

Fenestration: *Bird-building Collisions*  
An Installation of Painting and Collage

by

Christine Elizabeth Walker

A thesis exhibition presented to OCAD University  
in partial fulfillment of the requirements  
for the degree of  
Master of Fine Arts  
in  
Interdisciplinary Art, Media and Design

Gallery 918, 918 Bathurst Street, March 30<sup>th</sup> - April 14<sup>th</sup>  
Toronto City Hall, 100 Queen Street West, May 14<sup>th</sup> - 18<sup>th</sup>

Toronto, Ontario, Canada, 2012

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The city of Toronto is located on a flight path used by millions of migratory birds. It is estimated that, “1 to 10 birds will hit each building, each year, in North America alone. In Toronto, that amounts to between 1 to 10 million migrating birds lost every year.”<sup>1</sup> Although these collisions account for more bird deaths every year than anything else, this knowledge is not widespread or collectively seen as a need for concern. The overall objective of this interdisciplinary project is to expose this issue through collage. The project aims to increase people’s awareness of bird-building collisions and avian perception, and to lead to new questions for future interdisciplinary research.

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<sup>1</sup> "The Danger of City Lights to Migrating Birds: Lights Out Toronto," FLAP - Fatal Light Awareness Program, <http://flap.org/toronto-lights-out.php> (accessed February 12, 2012).

I would like to acknowledge some of the people who have supported me throughout this thesis project:

My Principal Advisor, Dr. Vladimir Spicanovic, your generosity with time and advice has been invaluable. I am fortunate that you also appreciate the more poetic things in life, like the joy of painting and the beauty of birds.

Eric Nay, your rational approach kept me grounded, while your sense of humour kept things light.

Bruce Hinds, your ability to step back and see the bigger picture has kept me focused.

Barbara Rauch, your support as program director has been greatly appreciated.

My wonderful classmates, Pedro, Britt, Julian, Rita, Rebecca, Anya, David, Po, Susan, Keith, Ben, Fareena and Nermin, I couldn't have hoped for a better group of people to share this experience with.

Stefano, I appreciate your patience and support while I took over our house with art supplies, and took over our conversations with birds and painting.

The volunteers at FLAP, especially Susan, Lori and Riita, thank you for making a difference.

To my parents, John and Carol Walker, who have supported and encouraged my love of animals and art since I was a child.

To everyone at the Fatal Light Awareness Program, your efforts are truly inspirational.

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Fig. 1: Golden-crowned Kinglet, found at York Mills Centre on October 19<sup>th</sup>, 2011.

*"There is nothing in which the birds differ more from man than the way in which they can build and yet leave a landscape as it was before."*<sup>2</sup> -Robert Lynd

*"It's important to point out that the buildings were not built to kill birds... But there comes a point where people have to take responsibility."*<sup>3</sup> -Michael Mesure

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<sup>2</sup> Robert Lynd, *The Blue Lion, and other Essays*, London: Methuen & Co., 1923.

<sup>3</sup> Michele Mandel, "Suit Seeks to Protect Birds from Office Buildings," *The Toronto Sun*, February 9, 2012, sec. News: Toronto & GTA, <http://www.torontosun.com/2012/02/09/suit-seeks-to-protect-birds-from-office-buildings> (accessed February 14, 2012).



## **Chapter 1: Introduction**

The city of Toronto is located on a flight path used by millions of migratory birds. It is estimated that 1- 10 million of these birds are killed annually in Toronto due to collisions with tall buildings.<sup>4</sup> Although bird-building collisions account for the most bird deaths every year aside from habitat loss<sup>5</sup>, this knowledge is not widespread or collectively seen as a need for concern. These collisions require our attention, and interdisciplinary art may be an effective tool to encourage people to better understand them. It is my hope that this project will eventually lead to discussion about ways to remedy this problem, and the impact of building design and architectural fenestration.<sup>6</sup>

I am a teacher, mainly teaching visual arts and media literacy to students in grade 7 and 8. I first became interested in bird-building collisions in 2008 after reading an article in the Toronto Star titled, 'Scarborough Highrise a Death Trap for Birds.'<sup>7</sup> It coincided with an art exhibition at Metro Hall in Toronto in which my students and I were going to be participating. After consulting with my students, we decided to use this topic to create an installation art work for the exhibition – called 'Frameworks' – to raise awareness about collisions between birds and buildings. It was very successful, and the empathy demonstrated by the students was very inspirational. I have continued to read about this issue since this exhibition ended, and decided that my Master's degree would be an ideal place to explore it more fully. Using the skills from my background as a painter, my

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<sup>4</sup> "The Danger Of City Lights to Migrating Birds: Lights Out Toronto," FLAP - Fatal Light Awareness Program, <http://flap.org/toronto-lights-out.php> (accessed February 12, 2012).

<sup>5</sup> Predation by domestic cats accounts for the third largest amount of bird deaths, after habitat loss and collisions.

<sup>6</sup> Fenestration refers to the design and/or layout of openings on the surface of a building or wall, including windows and curtain walls.

<sup>7</sup> Noor Javed, "Scarborough Highrise a Death Trap for Birds," *Toronto Star*, March 9, 2010, sec. News, <http://www.thestar.com/news/gta/article/777024--scarborough-highrise-a-death-trap-for-birds> (accessed Dec. 9, 2011).

objective was to integrate additional disciplines such as photography and audio to create a thesis project that speaks specifically to the issue of bird-building collisions.

Birds have always interested me, and this problem that is unique to urban spaces like Toronto attracted my attention. I have been volunteering with the Fatal Light Awareness Program (FLAP)<sup>8</sup> in Toronto since September 2011, and this has greatly informed my own sense of empathy for these birds. It has driven me to continue to research the relationship between birds and the fenestration of buildings, and to find ways of sharing this knowledge and experience with a larger audience.

### **Background and Context of Bird-building Collisions**

Professor Daniel Klem who currently teaches at Muhlenberg College in Pennsylvania, has been researching bird-building collisions since the early 1970s. He completed his Doctorate in Zoology, with Majors in Ethology and Ornithology, and a Minor in Biometrics. He has written numerous articles and conducted extensive research on the relationship between birds and windows. He said he was, “struck almost immediately by the potential magnitude of loss from such a ubiquitous, invisible threat.”<sup>9</sup> He felt that he needed to get people’s attention about the issue, so he took the lowest estimated number of annual bird deaths from window collisions – 100 million – and stated, “you would need 333 Exxon Valdez oil spills each year to match the carnage. It is ironic that the 100,000 to 300,000 marine birds estimated to have been killed by the 1989 Exxon

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<sup>8</sup> "FLAP - Fatal Light Awareness Program - Working to Educate & Engage People About The Safety of Migratory Birds in the Urban Environment," FLAP - Fatal Light Awareness Program. <http://www.flap.org/> (accessed January 5, 2012).

<sup>9</sup> Daniel Klem Jr., "Glass: A Deadly Conservation Issue for Birds," *Bird Observer* 34, no. 2 (2006), 75, <http://www.birdscreen.com/PDF/Bird-Observer2006.pdf> (accessed January 3, 2012).

Valdez oil spill in Alaska is still often cited by various media sources as a prime example of a world-class environmental disaster while the far greater toll exacted by glass every year largely goes unnoticed.”<sup>10</sup>

Perhaps the lack of public awareness surrounding the issue of bird fatalities stems from the fact that the collisions have only grown into a major problem in the recent years, with the proliferation of tall,<sup>11</sup> highly reflective buildings. A report published for the World Wildlife Fund Canada and the Fatal Light Awareness Program observes that, “Only in this century, and therefore suddenly in evolutionary time-scales, have migrating birds faced collisions with artificial obstacles along their flight paths: buildings and other towering structures covered in glass and lit at night.”<sup>12</sup>

Collisions occur for several reasons, and this is discussed in more detail in Chapter Two. During the daytime, birds see trees and the sky reflected on the vertical surfaces of buildings, and do not recognize that these reflections are in fact illusions because they lack experience with urban architecture. As described on the FLAP website, “North America sits beneath four of the world’s busiest migratory bird corridors: the Pacific, Central, Mississippi and Atlantic Flyways,”<sup>13</sup> with the Atlantic and Mississippi flyways both passing over Toronto. Migrating nocturnally, birds are attracted to the white lights of the city, but then become trapped and confused in the unfamiliar urban environment.

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<sup>10</sup> Klem Jr., “Glass: A Deadly Conservation Issue for Birds,” 75.

<sup>11</sup> Windows located on building walls for the first 12 metres above grade, (approximately four storeys) are the most dangerous to birds. This is the standard height of trees, which can be reflected on the windows.

<sup>12</sup> Lesley J. Evans Ogden, *Collision Course: The Hazards of Lighted Structures and Windows to Migrating Birds*, Toronto: World Wildlife Fund Canada, Fatal Light Awareness Program, 1996, i.

<sup>13</sup> “Why We Care,” FLAP - Fatal Light Awareness Program, <http://www.flap.org/who-we-are.php> (accessed February 13, 2012).

Collisions between birds and buildings have not been widely explored using visual arts. I believe that the discourse surrounding this issue exists mainly in the fields of science, ornithology, environmental studies, and architecture. With my thesis project, I aim to raise awareness of these collisions outside of these fields by exploring the way birds possibly understand and relate to Toronto's urban space. Most of the information regarding this issue is textual, and this project explores the problem using a visual translation of this textual information.

### **Research Objectives and Questions**

This project aims to explore bird-building collisions and to create a visual response to them. Another aim is to create an increased awareness of these collisions, and the experiences of birds in Toronto. Most of the existing information about bird-building collisions is difficult to read unless one has some prior knowledge of the problem and/or bird anatomy to draw from. This thesis project will explore ways of communicating this information in visual forms that are different than the more diagrammatic and discipline-specific ones that currently exist in fields such as science and ornithology.

