with the drawing becoming a generative force that reveals possibilities.

Figure 13: *Threshold(s) of Masks*
Process Study

Drawing as a generative force differs from drawing as representational. In the former, the abstractness of the drawing is highlighted. In its totality, the drawing serves to represent an idea that requires further investigation. The ideas that form in our mind are often obscure and unknown, therefore, translating them into a drawing is a difficult task. Drawing becomes an iterative process of refining the images so that they can take form on the space of the paper. The abstractness of drawings makes them more flexible in “mediating the ineffable gap between thought and the world of spatial experience.”¹⁷ The image created becomes a representation of the original idea, a version of it that has been translated into a visible image. David Ross Scheer notes that, “[The] mental image exists in a different way than the object, being perceived by the mind rather than by the eye and hand.”¹⁸ The form in our mind is much different from what the tangible form becomes. The act of drawing engages this activity and the product of that act is the resultant outward expression of that idea. Constructing the drawing with this dual-relationship in mind is important to the design of architecture.

1.3 Drawing: the act and product of

The drawing is most effective when it is revealing possibilities. While representation propagates known ideas and images, drawing generates new realities and spaces. It uncovers hidden potentials, latent ideas that can be revisited repeatedly, each layer revealing a new reality. Invisible and visible forces become layered within the space of the drawing; physical and quantitative factors such as shapes, forms, visual perception of space, and colour can be documented. Additionally, qualitative and unseen forces can be translated as

well, capturing the effects of experience, emotion or feeling and projecting it onto the space of the paper. This perceptual multiplicity captures the dynamic and complex relationship between ideas and architectural design.

Drawings in architecture involve the proliferation and generation of ideas that ultimately result in a designed object. They are not merely notational devices, but instrumental devices that play a significant role as the generators of design and interpretations.¹⁹ The act and product of drawing is a dialogue between the architect and the idea, an engagement noted by Bernard Tschumi as a form of knowledge, informing how we think and work. Mediating between the act and product of drawing requires using new ways of relating to concepts and precepts. The use of appropriate methods and media, ones that attempt to bridge the gap between the visible and invisible in architecture, means that thinking does not become the dominant factor in this exploration, but is at an equal level with action and seeing.²⁰ It is working towards the discovery of rational and quantitative descriptors that might be used in traditional architectural design. There is no prescribed route, just an unfathomable exploration where each single theory, each fairy tale, each myth, contributes to the process of completion.²¹

Throughout history, artists and architects, having embraced the drawing through a variety of media available, enabled the spectator to conceive of and view space differently in each era. To better understand the roles and capacities of the drawing, it becomes important to investigate its use in both the arts and in architecture.

Notes

- 1 Robin Evans, *Translations from Drawings to Buildings* (Cambridge: MIT Press, 1986), 156.
- 2 Juhani Pallasmaa in, *The Death of Drawing: Architecture in the Age of Simulation* (New York: Routledge, 2014), 73.
- 3 David Ross Scheer, *The Death of Drawing: Architecture in the Age of Simulation*, (New York: Routledge, 2014), 55.
- 4 Juhani Pallasmaa, *The Embodied Image* (Chichester: Wiley, 2011), 93.
- 5 Scheer, *Death of Drawing*, 58.
- 6 Dalibor Vesely, *Architecture in the Age of Divided Representation*, (Cambridge: MIT Press, 2004), 21.

- 7 Pallasmaa, *The Embodied Image*, 93.
- 8 Robin Evans, *The Projective Cast: Architecture and its Three Geometries*, (Cambridge: MIT Press, 1995), 22.
- 9 Nat Chard and Perry Kulper. *Fathoming the Unfathomable*, (New York: Princeton Architectural Press, 2014), 10.
- 10 Ibid., 13.
- 11 Brigid Mc Leer, "Empathetic Blossomings: The 'Drawings' of Penelope Haralambidou," in *The Blossoming of Perspective* by Penelope Haralambidou, (Domobaaal: London, 2007), 21.
- 12 Ibid., 22-23.
- 13 Ibid., 22.
- 14 Rachel Whiteread, quoted in Bridgid Mc Leer, *Empathetic Blossomings*, Domobaaal: London, 2007), 22.
- 15 Scheer, *Death of Drawing*, 58.
- 16 Laura Allen and Marcus Smout, interview by Peter Cook and Will Hunter, *Architectural Review*, April 26, 2013.
- 17 Scheer, *Death of Drawing*, 50.
- 18 Scheer, *Death of Drawing*, 52.
- 19 Aarati Kanekar, "Between Drawing and Building," *The Journal of Architecture*, 15, no.6 (2010): 772.
- 20 Jyanzi Kong, *Geometry of the Unconscious*, (Singapore: Page One, 2011), 89.
- 21 Paul K. Feyerabend quoted in Jyanzi Kong, *Geometry of the Unconscious*, (Singapore: Page One, 2011), 44.

Reveries of Flight

Using a projective approach, where the design is explored through the drawing of space, rather than the space of drawing, *Reveries of Flight* uses bird morphology and choreographic notation as a starting point. Produced by hand, the mylar surface is the site of investigation. Drawing on both sides of the mylar reveals a varied depth, with the back side of the mylar presenting a lighter contrast than the front, creating a visual hierarchy within the image. What appears as background in the drawing can be interpreted as being “behind” spatially, creating a gap between what is at the “forefront” of the drawing. The drawing serves as a proto-formal map, outlining the emergence of new realities. Aarati Kanekar describes this act of mapping as suggestive of translation from a phenomenon into visual abstraction, serving as a generative process.¹

Figure 14 *Reveries of Flight Detail*
Ink on mylar
24 x 36 in.

Figure 15 *Reveries of Flight Detail*
Ink on mylar
24 x 36 in.

Figure 16 *Reveries of Flight Detail*
Ink on mylar
24 x 36 in.

Figure 17 *Reveries of Flight*
Ink on mylar
24 x 36 in.

Analyzing the first drawing permits certain key structures to be revealed (Figure 14). Abstracting the flight pattern of the birds suggesting ideas of duality, temporality and simultaneity. Anchoring these flight patterns are three-dimensional structures that resemble distorted platonic solids (Figure 15). These objects appear to be connecting to the darkness of the birds, but a closer look shows that dashed lines touch the objects only slightly, or in some cases, not at all. The horizontal lines within the objects break apart the three-dimensional form, hinting at figure-ground relationships and a contrast of materials and hierarchy within the object. The dashed lines within the drawing produce a choreographed quality, reinforcing the theme of temporality while the false shadows below the object, not corresponding to the direction of the abstracted birds or revealing their origins, belong to no real spatial makeup (Figure 16). The shadows have a projective nature, as if something outside of the drawing is casting them onto the paper's surface.

Notes

- 1 Kanekar, Aarati, “Architecture's Pretext: Spaces of Translation,” (New York: Routledge, 2015), 108

Figure 14

Figure 15

Figure 16

Figure 17

After the Blackbird Whistles

Building upon the layers compiled in *Reveries of Flight*, *After the Blackbird Whistles* aids in generating a design brief. Movement and procession (through the space of what could be plans, sections, or elevations) is mapped, with the drawing oscillating between spatial proposals and marks for formal development. Various aspects of the drawing can be explored, on their own or as a whole, creating their own narrative.¹

Figure 18: *After the Blackbird Whistles*
Detail
Ink on mylar

Preliminary notions of spatial configuration are found within the solid lines of the drawing (Figure 18). Gestural marks present the notion of spaces that could be a frame or stairs, viewed in plan or section. The morphologies present within the first drawing are also translated onto the second, but appear as different forms. Marks coming together with the abstract forms intersect in the middle of the drawing, presenting a series of objects that continue to transform and dissolve (Figure 19).

Figure 19: *After the Blackbird Whistles*
Detail
Ink on mylar

Figure 20: *After the Blackbird Whistles*
Detail
Ink on mylar

The overall composition presents various thresholds and entry points within the arrangement. Since the drawing can be read as a plan, section, or elevation, these entry points become multiplied, creating different senses of a space. The drawing challenges physical limitations by ignoring them; everything is subject to the creator's direction or spectator's interpretation (Figure 20).²

Layering the drawings helps to identify where possible proto-formal expressions and interventions might occur. Further analysis of the drawing reveals potential relationships between spaces, connecting details like the ones found in previous drawings. The key structures found in the first two drawings are transposed and layered in the third drawing. The abstract nature of the first drawing, and the spatial forms of the second, work to reveal new meanings and ideas. The false shadows of *After the Blackbird Whistles* use the same primary forms as *Reveries of Flight*, ones that reinforce artificiality and temporality within the drawing.

Notes

- 1 Aarati Kanekar, *Architecture's Pretext: Spaces of Translation*, (New York: Routledge, 2015), 117
- 2 Antony Morey, "Shallow Depth," *Y Not Workshop*, accessed July 31, 2017, <http://ynotworkshop.com/shallow-depth>

Figure 18

Figure 19

Figure 20

The Eye of the Blackbird

The *Eye of the Blackbird* (Figure 21) is an inverted image of *After the Blackbird Whistles* that is laser-cut onto a piece of black-painted Corian. The black spray paint is burned off by the laser cutter, revealing the white Corian below. *Eye of the Blackbird* introduces the idea of depth to drawing by the layers that are created on the Corian. Resembling, an x-ray, the drawing reveals layers not seen in *After the Blackbird Whistles*. The blurred edges around the white objects glow, creating a phenomenological or ephemeral quality to the drawing. The inversion highlights an archeological quality since the subtractive creation of the white lines beneath the background surface suggests the uncovering of objects in the earth. In *After the Blackbird Whistles* the black marks on the white paper are more akin to the instantaneous formation of objects in space rather than their subtractive revealing.

Figure 21 *Eye of the Blackbird*
Digital image laser-cut on black spray
painted corian

Figure 21

Figure 22

2. Drawing Space

Drawing and painting have always been unique mediums for the exploration and representation of space. Various art movements from the Middle Ages to contemporary times have investigated the formation and depiction of space through specific languages of representation. In particular, the architectural drawing constantly evolves as new techniques, media and conventions appear, adapting to the visual climate of the time. From the thickness of the line, to adopting hatches for materials, adapting isometric and axonometric projections, using strips of mylar and photographic techniques such as montage, taking cues from film to sequence narrative, the drawing has always varied.¹ These manifestations recognize the difficulty of trying to capture the complexity of temporal spatial experience, oscillating between the specific and the abstract, the real and the imaginary.

2.1 (Re)Presenting Space

2.1.1 Projecting Space

Figure 22: *The Holy Trinity*
Masaccio, 1425

Concepts of linear perspective and orthographic projection introduced in the 15th century would become the foundation of the dominant language of representation that prevailed in the arts until the late 19th century. These two techniques additionally make up the basis of traditional architectural drawings and design. The development of linear perspective became a major force in shaping the modern language of representation in the Western world, affecting how Western humanity saw itself within the universe. Prior to the 15th century, the medieval conception of space was expressed in paintings through flat, floating arrangements.² Objects were depicted upon a planar surface in conformity with the way they were seen, without reference to their absolute shapes or relations, reinforcing the belief that God was at the centre of the universe (Figure 23). Society during the Middle Ages would view their actions as part of God's divine will and Medieval paintings reflected this belief. Focusing on the church, they contained no depth as they did not focus on the world around them or depicting the human body proportionately. It was not until the Renaissance and Nicholas Copernicus' theory that the earth and its neighbouring planets revolved around the sun, that people began to view man at the centre of the universe. Rather than looking to the heavens, they looked to the natural world around them. Their artistic sensibilities began to change toward developing a method to portray man and spatial depth realistically in representations.

Figure 23

Figure 24

Linear perspective would further the break from the Medieval perception of space. The whole picture or design is calculated to be valid from a singular viewpoint and therefore privileged the spectator within the scene. Perspectival representation helped facilitate a unity between thinking and feeling in western society, a union of art and science.³ The position of the spectator and their appreciation of the visibility and beauty of geometry and three-dimensional representation becomes the focus of the image.⁴ It was thanks to the development of linear perspective that drawing became the medium used by architects and artists to design and explore spatial representation.

While the development of linear perspective should be credited to a whole era and not a singular individual, Filippo Brunelleschi (1377-1446) is viewed as one of its greatest proponents. His realization of linear perspective would govern pictorial depictions of space for four hundred years. When he outlined buildings in a town, for instance, Brunelleschi used a fixed one-point perspective, using parallel lines that appear to converge at a single point. Seeking to test the validity of this approach (Figure 24). He would go on to use linear perspective in his painting *Florence Baptistery*. While standing before the actual Baptistery, he held a mirror up while looking through a hole, from the backside of the painting. When he pulled the mirror away, he saw the actual Baptistery, and when he held the mirror up, he saw that the painting's reflection corresponded precisely to reality. *The Holy Trinity* by Brunelleschi's protégé Masaccio serves as an early example of the use of linear perspective in Renaissance painting, as well as one of the first examples of Brunelleschi's discovery being implemented in art. The large barrel vault that encircled the composition shows God within a constructed, built space, demonstrating the depth of its surroundings (Figure 22). *The Holy Trinity* allows one to work backwards to reconstruct the space that Masaccio depicts, thereby translating two-dimensional space into a three-dimension one.

Figure 23: *Reconstruction of the Temple of Jerusalem*
William of Tyre, 1276

Figure 24: *Brunelleschi Optical Instrument*
Jim Anderson

Figure 25a

Figure 25b

Figure 25: *Treatise on Measurement*
 a) *The Drawing of a Woman Lying*
 Albrecht Dürer, 1532

b) *The Draughtsman of a Lute*
 Albrecht Dürer, 1532

Leonardo Da Vinci, along with Albrecht Dürer, have long been considered the early masters of linear perspective. Albrecht Dürer's drawings in *Underweysung der Messung (Treatise on Measurement)* depict how one could accurately create perspective drawings (Figure 25a and 25b). With regard to perspective devices created by Dürer, Robin Evans notes: "The behaviour of the taut strand drawn from the nail in the wall to the contour of the lute, and the behaviour of the line of sight that passes from the draftsman's eye through the framed grid and onward to the contour of the voluptuous woman he is studying, are sufficiently alike to make the geometrical description of the one event the same as that of the other."⁶ Linear perspective allows for the same perception of an object in art as the eye does when viewing the real object.