I am exploring two main research questions:

- 1) What are the key characteristics of avian perception in relation to bird-building collisions?*
- 2) To what extent can the practice of collage and interdisciplinary art be used to address the issue of bird-building collisions?*

**Rationale**

Bird-building collisions need to be investigated because they are a significant problem in Toronto, but are not common knowledge. This topic interested and challenged me because I am currently living in the city of Toronto, and I was not familiar with bird-building collisions prior to the project I completed with my students. I moved here from the smaller city of Halifax, where birds don't collide with buildings very often. This is because there are fewer tall buildings, and Halifax is located on just one major migratory route – the Atlantic flyway. I believe that other people could share this lack of experience with bird-building collisions, and may not yet be aware of the existence of such a problem, or its extent.

There is a lack of research that addresses bird-building collisions in the visual arts. This thesis project provides an alternate way of exploring the predominantly textual information on this topic, making it accessible to a more public audience. It uses an interdisciplinary approach to contribute visual representations of how birds may perceive the built environment, therefore adding new ways of visualizing and relating to the problem. By exploring a different perspective, it will ideally reach people outside of the fields of ornithology and science, increasing public awareness of this issue.

**Theoretical Framework**

The literature review includes a critical review of relevant literature and theory. It also includes evidence and information about bird-building collisions. There is an overview of theoretical texts which provide insight into the factors contributing to bird fatalities,

including statistical information. Ornithology texts are referenced in order to better understand avian vision. This thesis explores the way that birds' perception functions, and how this relates to human perception through studio art production. This framework also includes an overview of different artistic practices where artists are exploring similar themes, as well as those who are using collage to achieve similar aesthetic results in their work. Literature regarding collage as a qualitative research method is discussed, and how this relates to the organization of this thesis project.

I have been volunteering with the Fatal Light Awareness Program since September of 2011, as reinforcement to the factual information I have been reading. I have had the opportunity to see for myself the impact of the buildings on the lives of birds, and to examine the exterior surfaces of the buildings up close. The experience of volunteering with FLAP makes it easier to interpret and visualize the data related to bird-building collisions.

### **Scope and Limitations**

This project uses collage to focus on six species of migratory songbirds that fly through Toronto and collide with buildings. The birds I am choosing to focus on are the six species that were injured or killed the most according to FLAP's 2010 data. They are, in descending order, the Golden-crowned Kinglet, Black-capped Chickadee, White-throated Sparrow, Ovenbird, Dark-eyed Junco, and Nashville Warbler<sup>14</sup>. The three main

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<sup>14</sup> "FLAP DATA 2010," *Touching Down: The Newsletter of the Fatal Light Awareness Program*, Spring 2011, 7.

areas of Toronto I am focusing on are Yonge Street and York Mills Avenue in North Toronto, Consilium Place in Scarborough, and the downtown Financial District.

The studio work within this thesis project consists of collages which are based on and inspired by the theoretical and factual research. The cutting and merging together of materials and information functions as a metaphor for the fragmented and disoriented vision of birds in an urban environment.

## **Chapter 2: Literature Review | Theoretical Framework**

This theoretical framework is organized into two sections. The first section includes factual information about birds' perception in relation to human vision, as well as information about collisions between birds and buildings. The second section suggests the ways in which collage can be used as an interdisciplinary qualitative research methodology. In his essay, 'Interdisciplinary Research: A Philosophy, Art Form, Artifact or Antidote?' John G. Bruhn claims that, "interdisciplinary research attempts to ask questions in ways that cut across disciplinary boundaries,"<sup>15</sup> thus creating research questions that would not exist otherwise.

### **Section One: Birds and Buildings**

#### **Avian Perception**

Collisions between migratory songbirds and reflective glass buildings are an increasing problem in cities. Reflective curtain walls<sup>16</sup> of buildings are especially deadly to birds, and the City of Toronto Bird Friendly Development Guidelines state that, "birds (like humans) have no natural sense designed to perceive clear glass as a solid object."<sup>17</sup> Humans however, are able to differentiate based on lived experience and visual cues.

In terms of human vision, Denise Grady explains, "Vision, of course, is more than recording what meets the eye: it's the ability to understand, almost instantaneously,

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<sup>15</sup> John G. Bruhn, "Interdisciplinary Research: A Philosophy, Art Form, Artifact or Antidote?" *Integrative Physiological and Behavioral Science* 35, no. 2 (2000), <https://springerlink3.metapress.com/content/b5u2707n86448lx8/resource-secured/?target=fulltext.pdf&sid=pkq4u2mmbbxzgzdjysshlmqa&sh=www.springerlink.com> (accessed February 15, 2012).

<sup>16</sup> A curtain wall is an exterior covering on a building that is not structural (such as glass), and acts as a façade.

<sup>17</sup> City of Toronto, 2007, City of Toronto Green Development Standard: Bird-Friendly Development Guidelines, <http://www.toronto.ca/lightout/guidelines.htm> (accessed February 25, 2011), 3-4.



what we see.”<sup>18</sup> Our human brain “has to actively construct or invent our visual world. Confronted with an overwhelming barrage of visual information, our brain must sort out relevant features and make snap judgments about what they mean.”<sup>19</sup> Birds may also be required to make these ‘snap judgments’ about things they see, especially while flying at high speeds, scanning for food, predators, and areas of potential safety. Rudolf Arnheim writes that for humans, “What happens in perception is similar to what at a higher psychological level is described as understanding or insight.”<sup>20</sup> “To perceive is not merely to have sensory stimulation. It is to have sensory stimulation one understands.”<sup>21</sup> This suggests that an unfamiliar environment could compromise one’s ability to correctly perceive the sensory stimuli of their surroundings. While we don’t know for sure, we could assume that birds may also possess this difficulty, especially when confronted with architecture they are inexperienced with.

The main difference between bird perception and human perception is biological. Birds do not possess the same binocular vision that humans possess. Binocular vision results in stereopsis (depth perception) and the ability to see faint objects. Birds are unable to perceive solid objects or to make the same distance judgements as animals or humans with binocular vision are. Instead, their range of binocular vision only falls within 15 to 30 degrees of their horizontal vision plane, whereas humans see 120 degrees. It is theorized by ornithologist Graham R. Martin in the ‘Journal of Vision’ that this

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<sup>18</sup> Denise Grady, “The Vision Thing: Mainly in the Brain,” DISCOVER Magazine, <http://discovermagazine.com/1993/jun/thevisionthingma227> (accessed July 31, 2011).

<sup>19</sup> Ibid.

<sup>20</sup> Rudolf Arnheim, *Toward a Psychology of Art; Collected Essays*. Berkeley: University of California Press, 1966, 33.

<sup>21</sup> Alva Noë, *Action in Perception*, Cambridge, Massachusetts: MIT Press, 2004, 181.

adaptation is partly so that birds are better able to estimate distance and prepare themselves to land on a surface, and it assists with feeding.<sup>22</sup>

One disadvantage of birds' binocular vision is that this visual overlap falls within the peripheral field of vision because their eyes are laterally positioned on the head. Martin claims this results in, "relatively lower quality images compared with central vision."<sup>23</sup> Another problem birds may have with reflective buildings is their inability to distinguish between certain colours. Although they have excellent colour vision, birds have difficulty when the contrast between two surfaces is eliminated, as demonstrated in experiments by Bhagavatula et al.<sup>24</sup> This accounts for additional confusion when birds are confronted with obstacles that have little contrast against or blend into their background, like reflective buildings.

Birds' vision differs in one positive way from human vision, in that birds are able to see ultraviolet light. Humans can see colours that occur between 400 and 700 nanometres, from violet to red. Jennifer Amie suggests that, "Birds, on the other hand, also perceive colors below the 400 nm wavelength, in the ultraviolet range between 340 nm and 400 nm. This slight extension of the spectrum of visible color results in a markedly different perception of the world."<sup>25</sup> This trait is being taken advantage of to develop products

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<sup>22</sup> Graham R. Martin, "What is Binocular Vision for? A Bird's Eye View," *Journal of Vision* 9, no. 11 (2009), 4, <http://journalofvision.org/9/11/14/> (accessed March 3, 2011).

<sup>23</sup> Ibid.

<sup>24</sup> Partha Bhagavatula, Charles Claudianos, Michael Ibbotson, and Mandyam Srinivasan, "Edge Detection in Landing Budgerigars (*Melopsittacus undulatus*)," *PLoS One (Public Library of Science)* 4, no. 10 (2009), <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2752810/?tool=pmcentrez> (accessed March 3, 2011).

<sup>25</sup> Jennifer Amie, "A Bird's Eye View: Ultraviolet Vision Lets Birds See What Humans Can't," *Imprint*, Spring 2007, <http://www.bellmuseum.org/imprint/birdseye03.html> (accessed February 26, 2011).

such as coated glass. According to the Bird-Friendly Development Guidelines it would then, “enable a window to be clear and/or reflective to the human eye but appear solid to a bird’s.”<sup>26</sup> This ability to see ultraviolet light and additional colours informs the colours used in my studio work, and the possibilities for representing the way birds would see colour.

### **Daytime Collisions**

During the day, glass surfaces reflect the external environment. Birds focus on this rather than the surrounding visual cues that determine that the building is an obstacle. “Daytime strike rates are much higher where glass surfaces reflect nearby vegetation than where they do not.”<sup>27</sup> Birds see the vegetated area, mistake it for safe habitat or shelter, and fly towards it.<sup>28</sup> This brings up another issue, suggested in the *Wilson Journal of Ornithology* as the trend of using, “landscaping features that provide food and shelter for birds,”<sup>29</sup> around commercial buildings. These initiatives have many benefits, but they also entice birds into the urban centre that poses a threat to their safety.

According to the Bird-Friendly Development Guidelines, “Birds will strike clear glass while attempting to reach habitat and sky seen through corridors, windows positioned opposite each other in a room, ground floor lobbies, glass balconies or where glass walls

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<sup>26</sup> City of Toronto, City of Toronto Green Development Standard: Bird-Friendly Development Guidelines, 16.

<sup>27</sup> Yigal Gelb, and Nicole Delacretaz. “Avian Window Strike Mortality at an Urban Office Building,” *The Kingbird* 56, no. 3 (2006), 190.

<sup>28</sup> *Ibid.*, 196.

<sup>29</sup> Steven B. Hager, Heidi Trudell, Kelly J McKay, Stephanie M Crandall, and Lance Mayer, “Bird Density and Mortality at Windows,” *The Wilson Journal of Ornithology* 120, no. 3 (2008), 550-551.

meet at corners.”<sup>30</sup> If these fenestration surfaces are visually interrupted in some way, “birds begin to perceive buildings as objects to be avoided when the distance between features or patterns on glass is at approximately 28 cm, with the most effective pattern distance at 10 cm or less. Essentially, the denser the pattern the more effective it becomes in projecting itself as a solid object to birds.”<sup>31</sup>

### **Nocturnal Collisions**

The majority of diurnal<sup>32</sup> songbirds migrate nocturnally. A major problem is when the lights are left on inside buildings at night. As written in the Journal ‘Ecology and Society’, birds are attracted by white lights, and fly towards them.<sup>33</sup> Many building lobbies contain plants and areas of perceived safety behind the glass windows. The FLAP ‘Summary Report on the Bird Friendly Building Program’ document states that, “In addition to mortality directly caused by collision, the apparent entrapment of birds at artificial light sources results in exhaustion, disorientation, and increased risk of incurring secondary injuries.”<sup>34</sup>

Although birds have superior colour vision to most animals during the daylight, they have decreased capabilities when the light is dimmer outside. Coloured retinal oil droplets within birds’ eyes filter light, blocking it from reaching the cones by approximately half, meaning that birds require much more light to see adequately than

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<sup>30</sup> City of Toronto, City of Toronto Green Development Standard: Bird-Friendly Development Guidelines, 3-4.

<sup>31</sup> Ibid., 9-10.

<sup>32</sup> Diurnal means that they are most active during the daytime.

<sup>33</sup> H. Poot, B. J. Ens, H. de Vries, M. A. H. Donners, M. R. Wernand, and J. M. Marquenie, “Green Light for Nocturnally Migrating Birds,” *Ecology and Society* 13, no. 2 (2008), 47, <http://www.ecologyandsociety.org/vol13/iss2/art47/>

<sup>34</sup> Lesley J. Evans Ogden, *Summary Report on the Bird Friendly Building Program: Effect of Light Reduction on Collisions of Migratory Birds*, Toronto: Fatal Light Awareness Program, 2002, 3.

humans.<sup>35</sup> This makes obstacles even more difficult to see, especially if they do not contrast significantly with their background.

Nocturnal migratory songbirds use geomagnetic signals and a star compass to orient themselves during migration. They are actually able to perceive the earth's magnetic field, which appears to the retina as visual patterns. It is theorized by Mouritsen et al. that there is, "a distinct night-vision brain area in night-migratory songbirds."<sup>36</sup> This area is known as Cluster N.<sup>37</sup> It is most active at night in nocturnal migrants, and is used for compass orientation at night.<sup>38</sup>

According to Lesley J. Evans Ogden, birds are further confused by the colour of lights, which interfere with their internal compasses. Transport Canada requires that all buildings over 150 metres have red or blinking white lights to alert aircraft of their presence and height.<sup>39</sup> In 'Green Light for Nocturnally Migrating Birds,' the authors propose that birds require blue and green wavelengths to orient themselves during migration.<sup>40</sup> Red, the longest wavelength, interferes with this magnetic orientation. This problem is compounded on overcast nights, when the stars and constellations birds

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<sup>35</sup> Olle Lind, and Almut Kelber, "The Intensity Threshold of Colour Vision in Two Species of Parrot," *The Journal of Experimental Biology* 212 (2009), 3697, <http://jeb.biologists.org/cgi/reprint/212/22/3693> (accessed March 3, 2011).

<sup>36</sup> Henrik. Mouritsen, Gesa Feenders, Miriam Liedvogel, Kazuhiro Wada, Erich D. Jarvis, and Marcus E. Raichle, "Night-Vision Brain Area in Migratory Songbirds," *Proceedings of the National Academy of Sciences of the United States of America* 102, no. 23 (2005), 8343..

<sup>37</sup> According to Mouritsen et al, Cluster N is a cluster of brain regions only active in migratory songbirds, only during night vision. They suggest it is involved in enhanced night vision, and it integrates "vision-mediated magnetic and/or star compass information for nighttime navigation."

<sup>38</sup> Dominik Heyers, Martina Manns, Harald Luksch, Onur Güntürkün, and Henrik Mouritsen, "A Visual Pathway Links Brain Structures Active during Magnetic Compass Orientation in Migratory Birds," *PLoS One (Public Library of Science)* 2, no. 9 (2007), 1-3, <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0000937> (accessed March 4, 2011).

<sup>39</sup> Evans Ogden, *Summary Report on the Bird Friendly Building Program: Effect of Light Reduction on Collisions of Migratory Birds*, 15.

<sup>40</sup> Poot et al., "Green Light for Nocturnally Migrating Birds," 47.

would use for navigation are less visible.<sup>41</sup> Evans Ogden also writes that “inclement weather forces birds to migrate at low elevations,”<sup>42</sup> and there is a large increase in the number of bird fatalities on evenings with lower cloud cover, rain, snow, or wind.

### **Precedents in Art Practice**

One artist who was rescuing birds even before FLAP was founded is painter Barry Kent MacKay. He seems to separate his painting from the problem of bird-building collisions, and was quoted on a website called ‘Progressive Aesthetics’ as saying, “If I had my choice, I’d like to paint.”<sup>43</sup> The website went on to explain that, “At the same time, he feels he has to direct his time towards advocacy,”<sup>44</sup> creating a separation between the two areas. Most of the paintings done by MacKay appear to celebrate the birds in life, and are highly naturalistic. They do not refer explicitly to the buildings or conditions causing the deaths of these birds. His focus is primarily on illustration, and he most recently created images of dead birds for the City of Toronto publication ‘A Field Guide to: Common Birds of Toronto.’<sup>45</sup> This booklet (Fig. 2) provides information on Toronto birds, how to make buildings more bird-friendly, how and where these birds are most likely to be injured, and the estimated number killed annually in the Greater Toronto area. Toronto Star columnist Kyle G. Brown writes, “Far from being a pastoral picture of birds perched on tree branches, the 10 species depicted are dead, on their backs, beak-

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<sup>41</sup> Poot et al., “Green Light for Nocturnally Migrating Birds,” 47.

<sup>42</sup> Evans Ogden, *Summary Report on the Bird Friendly Building Program: Effect of Light Reduction on Collisions of Migratory Birds*, 12-13.

<sup>43</sup> “Artists: Biographies,” Progressive Aesthetics, <http://progressiveaesthetics.wordpress.com/artists/> (accessed February 11, 2012).

<sup>44</sup> Ibid.

<sup>45</sup> *A Field Guide to: Common Birds of Toronto*, Toronto: FLAP.org, 2009.

up.” He also describes the guide as, “macabre, [an] almost satirical spin on traditional guides.”<sup>46</sup>

Another artist associated with FLAP is Alan Bell, who is involved in taxidermy and wood-carving. Alan joined FLAP in 2000, and he is quoted as saying, “I’m very passionate by what I do. All wildlife is endangered. [I use my art] to raise awareness.”<sup>47</sup> Many of his woodcarvings depict birds that are highly realistic, with attention to posture, attitude and detailed appearances. Some of his work has references to the urban environment, but the buildings themselves are not referenced in the artwork. An upcoming project for him is a Saw-whet Owl with glass incorporated into the carving to reference the shiny windows that are a threat.<sup>48</sup>

Dutch artist Benjamin Verdonck doesn’t make work explicitly about bird-building collisions, but a lot of his work engages the public and touches the issue of these collisions. A theme he regularly explores is the relationship between humans and animals that inhabit urban spaces. He created a series of works called ‘Kalender’ beginning on January 3<sup>rd</sup>, 2010 and ending January 2<sup>nd</sup>, 2011. The M HKA<sup>49</sup> website states, “More than 150 actions took place in the city of Antwerp over a period of 365 days.”<sup>50</sup> The piece he created on March 13<sup>th</sup> featured a bird of exaggerated size lying dead on the ground. It lay on the sidewalk of a busy street with a sheet draped over its

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<sup>46</sup> Kyle G. Brown, “This Law is for the Birds,” *Toronto Star*, November 15, 2009, <http://www.thestar.com/news/insight/article/725980--this-law-is-for-the-birds> (accessed February 12, 2012).

<sup>47</sup> “Artists: Biographies,” *Progressive Aesthetics*.

<sup>48</sup> *Ibid.*

<sup>49</sup> M HKA is the abbreviation of ‘Museum van Hedendaagse Kunst Antwerpen’

<sup>50</sup> “Benjamin Verdonck,” M HKA, [http://www.muhka.be/toont\\_beeldende\\_kunst\\_detail.php?la=en&id=3031](http://www.muhka.be/toont_beeldende_kunst_detail.php?la=en&id=3031) (accessed February 12, 2012).

body so that just its feet stuck out, with a pool of blood beneath it. There were barricades and police tape surrounding the bird, and large splotches of what was meant to resemble bird excrement lay in the area.<sup>51</sup>

Verdonck's installation generated a lot of public interest and speculation about the meaning of this event, and what factors could have led to the death of this bird – hoax or not. The photo documentation on Verdonck's website shows the horrified faces of hundreds of onlookers. Using art as a catalyst for conversation is what interested me in the work, and the playful blurring of the lines between reality and fiction. If art can be presented in a way that triggers conversation about an intended subject (bird-building collisions in my case), then it can possibly become a tool that generates awareness and inquiry surrounding that subject.