Evans' description of the object also reveals the problem of how linear perspective was viewed by artists and architects. In the case of Dürer's drawing of an artist drawing a lute, "The behaviour of these three analogical systems – the optical (Dürer's artist looking at his model through the gridded veil), the mechanical (Dürer's contraption for drawing a lute, which could be operated by a blind man), and the geometrical (linear perspective) – will not be identical.⁶ Linear perspective portrays itself as a tool that is the same as the real thing, when it is only similar to the real thing. Evans continues: "The only straight lines are those that are idealized in geometry. Neither light nor bits of string travel in exactly straight lines. String is bent by gravitation; light is also bent by its passage through varying densities of atmosphere."⁷ Dürer's devices provided every artist at the time with the geometric and mechanical means of constructing linear perspective, paving the way for its standardization in drawing and painting. The device would transcribe optical vision onto the space of the drawing. The limitations of linear perspective in representation would be explored by others in the late 19th century and early 20th century as artists strove for new ways to depict concepts of space and the experience of space.

Figure 26

Just as linear perspective became a large influence on the Renaissance and subsequent artists, Orthographic projection became a key transformer of the architectural drawing and a required tool of the builder. Many Italian architects who were trained as painters were prone to produce perspectives in their design process, but perspective only gave partial views of a building.⁸ Many critics of perspective believed that it gave an incomplete picture and that it distorted reality due to its singular viewpoint. Artists and architects sought a method to conceive and construct vision, rather than to merely transcribe it.

Painter-architect Raphael helped to usher in this viewpoint. He believed that by the spectator stepping further away from the building, foreshortening becomes reduced and eventually eradicated.⁹ Raphael brings together plans, external elevations and internal elevations (sections) and joins them by parallel lines. These parallel lines are understood to be representations of light paths projecting the information without distorting it and serving as true units of measurement (Figure 26).¹⁰

Orthographic projection was used by various artists including Leonardo da Vinci during the Renaissance and was also the predominant form of representation in the Eastern World. Furthermore, it would be heavily used in military architecture as it delivered a specificity that linear perspective could not provide. Drawings of architectural fortifications were required to be precise and descriptive. Plans were needed to be seen in full and perspective would conceal too much information. Orthographic projection would be the instrument of exact representation, the “eye of the sun” as the shadows cast by the sun are parallel to the plane.¹¹

Figure 26: *The Principles of Parallel Projection*
Daniel Fournier, 1716

2.1.2 Abstracting Space

In the *Origin of Painting* (1830) by Karl F. Schinkel, Schinkel portrays the first mark as preceding the architectural setting (Figure 27). Without the drawing, there would be no architecture, no space to inhabit. It can be compared with the 1775 painting by David Allen that privileged the architectural space over depicting the act of drawing (Figure 28). The painting showcases a post-architectural setting that contrasts with Schinkel's pre-architectural setting.¹² As observed by Robin Evans in *Translations from Drawings to Building*, Schinkel depicts the shadows as being cast by the sun, whereas Allen depicts the source of illumination, casting shadows as the candle. The sun projects parallel rays (ie. orthogonal), whereas the radiating rays of candlelight is more akin to linear perspective. In the former, the architect uses an abstract projection, measurable and precise, that transmits information. The painter, on the other hand, uses pictorial projection that produces an iconographic image.¹³

These two depictions highlight the differences between art and architecture. In Schinkel's painting, architecture is brought into existence through drawing. The subject exists after the drawing and not before, whereas in art, the drawing is the result of nature and created after it.¹⁴ Evans comments: "Drawing in architecture is not done after nature, but prior to construction; it is not so much produced by reflection on the reality outside the drawing, as productive of a reality that will end up outside the drawing."¹⁵

Furthermore, the two versions of *Origin of Painting* present the different roles of parallel projection and linear perspective. The appeal of parallel projection lies in the fact that it presents the width, height and depth of objects in scale, with receding lines that do not converge. It is therefore well suited to the depiction of things that must be constructed, such as buildings and machines.¹⁶ The artists of the early 20th century avant-garde wanted to go beyond art's traditional role of interpreting the world, using it as a projection to imagine art capable of constructing new worlds.¹⁷ They were attracted to axonometric projection because it could translate abstract information and was measurable and precise. Unlike perspective that has an ocular-centric focus, axonometric perspective is concerned with the construction and consistency of measurement."¹⁸

Linear perspective and parallel projection would serve as the dominant modes of representation until the late 19th Century. These techniques conceived of space in two different ways. Linear perspective presented a viewpoint of an object and depicted three-dimensional space, while parallel projection would translate measurable and precise information and prove beneficial to builders and construction. As is noted in the following chapters, these modes of representation would be challenged in the late 19th century and early 20th century by artists seeking new methods of conceiving of space.

Figure 27

Figure 28

2.1.3 Abstraction and Representation

While many would use linear perspective to document the space that surrounds them, artists, such as Giovanni Battista Piranesi, would use it to speculate on the numerous possibilities of conceiving space. In 1749, Piranesi developed his widely-regarded drawings of imaginary prisons, *Carceri d'Invenzione (Prisons for the Imagination)* (Figure 29). Pushing his drawing style to the limit, he produced over-scaled and dark shadows of imaginary spaces so distinctive that they are easily recognizable today. The *Carceri* would have a lasting influence on the conception and depiction of space by the avant-garde movements of the 20th century such as Cubism and Surrealism. Here, one sees a break from the idea that art and architecture had to be mimetic and replicate the past.

Figure 27: *Origin of Painting*
David Allen, 1775

Figure 28: *Origin of Painting*
Karl F. Schinkel, 1830

Neil Spiller, comments that the Piranesi's drawings of *Carceri* "seem to have come fast and furious from his hands, almost torn from a fevered soul. They are characterized by a frenzy of linework, deep, foreboding shadows, pulleys, cables, half-glimpsed torture machines and vertiginous Classical heights."¹⁹ *Carceri*'s work features multiple vanishing points and warped perspectives where space is obscured and reality questioned. The effect of the *Carceri* drawings can be seen in the works of 20th Century architects such as Lebbeus Woods and Daniel Libeskind.

The complexity of expression between the abstract and the representational becomes apparent In *Santa Maria del Priorato* (1764-1766), Giovanni Battista Piranesi's only built work. The altarpiece, heavily detailed when viewed from the front, depicts the Madonna and Child and is highlighted by indirect light coming through the apertures in the dome above (Figure 30). Conversely, the rear of the altarpiece is adorned with blank surfaces and pure abstract forms contrasting with the detailed front. Some theorists, such as Manfredo Tafuri, believe that it is intentional in its 'incompleteness' and a statement by Piranesi about silence.

*The light coming from the apse directly illuminates the back of the altar, accentuating its hallucinating geometricism. The overlapping of the images on the front facing the entrance, facing the community of the faithful, corresponds to the striking abstraction of the pure geometric volumes on the back of the altar: a bare sphere and a solid figure of complex structure that embraces it.*²⁰

He compares it to a rupturing of architecture from classical representation, looking forward rather than to the past. A zero-point in architecture, akin to that of Kazimir Malevich's *Black Square* in 1915, positions Piranesi as the father of the architectural avant-garde (Figure 34).²¹ Tafuri views this abstraction as architecture turning its back upon itself, a representation

Figure 29a

Figure 29b

Figure 29c

Figure 29d

Figure 30a

Figure 30b

Figure 30c

that does not speak. Peter Eisenman however, regards the rear of the altarpiece not as representing the idea of silence, but of absence - the absence of communication, meaning, and decoration as it is usually found in a religious setting.²² Defying the traditional notions of an altarpiece for its time, it emphasises the blur between figuration and abstraction.

2.2 (Re)Configuring Space

2.2.1 Fracturing space

Figure 29: *Carceri (Imaginary Prisons)*

Giovanni Battista Piranesi, 1745-1750

- a) Title Page
- b) The Man on the Rack
- c) The Round Tower
- d) The Staircase with Trophies

Figure 30: *Santa Maria del Priorato Altar Piece*

Giovanni Battista Piranesi, 1764-1766

- a) Rear View
- b) Ornament Detail on Altar
- c) Ornament Detail on Altar

Just as linear perspective was a sharp departure from medieval depiction of space, modern modes of visual representation made a sharp departure from perspective. The Industrial Revolution and the innovative technologies that arose from it invoked a new energy and dynamism in the world. Avant-garde movements such as Futurism and Cubism would embrace technology and the modern world. The invention of the camera and the introduction of photography to popular culture would help to shatter the world views propagated by the conventions of linear perspective. Like Piranesi in the 18th Century, the Cubist artists of the early 20th century attempted to recreate the dynamic way in which humanity could now perceive objects and experience space.

The chronophotography of Eadweard Muybridge and Étienne-Jules Marey would have a large influence on the perception of space and time as it was represented in the arts. Chronophotography involved taking multiple images in series to capture motion. Muybridge was hired to confirm a theory and analyze whether all four feet of the horse were off the ground at the same time while galloping. He set up a series of electric shutter releases that captured freeze-frames of the horse's motion as it passed by, proving the theory that all four feet of the horse are momentarily off the ground while galloping. Muybridge would continue to improve his technique, making a series of motion studies of animals and humans. His

Figure 31

Woman Walking Downstairs (1867) (Figure 31) would serve as inspiration for Marcel Duchamp's 1912 painting *Nude Descending a Staircase, No.2* (Figure 32).

Inspired by photography and the shattering of linear perspective, Cubism would try and show all sides of the depicted objects simultaneously. Cubist paintings became artful juxtapositions of form, line, texture, colour, detail, as well as foreground and background, as shown in the works of George Braque and Pablo Picasso.²³ Their art was a rejection of the traditional techniques of perspective, foreshortening, modeling and the imitation of nature. As noted by Sigfried Gideon, "The Cubist dissects the object, tries to lay hold of its inner composition. They seek to extend the scale of optical vision as contemporary science extends the law of matter."²⁴ The depiction of planes and lines, often intermixed, transparent and dynamic, presented a sharp contrast to the lines of perspective that converged on a single point.²⁵

Marshall McLuhan in 1964 said of Cubism that, "by giving the inside and outside, the top, bottom, back, and front and the rest, in two dimensions, drops the illusion of perspective in favour of instant sensory awareness of the whole."²⁶ As introduced previously, Marcel Duchamp would turn painting on its head with such works as *Nude Descending the Staircase No.2*. In addition to showing all sides of the object at once, Duchamp would also depict time, velocity and the nested representations of the X-ray body.²⁷ The painting was rejected by Cubism for being too Futurist and was generally perceived to be unintelligible at the time. Duchamp would use the visual language of the captured image that photography created, to inform the construction of the image within his paintings.

Figure 32

Figure 31: *Woman Walking Downstairs*
Eadweard Muybridge, 1887

Figure 32: *Nude Descending the Staircase No.2*
Marcel Duchamp, 1912

Figure 33: *The Large Glass*
Marcel Duchamp, 1915-1923

- a) Nine Shots Detail
- b) Chocolate Grinder Detail
- c) Malic Molds and Shattered Glass Detail
- d) The Bridge Stripped Bare by Her Bachelors, Even

With his later work *The Bride Stripped Bare by Her Bachelors, Even (The Large Glass)* (1915-1923), Duchamp would further push the modes of conventional representation and this highlights Duchamp's struggle to reveal an invisible dimension of projection beyond the conventional boundaries of Renaissance painting, sculpture and architecture (Figure 33).²⁸ His construct involves various interpretations, allusions, science and metaphors. *The Large Glass* is composed of two large panes of glass in a steel frame (an expression of modernity through the incorporation of industrial technology) where the upper pane is the domain of the bride and the lower, the bachelors. The bridge is shown as a multidimensional being with its technologies invisible and powerful.²⁹ Contrastingly, the bachelors are trapped below, lusting after the bride. Interestingly, Duchamp partially uses linear perspective to portray this scene, which had been rejected by the avant-garde of the early 20th Century. Duchamp uses the conventions of traditional perspective and subverts it, co-opting it for his own intent allowing the spectator to act as a participant in the work.³⁰

Figure 34

The transparency of the glass and its large frame result in an image that cannot be perceived independently from the space that it is placed in. The upper pane of the glass is more representational, revealing something familiar yet not recognizable than the lower figural domain of the glass.³¹ As Alberto Perez-Gomez notes,

While traditional perspective aimed at closing the gap between object and its representation, the manifestation of the invisible in Duchamp's work emerges from this gap – or delay – that distinguishes appearance and apparition and the work becomes a question for the missing object, the object of desire. Rather than perpetuating an objectified life world through a perspectival view, as an absolute truth outside of time, Duchamp's "hinge/window/hinged window" reveals our ephemerality, reciprocal to that of art – our existence as an in between, as an infra-thin yet purposeful moment of incandescence.³²

The mediums used by Duchamp in his work expanded the capacity of art to transcend the limitations of painting and drawing. In each of his works, Duchamp tries to capture the invisible forces and project them into a visible domain. Through the juxtaposition of different realities and the adapting of film techniques, artists would attempt to capture a previously invisible, uncharted aspect of experience through art.

Figure 35

Figure 36

Figure 37

2.2.1 Infinite Space

Figure 34: *Malevich at Tate Modern*
Tate Modern, 2014.

Figure 35: *Architecton Gota*
Kazimir Malevich, 1923

Figure 36: *Architecton Gota*
Kazimir Malevich, 1923

Figure 37: *Malevich's Tektonik*
Zaha Hadid, 1976-1977

Shortly following the development of Cubism, Kazimir Malevich's *Black Square*, painted in 1915, would further enforce the schism between representational and abstract art (Figure 34). Compared with the representation of reality in previous artwork, Malevich abandoned the depiction of reality and the object altogether, and invented a new world of shapes and forms. "What its paintings achieve are fundamentally only pure interrelationships. Flatly extended rectangles and strips float in continuous interrelation in space for which there is no true human measure,"³³ noted Gideon. Malevich and his work would serve as the foundation for Suprematism, a Russian avant-garde art movement.

Suprematism, and specifically the work of Kazimir Malevich, would be revisited nearly a half a century later and implemented in architecture through the early work of Zaha Hadid in the 1970s (refer to Chapter 3.2.3). Hadid was fascinated by abstraction and how it could lead to abstracting plans as well as serving as an investigative principle.³⁴ She elucidates her principles in her thesis for the Architectural Association School of Architecture in London. In it, Hadid uses Malevich's *Architectons* (Figures 35 and 36), a series of abstract models used for spatial research, for architecture imposed on the Thames River in London (Figure 37). When speaking of Malevich's influence on her work, Hadid notes:

*His geometric forms began a conceptual development beyond the planar, becoming forces and energies, leading to ideas about how space itself might be distorted to increase dynamism and complexity without losing continuity. My work explored these ideas through concepts such as explosion, fragmentation, warping and bundling. The ideas of lightness, floating and fluidity in my work all come from this research.*³⁵

Figure 38

Figure 39

Artists of the avant-garde wanted to imagine art that could construct new worlds. This was the appeal of the axonometric. It could transmit abstract information and yet was measurable and precise. The artists of Suprematism would appropriate devices from technical disciplines and abstract them visually. For them, it was the ideal technique to represent universal geometries and infinite space. Here, space and time existed at once, presenting multiple views.