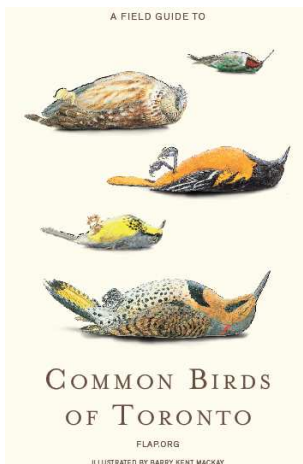


Fig. 2: FLAP's 'A Field Guide to Common Birds of Toronto' illustrated by Barry Kent Mackay



Fig. 3: FLAP bird layout, 2009. Photo: FLAP/ Kenneth Herdy

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<sup>51</sup> "Kalender 09," index - Kalender 09, <http://www.kalender09.be/kalnder/index.php?tag/pechvogel> (accessed February 12, 2012).



There are several artists that use the subject of dead birds in their work, although few deal with the cause of their deaths. In a show called 'Beautiful Vagabonds: Birds in Contemporary Photography' in New York, there is a piece by Terry Evans titled, 'Field Museum, Drawer of Eastern Meadowlarks, various dates and locations,'<sup>52</sup> from 2001. Inside, "Close to three dozen lifeless creatures, seen together, demonstrate the uniqueness of individuals."<sup>53</sup> The cause of death is not apparent in her photograph, but the dead birds that are laid out and catalogued are reminiscent of the annual bird display organized by FLAP at the Royal Ontario Museum in Toronto to show birds killed by buildings (Fig. 3).<sup>54</sup> Other artists who use deceased birds in their work include taxidermy artist Polly Morgan,<sup>55</sup> and photographer Chris Jordan.<sup>56</sup>

In my work, rather than focusing solely on deceased birds, I am trying to contextualize the cause of their deaths. I am using collage as a method to visualize bird-building collisions and as a metaphor for the fragmented vision of birds in an urban environment. "In a sense the collage as memo parallels the qualitative experiences of the reality under study, reinstates it in a new form,"<sup>57</sup> according to authors Donna Davis and Lynn Butler-Kisber.

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<sup>52</sup> "Yancey Richardson Gallery > Exhibition," Yancey Richardson Gallery, [http://www.yanceyrichardson.com/view\\_works/?object\\_id=202&work\\_id=1689](http://www.yanceyrichardson.com/view_works/?object_id=202&work_id=1689) (accessed February 13, 2012).

<sup>53</sup> Peggy Roalf, "High Flyers at Yancey Richardson," DART | Design Arts Daily, <http://www.ai-ap.com/dart/article/2406/high-flyers-at-yancey-richardson.html> (accessed February 13, 2012).

<sup>54</sup> Curtis Rush, "Dead-Birds Issue Going to Court Next Month," *Toronto Star*, March 9, 2011, sec. News, <http://www.thestar.com/news/article/951253--dead-birds-issue-going-to-court-next-month> (accessed February 12, 2012).

<sup>55</sup> "Polly Morgan," Polly Morgan, <http://pollymorgan.co.uk> (accessed February 16, 2012).

<sup>56</sup> Chris Jordan, "Chris Jordan: Midway," Chris Jordan: Photographic Arts, [www.chrisjordan.com/gallery/midway/#CF000441%2017x22](http://www.chrisjordan.com/gallery/midway/#CF000441%2017x22) (accessed February 14, 2012).

<sup>57</sup> Donna Davis, and Lynn Butler-Kisber, "Arts-Based Representation in Qualitative Research: Collage as a Contextualizing Analytic Strategy," (1999), 18, <http://eric.ed.gov/PDFS/ED431790.pdf> (accessed February 15, 2012).

## **Section Two: Collage as Method**

### **A Brief History of Collage**

In his essay titled, 'Collage', art critic Clement Greenberg writes, "Collage was a major turning point in the evolution of Cubism, and therefore a major turning point in the whole evolution of modernist art in this century. Who invented collage – Braque or Picasso – and when is still not settled."<sup>58</sup> Pablo Picasso and Georges Braque were concerned, "with finding for every aspect of three-dimensional vision an explicitly two-dimensional equivalent,"<sup>59</sup> according to Greenberg. They wanted to break away from the flatness of painting, and felt that collage could create illusions of space and perceived depth through layering and juxtaposition.

In the book 'In Defiance of Painting', Christine Poggi proposes that collage began as a work of art, "in which materials appropriated from everyday life, relatively untransformed by the artist, intrude upon the traditionally privileged domain of painting." She describes these as materials, "which retain their former identity within the new pictorial context, [and] challenged some of the most fundamental assumptions about the nature of painting."<sup>60</sup> Collage emerged as an interdisciplinary medium, and, "by 1912, [the Futurists and Cubists] had found that working between existing genres, or synthesizing the possibilities of various media, could be a means of creating exciting new works that defied traditional categorization."<sup>61</sup> "In the visual arts, then, a desire to

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<sup>58</sup> Clement Greenberg, "Collage," In *Art and Culture; Critical Essay*, Boston: Beacon Press, 1961, 70.

<sup>59</sup> Ibid., 70-71.

<sup>60</sup> Christine Poggi, "The Invention of Collage," In *In Defiance of Painting: Cubism, Futurism, and the Invention of Collage*. New Haven: Yale University Press, 1992, 1.

<sup>61</sup> Ibid., 28.

obliterate the distinction between genres or media emerged.”<sup>62</sup> This desire to hybridize genres or disciplines was an important change with the development of collage.

### **Contemporary View of Collage**

The artists who used collage questioned the flatness of painting, and created new meanings from the rise of visual mass media. In the exhibition catalogue for ‘Collage, the Unmonumental Picture’, Laura Hoptman describes collage as the, “conduit through which elements of real life... have entered into the language of contemporary art. This gentle invasion of the lived world into a more rarified one emblemized the most important conundrum of post-realistic art; namely, how to bridge the unavoidable gap between what we call art and what we call life.”<sup>63</sup> Collage is not an exclusive medium, and includes materials from a multitude of sources, often using print media. It could be seen as a hybrid form, assimilating elements from other disciplines such as painting, photography and design.

In collage a single, coherent notion “gives way to relations of juxtaposition and difference,”<sup>64</sup> according to L. Rainey, and these fragments “work against one another so hard, the mind is sparked”<sup>65</sup> into new ways of knowing, suggests L. Steinberg. The ambiguity that remains present in collage provides a way of expressing the said and the

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<sup>62</sup> Poggi, "The Invention of Collage," 165.

<sup>63</sup> Laura Hoptman, "Collage: The Seamier Side," In *Collage: The Unmonumental Picture*, New York: Merrell, 2007, 9-11.

<sup>64</sup> L. Rainey, "Talking Dictation: Collage, Poetics, Pathology and Politics," *Modernism/Modernity* 5, no. 2 (1998), 124, quoted in J. Gary Knowles, and Ardra L. Cole, "Collage as Inquiry," In *Handbook of the Arts in Qualitative Research: Perspectives, Methodologies, Examples, and Issues*, Thousand Oaks: SAGE Publications, 2008, 268.

<sup>65</sup> L. Steinberg, *Other Criteria: Confrontations with Twentieth-Century Art*. New York: Oxford University Press, 1972, 14, quoted in J. Gary Knowles, and Ardra L. Cole, "Collage as Inquiry," In *Handbook of the Arts in Qualitative Research: Perspectives, Methodologies, Examples, and Issues*, Thousand Oaks: SAGE Publications, 2008, 268.

unsaid, and allows for multiples avenues of interpretation and greater accessibility. This exploratory process of learning guides the viewer into arriving at these conclusions. They have the opportunity to decipher these ideas themselves rather than being told them directly. It provides an entrance into the work, and lets them take ownership over their interpretation. In 'Collage as Inquiry', Gary Knowles and Ardra Cole claim that, "Collage can contribute to qualitative research in several profound ways. The potentially evocative power of art forms, in particular visual ones, produces a sensory or embodied response that can help the viewer/responder generate meanings in very concrete ways."<sup>66</sup>

Collage may be interpreted as an interdisciplinary art form, and it facilitates new ways of thinking by incorporating fragments and components from different disciplines to create new meanings. In her PhD thesis, Kathleen Vaughan writes, "A collage practice is built on juxtaposition, on the interplay of fragments from multiple sources, whose piecing together creates resonances and connections that form the basis of discussion and learning."<sup>67</sup>

American Artist Budd Hopkins wrote about the use of collage in an article titled, 'Modernism and the Collage Aesthetic'. "Ours is a disturbingly pluralistic world in which we deal with infinitely more information, more contradictory social roles, [and] more diverse "realities" than in any previous century. The smooth, continuous, unruffled

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<sup>66</sup> J. Gary Knowles, and Ardra L. Cole, "Collage as Inquiry," In *Handbook of the Arts in Qualitative Research: Perspectives, Methodologies, Examples, and Issues*, Thousand Oaks: SAGE Publications, 2008, 268.

<sup>67</sup> Kathleen Vaughan, "Pieced Together: Collage as an Artist's Method for Interdisciplinary Research," *International Journal of Qualitative Methods* 4, no. 1 (2005), 12, [http://www.ualberta.ca/~iiqm/backissues/4\\_1/pdf/vaughan.pdf](http://www.ualberta.ca/~iiqm/backissues/4_1/pdf/vaughan.pdf) (accessed January 20, 2012).

space of older representational art is not appropriate to the disjunctions of our typical life experience.”<sup>68</sup> He continues, “When one considers the basic technological changes that have occurred in the last hundred years and the ways they have altered the texture of life, one can see why collage has become the most appropriate metaphor for modern existence.”<sup>69</sup>

### **Collage as a Metaphor**

Hopkins’ observation about collage acting as a metaphor for modern existence could be related to the reason the bird-building problem exists in the first place – the collaging or forced synthesis of these two different worlds. This absolutely creates a ‘disjunction’ rather than a ‘smooth, continuous unruffled space’, and it is the collision of these two worlds and ways of existing that creates this problem. Birds have been migrating for thousands of years, and it is only in recent times that their migratory path has been interrupted and fragmented by the rapid increase in reflective buildings in urban centres. In this thesis project, collage functions as a metaphor for understanding reality and reconstructing the experience of birds, in a poetic sense. Davis and Butler-Kisber suggest that, “To a highly literary group of artists and writers, collage became a collection of images that could be freely arranged and manipulated almost as substitutes for words on a page: a form of spontaneous visual poetry.”<sup>70</sup>

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<sup>68</sup> Budd Hopkins, “Modernism and the Collage Aesthetic,” *New England Review (1990-)* 18, no. 2 (Spring) (1997), 6, <http://www.jstor.org/stable/40243172> (accessed March 7, 2011).