Figure 38: *Proun Room*
El Lissitzky, 1923

Figure 39: *Globetrotter (In Time)*
El Lissitzky, 1923

The Suprematist movement focused on basic geometric forms painted in a limited range of colours. Malevich's protégé El Lissitzky would use these techniques to further develop the Suprematist movement. El Lissitzky would take the abstract, 2-D forms and shapes present in Suprematist art and translate them into spatial elements. Lasting for over a decade, his style, *Proun*, would explore these ideas in three dimensional installations (Figure 38). Alberto Perez-Gomez notes that El Lissitzky conveyed the most potential of the new space of art and architecture.³⁶ El Lissitzky describes the space of the plane in Suprematist painting as the first truly infinite space, expanding simultaneously forward from the plane and into its depth, and dispelling the illusion of three-dimensional perspective space.³⁷ For El Lissitzky, this creation of space could be realized in the world of embodied experience, envisioning an experience of objects that would last as long as the movement of the viewer lasts, rejecting the reduction of art or architecture to an aesthetic object.³⁸ El Lissitzky was interested in capturing the temporality of the embodied experience in his expressions of time and space.³⁹

2.2.3 Constructing Space

Constructivism developed alongside Suprematism, but where Suprematism was concerned with abstract forms, Constructivism focused on real objects and technical details, denouncing representation and focusing on construction. Constructivist art attempted to realize abstract constructions that were three-dimensional and kinetic. Later, throughout the 1920s, Constructivism promoted the integration of technology and artistic activity, seeing the artist as a creator of the new environment and the new social order.⁴⁰ For Constructivists, objects were created not to express beauty or a particular artistic point of view, but to represent the world.⁴¹ Materials were used to their capacity, in ways that demonstrated their various uses. Art work and the objects created would be dictated by their material properties, in opposition to the traditional way of transforming materials into something very different. The goal here for some was to translate ideas and designs into mass production; for others, it was an end in itself, expressing the dynamism of modern life.

Returning to El Lissitzky's work, we see a blending of Suprematist and Constructivist beliefs. His translation from ideas held within two-dimensional paintings into three-dimensional objects, captured ideas of moving beyond abstract ideas. The dynamic movement of his work would, for instance, show walls with the contrast of different materials and shadows and light creating objects floating in space. The objects in *Proun* would reinforce the Constructivist agenda of objects and constructions and would inform the design of everyday objects around us, presenting them as existing as-is and not as representations.

Ivan Chernikov drew obsessively. Producing many built objects, he also crafted fantastic architectural fantasies that resembled Constructivist architectural shapes. In 1933, he produced *Architecture Fantasies*, a powerful, graphic collection of his work consisting of over one hundred drawings. The work centered on complexes with an industrial overtones and with massive chunks of building juxtaposed against frames of megastructural girth, cylindrical objects are posed against bands of mesh or window. (Figure 40)⁴² Chernikov's propositions contained no brief, no site or other constraints - just speculations about form and space. He believed that it was important to draw and to fantasize. To him, they showed new compositional processes and new ways of representation.⁴³ Within his drawings, one can see the craftsmanship and command of the medium. Lines, shapes, energy and colour fill the drawings, stirring the imagination, freeing one from the typical constraints of an architectural project.

Figure 40a

Figure 40b

Figure 40c

Figure 41

Figure 41: Ivan Chernikov

a) Columbus Monument, Foundations of Contemporary Architecture, 1925-1930

b) Composition no. 16 Illusion, Architectural Fantasies, 1929-1933

c) Composition no. 21, Complex Spatial Combination of Skyscraper Shapes, Architectural Fantasies, 1929-1933

Figure 40: *The Garden of Earthly Delights*
Hieronymus Bosch, 1490

2.2.4 Space of Dreams

Expanding on the ideas presented by Cubism and Suprematism, as well as those in the fantastical and surreal works of Piranesi and 15th Century artist Hieronymus Bosch, proponents of Surrealism would explore the concept of space through the unconscious mind. In *The Garden of Earthly Delights*, painted between 1490 and 1510, Hieronymus Bosch created a surreal landscape depicting religious and symbolic narratives (Figure 41). Surrealists were attracted to its bodily distortion, fragmentation and truncation.⁴⁴ The Surrealist movement would produce art that provided a view to a world beyond the reality of time and space. Its artists implemented techniques such as automatism; this method, influenced by the writings of Sigmund Freud, embraced the subconscious aspects of drawing and painting by allowing the hand to freely and randomly move across paper. It involves the pre-conscious/unconscious production in which formal structuring processes are allowed free play, unfettered by logical editing.⁴⁵ Surrealists believe that this method would unlock the creativity that came from the deep part of a person's subconscious.

Surrealism concerns itself with the body, the house and the city.⁴⁶ How one views the object would affect how they perceive that object and therefore prosthetics like suits, masks and optical devices would also alter this perception. The house is viewed to contain multiple meanings and symbols and impacts how one could see and understand the world. They saw the city as a massive engine of chance, throwing up possibilities of love, strange juxtapositions of ideas, symbols and ever changing meanings.⁴⁷ Surrealists sought opportunities to reveal

the hidden depiction of an object and traditionally this was done by embracing individual perception and the senses.

The work of Surrealist artist Giorgio de Chirico depicts narratives in a staged environment of uninhabited piazzas, towers and arcades. The use of linear perspective and long dramatic shadows created a dreamlike clarity (Figure 42). The architecture that is featured in these paintings shows no trace of its history. As Neil Spiller describes it, "Baroque and Renaissance flourishes are absent, decoration stripped down."⁴⁸ de Chirico's paintings portray otherworldly environments that are unable to be built. These paintings would influence perceptions of the spatial potentials of interiors and urbanity.⁴⁹ Similarly, the paintings of Rene Magritte explore the unconscious gaps between communication and interpretation of the words and images we use to describe reality. *Human Condition* showcases a canvas on an easel in front of a window (Figure 43). The image on the painting is the same as what would be seen through the window, leaving the spectator to question whether the painted image and the scene behind are in fact the same aspects of a concealed reality.

The implementation of Surrealism in architecture was the exploration and uncovering of the "gaps" that make it possible to invite the imagination.

*The kinds of possible gaps in architecture are numerous. They can occur between reality and dream or myth; between form and sign, figure, meaning, name, or material, between function and sign, object or structure; between object and name, word or meaning; between structure and name, message or construction; between sign and material, language and house; space and place. The gap can also be endemic to human experience between reading and seeing or abstraction and conscious experience.*⁵⁰

Exploring these gaps breaks away from the preconceived notions and biases within perception, allowing the designer to invent a world all their own. One such example can be found in the research of Frederick Kiesler. With *The Endless House*, Kiesler would use models, prototypes and drawings to develop a single project over the course of more than 25 years (Figure 44). *Endless House* arose from a collaboration between Kiesler and Surrealist artists, including Marcel Duchamp.⁵¹ Kiesler sought to create a "fantastic dream world that could reach out to the cosmos and expand."⁵² Kiesler would conceive of *The Endless House* as a project without walls and as a double-curved geometry. He described living in it as a psychological and emotional emancipation for the dweller.⁵³ Using models and study sketches, Kiesler would show the materiality and structure of the house and aim to create an

Figure 42: *Italian Piazza*
Giorgio de Chirico, 1913

Figure 43: *Human Condition*
Rene Magritte, 1913

Figure 42

Figure 43

Figure 44a

Figure 44b

Figure 44c

organic space. Kiesler viewed the house as an extension of its inhabitant and as the result of organic growth. Kiesler would use automatic drawing to develop his architectural lines. He saw the possibilities as such:

Drafting is grafting vision on paper with lead, ink, or.... Blind-folded skating rather than designing, significantly keen, directed by experience and will, and channeling one's feelings and thoughts, deliberately proud of pruning them to clarity and definition. Chance drawing and sculpting and sculpting or painting is an ability to let go, to be entirely tool rather than a guide of tools. It is to design with one's whole body and mind, never mindful of either. No, it is not sketching, the bastard version between chance and will.⁵⁴

Figure 44: Endless House
Frederick Kiesler, 1950

a) Frederick Kiesler constructing Endless House model

b) Endless House Sketch

c) Exterior view of Endless House model

The development of the Endless House was a long process for Kiesler. He viewed the house as an extension of the human body, full of systems and organs, that started with sketching and drawings created by the unconscious mind. The works presented by Surrealists and Frederick Kiesler are not ones with known outcomes or preconceived notions. Rather, they were provoked by dreams, subconscious associations between images, text and their meanings.⁵⁵ The product would cater more to subjective qualities rather than only rationality, attempting to bridge the gap between the visible and invisible in architecture.

2.3 The Arrested Image

At the end of his book *The Projective Cast*, Robin Evans presents a diagram titled, *The Arrested Image* (Figure 45). The purpose of this image is "to define the different fields of projective transmission that concern architecture."⁵⁶ In it, Evans defines the "four repositories" as: orthographic drawings, perspective drawings and images, the designed object, and the human designer/observer; subdivided into imagination and perception. He describes projection as the transfer of information from one repository of knowledge to another. Each of these repositories projects information to, and receives information from, the other three. Information does not travel smoothly in these projections and can become distorted. "The Arrested Image" is a useful framework within which to investigate the potential roles of the architectural drawing.

Traditionally, the design of architecture is a continual process of exchange of information between these four repositories. However, as technology and digital design techniques have altered how we think about designing and constructing, the framework is evolving. This design research presents alternative methods of projection in architectural design that positions itself within Evans' framework. Each method offers its own set of criteria or

internal logic. Therefore, translation between each process is dependent upon the repository in question; reshaping the original and allowing for new associations. These techniques combine to structure and produce the work, as well as provide methods of interpretation as the design research continues.

In *The Creative Act*, Marcel Duchamp discusses the role of the artist and the spectator. He describes the artist as a "mediumistic being," one whose "decisions in the artistic execution of the work...cannot be translated into a self-analysis."⁵⁷ This falls to the spectator whose role it is to "bring the work in contact with the external world."⁵⁸ The 'creative act' is the interaction between the artist and spectator in which the spectator has final say. This relationship is further explored and refined when it is completely transferred to the spectator after the work has been produced: the spectator determines the weight of the work, becoming in effect, an architect himself or herself.

As echoed by Evans, during the process of design the architect is simultaneously the artist and the spectator. The drawing aids in facilitating the relationship between the architect and the viewer. It mediates elements onto the space of the drawing that will be interpreted and analyzed by the architect/spectator. As the *Arrested Image* highlights, architects draw with the implicit expectation that the drawing is not the end product, but is a technique for thinking through complex ideas with the intent that the "actual" or "final" expression is to be realized in another medium (ie. the building). The following chapter highlights this process by examining the evolution of the architectural drawing and its co-opting of visual mediums to convey critical ideas about architecture.

Figure 45: *The Arrested Image*
Robin Evans, 1995

Figure 45

Notes

- 1 Nicholas Olsberg, "The Evolving Role of the Drawing," *Architectural Review*, 233, no.1395 (May 2013): 36.
- 2 Sigfried Gideon, *Space, Time and Architecture*, (Cambridge: Harvard University Press, 5th Edition, 2008), 31.
- 3 Gideon, *Space, Time*, 31-32.
- 4 Dalibor Vesely, *Architecture in the Age of Divided Representation*, (Cambridge: MIT Press, 2004), 110.
- 5 Robin Evans, *Translations from Drawings to Buildings*, (Cambridge: MIT Press, 1986), 127.
- 6 Robin Evans, *The Projective Cast: Architecture and its Three Geometries*, (Cambridge: MIT Press, 1995), 127.
- 7 Ibid., 127.
- 8 Evans, *Projective Cast*, 107.
- 9 Ibid., 108.
- 10 Ibid.
- 11 Scolari, Massimo, "Oblique Drawing: A History of Anti-Perspective," (Cambridge: MIT Press, 2012), 15.
- 12 Evans, *Translations*, 163-164.
- 13 Allen, Stan "Practice: Architecture, Technique and Representation", (London, Routledge, 2000), 5.
- 14 Evans, *Translations*, 165.
- 15 Evans, *Translations*, 165.
- 16 Scolari, *Oblique*, ix.
- 17 Allen, *Practice*, 18.
- 18 Ibid., 20.
- 19 Neil Spiller, *Visionary Architecture: Blueprints of the Modern Imagination*, (New York: Thames & Hudson, 2006), 12.

- 20 Manfredo Tafuri, *The Sphere and the Labyrinth: Avant-Gardes and Architecture from Piranesi to the 1970s* (Cambridge: MIT Press, 1987), 48.
- 21 Ibid., 49.
- 22 Eisenman, Peter. "Dual in the Sun." Lecture, *Drawings' Conclusions* Symposium from Sci-Arc, Los Angeles, CA, March 24th, 2017.
- 23 Spiller, *Visionary Architecture*, 29.
- 24 Gideon, *Space, Time and Architecture*, 437.
- 25 Ibid. 437.
- 26 Marshall McLuhan, *Understanding Media: The Extensions of Man*, (New York: McGraw Hill, 1964), 5.
- 27 Neil Spiller, *Architecture and Surrealism*, (London: Thames & Hudson, 2016), 23.
- 28 Alberto Perez-Gomez, *Architectural Representation and the Perspective Hinge*, (Cambridge: MIT Press, 2000), 371.
- 29 Spiller, *Architecture and Surrealism*, 46.
- 30 Perez-Gomez, *Architectural Representation and the Perspective Hinge*, 371.
- 31 Ibid., 372
- 32 Ibid., 373.
- 33 Gideon, *Space, Time and Architecture*, 439.
- 34 Zaha Hadid, "Zaha Hadid RA on the influence of Malevich in her work," in RA Magazine, Summer 2014. Retrieved from <https://www.royalacademy.org.uk/article/zaha-hadid-ra-on-the-influence-of>
- 35 Ibid.
- 36 Alberto Perez-Gomez, *Architectural Representation and the Perspective Hinge*, (Cambridge: MIT Press, 2000), 319.
- 37 Ibid, 320.
- 38 Ibid, 322.
- 39 Ibid, 323.
- 40 Irina Verkhovskaya, "Iakov Chernikhov and the Architectural Culture of Revolutionary Russia," (Thesis, University of Cincinnati, 2002), 13.

- 41 "Important Art and Artists of Constructivism," http://www.theartstory.org/movement-constructivism-artworks.htm#pnt_2)
- 42 Peter Cook, *Drawing: The Motive Force of Architecture*, (Chichester: Wiley, 2014), 122.
- 43 "Yakov Chernikov: An Architect of His Time," Modified 26 July 2012, Natasha Chibireva, <http://www.bdonline.co.uk/yakov-chernikhov-an-architect-of-his-time/5040301.article>
- 44 Spiller, *Architecture and Surrealism*, 41.
- 45 Kevin Rhowbotham, *Form to Programme*, (London: Black Dog Pub, 1995), 14.
- 46 Spiller, *Architecture and Surrealism*, 29.
- 47 Spiller, *Architecture and Surrealism*, 41
- 48 Spiller, *Architecture and Surrealism*, 20.
- 49 Ibid., 20.
- 50 Jean La Marche, "Surrealism's Unexplored Possibilities in Architecture," in *Surrealism and Architecture*, ed. Thomas Mical, (New York: Routledge, 2004), 274.
- 51 Simon Unwin, *Twenty Buildings Every Architect Should Understand*, (New York: Routledge, 2010), 53.
- 52 Ibid., 85.
- 53 Spiller, *Visionary Architecture*, 43.
- 54 Frederick Kiesler as cited in Simon Unwin, *Twenty Buildings Every Architect Should Understand*, (New York: Routledge, 2010), 57.
- 55 "MoMA Tapping the Subconscious," https://www.moma.org/learn/moma_learning/themes/surrealism/tapping-the-subconscious-automatism-and-dreams
- 56 Evans, *Projective Cast*, 328.
- 57 Duchamp, Marcel, *"The Essential Writings of Marcel Duchamp"* (London: Thames & Hudson, 1975), 138.
- 58 Ibid., 138.

Translation in Series

Translation in Series (Figure 46) is an exploration of creating architecture through the automatic act of drawing. Here, the formal structuring process can be freely explored through unconscious production.¹ This process is inspired by the Surrealist technique of automatic writing and automatic strategies. As discussed by Jyanzi Kong: “[T]he exploration of forms in the formation of new design thinking necessitates a collision of ideas, be they in the form of analogy, metaphor or allegory.”²

As a starting point, this experiment focused on the act of producing many pieces of work, as quickly as possible, in series. By producing multiple works in succession, large amounts of material are produced to be reflected upon. This process was adopted to break free from “directionless” reflection. A series of fifty drawings was produced, of which ten were culled to engage in a process of further refinement and elaboration. The aim of this task was to engage with “automatic” drawing and to create formal, serial compositions. This “automatic” approach reduces the need for conscious rationality, with designs that can hinder the process development. Focusing on the details was not what was important. Rather, the emphasis was on the creation of space and the formation of visual gestures and expressions that related to the initial subject matter of the design work, their thresholds and boundaries.

The drawings were intentionally abstract, often obscure, and always intuitive and varied in composition, style, and coherence. The first few served as a generative process for the next few, in which the specificity of form and content could be expanded upon. This process would continue throughout the fifty drawings. Periodically stopping to analyse and evaluate the drawings throughout the series, to see which would best advance the project, proved to be beneficial. This process oscillates between the acts of seeing, doing, and thinking and is not intended to be representative of any particular architectural language.

Figure 46: *Translation in Series*
Series of fifty drawings
Ink on Vellum

Of the ten drawings culled, a further four were selected to shape a specific narrative. The drawings at this stage are described as proto-formal: they have architectural undertones, but are not yet architectural. The first two drawings are intended to be read as proto-formal plans, while the latter two are proto-formal sections and details respectively. An artificial narrative was created at this stage to reflect upon the drawings created and to bring coherence to them. This reflection involved revisiting the drawings and reinterpreting how they relate to each other.

Notes

- 1 Kevin Rhowbotham, *Form to Programme* (London: Black Dog Pub., 1996), 20.
- 2 Jyanzi Kong, *Geometry of the Unconscious: An Uncertain Truth in Architecture*, (Singapore: Page One, 2011), 44.

3. Drawing Speculation

As architects began to express their dissatisfaction with the functionalist paradigms of Modernism in the 1970s, the universal acceptance of its dogma began to waver and eventually wane. Many would use the drawing to explore their criticisms of postwar architecture and urbanism. These avant-garde architects subverted convention through their architectural projects and engaged in projects that were deemed unbuildable, but served to challenge the constraints of conventional architectural thought and expression, speculating on the possibilities of architecture. As David Ross Scheer writes:

"Drawing can become a tool for revealing conventions for what they are: a set of often unacknowledged assumptions that embed ideas in design, making them seem natural and inevitable when in fact they channel thinking in certain directions. So intimate is the relationship between drawing conventions and architectural thought that challenging conventions can become a means of thinking about architecture. Drawing can become architecture in certain circumstances..."

We've seen how drawings in architecture have changed over time, incorporating new materials and techniques. The early 20th century made use of abstract, axonometric projections and adapted photographic techniques (ie. collage, introduction of film and recorded movement etc.) to present an alternative way to think about and represent architecture. These various methods helped showcase a characteristic approach to line, shadow, framing, or the suggestion of space.² The avant-garde architects of the 1960s and '70s would further push the media being used at the time and co-opt them to get their ideas out. Whether it be the collage and film techniques of Superstudio, the use of conventional architectural drawings to propose large megastructures by Archigram, or the early abstract paintings of Zaha Hadid, various media have been used by architects and designers to challenge the conventions of their times and to spark new ideas.

Figure 47

3.1 Radical Drawings

In the 1960s and '70s, many architects found general displeasure with the lack of work and creative stagnation in their profession. The postwar architecture of the 1950s and early '60s left many architects, thinkers and designers feeling uninspired and reactive against functional, simplistic Modernist principles. Many young architects and graduates would turn to paper architecture to satisfy their design cravings. Groups such as Archizoom, Archigram and Superstudio would become well known for their "radical architecture" and assaults on what the constituted "architecture."

3.1.1 Archigram

The members of Archigram would create some of the most influential architectural images of the 1960s and beyond. Their approach to revisiting the "machine for living in" for postwar architecture demanded that every design be born of imagination.³ They created radical projects that attempted to bring architecture up to speed with leading artistic, technological and cultural tendencies.⁴ Archigram created fantastical works that remained rooted in the contemporary world, believing that architecture should not be fixed, but rather should suggest nomadic life and liberation from the Modernist post-war architecture being realized at the time.

The *Plug-In City* proposal suggested a fantasy city with modular residential units that plug into an urban mega machine (Figure 48). It incorporates residences and transportation and services all through large cranes. In *Archigram: Architecture without Architecture*, Simon Sadler suggests that "The aesthetic of incompleteness, apparent throughout the Plug-In

Figure 47: *A Walking City*
Archigram, 1964

Figure 48: *Plug-In City: Maximum Pressure Area*
Peter Cook, 1964
Ink and gouache on photomechanical print

Figure 48

City scheme and more marked than in megastructural precedents, may have derived from the construction sites of the building boom that followed the economic reconstruction of Europe.⁶⁵

Characteristic to Archigram's work, is the use of collage in their drawings. Contrast to that of the modernist drawings of the time, the colourful adoption of Pop Art would entice the audience and redefine the imagery of architectural drawings. They explored print media and played with the layout, compositions and techniques. The aim of their visual language was to represent the possible outcomes, generate further conversation and provide ideas.

Why we needed it was to show an architecture appropriate to our period of time. It was an exciting period full of experimentation, bright colours, casual sex; it was the spirit of that period. That was put into those drawings – particularly those by Ron, Peter and to an extent Denis. It wasn't really about showing new architecture it was about showing the building is in itself fun and exciting and is perhaps merely a backdrop to what is going on. The big thing is the fun times and the architecture that merely enables it but doesn't determine it. The view of architecture prior to that was that you live according to the dictates of the building you are in. You are inventing a life and the architecture allows you to do it.⁶⁶

In their presentations, Archigram would use collage, drawings and text to create a narrative of their ideas. Like the cities they present, their images would be made from different styles and sources, cut and pasted into fluid layouts.⁷

Figure 49

3.1.2 Superstudio

The Italian architecture firm Superstudio would establish itself in three main areas of research: the architecture of the monument, the architecture of the image, and technomorphic architecture. With the *Continuous Monument* series, Superstudio would use collage, films, renderings and the grid to mediate space and convey their 'anti-architecture.' Superstudio "move[d] towards the continuous monument, a form of architecture all equally emerging from a single continuous environment the world rendered uniform by technology, culture and all the other inevitable forms of imperialism."⁹

The *Continuous Monument* series proposed megastructures that stretched across world capitals and the landscape, metaphors for the ills of globalization and the unchecked proliferation of homogenous architecture (Figure 49).⁹ The works would be alluring and seductive, but also would warn of the nightmare possible in the future. By creating images of a dystopian society, Superstudio critiqued the Modernist trend of architecture at the time. The images of a large elongated structure were stark white and consisted of only a grid, that could be inserted anywhere (Figures 50 and 51). These structures were devoid of colour and articulation, Superstudio's criticism of the growing trend of consumerism and globalization. The exterior of the structure does not reveal any of the interior's activities. The grid spreads out over various cities and natural landscapes and even into space.

Figure 49 *Continuous Monument:*
New York
Superstudio, 1969
Lithograph

Figure 50 *Continuous Monument:*
Alpine Lakes
Superstudio, 1969
Cut-and-pasted printed paper, colored pencil,
and oil stick on board

Figure 51 *Continuous Monument:*
New York Extrusion Project
Superstudio, 1969
Graphite, color pencil, and cut-and-pasted
printed paper on board

Figure 50

Figure 51

*...if design is merely an inducement to consume, then we must reject design; if architecture is merely the codifying of bourgeois model of ownership and society, then we must reject architecture; if architecture and town planning is merely the formalization of present unjust social divisions, then we must reject town planning and its cities...until all design activities are aimed towards meeting primary needs. Until then, design must disappear. We can live without architecture...*¹⁰

Like Archigram, Superstudio would make use of the media of the 1960s and 70s. Superstudio used drawings, photo-montages, storyboards, manifestos, pamphlets, furniture, exhibitions, and installations to get their message out. Their architecture was one of total order, with no objects, labour, architects or merchandise.¹¹ Superstudio would use the grid at varying scales from geographical projects to the design of objects such as lamps and furniture, resulting in a singular transferable design that remains identical to itself, changing in scale without inconvenience.¹²

3.2 Subversive Drawings

Building upon the work presented by architecture groups such as Superstudio and Archigram, the 1970s offered even more avant-garde architecture, pushing the limits of conventional architectural drawing. The subversive nature of these drawings would co-opt media available at the time and break apart traditional architectural drawings. "Building upon the disenchantment with the social and political conditions of Modernism in the post-war period, these concepts would react against the increasing consumerism and industrial mechanisms of planning that reduce architecture to mere building technology stripped of social agenda."¹³ The drawing in architecture became a tool for challenging the discipline and to function as an ideological model, providing the conditions for revolutionary change and bringing about a better society.¹⁴

3.2.1 Rem Koolhaas

During his time at the Architectural Association in London, Rem Koolhaas would use his thesis to explore architecture as an instrument of social and political invention by exploring its subversive role in the metropolis and its capacities to host fringe activities and stage unexpected events.¹⁵ *Exodus, or the Voluntary Prisoners of Architecture* by Rem Koolhaas, Elia Zenghelis, Madelon Vreindorp and Zoe Zenghelis, is inspired by Berlin during the Cold War and the wall that separated East and West Berlin. Koolhaas would rethink the concept of architecture as a means of constraint, division and exclusion, and re-imagine it as a tool for initiating change, providing freedoms, and allowing for the emergence of unpredictable events.¹⁶

Eighteen drawings were produced in all, using traditional architectural drawing techniques, watercolours, collages, and text as the project explored the difference between event and program. The collages create a vivid depiction of life within the walls where, to become liberated, citizens voluntarily sought refuge within a prison. As Bernard Tschumi did with *The Manhattan Transcripts* (refer to 3.3.1), Koolhaas would use the square and the grid to stage his scenes, showcasing the fact that freedom and open-ended situations can occur in inflexible and constraining schemes such as the grid and square.¹⁷

Figure 52: *Exodus, or Voluntary Prisoners of Architecture: The Strip (Aerial Perspective)*
Rem Koolhaas, 1972

Cut-and-pasted paper with watercolor, ink, gouache, and color pencil on gelatin silver photograph (aerial view of London)

Figure 53: *Exodus, or Voluntary Prisoners of Architecture: Training the New Arrivals (Axonometric projection)*
Rem Koolhaas, 1972

Cut-and-pasted photolithographs and gelatin photograph on paper

Figure 54: *Exodus, or Voluntary Prisoners of Architecture: The Strip*
Rem Koolhaas, 1972

Cut-and-pasted paper and painted paper with ink, pen, and graphite on photolithograph (map of London)

3.2.2 Daniel Libeskind

In the late 1970s, Daniel Libeskind used the architectural drawing to unfold future possibilities and challenge the limits of the architectural drawing. He believed that architecture should be read on its own terms and that the drawing can allude to multiple events. In describing *Micromegas* (Figure 55 and 56), Neil Spiller comments:

*These drawings are generally ascalar, infinite, compact and complex, a synthesis between sign and element - a Proun for the new millennium. Each vista opens into other arrangements of self-similar but forever variable, slightly askew alignments. Architecture and its comprehension become conditioned by multiple perspective points. Nothing is given preference; nothing has precedence.*¹⁸

Figure 55: *Micromegas: Dance Sounds*
Daniel Libeskind, 1979
Graphite on Trace Paper

Figure 56: *Micromegas: Dream Calculus*
Daniel Libeskind, 1979
Graphite on Trace Paper

With *Micromegas*, Libeskind created eleven pencil drawings named after a short story by French historian and philosopher Voltaire. They depict an ambiguous spatial world that emerges out of an older, familiar one.¹⁹ A sharp contrast to the drawings produced at the time, *Micromegas* shifts the weight of meaning from behind to in front and from before to after, first creating the work then looking to see if it signifies anything.²⁰ Libeskind co-opts the tools of axonometry and isometry to create a fluctuating, conflicting series of spaces.²¹

Figure 55

Figure 56

3.2.3 Zaha Hadid

As mentioned in Chapter 2: *Drawing Space*, the early work of Zaha Hadid was heavily influenced by Malevich's Suprematism. Hadid saw a way to challenge conventional architectural dogmas through abstraction. For almost 20 years, she produced drawings and large-scale paintings for projects, speculating on their architectural possibilities. It was not until 1993 that her first built work – the *Vitra Fire Hall* – was realized. Hadid would use a multiplicity of drawing techniques from plan, section, isometric, axonometric bird's-eye and worm's-eye perspectives with multiple horizons and vanishing points to communicate alternative views.²²

*It is perhaps the intensity and determination evident in Hadid's work that some commentators find confronting. The commitment to line and unconventional drawing projection is implicit in her design process and begins with sketching abstract, flat, two-dimensional line compositions that form the first external contours of a project's conception. She continued to develop the sketch as she interprets these early contours further into the programme and layout, and after hundreds of sketches, physical models and rigorous testing she begins to consolidate her vision for the architecture.*²³

Hadid used sketches and paintings to organize and analyse her vision for buildings. Paintings that used colour showed the quality and character of the intended architecture; they were part of the process of discovery that would culminate in a finished building.²⁴ A comparison of Hadid's early drawings to her built work reveals how she envisioned architecture. The paintings are dynamic and light, creating a floating effect that departs from the heavy, grounded way in which buildings were traditionally depicted, and an impression of freedom that opens architecture to the public.