<sup>69</sup> *Ibid.*, 11.

<sup>70</sup> Davis, and Butler-Kisber, “Arts-Based Representation in Qualitative Research: Collage as a Contextualizing Analytic Strategy,” 5.

I suggest that collage has the unique ability to be self-reflexive, and the materials used within the collage can be subverted and juxtaposed in new ways to create new, sometimes oppositional readings. These alternate readings may lead to new perspectives of subjects that are not fully understood by the public, such as the relationship between birds and the urban environment. As described on the New York New Museum website, "collage is a medium that by definition incorporates fragments and deals with opposing tensions, broken images, hidden desires, and collective myths."<sup>71</sup> Yvonne Spielmann proposes that collage combines "heterogeneous elements into one single form", and with "its techniques of inserting and layering the collage has mainly been used in fine arts to break up the close surface structure of painting and to express the modernist idea of fragmentation and simultaneity in the arts."<sup>72</sup> This idea of fragmentation is at the core of this thesis project, as it speaks both to the fragmentation of reflections on the surfaces of buildings, and to the (although rather morbid) fragmentation and destruction of migratory songbirds.

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<sup>71</sup> "Collage: The Unmonumental Picture: NewMuseum.org," New Museum: NewMuseum.org, <http://www.newmuseum.org/exhibitions/5> (accessed March 2, 2011).

<sup>72</sup> Yvonne Spielmann, "Aesthetic Features in Digital Imaging: Collage and Morph," *Wide Angle* 21, no. 1 (January) (1999), 131-148, <http://muse.jhu.edu/journals/wan/summary/v021/21.1spielmann.html> (accessed March 7, 2011).

### **Chapter 3: Methodology**

I am using collage to explore how the juxtaposition of images could possibly represent how birds relate to urban spaces in Toronto. I have also chosen to use collage as a methodology because of the interdisciplinary nature of my research which spans across several different disciplines, each contributing something different to the overall project. Similar to a collage, I chose the most relevant aspects from disciplines such as aesthetics, ornithology and environmental studies to create and support the work in my exhibition.

In the International Journal of Qualitative Methods, Kathleen Vaughan suggests that, “a collage methodology is interdisciplinary, juxtaposing multiple fields of endeavor and situating the practitioner and his or her work within and between them.”<sup>73</sup> Gary Knowles and Ardra Cole also write about collage as a qualitative research method. “The use of visual inquiry, in this case collage, can mediate understanding in new and interesting ways for both the creator and the viewer because of its partial, embodied, multi-vocal, and nonlinear inquiry from historical, theoretical, and practical perspectives to provide a context, strategies, tools, and examples.”<sup>74</sup> This thesis aims to provide a different visual understanding of bird-building collisions. These collages contain photographs of buildings that are deadly to birds, but these images have been cut up and reassembled to symbolically represent the disorientation and confusion of birds in an urban environment. This could be similar to the way birds would see the buildings –

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<sup>73</sup> Vaughan, "Pieced Together: Collage as an Artist's Method for Interdisciplinary Research," 12.

<sup>74</sup> Knowles and Cole, "Collage as Inquiry," 265.

pieces, fragments, sections – all while moving at a rapid speed and scanning for predators and areas of safety.

### **Photographic Documentation**

When creating the studio work, my first step is to take photographs. I have compiled an archive of photographs that I have taken of the buildings and birds that are affected by collisions. The photographs used in the work are my own, and they represent what I have seen while patrolling for injured or deceased birds for FLAP. I photograph the buildings that are documented by FLAP as being the most deadly to migratory birds, either due to their reflectivity or transparency. The three main areas of Toronto I am focusing on are Yonge Street and York Mills Avenue (Fig. 4), Consilium Place in Scarborough (Fig. 5), and the Financial District of downtown (Fig. 6), because they are documented by FLAP as being the three worst areas for collisions.



Fig. 4: York Mills Centre



Fig. 5: Consilium Place



Fig. 6: Toronto Dominion Centre

I have chosen to incorporate photography into this project because it allows me to reference the factors contributing to the collisions. These images may become less documentary and more ambiguous when incorporated into the collages. According to theorist Jean Baudrillard, photography “reveals a radically non-objective world. It is a



paradox that the lack of objectivity of the world is disclosed by the photographic lens.”<sup>75</sup>

Baudrillard also suggests that “through the image the world asserts its discontinuity, its fragmentation, its artificial instantaneousness.”<sup>76</sup> In my collages, I attempt to exaggerate the fragmentation by cutting up the photographs and reconfiguring them on Mylar.

Helmut Weihsmann proposes that, “Paradoxically, photography mirrors the world mechanically and correctly but it cannot reproduce a true image of reality.”<sup>77</sup> I attempt to create feasible perspectival space in some areas, and to create other areas that could not exist in reality, using the photographs as a framework.

I photograph birds as I am patrolling for FLAP during Fall and Spring migration seasons.

Before dawn FLAP volunteers “use nylon nets to help capture confused birds. Paper bags provide an easy means of transport, and give each bird a warm, dark place in which to recuperate before being set free...Within a few hours, if there is no sign of injury, the bird will be released in a natural area well beyond the downtown core.”<sup>78</sup> If the birds are alive I don’t take photographs, since my goal is to pick them up and place them in a paper bag as quickly as possible to minimize the amount of stress they experience.

When I find birds that are deceased, I usually photograph them before tagging them and placing them in a bag (as per FLAP protocol). The bags are then labelled with the time, species and gender of bird, location, and which face of the building they were found at

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<sup>75</sup> Jean Baudrillard, “Jean Baudrillard – Photographies,” The European Graduate School - Media and Communication - Graduate & Postgraduate Studies Program, <http://www.egs.edu/faculty/jean-baudrillard/articles/photographies/> (accessed October 15, 2011).

<sup>76</sup> Ibid.

<sup>77</sup> Helmut Weihsmann, “Four Elevators/ Lost in Intermediate Space,” Hubert Blanz, [http://www.blanz.net/e\\_text11.html](http://www.blanz.net/e_text11.html) (accessed January 2, 2012).

<sup>78</sup> *Volunteer Bird Rescuer Training Manual*, Toronto: Fatal Light Awareness Program, 2006.

(using cardinal directions<sup>79</sup>). This information is collected annually by FLAP to document the buildings and birds most affected by collisions.

The birds I chose to focus on for this project are the six species that were injured or killed the most in 2010 according to FLAP's data. They are – in descending order according to numbers affected – the Golden-crowned Kinglet, The Black-capped Chickadee, the White-throated Sparrow, the Ovenbird, the Dark-eyed Junco, and the Nashville Warbler<sup>80</sup>. According to a 2002 FLAP report based on Toronto Island bird-banding data, "these numbers do not simply reflect a greater preponderance of these species flying through the area, but apparently result from a species-specific propensity for collision."<sup>81</sup>

I am also looking at which areas specifically affect the six species of birds I am looking at. In an e-mail message to me from FLAP Program Manager Susan Krajnc, she said that White-throated Sparrows and Ovenbirds were found mainly in the Financial District. Black-capped Chickadees, Dark-eyed Juncos, Nashville Warblers were found in all areas known to be deadly, and Golden-crowned Kinglets were found mainly near Yonge Street and York Mills Avenue, and at Consilium Place in Scarborough.<sup>82</sup> I am using this information to incorporate elements from each of these six species into the studio work.

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<sup>79</sup> Cardinal directions refer to North, East, South and West.

<sup>80</sup> "FLAP DATA 2010," *Touching Down: The Newsletter of the Fatal Light Awareness Program*, 7.

<sup>81</sup> Evans Ogden, *Summary Report on the Bird Friendly Building Program: Effect of Light Reduction on Collisions of Migratory Birds*, 8.

<sup>82</sup> Susan Krajnc, e-mail message to author, February 6, 2012.

## **Painting Process**

I came to this Master's program as a painter, and worked mainly with oil paint on canvas. Many of my paintings filled the entire picture plane, and embodied a flat, graphic aesthetic. For this thesis project, I wanted to create a picture plane with more depth, and felt that incorporating photographic elements and expanding my painting practice to include different media and modes of painting would help to achieve this. I experimented with different media within the collages to intervene and merge the photographic images together. These materials include acrylic and watercolour paints, ink, pencil and pencil crayon. Some of these interventions allude to the split second glimpses of things that birds could see while in flight. The palette I used includes colours that represent the six birds themselves, and the ultraviolet spectrum that birds are able to perceive.

For this thesis project, I began using Mylar as a support material. Interventions on the back of the translucent Mylar can be seen through to the front, adding another potential layer to the collages. I began with rolls of Mylar which I cut into rectangles of uniform dimensions. The horizontal orientation of the Mylar lends itself to a panoramic visual field that alludes to the way birds can see in relation to humans. I also experimented more with the role of negative space in the work, creating dense areas in the centre where photographs and paint fused together, leaving the surrounding space 'untouched'. This meant that the collaged sections could start to create new shapes themselves, acting perhaps as viewpoints into ambiguous, fragmented environments.