Figure 57: *The World (89 Degrees)*Zaha Hadid, 1983
Cut-and-pasted paper with watercolor, ink, gouache, and color pencil on gelatin silver photograph (aerial view of London)

Figure 58: *Victoria City Aerial*
Zaha Hadid, 1988
Acrylic on Cartridge Paper

Figure 59: *Vision for Madrid*
Orange Explosion on White, Multi-coloured on White, More Black Explosion, Orange Explosion on Black
Zaha Hadid, 1992
Acrylic on cartridge paper

3.3 Dynamic Drawings

As described in Chapter 2, film and photography techniques presented a new expressive medium to artists and architects, presenting possibilities of a whole new temporality to the visual experience.²⁵ The Deconstructivist architecture of the 1980s built upon postmodern ideas and avant-garde art to present an architecture concerned with fragmentation, juxtaposition and subverting traditional building conventions. Many architects would use the new technology of the 1980s to realize their conceptions, transforming the drawing into a built object.

3.3.1 Bernard Tschumi

Concerned with architecture as a form of knowledge, rather than as a knowledge of form, Bernard Tschumi is preoccupied with events and movement. He believes that space is created/defined by an event or events taking place within it. With this preoccupation in mind, Tschumi disregards traditional protocols of architectural drawings. Influenced by the works of Archigram, Cedric Price and the Situationist Internationale, he seeks ways to represent choreographed architectural experiences of the city and compiled these methods in *The Manhattan Transcripts*.

The Manhattan Transcripts uses the experimental film techniques of his time, such as the jump-cut, quick-cut and tracking shot. Tschumi co-opted the techniques of film scripts, storyboards and choreographic notation to describe architectural events and represent the dynamic components of architecture. *The Manhattan Transcripts* consists of four episodes, each using a three-part device. Events, spaces, and movements are represented by photographs, traditional architectural drawings and motion diagrams. These devices are used in every episode and get more complex as the series goes on.²⁶

The visual style of *The Manhattan Transcripts*, while restrained, is rich in information. Tschumi uses plans and elevations, diagrams, axonometric and perspective views to move toward architectural propositions.²⁷ Expressions of movement are represented with dashed lines and arrows, while dotted lines indicate structure. Using the square as a unit of event, Tschumi frames the experience. The light squares are broken up by dark, black and white photographs that describe an event in architecture.²⁸ The abstracted photos, diagrams and architectural conventions open the work up to multiple interpretations.

Figure 60: *The Manhattan Transcripts*
Project, New York, New York, Episode
4: *The Block*
Bernard Tschumi, 1970-1981
Ink and cut-and-pasted gelatin silver
photographs on tracing paper

Figure 61: *The Manhattan Transcripts*
Project, New York, New York, Episode
4: *The Block*
Bernard Tschumi, 1970-1981
Ink and cut-and-pasted gelatin silver
photographs on tracing paper

Figure 62: *The Manhattan Transcripts*
Project, New York, New York, Episode
4: *The Block*
Bernard Tschumi, 1970-1981
Ink and cut-and-pasted gelatin silver
photographs on tracing paper

The work in *The Manhattan Transcripts* was dedicated to the process of design, not the arrival of a building. Tschumi was searching for an ideal architectural process. Recognizing that the drawing is both a limitation on, and a means of, presenting architectural inquiries, he incorporates innovative and radical techniques to translate the experience of architecture and the city onto the space of the drawing. He transcribes moments of experience in the city using photographs and architectural drawings as methods of forming architectural ideas.

Figure 60

Figure 61

Figure 62

3.3.2 Coop Himmelb(l)au

The methods used by Wolf Prix and Helmut Swiczinsky at Coop Himmelb(l)au is very much influenced by the automatic techniques of Surrealism. Their architecture is dependent on capturing the energy and intuitiveness inherent in this process. Similar to the way art is produced, they employ a process that engages the human mind, creating a personal statement about architecture.²⁹

This automatic process is one that is very intuitive and depends on an internal dialogue with oneself. It is not enough to just engage in automatism or action painting as this does not make the content any better than traditional methods. What is needed is to be self-monitoring and to be aware of what is being generated to question it. Coop Himmelb(l)au used the print media and techniques of the late 60s through the mid 1980s to create their energetic work. The initial sketch would quickly result in a three-dimensional model that was built to match the initial drawing, and from that, more conventional orthographic drawings were developed that documented the energy and emotion of the space.

While engaging in speculative work and an avant-garde design process, Coop Himmelb(l)au's architecture is always focused on moving from speculative fantasy to built form.³⁰ In this case, the drawings are translated directly to the built object. The original drawing and the final project, while quite similar, are intended to be expressively identical as they arose from the intent to capture the energy in the drawing.

The design of *The Open House* is an example of this energetic process (Figure 63). The sketch was created with the eyes closed and focused not on details, but the radiance of light and shadows, brightness and darkness, height and width, whiteness and vaulting, the view and the air.³¹ Prix believes that the beginning of a drawing is the moment to capture this energy, as that is when the building is decided.³² Prix continues to describe the benefits of this intuitive process.

Doing the sketch in a very explosive and condensed moment enabled us to create a level of complexity which you never get if you put one part next to the other....It's kind of a black hole in the moment of designing. We have to introduce another language into architecture in order to create a new aesthetic that is much more advanced than the aesthetics of the time; it is an intellectual point of view – understanding ahead of the time and seeing into the future.³³

Figure 63: *Open House Sketch*
Wolf D. Prix, Helmut Swiczinsky (1983)

Figure 64: *Formuttation 1*
Wolf D. Prix, Helmut Swiczinsky (1981)
Graphite on Paper

Figure 63

Figure 64

3.4 Conclusion

The work of the avant-garde architects of the 60s, 70s and 80s proved to be influential to the discourse of architecture, expanding the generative and potential capabilities of the drawing to capture and convey previously unexplored ideas. These architects would use the mediums available and co-opted them to carry their messages and ideas about architecture. As digital technology became readily available, this explosion of the architectural drawing would carry on into the 1990s and 2000s through the work of Lebbeus Woods, Wes Jones, James Corner, Perry Kulper and Bryan Cantley. Embracing technology would allow for greater expanse of the architecture drawing as ideas from the mind would be translated across a variety of mediums both digital and analog.

Notes

- 1 David Ross Scheer, *The Death of Drawing: Architecture in the Age of Simulation*, (New York: Routledge, 2014), 87.
- 2 Nicholas Olsberg, "The Evolving Role of the Drawing," *Architectural Review*, 233, no.1395 (May 2013): 36.
- 3 Simon Sadler, *Archigram: Architecture Without Architecture*, (Cambridge: MIT Press, 2005), 5.
- 4 Ibid., 8.
- 5 Ibid., 14.
- 6 Tim Abrahams' interview to Mike Webb on Cosmopolitanscum: <http://cosmopolitanscum.com/2011/10/28/interview-michael-webb/#more-948>
- 7 Serena Pollastri, "Archigram," *Visual Conversations on Urban Futures*, January 17, 2016, accessed August 3, 2017, <https://subjectivefutures.wordpress.com/2016/01/17/archigram/>
- 8 Neil Spiller, *Visionary Architecture: Blueprints of the Modern Imagination*, (New York: Thames & Hudson, 2006), 87.
- 9 Stephen Wallis, "A '60s Architecture Collective That Made History (but No Buildings)," *The New York Times Style Magazine*, April 13, 2006, Accessed August 3, 2017, <https://www.nytimes.com/2016/04/04/t-magazine/design/superstudio-design-architecture-group-italy.html>
- 10 Jezko Fezer, "Superstudio & Archizoom 1968-1972," *032c*, Accessed August 3, 2017, <https://032c.com/2003/superstudio-archizoom-1968-1972/>

- 11 Fernando Quesada, "Superstudio 1966-73: From the World Without Objects to Universal Grid," *Footprint*, Spring 2011, no.8: 25.
- 12 Ibid., 28.
- 13 Ingrid Böck, *Six Canonical Projects by Rem Koolhaas: Essays on the History of Ideas*, (Berlin: Jovis, 2015), 40.
- 14 Ibid., 41.
- 15 Jeffrey Kipnis, *Perfect Acts of Architecture*, (New York: Museum of Modern Art, 2001), 14.
- 16 Ibid., 33.
- 17 Jeffrey Kipnis, quoted in *Six Canonical Projects by Rem Koolhaas*, Ingrid Böck, (Berlin: Jovis, 2015), 33.
- 18 Spiller, *Visionary Architecture*, 153.
- 19 Lebbeus Woods, "Libeskind's Machines," Lebbeus Woods, November 24, 2009, Accessed August 3, 2017, <https://lebbeuswoods.wordpress.com/2009/11/24/libeskinds-machines/>
- 20 Robin Evans, "In the Front of Lines That Leave Nothing Behind," AA Files 6, (May 1984), *Architecture Theory since 1968*, ed. K.Michael Hays, 484.
- 21 Ibid., 484.
- 22 Yael Resiner, *Architecture and Beauty: Conversation with Architects About a Troubled Relationship*, (Chichester: Wiley, 2010), 184.
- 23 Ibid., 186.
- 24 Ibid., 187.
- 25 Alberto Perez-Gomez and Louise Pelletier, *Architectural Representation and the Perspective Hinge*, (Cambridge: MIT Press, 2000), 373.
- 26 Kipnis, *Perfect Acts*, 58.
- 27 Peter Cook, *Drawing: The Motive Force of Architecture*, (Chichester: Wiley, 2014), 25.
- 28 Selena Slavic, "Event and Movement in Architecture," *Emperors New Architecture*, accessed August 3, 2017, <http://emperors.kucjica.org/event-and-movement-in-architecture/>
- 29 "Open House", *Coop Himmelb(l)au*, accessed August 4, 2017, <http://www.coop-himmelblau.at/architecture/projects/open-house/>
- 30 Wolf Prix, "Self Confident Forms," *Architecture and Beauty*, Yael Resiner, (Chichester: Wiley, 2010), 120.

31 "Open House," *Coop Himmelb(l)au*, accessed August 4, 2017, <http://www.coop-himmelblau.at/architecture/projects/open-house/>

32 Prix, *Architecture and Beauty*, 120.

33 Ibid., 120.

Shadows of Inflection

The availability of a variety of digital technologies provides architects with the capability of exploring the drawing in a way that was previously not possible. *Shadows of Inflection* explores a form-finding process that translates two-dimensional drawing into a three-dimensional construct. This method entails creating a digital representation of the drawing and then projecting that drawing into the virtual space of the computer.

In this example, a portion of the drawing was extracted for digital representation. From this, a digital model was created to explore the spatial characteristics of the drawing in three dimensions. The drawing is translated into a physical construct that becomes an extension of the drawing, as well as an artifact on its own. The digital image was created by tracing out the forms in the drawing and then relocating them within three-dimensional space. The drawing fragments were placed at various points within a bound frame either horizontally or vertically. This served as a reference image for the physical construct. The physical construct was made similarly to the digital drawing, with laser cut acrylic pieces being embedded in layers of resin. While the acrylic pieces were the same size as shown in the digital model, their location and placement would differ slightly through the translation from one media to another. They were placed by hand as the resin is poured, echoing similarly indeterminate results as with drawing, where the marks on the paper are created without knowing the outcome and location of the next piece.

The finished construct serves as both diagram and hybrid construct. Viewing the construct from various angles allows the pieces to become layered upon each other, presenting a different composition depending upon the point of view of the observer. Where pieces overlap, a new image is formed. Gyorgy Kepes describes this effect as transparency.

If one sees two or more figures overlapping one another, and each of them claims for itself the common overlapped part, then one is confronted with a contradiction of spatial dimensions. To resolve this contradiction one must assume the presence of a new optical quality. The figures are endowed with transparency: that is, they are able to interpenetrate without an optical destruction of each other.¹

Elaborating further:

Transparency however implies more than an optical characteristic, it implies a broader spatial order. Transparency means a simultaneous perception of different spatial locations. Space no longer recedes but fluctuates in a continuous activity. The position of the transparency figures has equivocal meaning as one sees each figure now as the closer, now as the further one.²

Figure 65: *Shadows of Inflexion*
Laser cut acrylic pieces embedded in polyester resin.

This is also described as phenomenal transparency by Colin Rowe. The artifact provides a new perspective with which to view and analyze the drawing. The pieces embedded within the resin present a new spatial possibility depending on the viewpoint of the spectator. The construct presents the drawing on a different scale as well. The drawing becomes three-dimensional and can posit notions of a larger scale such as that of a site plan. Or perhaps it could be said that it presents the house as a series of multiple levels that are not static. Analyzing the construct from a different angle causes the pieces to overlap and blend together. It also causes each side of the construct to differ in size to the spectator.

Notes

- 1 Gyorgy Kepes in *"Words and Architecture"* by Adrian Forty, (London: Thames & Hudson, 2012), 286-287.
- 2 Ibid., 286-287.