Painting was also a way to unify the disparate formal and stylistic elements within the collages, and created a sense of continuity between photographic and painted elements within the work. I experimented with watercolour paints on the Mylar, and I enjoyed the less predictable, more organic results that could be achieved. Watercolour paints leave concentric lines of pigment on the Mylar as the water evaporates. This organic aesthetic could allude to areas symbolizing foliage and water, and the vivid colours could be seen as referencing the additional colour spectrum that birds are able to perceive. This was very different for me from working with oil on canvas, and encouraged experimentation with the materiality of the paint itself. In some places I used a brush, in others I moved the Mylar to shift the water before it dried, and in others I used my hands to manipulate the paint. The liquidity of the watercolour created an interesting relationship with the photographs of architectural elements, perhaps alluding to the relationship between nature and the built environment. The transitions from painted to photographic areas create a sort of visual fluctuation through the collages, further referencing the correlation between the fragmented vision of birds and their disorientation when these two environments overlap.

I also used Acrylic paint within the collages, in a less fluid form than the watercolour paint. I was interested in further blurring the lines between the painted areas and the photographs, so that it became difficult to distinguish one from the other. I was referencing the reflective surfaces that birds are deceived by, where reality and illusion become ambiguous. While working, it became apparent that the photographic images didn't necessarily depict the reality within the collages, and often contained images that

were more ambiguous and illusionary than the painted areas. This created an interesting shift, where, at times, the painted interventions became the only 'real' sections of the collages, because they contained evidence of the materials and tools used in their creation. The paint acted as a way of representing and materializing the fragmented reality as birds may experience it. For me, it became a visceral, tactile way of altering the photographic elements within the collages, leaving behind the trace of my own hand as I attempted to interpret the information and research I was collecting.

### **Collage Process**

I am using fragmentation as a technique, using elements taken from reality including the surroundings they pass through on their migratory journey, the buildings they violently collide with, and the reflections that cause these deaths. I have also used imagery from parts of these six birds in the collages, including feathers, wing structure and colours.

I am using information I have read about human and avian vision systems and their function, or 'dysfunction' within the context of bird-building collisions to guide my collage-making process. Birds have multiple foveae, so they can see several parts of their field of vision in focus, while humans only have one. Therefore some areas of the work may appear blurred, while others are more focused. Migratory songbirds also have a very narrow field of binocular vision. I used this information when considering the illusion of depth within the collages. Referencing linear perspective, I attempt to create some sections that appear very flat or two-dimensional, and suggest the illusion of depth in other sections to reference the stereopsis of birds. Rudolf Arnheim suggests

that, "Some of [a three-dimensional object's] qualities can be reproduced in drawing and painting, others cannot. This means that whenever they cannot be reproduced directly, an equivalent must be developed from the means offered by the medium of representation."<sup>83</sup> In my studio work, I attempt to use the medium of collage as a way of depicting three-dimensional spaces on a two-dimensional surface, which could also symbolically be seen as a reference to the flat surfaces of windows and the curtain walls of buildings.

Artist Leslie Shows was an influence on my process, as she is particularly interested in blurring the lines between materials in her collages. These images are seamlessly integrated into the work, so that the borders where paper blends into paint and vice versa are difficult to see. Her work has been described by New York art critic Nana Asfour as, "a spectacular rendition of ecological decay and destruction," depicting, "the ravages of man, rather than the ravages of nature."<sup>84</sup> Shows' work is related to my project because she is also responding to an environmental issue, and her work is a creative response to factual, documented problems. On Shows' website, Elizabeth Armstrong from Art Review magazine states that, "her apocalyptic landscapes are closer to documentaries than fiction."<sup>85</sup> Her use of material integration is also of interest, although she also incorporates sculptural materials into her works, such as rust and fingernails. I choose to maintain the identity of the photographs in my own work, to prevent a complete merging of them with the other media I use, such as paint, ink or

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<sup>83</sup> Arnheim, *Toward a Psychology of Art; Collected Essays*, 35.

<sup>84</sup> Nana Asfour, "Leslie Shows, "Five Grounds" - Art - Time Out New York," Time Out New York - NYC events, activities and things to do, <http://newyork.timeout.com/arts-culture/art/74674/leslie-shows-five-grounds> (accessed April 1, 2011).

<sup>85</sup> Elizabeth Armstrong, "Press," Leslie Shows, [leslieshows.com/leslie-shows-press.pdf](http://leslieshows.com/leslie-shows-press.pdf) (accessed February 15, 2012).

pencil. I want my works to specifically reference the contributing factors to the problem (e.g., the specific buildings and birds), rather than a more general critique.

I have been experimenting with incorporating sound into this thesis project. I have researched and collected the songs and alarm calls from these six birds to experiment with to create an audio piece for the installation. The combination of images and sound is intended to create a multi-sensorial environment, using the “heterogeneous, multivalent, multidimensional medium”<sup>86</sup> of collage, as described by Davis and Butler-Kisber.

When creating the collages, I combine my photographs into a composition, referencing data from FLAP about the birds and buildings that are most affected by collisions, as well as research I have done about birds’ perception. For example, when creating the structure for ‘Deceptive Habitat’, I chose to use photographs I took while patrolling for FLAP downtown near Metro Hall (Figs. 7, 8 and 9), where there is a lot of greenery in the lobby that is visible through the glass.



Fig. 7: Metro Hall



Fig. 8: Swainson's Thrush,  
Sept. 26, 2011.



Fig. 9: Metro Hall

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<sup>86</sup> Davis and Butler-Kisber, "Arts-Based Representation in Qualitative Research: Collage as a Contextualizing Analytic Strategy," 6.

I assembled the photographs in different combinations on sheets of Mylar, manually fragmenting them by cutting and reconfiguring them to reference the fragmented perception of these buildings that birds could possibly have (Fig. 10). I also used paint to create images on acrylic sheets referencing ‘powder down’<sup>87</sup> imprints that could potentially be left by the six species after a collision with a flat surface. I experimented with vertically layering them in front of the collages, possibly referencing panes of glass (Fig. 11).



Fig. 10: ‘Deceptive Habitat’, mixed media on Mylar, 72" x 36"



Fig. 11: ‘Deceptive Habitat’- installation with panels of acrylic sheet hung in front

For ‘Forest Superimposed’ I used a similar approach to ‘Deceptive Habitat’, and used photographs I took when patrolling for FLAP near Yonge and York Mills (Figs. 12 and 13). This was the place where I patrolled the most during Fall migration. I integrated elements of a dark-eyed Junco (Fig. 14) into this collage.



Fig. 12: Yonge Corporate Centre



Fig. 13: Yonge Corporate Centre



Fig. 14: Dark-eyed Junco, Oct. 6, 2011

<sup>87</sup> “Birds produce two substances which help to maintain the quality and perhaps the waterproofing of the feathers. One is powder-down.” “Occasionally, when a bird flies into a window, it leaves a clear imprint of itself on the glass; this is made up of powder-down which has been knocked off the feathers by the impact.” Source: Christopher M. Perrins, and David Attenborough, “Feathers,” In *New Generation Guide to the Birds of Britain and Europe*, Austin: University of Texas Press, 1987, 30.



The feathers symbolically refer to the metaphorical use of collage as a tool for the merging of two differing environments, the natural and the built (Figs. 15 and 16).



Fig.15: 'Forest Superimposed', mixed media on Mylar, 72" x 36"



Fig. 16: 'Forest Superimposed'- installation with acrylic sheets hung in front, and collaged elements on wall

The use of photographs and fragmented space is similar to the work of Viennese artist Hubert Blanz. He refers to the city as a collage itself, and also uses photographs and digital media to create unsettling perspectival visual spaces in his work. In particular, his piece called 'Four Elevators'<sup>88</sup> plays with ideas of architectural space and exaggerated perspective, using New York skyscrapers as reference. In a review of the work, critic Helmut Weihsmann suggests that in Blanz's work, "we can discover real artefacts or fragments of photographed urban spaces like the pieces of a puzzle fitted together into visionary or utopian compositions."<sup>89</sup>

In addition to creating collages that include images of the fragmented urban environment, I also experimented with ways of visually reimagining some of the data and diagrams from the textual research I conducted. Using a similar process of collaging together photographs and wet media such as paint, I attempted to focus specifically on

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<sup>88</sup> Hubert Blanz, "Four Elevators," Hubert Blanz, [http://www.blanz.net/e\\_fe01.html](http://www.blanz.net/e_fe01.html) (accessed January 2, 2012).

<sup>89</sup> Weihsmann, "Four Elevators/ Lost in Intermediate Space."

some of the relevant information related to the navigation and perception of migratory songbirds. For example, in 'Flyways' I referenced the two major flyways that pass over Toronto, along with data from the Toronto Ornithological Club about areas with the most migratory bird sightings.<sup>90</sup> I also looked at weather radar images showing bird migration (Figs. 17 and 18).

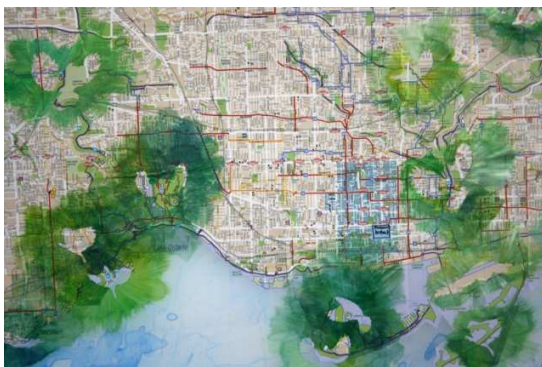


Fig.17: 'Converging Flyways' in progress (detail)



Fig.18: 'Converging Flyways', mixed media on Mylar, 36" x 36" (detail)

Through this creative research, I have used collage as a method to assemble and also to critique and re-evaluate the studio work. My process consisted of a series of studio explorations, or as Davis and Butler-Kisber propose, a "series of 'analytic memos' in which my reflections and ideas were built up and modified as the data unfolded, mov[ing] my analysis forward." They also suggest that, "collages [can become] important elements of self-critique to preserve balance in the analytic process and the writing of the report."<sup>91</sup> In this sense, my studio work and my theoretical research are interrelated, each informing the other within the project. The writing and the studio work evolved by being mutually dependent.

<sup>90</sup> *Migratory Birds in the City of Toronto: A Literature Review & Data Assessment*, Toronto: City of Toronto, 2009, 34.