Figure 65a

Figure 65b

Figure 65c

Figure 65d

4. Constructing the Drawing

Translation (noun)

1. the conversion of something from one form or medium into another.

In *The Task of the Translator*, Walter Benjamin views translation as a form of art rather than a result of art. Benjamin sets out to define translation as its own form since art is not made for the observer and therefore they would not be able to understand it.¹ Benjamin goes on to propose that the task of the translator is different from that of the artist. To Benjamin, trying to translate an author's original intent, meaning for meaning, is futile to attempt and would result in "inaccurate transmission of inessential content."² Instead, he believes that the translator should focus on the object itself rather than the meaning. He refers to this as trying to obtain a "pure form of language". The role of the translator is to recognize intentions and to test, or even break, them. The translator must discern the intended effect that produces the original, offering a dialogue that allows for new interpretations and associations.³ Translation becomes externalized through the media and techniques it uses. In analyzing a drawing's conceptual logic (form, rhythms, patterns, lines, shapes) and constructional logic (the way it is put together) - designers and architects can begin to move the work forward.⁴

The work presented in this design research utilizes a wide variety of methodologies for constructing the drawing. They include the following:

1. Proto-Formal Objects
2. Abstract Nature of Diagrams
3. Generative Force of Mapping
4. Indeterminacy of Constructs

4.1. Proto-Formal Objects

The projects and methodologies implemented in this design research are being developed as means of design, experimentation, and refinement. Research was engaged in for its own merits but also with the idea that it could support further development of the design for implementation in other scenarios. The methodologies outlined in this chapter help to proliferate those proto-forms that are not yet interpreted but have an uncharted capacity.⁵ The form-to-programme method used employs abstract forms in speculative proto-capacities.⁶

This formal approach, presented by Kevin Rhowbotham in 1995, uses formal analysis and experimentation as the centre of the design process. As described by Rhowbotham: "[Form and its dependency on conceptual strategies could now be placed at the centre of architecture research, experimentation and production....[bringing] out new possibilities

Figure 66

of use.⁷⁷ Rather than following the predominant approach of schematic design, design development and construction, this method considers form and aesthetics as the focus of design and applies function to the developed form.

Figure 66: *House of Three Birds*
Process Study

As discussed previously, the architectural drawing has deployed the various media and technologies of an era and co-opted them to engage with critical architectural discourses. In designing this way, it also becomes important to question the methods used and what is being structured in the work produced. This requires an engagement with the work on two levels. On the first level, there is engagement with the project through the act of drawing, as introduced in Chapter 1. The second level, also introduced in Chapter 1 involves analysis of the work as though they were independent objects, irrespective of intent or meaning. Here, we are looking at the work from a formal perspective, looking for common elements, ideas, and marks that can be expanded upon and developed.

Figure 67: *House for Three Birds*
Digital Drawing

The projects and drawings in this design-research have been referred to as proto-formal in their naming: proto-formal sections, proto-formal plans and so on⁸. What would normally be considered models in the normative architectural design process are referred to as constructs here. Referring to a work in this way privileges its speculative, un-interpreted nature (Figure 67). This allows for numerous possibilities and capacities to be investigated. They are “proto-” in the sense that they have yet to acquire a determinate and desired effect by being selected to a specific purpose and pursuit.⁹ This formal approach to design offers an opportunity for an intuitive and instant evaluation. It eliminates extended analysis and

justification in favour of totalization rather than differentiation. However, the approach is still rational in the sense that it provides an intuitive appreciation of performativity.¹⁰ The object is differentiated and appreciated through the process of distinction and evaluation, not simply through distinct knowledge. The object isn't scrutinized only for those distinct features that define it, or for recognizable forms and expressions. It is analyzed for elements that propagate or generate ideas.

Figure 67

4.2 Abstract Nature of Diagrams

Diagrams have long been important for the communication of concepts of architectural design and construction. They transfer information to others and function as drivers or triggers, translating a design from an abstract representation to a final product. Diagrams are used in the initial stage of a project as a way of presenting a conceptual or abstracted idea of the design. They focus on specific aspects of it even as they search for solutions to it.¹¹ Normative diagrams in architecture bear an abstract resemblance to the object being represented, thus informing the viewer of how it might be realized. A series of determined steps ensues to translate the diagram into design drawings and finally into the built object.¹² An alternative diagram is one that, rather than compressing information, triggers and proliferates it.

In *Diagrams: Interactive Instruments in Operation*, Ben Van Berkel and Caroline Bos of UN Studio discuss the generative and transformative capabilities of diagrams in the design process. Rather than considering the diagram as part of a reductive machine that compresses information, Van Berkel and Bos advocate for its use as a proliferating machine.¹³ In this sense, the diagram and its implementation is described by Gilles Deleuze, who sees it as an abstract machine. This abstract machine is not representative of something real, but rather constructs a real version of what is yet to come.¹⁴ It is always changing on its way to "some" form - not a "right" form or the only form, but one out of the many that are possible. It is not dependent on a particular concept or idea but rather evolves and develops through the design process.¹⁵

The implications of the abstract machine are open-ended, hence its value. Diagrams are worked upon without predetermined consequences, or stable interpretation. Van Berkel and Bos perceive the diagram as a device that avoids representation, critique, or type in favour of projecting possible realities.¹⁶ The work presented in this thesis is viewed in a similar way to the diagram and the abstract machine. The drawings and constructs are instruments that propel the project forward, drawing in concepts external to architecture, rather than superimposing them.¹⁷ The representational methods used are not reflective of images or symbols, with the result that ever-changing meanings or interpretations are produced. This liberates the design from its tendency to use fixed or predetermined objects and reveals specific moments of interpretation, utilisation, perception, and construction that unfold and proliferate on various levels of abstraction.¹⁸ This abstraction permits multiple readings and interpretations. In attempting to convey an idea, the drawings are simultaneously diagrammatic, representational of a known object or image, and an autonomous object themselves.¹⁹ This is due to their latent potential and the multiple methods that one can

poach and dissect the drawing. Working diagrammatically means to engage in the many forces that can shape the designed object.

Figure 68: *House VI, Transformation I*
Ziptane and laminated coloured paper with
ink on paper
Peter Eisenman

An example of these diagrams can be found in Peter Eisenman's *House VI* (Figures 68-70). Eisenman developed sixty-three drawings on his way to the design of *House VI*. By manipulating walls, columns and stairs, he would diagram and draw in an axonometric style until the design would emerge. Jeffrey Kipnis notes that:

Figure 69: *House VI, Transformation VIII*
Ziptane and laminated coloured paper with
ink on paper
Peter Eisenman

"He proposed that one could detach design from the mind-numbing convention of service and, instead, transform a finite set of elements according to generative rules. For example, walls, columns and stairs could be treated not as functional or structural elements but as signs.... In these drawings-as-film, one watches three Cartesian units, a red grid, a blue grid, and a black/white cross of planes unfold and interact according to some obscure genetic program. House VI seems to emerge automatically, like a single cell's transformation into a multi-celled organism. Though the rationale behind each step remains difficult to recover, the compelling sense of a deep logic driving the design launched both a generation of research into automatic processes and Eisenman's reputation."²⁰

Figure 70: *House VI, Transformation XII*
Ziptane and laminated coloured paper with
ink on paper
Peter Eisenman

Figure 71: *Spatial Pollination v.03*
Digital construct printed on mylar, 24x 6 in.

Desley Luscombe analyses the role of the drawing in realizing architecture through the work of Peter Eisenman's axonometric drawings of *House VI*. Luscombe reviews the techniques and ideas behind Eisenman's drawings for *House VI* and how they challenge the viewer to actively re-compose an architectural subject from the drawings through physical, perceptual, and intellectual engagement.²¹ Luscombe notes the use of the axonometric, diagrams, and colour in the evolution of Eisenman's process, producing possibilities for manipulation in conceptual architecture. Eisenman's work explores the relationship between media and representation and presents architectural concepts throughout their development. It focuses on abstraction and form as the basis of the conceptual in architecture.²² For Eisenman, the drawings are an endpoint that are developed in parallel with the design of the building.²³

Figure 71

4.3 Generative Forces of Mapping

In *Agency of Mapping*, James Corner presents mapping not as a passive device of spatial measurement and description, but rather as extremely opaque, imaginative, operational instruments. Corner advocates for the use of mapping as a creative exercise that can generate future work.

*"The artistry lies in the use of the technique, in the way in which things are framed and set up. Through reformulating things differently, novel and inventive possibilities emerge. Thus mapping innovates; it derives neither from logical possibility (projection) nor necessity (utility) but from logical force. The agency of mapping lies in its cunning exposure and engendering of new sets of possibility."*²⁴

Using a variety of techniques, Corner calls for the destructuring of mapping, and for it to play a more creative role in design. The development of more open-ended and flexible notions of scale, framing, orientation, projection, indexing and coding will result in the presentation of a new model rather than a re-presenting of known ones.

The technique of mapping in this design research recognizes the paper as the space of drawing rather than the drawing of space.²⁵ It departs from the belief that a necessary relationship exists between the space of speculation (the drawing) and the space of execution (the building), arguing that the nature of architecture and its contingent spatialities are dependent upon the possibilities in the drawing itself and not upon any project or physical space.²⁶ By viewing the drawing as a map, graphic structures can be re-read so that marks on the drafting plane no longer refer to the physical surfaces of objects, but to characteristics of spatial extension, to trajectories, to oscillations, to orbits, to vibrations, to repetitions, to syncopations, etc.²⁷ New ways of describing space in the drawing have emerged, and alternative drawing codes have been extracted.

Perry Kulper describes the drawing as "an active discussion between the various agencies of the language of architecture and the language of representation envisioned through the architectural drawing; latency – or what cannot be intellectualized – discovered through uncovered relations, forensic and detective like, in the act of constructing the drawings."²⁸ This method forgoes the identification of technical and rationale descriptors as the driving force within the drawing, and gives way to a more expressionistic approach. An example of this can be found in Kulper's work, *Fast Twitch Desert Dwelling*. Kulper uses a wide variety of techniques and mediums in creating his drawings, such as: Mylar, graphite, ink, tape, found imagery, x-rays, foil, photographs, transfer letters, transfer film, and cut paper.²⁹ Employing

Figure 72: *The Central California History Museum Competition*
Perry Kulper, 2000

Figure 73: *Site Plan v.01*
Perry Kulper, 2014

Figure 74: *The Central California History Museum Competition*
Cryptic Site Drawing, v.02
Perry Kulper, 2000

Figure 75

analog and digital drawing techniques in combination with a wide variety of architectural conventions to reveal, or potentially reveal, a variety of meanings. Kulper uses layering and thickening of information—as in a map—that hints at spatial possibilities even as it formulates the potential for a project brief. Kulper's drawings are not intended to be architectural, but instead hint at, and engage with, architectural ideas (Figures 72-74). They present a way of thinking, positioning the architect as a *bricoleur*, engaging a diverse range of tools to create a layered drawing where patterns and relationships can emerge. They are not read as typical architectural drawings. In Kulper's work, to build the object captured within the drawing, you need to work backwards from the drawing itself.³⁰

Kulper's drawings are of unique interest and one can spend large amounts of time analysing them. They contain layers upon layers of information: symbolic notations, figurative images, gestural marks, all contained within one drawing, often appearing as a map. In *Architecture's Pretexts*, Aarati Kanekar notes that the effort to broaden the bandwidth of understanding about the content and structural makeup of the project has led to "thick" drawings where layers of information are translated visually, creating a pattern of relationships and a complex web of maps.³¹

Figure 75: *Migratory Patterns v.01*
Digital DrawingFigure 76: *Migratory Patterns v.03*
Digital Drawing

Figure 77a

Figure 77b

4.4 Indeterminacy of Constructs

Construct (noun)

1. an idea or theory containing various conceptual elements, typically one considered to be subjective and not based on empirical evidence

Construct (verb)

1. to make or form by combining or arranging parts or elements

For Bryan Cantley, the architectural drawing is viewed as having dual aspects: the thing-in-itself and the thing-as-it-appears to us are two sides of the same thing.³² Cantley uses the drawing to engage with unknowable ideas in a world where machines and virtual machines are continually evolving.³³ Cantley's work can "exist in many places, or rather any place, at any given time. It is both site-less and of many sites."³⁴ Using the drawing as a space of investigation, Cantley works on postulating a series of projects that engage with a variety of ideas. The *Mobile Gatherspace* was envisioned as a floating civic plaza that travels from location to location, encountering various sites and conditions (Figure 77a).

Figure 77: *Form uLA: Dimension/*
Bryan Cantley
a) *Mobile Gatherspace*
b) *Placemaker/Seedplanter*

In addition to the drawing techniques, Cantley uses models, both physical and digital in the production of his work. As described by Cantley:

"The models are based on a set of 2.5-dimensional drawings that investigate hybrid dimensions, overlapping conditions, and multiple scales. By Working in 2.5D, the models explore connections between 3D architecture and 2D graphic communication. Graphical data is derived from the original sketches and then used as a layering device to create three-dimensional entities."³⁵

He continues:

"The blurred condition... of a drawing... of an idea... of a space... is what my experimentation has always been about, even in the not-so-literal vibration of the "traditional" project – where one can see all the physical parameters of the project at once... it is still meant to suggest opportunities.

It's similar to the way I feel about how we interpret, inhabit, and experience space. Be it the built space of architecture, the page space of the written word, or the audible and emotive space of music. We can all witness the same event, but we may take varied resonant memories from that same event. Therefore, the "variations" of the object... the trajectory explorations... the indeterminate condition... attempt to reflect the variations of experiential quality and potential."³⁶

Figure 78: *Pantomime Pollinator v.01*
Hybrid Construct

Figure 79: *Pantomime Pollinator v.02*
Hybrid Construct

This hybridization is evident in the projects *The Batman Series* and *Placemaker/Seedplanter Models* (Figure 77b). In his drawings, Cantley employs orthographic projection techniques with descriptive geometry. Arrows signal unknown movement or transformations; they do not indicate a direction, but are rather placeholders for an unknown force or experience.³⁷ The *3A Models* were a series of experimental constructs that were produced within 24 hours. Models combine with the drawing to examine conditions that would not have been part of the drawing alone, thereby providing data to be interpreted. The indeterminacy in these hybrid conditions allows for any number of interpretations.

Figure 78

Figure 79

Notes

- 1 Walter Benjamin, "The Task of the Translator," in Hannah Arendt (ed.), *Illuminations*, (New York: Schocken Books 1968), 69
- 2 Ibid., 69
- 3 Aarati Kanekar, *Architecture's Pretext: Spaces of Translation*, (New York: Routledge, 2015), 2
- 4 Ibid., 2.
- 5 Patrik Schumacher, *The Autopoiesis of Architecture*, Vol. 1 (Chichester: John Wiley & Sons, 2015), 15
- 6 Ibid., 15.
- 7 Kevin Rhowbotham, *Form to Programme* (London: Black Dog Pub., 1996), 13.
- 8 Perry Kulper, "The Precision of Promiscuity," OFFRAMP 09, (2015): 1.
- 9 Schumacher, *The Autopoiesis of Architecture*, 16.
- 10 Ibid., 16.
- 11 Ibid., 348.
- 12 Ibid., 349.
- 13 Ben Van Berkel and Caroline Bos, "Diagrams" in *This is Not Architecture*, ed. Kester Rattenbury (London: Routledge, 2002), 102.
- 14 Ibid., 104.
- 15 Gale Futon, "Before the Projective...there was the Diagrammatic," in *Field Correspondence*, 1, No.1 (2009): 5.
- 16 Ibid., 3.
- 17 Ibid. 105.
- 18 Ibid. 105.
- 19 Bryan Cantley, Interview with Corrado Curti. *Experimental Dialogues: Sex Machines*, Cluster, August 21, 2010.
- 20 Jeffrey Kipnis, *Perfect Acts of Architecture*, (New York: Abrams, 2001), 34.

- 21 Desley Luscombe, "Architectural concepts in Peter Eisenman's axonometric drawings of House VI," *The Journal of Architecture*, 19, no.4 (2014): 606.
- 22 Ibid., 563-564.
- 23 Ibid., 578.
- 24 James Corner, "The Agency of Mapping," in *Mapping*, ed. Denis Cosgrove (London: Reaktion, 2002), 251.
- 25 Rhowbotham, *Form to programme*, 20.
- 26 Ibid., 20
- 27 Ibid., 20
- 28 Nat Chard and Perry Kulper. *Fathoming the Unfathomable*, (New York: Princeton Architectural Press, 2014), 10.
- 29 Ibid., 118
- 30 Nigel Coates, *Narrative Architecture*, (Chichester: Wiley, 2012), 58.
- 31 Kanekar, *Architecture's Pretext*, 117
- 32 Bryan Cantley, "Two Sides of the Page: The Antifact and the Artefact," in *Drawing Architecture*, ed. Neil Spiller (Bognor Regis: John Wiley & Sons Ltd., 2013), 41.
- 33 Bryan Cantley, *Mechudzu: New Rhetorics for Architecture* (New York: Springer, 2011), 5.
- 34 Ibid., 6.
- 35 Ibid., 22.
- 36 Bryan Cantley, Interview with Corrado Curti. *Experimental Dialogues: Sex Machines*, Cluster, August 21, 2010.
- 37 Aaron Betsky in *Mechudzu: New Rhetorics for Architecture* by Bryan Cantley, (New York: Springer, 2011), 29.

Threshold(s) of Masks

Threshold (noun)

1. a strip of wood, metal, or stone forming the bottom of a doorway and crossed in entering a house or room.

• [in singular] a point of entry or beginning

2. the magnitude or intensity that must be exceeded for a certain reaction, phenomenon, result, or condition to occur or be manifested.

Threshold(s) of Masks (Figure 81) expands on the architectural ideas presented within the first set of triptych drawings and the construct *Shadows of Inflexion*. By unpacking the first set of drawings, the next series of work begins to dig deeper to explore the architectural possibilities of a threshold. The drawing takes fragments of the triptych and has each work as an element of a threshold to create an architecture that can be malleable and transformative. It operates based on asking the questions: what happens once you pass through the space? What is on the other side, just beyond the illuminated edge?

In his essay, *Super Limen*, Hans Teerds, when referring to the door in the Kolenkit residential building in Amsterdam, describes the threshold as, “the essence of the entire architectural construction concentrated. Not only is the boundary penetrated there, but it also becomes accessible, can be crossed...Within this threshold, inside meets outside, without interception. Outside a person is watched, questioned, weighed; inside, they can drop the mask.”¹ The entrance is more than just a mental transition; it is also a physical and physiological moment of transition. “An immediate unconscious projection, identification and exchange takes place; we occupy the space and the space settles in us. We grasp the space with our senses and we measure it with our bodies and movements.”²

The drawing *Threshold(s) of Masks*, explores this transition. It proposes a fragmentation – various experiences that explore the boundary, or in this case, the line that becomes the space. Engaging with the idea of thresholds presents the defining edges and limits of objects that exist in space. The term “threshold” has meaning only when it references other spaces that it separates, or brings together. Thresholds can be penetrated, accessed or crossed, an idea that the drawing serves to investigate.

As with the previous drawings in *House of Three Birds*, key elements are also structured within *Threshold(s) of Masks*. Here we see that the expanded choreographic elements have become much more transitive. The dashed lines converge in the middle and then diverge from each other, as if an outside element is pulling them apart, causing elements to wander around the plane. Elements in motion intersect with the dashed lines, as if responding to

Figure 80: *Threshold(s) of Masks*
Process Study

Figure 81: *Threshold(s) of Masks*
Ink on mylar
24 X 36 in.

their choreographic movements, but they are still not directly relatable to the gestures. The indeterminate objects that float throughout the page reinforce the dynamic nature within the drawings. Additionally, in the drawing indexical and notational properties can be seen. Like a recorded document or archive, the notation adds to the cabinet of curiosities within the drawing. Symbols that could correspond to a code or index are scattered throughout the drawing, suggesting that a translation is needed to see the meaning behind them.

Lastly, the solid black elements in the object create a figure-ground relationship. Some of the marks appear to break off from the central marks, suggesting a connection or similarity. The marks also vary in scale, altering the overall conception of scale and depth in the drawing, as well as implying growth within the marks themselves. The overlapping of objects and drawings presents both literal and phenomenal transparency. Figures within the drawing intersect and overlap, culminating in larger, fluctuating configurations.

Notes

- 1 Hans Teerds, "Super Limen," in *Building Atmosphere*, OASE, (91), (2013):115. Retrieved from <https://www.oasejournal.nl/en/Issues/91/SuperLimen>
- 2 Robert McCarter and Juhani Pallasmaa, on *Architecture as Experience* (London:Phaidon Press Limited, 2012), 14. Quoted in Hans Teerds, "Super Limen," in *Building Atmosphere*, OASE, (91), (2013):115. Retrieved from <https://www.oasejournal.nl/en/Issues/91/SuperLimen>

Figure 80

Figure 82

Wings of Transparency

Shadows of Inflexion introduces how, within this design research, drawings encompass numerous forms of representation, whether it be digital or analog. *Wings of Transparency* expands upon this idea through further exploration of a hybrid construct. The construct takes the key elements structured within the two-dimensional drawings and translates them for further exploration to see what kinds of effects can be produced in three-dimensional space. Each part of the construct was developed using the drawing as a reference, but where the drawing presents a flattened view, the model interprets what is behind the drawing. Modeling a drawing involves analyzing its constructional and conceptual logics to determine what elements exist, and where they exist in the space of the drawing.

Figure 82: *Wings of Transparency*
Hybrid Construct

Figure 83: *Wings of Transparency*
Hybrid Construct

Figure 84: *Wings of Transparency*
Hybrid Construct

Figure 85: *Wings of Transparency*
Hybrid Construct

Figure 86: *Wings of Transparency*
Hybrid Construct

Photographing the drawings and the construct together became a key moment in the design research. Whereas the previous projects explored the drawing in two-dimensional space and as a three-dimensional space separately, this investigation presents a hybrid, simultaneous drawing. Here, the construct becomes an extension of the drawing, revealing new relationships as well as carrying forward key elements. The two and a half dimensional drawing serves as a connection between the three-dimensional construct and two-dimensional graphic communication, per Cantley. The different levels of representation bring about questions of indeterminacy and fragmentation. Elements within the two-dimensional drawing seem to turn the page, so to speak. The frame pushes out of the drawing into spatial formations and known orientation and scale are blurred, becoming ambiguous with a new tale told from every viewpoint.

Figure 83

Figure 84

Figure 85

Figure 87

"We must not create as we see, but as we imagine. If we learn to remove our hindrance and see, refocus and understand what the work says, we may find it has its own voice, its own desires and its own urge to become more."¹

5. A House of Three Birds*

Architecture and architectural drawings typically focus on known parameters – known programs, events, locations, materials, known experiences. *A House of Three Birds** grapples with how to draw the unknown, the sublime, the liminal – the ineffable experience of architecture.

Conventional architectural drawings rely on creating what we see. They use conventions that allow for a clear understanding of their desired outcome, providing little interpretation of the author's meaning and intent. This design research focuses on providing a method of translation that engages the viewer with the space of the drawing, urging the drawing to become more than what is shown.

The projects shown in this chapter are an attempt at engaging undefined parameters. The initial experiments use two-dimensional drawings that do not conform to Cartesian coordinates and are not judged by form and function. Choreographies and trajectories are plotted on the site of the paper, creating moments of flux, alternating relationships, where each mark exists on an equal footing. The composition is fluid and remixed, purposely resisting traditional architectural conventions.

*A House of Three Birds ** is reflexive and inquisitive in its nature. It forms a series of spaces and relationships through conversation with its fluctuating virtual site, hinting at space and movement. Elements of the drawing are dissected and analysed, evoking emotion and reaction that inspires subsequent drawings. This discourse sparks a desire to extend the house into three dimensions. A desire to produce form and structure resulting in a "buildable architecture." Extrusion and rotation of the drawing in the virtual space of the computer creates a three-dimensional object, giving form to drawing.

While reduction is evident in translating the drawing into three dimensions, it also presents numerous possibilities, expanding the capacity of the drawing. The formation of the physical construct further exposes the invisible elements of the drawing: form, depth, shadow, scale, thickness, perception. Positioned alongside the relief, the object tries to locate itself between the drawing experiment and the physical reality, again, not conforming to either.

The marks and gestures fill in the gaps present between rational thought and subjective desires. The lines and shadows reveal depth and boundaries within the space of the drawing. Contrastingly, they also blur these boundaries or break them. Revealing answers or uncovering the potential of the drawing is up to the viewer. No clear solution is presented, only further possibilities that need to be embraced.

Figure 87: *A House of Three Birds*
Collected Drawings
Ink on mylar, 24 x 36 in.

Figure 88

Figure 88: *A House For Three Birds*
Digital Hybrid Drawing, Black and White

Figure 89: *A House For Three Birds*
Digital Hybrid Drawing, Colour

Figure 90: *Spatial Pollinator*
Digital Drawing printed on mylar, 24 x 36 in.

Figure 91: *Discarded Fragments*
Digital Drawing printed on mylar, 24 x 36 in.

Figure 92: *Choreographing Flight*
Digital Drawing printed on mylar, 24 x 36 in.

Figure 93: *Fantasy Flights v.03*
Digital Drawing printed on mylar, 24 x 36 in.

Figure 94: *Fantasy Flights v.03*
Digital Drawing printed on mylar, 24 x 36 in.

*A House of Three Birds** is a glimpse of the possibilities of the drawing. While independent and original on their own, they search to make meaning out of the drawings from which they have sprung.¹ As with the previous drawings their qualities are subject to poaching and dissection. Within the drawings, are differences in scale, volume, depth and shadows, all being produced from within the drawing. A world of imagination is presented, rather than the one that surrounds us.

Notes

- 1 Antony Morey, "Keeping Up With the Joneses," *Y Not Workshop*, accessed July 31, 2017, <http://ynotworkshop.com/new-page-1>.

Conclusion

Through the act of drawing, the design process is able to focus on the intensity of the experience and on conceptual understanding. Drawing allows the designer to discover design solutions that are differentiated from those available through normative processes, connecting the idea and result. It is important to recognize that this method does not result in directly translatable (or buildable) architecture. These are proto-formal ideas on their way to becoming architecture.

The projects in *A House of Three Birds** represent only part of what has become an ongoing, lengthy and personal exploration into the process of design in architecture. This design research proposes three methods for how the design of architecture can be viewed through the lens of drawing: drawing as a verb and noun, co-opting the drawing, translating the drawing. These methods can be applied by the designer throughout the design process to create a deeper, expanded, ineffable view of architecture that carries the essence of the designer's initial ideas throughout the project.

1. Drawing as a verb and noun

Viewing the design of architecture as an oscillation between the Act of and Product of Drawing expands the fields of possibilities. The act of drawing allows for the structuring of thoughts and their translation onto the space of the drawing, while its product allows for the interpretation of the drawing and its translation into other media, presenting opportunities for further exploration.

2. The Creative Act

Throughout history, drawing has been used to convey ideas in architecture. Architects have used the available media and co-opted them to portray certain ideas and thoughts. With the many digital tools available to us, architects and designers are now faced with what appears to be endless options for design. Viewing these tools through the lens of the drawing allows for a heterogeneous design process that reveals the latent potential within the drawing. Architects draw with the implicit expectation that the drawing is not the end product, but a technique for thinking through complex ideas with the intent that the "actual" or "final" expression is to be realized in another medium (ie. the building). Evaluating the product of drawing becomes valuable in analyzing the intended and unintended elements that are structured in the drawing and how they can be translated elsewhere.

3. Translating the Drawing

Constructing the drawing involves the simultaneous use of different media, recognizing their generative potential. Viewing the drawing as a diagram and map presents numerous unexplored outcomes that can be iteratively investigated. Translating the drawing recognizes that viewing the drawing is in-between the act, and that the product of drawing is an object unto itself, existing in its own state.

Through research and design, *A House of Three Birds** utilizes the drawing as a critical tool to interpret the ineffable experience of the world around us. In treating the drawing as the site of exploration, information becomes a layered, heterogeneous assemblage of yet to be explored possibilities. Preconceived notions or ideas become untangled through the subversion of conventional methods and approaches, revealing new perceptions. The experimental nature of these projects is intended to inform how we think about architecture and how we, as designers, can engage in the process of creating architecture differently and begin to ask the questions that would otherwise not be asked.

Appendices

Appendix A

Milestone Presentations

Drawing is as much as an engagement between the designer and medium as it is between the product and the spectator. How the work becomes curated is also important to the discourse of drawing as it allows the spectator to engage with the work, extending the drawings into the space it inhabits.

For each milestone submission, it became evident that the curation of the work was equally as important as the production of the work. How the work presents itself to the audience becomes a focal point as to how the work becomes interpreted and translated.