<sup>91</sup> Davis and Butler-Kisber, "Arts-Based Representation in Qualitative Research: Collage as a Contextualizing Analytic Strategy," 10.

## **Chapter 4: Results/ Findings**

I am exhibiting this thesis project in two locations. The two spaces I am using are open to the public, and do not function solely as art galleries. I optimistically anticipate that this will reach a broader audience, and a greater number of people accessing the work. I will be exhibiting on the main floor of Toronto City Hall from May 14<sup>th</sup>-18<sup>th</sup>, 2012.

Toronto City Hall is one of the only buildings in downtown Toronto that has retrofitted some of its windows to be bird-friendly, and they have also published several documents about bird-building collisions, such as the 'Bird-Friendly Development Guidelines',<sup>92</sup> and 'Migratory Birds in the City of Toronto.'<sup>93</sup>

I am having another exhibition and my thesis defence at Gallery 918 from April 4<sup>th</sup>-14<sup>th</sup>, 2012. This gallery is in a community centre, and I chose this space because, like City Hall, it will hopefully reach a more diverse public audience than an art gallery. The 918 Bathurst community centre regularly hosts events, optimistically increasing the visibility of my exhibition. At both locations I will include resources for people who would like to learn more and contact information for FLAP in case they want to get involved with volunteering or activism.

When focusing on my first research question, '*What are the key characteristics of avian perception in relation to bird-building collisions?*' I began by consulting textual resources and journals in the fields of science and ornithology which provided me with

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<sup>92</sup> City of Toronto, City of Toronto Green Development Standard: Bird-Friendly Development Guidelines.

<sup>93</sup> *Migratory Birds in the City of Toronto: A Literature Review & Data Assessment*, City of Toronto.

information about how birds' vision functioned. Birds are colliding with buildings for two reasons- their perception is not adapted to handle the urban environment, and our urban environment does not use bird-friendly materials that consider birds' perception.

One common theme during the research was that of navigation. The birds themselves must navigate from their wintering grounds to their breeding grounds and back. Their voyage through the city disrupts this journey, and requires unfamiliar navigational strategies. While I was compiling the research for this project I had to navigate through information and resources to determine what the most relevant sources were, and where to best access them.

This idea of navigation seemed so vital to the project that I decided it was important to integrate it into the exhibition, as well as the studio pieces themselves. In order for people to better understand what birds experience, it seemed appropriate to create a space where they too had to navigate through. There are two rooms that I am able to show work in at Gallery 918. Ideally this will create an installation that viewers will need to move through, with wall-mounted collages, and pieces hung from the ceiling.

Through the creative process, as I read key theoretical texts, I explored the second research question, *'To what extent can the practice of collage and interdisciplinary art be used to depict the issue of bird-building collisions?'* Collage was a medium that I began to view as an interdisciplinary method which gave me access to multiple interpretations. Collage supported the incorporation of different disciplines, including

ornithology and aesthetics, leading to diverse ways of considering bird-building collisions. The cutting and reassembling of images and space could operate as a metaphor for the possible experience birds would have, based on their perception, and their understanding (or lack thereof) of urban environments. It alludes to the forced merging of these two worlds – the built and the natural.

I am still exploring ways to achieve awareness through this thesis project, and will continue to do so through future endeavours. I hope that the use of photographs based on FLAP data can reinforce the actuality of bird-building collisions, and their specificity to certain cities and buildings.

## **Chapter 5: Conclusion | Summary**

How can the problem of bird-building collisions gain public knowledge and interest, and in what ways can art be a catalyst for this change? Through a collage methodology, I used theoretical and factual evidence about bird-building collisions in Toronto based in ornithology and aesthetics to inform my studio production. This creative process was based in my background in drawing and painting, and incorporated other media such as photography and audio to create a multi-sensorial exhibition that may be seen as a collage of different aesthetic and stylistic visual perspectives. This installation aims to promote further discussion about collisions between birds and buildings, and may be perceived as a memorial to all fallen birds. Included in this last chapter are some of the possible new research questions that have arisen for me, and directions for future interdisciplinary research.

## **Discussion | Conclusions**

When I was trying to locate visual resources related to bird-building collisions, I found some images of dead birds, but very few that explicitly referenced the problem. There are video clips on the internet of people filming birds flying into their windows, many with comments about the birds' lack of intelligence. To me this suggests a lack of awareness about the causes for these collisions, and a need for greater access to the data that exists regarding birds' perception and collisions. The subject of bird-building collisions is not something that is general public knowledge, and I believe that more research and discussion is required to fully understand this relationship between birds and buildings. How can this information be made accessible to a large number of

people, so that it does not remain isolated within the fields of science and ornithology?  
How can visual arts provide a forum for the creative extrapolation of information  
related to bird-building collisions and other scientific topics?

Through collage, I have expanded my own understanding of bird-building collisions by  
producing studio work that hybridizes the knowledge I have gained. For me, this led to  
modes of visual understanding which were new to my art practice, and created new  
questions about the topic. While conducting research, it also helped me to highlight  
gaps I perceived in the existing research, creating possible opportunities to explore  
these through creative research. I feel that using a different perspective and exploring  
scientific information through the lens of visual arts can contribute to the field of  
interdisciplinary studies as an alternate way of conducting research. Fields that are  
usually viewed as being separate could possibly be integrated to form new questions or  
hybrid ways of viewing and exploring critical issues.

Working within the framework of theoretical texts and research has helped me to grow  
as an artist and a scholar. It has also opened up new ways of exploring problems for me  
across disciplinary boundaries. This integration of different disciplines resonates with my  
teaching practice, and highlights the need to make links between different subjects to  
create cross-curricular connections. I look forward to responding to questions when I  
return to teaching such as: How can I use this thesis project as a model for curricular  
integration in the classroom? How can other subjects be explored through visual arts  
using the framework of multiple intelligences? Would this exploration possibly reach a

greater number of learners, or could it reach learners who struggle with traditional teaching techniques?

For future research, I am interested in strategies that will help to invoke this empathetic response from people towards migratory birds and their experiences in our built environments. As a teacher I employ strategies in class to help students to better understand the role of empathy, and this is something I would like to integrate into my visual arts practice. I believe that these processes can contribute to new modes of visual representation and consequently lead to new and perhaps deeper understandings of the relationship between humans and nature.

I learned a great deal about birds and the factors contributing to their deaths, and this in turn contributed to my own sense of empathy. I now appreciate and value these birds more than ever. By volunteering with the Fatal Light Awareness Program I have taken on an activist role alongside this thesis project. I will definitely continue to work with FLAP, and collaborate with them for community and school projects to continue to raise awareness and to find new ways to conceptualize this problem. I hope that this project will raise awareness in the community, and perhaps this and future projects will be able to elicit a greater sense of empathy from people for migratory birds who pass through our city.

Since this is a creative exploration that is ultimately my own personal response, of course there will be other ways of visualizing the same factual information. I would like



to expand my inquiries of, and continue to explore the perception of birds, especially related to their experience and understanding of urban space. I would be very interested to collaborate with people in other fields in the future to discover other perspectives and understandings of this topic.

My hope is that this project and further research about bird-building collisions will initiate discussions that will move towards changing the way we think about the architecture of Toronto. How can the architecture of Toronto be changed to prevent these unnecessary deaths? Although this question was beyond the scope of this thesis project, there is evidence that there are solutions that exist, and existing buildings could be retrofitted to be more bird-friendly. The issue of avian building collisions does not yield an easy solution, yet the situation is not hopeless and change is possible. As written by Irish author Robert Lynd, "there is nothing in which the birds differ more from man than the way in which they can build and yet leave a landscape as it was before."<sup>94</sup> If possible, our architectural landscape could be designed with more consideration towards the needs of migratory birds. With more research and increased awareness, perhaps this can be something to strive for; especially architecture located on major migratory flyways. The proposed Ford Calumet Environmental Centre<sup>95</sup> in Illinois is a very encouraging example. Although it has not been constructed yet, and continues to be postponed, it serves as an example of a potential building that can coexist with, and actually benefit migratory birds.

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<sup>94</sup> Lynd, *The Blue Lion, and other Essays*.

<sup>95</sup> "City of Chicago: Ford Calumet Environmental Center," City of Chicago, [http://www.cityofchicago.org/city/en/depts/doe/supp\\_info/ford\\_calumet\\_environmentalcenter.html](http://www.cityofchicago.org/city/en/depts/doe/supp_info/ford_calumet_environmentalcenter.html) (accessed March 8, 2011).

I will continue to work with FLAP to patrol for birds and to raise awareness about bird-building collisions. I am also interested in pursuing a Doctorate to continue to research the relationship between birds and buildings, ideally to get the chance to collaborate with others who are interested in finding solutions. As Michael Measure, the executive director of FLAP said, "It's important to point out that the buildings were not built to kill birds... But there comes a point where people have to take responsibility."<sup>96</sup> My hope is that this project, and others like it, can be the first steps towards taking responsibility, by initiating discussion and promoting awareness of bird-building collisions.

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<sup>96</sup> Mandel, "Suit Seeks to Protect Birds from Office Buildings."

## **References Cited**

*A Field Guide to: Common Birds of Toronto*. Toronto: FLAP.org. 2009.

Amie, Jennifer. "A Bird's Eye View: Ultraviolet Vision Lets Birds See What Humans Can't." *Imprint*, Spring 2007. <http://www.bellmuseum.org/imprint/birdseye03.html> (accessed February 26, 2011).

Armstrong, Elizabeth. "Press." Leslie Shows. [leslieshows.com/leslie-shows-press.pdf](http://leslieshows.com/leslie-shows-press.pdf) (accessed February 15, 2012).

Arnheim, Rudolf. *Toward a Psychology of Art; Collected Essays*. Berkeley: University of California Press. 1966. 33.

"Artists: Biographies." Progressive Aesthetics. <http://progressiveaesthetics.wordpress.com/artists/> (accessed February 11, 2012).