Figure 95: Milestone 01 Presentation Board

Figure 96: Milestone 02 Gallery Layout

Figure 97: Milestone 03 Presentation

Figure 98: *Final Presentation Gallery*

Appendix B

Preliminary Drawings

Figure 99: Initial Sketches

TRIPTYCH
SENSIBLE CHANCE INSENSIBLE

Appendix C

Narrative Drawing

The following drawings were culled from a *Translation in Series* (Figures 46) and served as the basis for a post-creative narrative that explored the liminal space.

Appendix D

House of Three Birds*

Figure 101: *Spatial Pollination v.01*

Figure 102: *Threshold(s) of Masks*
Process Drawings

Figure 103: Pantomime Flights Process
Drawings

Figure 104: *Wings of Transparency*
Construct Photos

Figure 105: *House for Three Birds*

Figure 106: Spatial Pollinaton v.02

Figure 107: *Spatial Pollinat* v.03

Figure 108: *Discarded Fragments v.02*

Figure 109: *Migratory Behaviour v.03*

Figure 110: *Fantasy Flights v.02*

Figure 111: Pantomime Pollinator
Process
Construct Photos

Works Cited

- Allen, Laura, and Luke Casper Pearson. *Drawing Futures: Speculations in Contemporary Drawing for Art and Architecture*. London: UCL Press, 2016.
- Allen, Laura, and Marcus Smout, interview by Peter Cook, & Will Hunter. *Interview: Smout Allen* The Architectural Review, (April 26, 2013).
- Allen, Stan. *Practice: Architecture, Technique and Representation*. London: Routledge, 2000.
- Böck, Ingrid. *Six Canonical Projects by Rem Koolhaas: Essays on the History of Modern Ideas*. Berlin: Jovis, 2015.
- Barthes, Roland, and Stephen Heath. *Image, Music, Text*. London: Fontana Press, 2010.
- Benjamin, Walter. *Illuminations*. Edited by Hannah Arendt. New York: Schocken Books, 1968.
- Benjamin, Walter. *The Work of Art in the Age of Its Technological Reproducibility, and Other Writings on Media*. Edited by Michael W. Jennings, Brigid Doherty, & Thomas Y. Levin. Cambridge, MA: Belknap Press of Harvard University Press, 2008.
- Berkel, Ben Van, and Caroline Bos. "Diagrams." In *This is Not Architecture*, edited by Kester Rattenbury, 99-109. London: Routledge, n.d.
- Cantley, Bryan, interview by Corrado Curti. "Experimental Dialogues: Sex Machines." *Cluster*. (August 21, 2010).
- Cantley, Bryan, and Dora Epstein Jones. *Mechudzu Form:uLA, Bryan Cantley: New Rhetorics for Architecture*. Wien: Springer, 2011.
- Chard, Nat, and Perry Kulper. *Fathoming the Unfathomable*. New York: Princeton Architectural Press, 2014.
- Chibireva, Natasha. *Yakov Chernikov: An Architect of His Time*. July 26, 2012. <https://www.bdonline.co.uk/yakov-chernikhov-an-architect-of-his-time/5040301.article> (accessed June 12, 2017).
- Coates, Nigel. *Narrative Architecture*. Chichester: Wiley, 2012.
- Cook, Peter. *Drawing: The Motive Force of Architecture*. Chichester: John Wiley & Sons, 2014.

- Corner, James. "The Agency of Mapping." In *Mapping*, edited by Denis Cosgrove, 213-252. London: Reaktion, 2002.
- Duchamp, Marcel. *The Essential Writings of Marcel Duchamp*. London: Thames & Hudson, 1975.
- Dunne, Anthony, and Fiona Raby. "Speculative everything." Cambridge: The MIT Press, 2013.
- Eisenmann, Peter. "Dual in the Sun." *Lecture. Drawing's Conclusions Symposium*. Los Angeles: Sci-Arc, March 24, 2017.
- Evans, Robin. *The Projective Cast : Architecture and its Three Geometries*. Cambridge: MIT Press, 1995.
- Evans, Robin. *Translations from Drawings to Buildings*. Cambridge: The MIT Press, 1986.
- Fezer, Jezko. *Superstudio & Archizoom 1968-1972*. 2003. <https://032c.com/2003/superstudio-archizoom-1968-1972/> (accessed August 03, 2017).
- Forty, Adrian. *Words and Buildings: A Vocabulary of Modern Architecture*. New York: Thames & Hudson, 2000.
- Futon, Gale. "Before the Projective...there was the Diagrammatic." *Field Correspondence* 1, no. 1 (n.d.).
- Gideon, Sigfried. *Space, Time and Architecture*. 5th. Cambridge: Harvard University Press, 2008.
- Hadid, Zaha. "Zaha Hadid RA on the Influence of Malevich in her work." *RA Magazine*, July 2014.
- Hawley, Christine. *Transitions: Concepts Drawings Buildings*. Burlington, VT: Ashgate Publishing Company, 2013.
- Hays, K. Michael. *Architecture's Desire : Reading the Late Avant-Garde*. Cambridge: The MIT Press, 2010.
- Hejduk, John, Norbert Miller, and Brigitte Groihofer. *Raimund Abraham: [UN]Built*. 2nd. Wien: Springer, 2011.
- Hendrix, John Shannon, and Lauren jEyan Holm. "Architecture and the Unconscious." Farnham: Ashgate Publishing Limited, 2016.

Holl, Steven, Juhani Pallasmaa, and Alberto Perez-Gomez. *Questions of Perception: Phenomenology of Architecture*. San Francisco, CA: William Stout Publishers, 2006.

Important Art and Artists of Constructivism. n.d. http://www.theartstory.org/movement-constructivism-artworks.htm#pnt_2.

Kanekar, Aarati. *Architecture's Pretext: Space of Translation*. New York: Routledge, 2015.

Kanekar, Aarati. "Between Drawing and Building." *The Journal of Architecture* 15, no. 6 (2010).

Kipnis, Jeffrey. *Perfect Acts of Architecture*. New York: Museum of Modern Art, 2001.

Kong, Jyanzi. *Geometry of the Unconscious: An Uncertain Truth in Architecture*. Singapore: Page One, 2011.

Kulper, Perry. "The Precision of Promiscuity." *OFFRAMP*, no. 09 (2015).

Latour, Bruno, and Albenayaneva. *Give me a gun and I will make all buildings move: An ANT's view of architecture. Explorations in architecture: Teaching, design, research*. n.d.

Leer, Brigid Mc. "Empathetic Blossomings: The 'Drawings' of Penelope Haralambidou." *The Blossoming of Perspective* (Domobaa), 2007.

Lim, C.J., and Ed Liu. *Short Stories: London in Two-and-a-half Dimensions*. Abingdom: Routledge, 2011.

Luscombe, Desley. "Architectural concepts in Peter Eisenman's axonometric drawings of House VI." *The Journal of Architecture* 29, no. 4 (2014).

Marche, Jean La. "Surrealism's Unexplored Possibilities in Architecture." In *Surrealism and Architecture*, edited by Thomas Mical, 274. New York: Routledge, 2004.

McLuhan, Marshall. *Understanding Media: The Extension of Man*. New York: McGraw-Hill, 1964.

MoMA Tapping the Subconscious. n.d. https://www.moma.org/learn/moma_learning/themes/surrealism/tapping-the-subconscious-automatism-and-dreams (accessed June 12, 2017).

- Morey, Antony. *Keeping Up with the Joneses*. n.d. <http://ynotworkshop.com/new-page-1> (accessed July 31, 2017).
- Morey, Antony. *Y Not Workshop*. n.d. <http://ynotworkshop.com/shallow-depth> (accessed July 31, 2017).
- Olsberg, Nicholas. "The Evolving Role of the Drawing." *Architectural Review* 233, no. 1395 (May 2013).
- Open House*. n.d. <http://www.coop-himmelblau.at/architecture/projects/open-house/> (accessed August 04, 2017).
- Pallasmaa, Juhani. *The Embodied Image: Imagination and Imagery in Architecture*. Chichester: John Wiley & Sons, 2011.
- Pérez-Gómez, Alberto, and Louise Pelletier. *Architectural Representation and the Perspective Hinge*. Cambridge: The MIT Press, 2000.
- Pollastri, Serena. *Archigram: Visual Conversations on Urban Futures*. January 17, 2016. <https://subjectivefutures.wordpress.com/2016/01/17/archigram/> (accessed August 03, 2017).
- Quesada, Fernando. "Superstudio 1966-73: From World Without Objects to Universal Grid." *Footprint*, Spring 2011: 25.
- Rattenbury, Kester, ed. *This is not architecture : media constructions*. New York: Routledge, 2002.
- Reisner, Yael, and Fleur Watson. *Architects and Beauty: Conversations With Architects About a Troubled Relationship*. Hoboken: Wiley, 2010.
- Reisner, Yael. *Architecture and Beauty*. Chichester: Wiley, n.d.
- Rhowbotham, Kevin. *Form to Programme*. London: Black Dog Pub, 1995.
- Riedijk, Michiel. *De Tekening: De Bestaansreden Van De Architect = The Drawing: The Architect's Raison D'être*. Rotterdam: 010 Publishers, 2009.

- Rowe, Colin, Robin Slutzky, Bernhard Hoseli, and Werner Oechslin. *Transparency: Literal and Phenomenal*. Basel: Birkhäuser, 1997.
- Sadler, Simon. *Archigram: Architecture Without Architecture*. Cambridge: The MIT Press, 2005.
- Scheer, David Ross. *Death of Drawing: Architecture in the Age of Simulation*. New York: Routledge, 2014.
- Schumacher, Patrik. *The Autopoiesis of Architecture*. Vol. 1. 2 vols. Chichester: John Wiley & Sons, 2015.
- Scolari, Massimo. *Oblique Drawing: A History of Anti-Perspective*. Cambridge: The MIT Press, 2012.
- Slavic, Seleva. *Event and Movement in Architecture*. n.d. <http://emperors.kucjica.org/event-and-movement-in-architecture/> (accessed August 03, 2017).
- Spiller, Neil. *Architecture and Surrealism*. London: Thames & Hudson, 2016.
- Spiller, Neil. *Visionary Architecture : Blueprints of the Modern Imagination*. New York: Thames & Hudson, 2007.
- Spiller, Neil, Helen Castle, Caroline Ellerby, and Elizabeth Gongde. *Drawing Architecture*. Chichester: John Wiley & Sons, 2013.
- Starkey, Bradley Starkey, Johnathan Hale, and Marco Frascari, . *From Models to Drawings: Imagination and Representation in Architecture*. Routledge: Routledge, 2007.
- Steves, Wallace, and L. Corrine Jones. *Thirteen Ways of Looking at a Blackbird*. Nacogdoches, TX: Stephen F. Austin State University Press, 2013.
- Tafuri, Manfredo. *The Sphere and the Labyrinth: Avant-Gardes and Architecture from Piranesi to the 1970s*. Cambridge: The MIT Press, 1987.
- Teerds, Hans. "Super Limen." *OASE* 91 (2013).
- Unwin, Simon. *Twenty Buildings Every Architect Should Understand*. New York: Routledge, 2010.

Vesely, Dalibor. *Architecture in the Age of Divided Representation*. Cambridge: The MIT Press, 2004.

Wallis, Stephen. *A '60s Architecture Collective That Made History (But No Buildings)*. April 13, 2006. https://www.nytimes.com/2016/04/04/t-magazine/design/superstudio-design-architecture-group-italy.html?_r=0 (accessed August 03, 2017).

Webb, Michael, interview by Tim Abraham. *Interview: Michael Webb* (October 28, 2011).

Woods, Lebbeus. *Libeskind's Machines*. November 24, 2009. <https://lebbeuswoods.wordpress.com/2009/11/24/libeskinds-machines/> (accessed August 03, 2017).

Works Considered

Bachelard, Gaston, M. Jolas, and John R. Stilgoe. *The Poetics of Space*. Boston, MA: Beacon Press, 1994.

Berger, John, Sven Blomberg, Chris Fox, Michael Dibb, and Richard Hollis. *Ways of Seeing*.

Bingham, Neil R. *100 Years of Architectural Drawing: 1900-2000*. London: Laurence King Publishing, 2013.

De Landa, Manuel. *Intensive Science and Virtual Philosophy*. London: Continuum, 2013.

Edelman, Gerald M., and Giulio Tononi. *A Universe of Consciousness: How Matter Becomes Imagination*. New York, NY: Basic Books, 2001.

Edelman, Gerald. *Wider Than the Sky: The Phenomenal Gift of Consciousness*. Yale University Press, 2008.

Forty, Adrian. *Words and Buildings: A Vocabulary of Modern Architecture*. New York: Thames & Hudson, 2000.

Greene, Herb. *Mind and Image: An Essay on Art and Architecture*. Lexington Ky.: University Press of Kentucky, 1976.

Hawley, Christine. *Transitions: Concepts Drawings Buildings*. Burlington, VT: Ashgate Publishing Company, 2013.

- Hendrix, John Shannon, and Lorens Holm. *Architecture and the Unconscious*. Farnham, Surrey: Ashgate Publishing Limited, 2016.
- Hill, Jonathan. *Immaterial Architecture*. New York: Routledge, Taylor & Francis Group, 2006.
- Holl, Steven, Juhani Pallasmaa, and Alberto Pérez Gómez. *Questions of Perception: Phenomenology of Architecture*. San Francisco, CA: William Stout Publishers, 2006.
- Lally, Sean, and Jessica Young. *Softspace: From a Representation of Form to a Simulation of Space*. London: Routledge, 2014.
- Merleau-Ponty, Maurice. *Phenomenology of Perception*. London: Routledge, 1965.
- Mical, Thomas. *Surrealism and Architecture*. London: Routledge, 2005.
- Pallasmaa, Juhani. *The Eyes of the Skin: Architecture and the Senses*. Chichester: Wiley-Academy, 2005.
- Riedijk, Michiel. *De Tekening: De Bestaansreden Van De Architect = The Drawing: The Architect's Raison D'être*. Rotterdam: 010 Publishers, 2009.
- Rowe, Colin, Robert Slutzky, Bernhard Hoesli, and Werner Oechslin. *Transparency: Literal and Phenomenal*. Basel: Birkhäuser, 1997.
- Sartre, Jean-Paul. *The Psychology of Imagination*. London: Routledge, 2001.
- Spuybroek, Lars. *The Architecture of Continuity: Essays and Conversations*. Rotterdam: V2 Pub., 2008.