Asfour, Nana. "Leslie Shows, "Five Grounds" - Art - Time Out New York." Time Out New York - NYC events, activities and things to do. <http://newyork.timeout.com/arts-culture/art/74674/leslie-shows-five-grounds> (accessed April 1, 2011).

Baudrillard, Jean. "Jean Baudrillard - Photographies." The European Graduate School - Media and Communication - Graduate & Postgraduate Studies Program. <http://www.egs.edu/faculty/jean-baudrillard/articles/photographies/> (accessed October 15, 2011).

"Benjamnin Verdonck." M HKA. [http://www.muhka.be/toont\\_beeldende\\_kunst\\_detail.php?la=en&id=3031](http://www.muhka.be/toont_beeldende_kunst_detail.php?la=en&id=3031) (accessed February 12, 2012).

Bhagavatula, Partha, Charles Claudianos, Michael Ibbotson, and Mandyam Srinivasan. "Edge Detection in Landing Budgerigars (*Melopsittacus undulatus*)." *PLoS One (Public Library of Science)* 4, no. 10 (2009). <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2752810/?tool=pmcentrez> (accessed March 3, 2011).

Blanz, Hubert. "Four Elevators." Hubert Blanz. [http://www.blanz.net/e\\_fe01.html](http://www.blanz.net/e_fe01.html) (accessed January 2, 2012).

Brown, Kyle G., "This Law is for the Birds." *Toronto Star*, November 15, 2009. <http://www.thestar.com/news/insight/article/725980--this-law-is-for-the-birds> (accessed February 12, 2012).

Bruhn, John G. "Interdisciplinary Research: A Philosophy, Art Form, Artifact or Antidote?." *Integrative Physiological and Behavioral Science* 35, no. 2 (2000).

<https://springerlink3.metapress.com/content/b5u2707n86448lx8/resource-secured/?target=fulltext.pdf&sid=pkq4u2mmmbbxgzgdjysshlmqa&sh=www.springerlink.com> (accessed February 15, 2012).

"City of Chicago: Ford Calumet Environmental Center." City of Chicago. [http://www.cityofchicago.org/city/en/depts/doe/supp\\_info/ford\\_calumet\\_environmentalcenter.html](http://www.cityofchicago.org/city/en/depts/doe/supp_info/ford_calumet_environmentalcenter.html) (accessed March 8, 2011).

City of Toronto. 2007. City of Toronto Green Development Standard: Bird-Friendly Development Guidelines. <http://www.toronto.ca/lightsout/guidelines.htm> (accessed February 25, 2011).

"Collage: The Unmonumental Picture: NewMuseum.org." New Museum: NewMuseum.org. <http://www.newmuseum.org/exhibitions/5> (accessed March 2, 2011).

Davis, Donna, and Lynn Butler-Kisber. "Arts-Based Representation in Qualitative Research: Collage as a Contextualizing Analytic Strategy." (1999): 1-29. <http://eric.ed.gov/PDFS/ED431790.pdf> (accessed February 15, 2012).

Evans Ogden, Lesley J. *Collision Course: The Hazards of Lighted Structures and Windows to Migrating Birds*. Toronto: World Wildlife Fund Canada, Fatal Light Awareness Program, 1996.

Evans Ogden, Lesley J. *Summary Report on the Bird Friendly Building Program: Effect of Light Reduction on Collisions of Migratory Birds*. Toronto: Fatal Light Awareness Program, 2002.

"FLAP DATA 2010." *Touching Down: The Newsletter of the Fatal Light Awareness Program*, Spring 2011. 1-8.

"FLAP - Fatal Light Awareness Program - Working to Educate & Engage People About the Safety of Migratory Birds in the Urban Environment." FLAP - Fatal Light Awareness Program. <http://www.flap.org/> (accessed January 5, 2012).

Gelb, Yigal, and Nicole Delacretaz. "Avian Window Strike Mortality at an Urban Office Building." *The Kingbird* 56, no. 3 (2006): 190-198.

Grady, Denise. "The Vision Thing: Mainly in the Brain." DISCOVER Magazine. <http://discovermagazine.com/1993/jun/thevisionthingma227> (accessed July 31, 2011).

Greenberg, Clement. "Collage." In *Art and culture; Critical Essays*. Boston: Beacon Press, 1961. 70-83.

Hager, Steven B, Heidi Trudell, Kelly J McKay, Stephanie M Crandall, and Lance Mayer. "Bird Density and Mortality at Windows." *The Wilson Journal of Ornithology* 120, no. 3 (2008): 550-564.

Hausmann, Franziska, Kathryn E. Arnold, N. Justin Marshall, and Ian P. F. Owens. "Ultraviolet Signals in Birds Are Special." *Proceedings: Biological Sciences* 270, no. 1510 (2003): 61-67. <http://www.jstor.org/stable/3558725> (accessed February 25, 2011).

Heyers, Dominik, Martina Manns, Harald Luksch, Onur Güntürkün, and Henrik Mouritsen. "A Visual Pathway Links Brain Structures Active during Magnetic Compass Orientation in Migratory Birds." *PLoS One (Public Library of Science)* 2, no. 9 (2007): 1-3. <http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0000937> (accessed March 4, 2011).

Hopkins, Budd. "Modernism and the Collage Aesthetic." *New England Review (1990-)* 18, no. 2 (Spring) (1997): 5-12. <http://www.jstor.org/stable/40243172> (accessed March 7, 2011).

Hoptman, Laura. "Collage: The Seamier Side." In *Collage: The Unmonumental Picture*. New York: Merrell, 2007. 9-11.

Javed, Noor. "Scarborough Highrise a Death Trap for Birds." *Toronto Star*. March 9, 2010. sec. News, <http://www.thestar.com/news/gta/article/777024--scarborough-highrise-a-death-trap-for-birds> (accessed Dec. 9, 2011).

Jordan, Chris. "Chris Jordan: Midway." Chris Jordan: Photographic Arts. [www.chrisjordan.com/gallery/midway/#CF000441%2017x22](http://www.chrisjordan.com/gallery/midway/#CF000441%2017x22) (accessed February 14, 2012).

"Kalender 09," index - Kalender 09, <http://www.kalender09.be/kalnder/index.php?tag/pechvogel> (accessed February 12, 2012).

Klem Jr., Daniel. "Glass: A Deadly Conservation Issue for Birds." *Bird Observer* 34, no. 2 (2006): 75. <http://www.birdscreen.com/PDF/Bird-Observer2006.pdf> (accessed January 3, 2012).

Knowles, J. Gary, and Ardra L. Cole. "Collage as Inquiry." In *Handbook of the Arts in Qualitative Research: Perspectives, Methodologies, Examples, and Issues*. Thousand Oaks: SAGE Publications, 2008. 265-276.

Krajnc, Susan. E-mail message to author. February 6, 2012.

Lind, Olle, and Almut Kelber. "The intensity threshold of colour vision in two species of parrot." *The Journal of Experimental Biology* 212 (2009): 3693-3699.  
<http://jeb.biologists.org/cgi/reprint/212/22/3693> (accessed March 3, 2011).

Lynd, Robert. *The Blue Lion, and other Essays*. London: Methuen & Co. 1923.

Mandel, Michele. "Suit Seeks to Protect Birds from Office Buildings." *The Toronto Sun*. February 9, 2012. sec. News: Toronto & GTA.  
<http://www.torontosun.com/2012/02/09/suit-seeks-to-protect-birds-from-office-buildings> (accessed February 14, 2012).

Martin, Graham R. "What is binocular Vision for? A Bird's Eye View." *Journal of Vision* 9, no. 11 (2009): 1-19. <http://journalofvision.org/9/11/14/> (accessed March 3, 2011).

*Migratory Birds in the City of Toronto: A Literature Review & Data Assessment*. Toronto: City of Toronto, 2009.

Mouritsen, Henrik, Gesa Feenders, Miriam Liedvogel, Kazuhiro Wada, Erich D. Jarvis, and Marcus E. Raichle. "Night-Vision Brain Area in Migratory Songbirds." *Proceedings of the National Academy of Sciences of the United States of America* 102, no. 23 (2005): 8339-8344. <http://www.jstor.org/stable/3375840>. (accessed March 2, 2011).

Noë, Alva. *Action in Perception*. Cambridge, Massachusetts: MIT Press, 2004: 181.

Perrins, Christopher M., and David Attenborough. "Feathers." In *New Generation Guide to the Birds of Britain and Europe*. Austin: University of Texas Press, 1987. 28-33.

Poggi, Christine. "The Invention of Collage." In *In Defiance of Painting: Cubism, Futurism, and the Invention of Collage*. New Haven: Yale University Press, 1992. 1-29.

"Polly Morgan." Polly Morgan. <http://pollymorgan.co.uk> (accessed February 16, 2012).

Poot, H., B. J. Ens, H. de Vries, M. A. H. Donners, M. R. Wernand, and J. M. Marquenie. "Green light for nocturnally migrating birds." *Ecology and Society* 13, no. 2 (2008): 47.  
<http://www.ecologyandsociety.org/vol13/iss2/art47/>

Rainey, L. "Talking Dictation: Collage, Poetics, Pathology and Politics." *Modernism/Modernity* 5, no. 2 (1998). 124. quoted in Knowles, J. Gary, and Ardra L. Cole. "Collage as Inquiry." In *Handbook of the Arts in Qualitative Research: Perspectives, Methodologies, Examples, and Issues*, Thousand Oaks: SAGE Publications. 2008. 268.

Roalf, Peggy. "High Flyers at Yancey Richardson." DART | Design Arts Daily.  
<http://www.ai-ap.com/dart/article/2406/high-flyers-at-yancey-richardson.html> (accessed February 13, 2012).

Rush, Curtis. "Dead-Birds Issue Going to Court Next Month." *Toronto Star*, March 9, 2011, sec. News. <http://www.thestar.com/news/article/951253--dead-birds-issue-going-to-court-next-month> (accessed February 12, 2012).

Spielmann, Yvonne. "Aesthetic Features in Digital Imaging: Collage and Morph." *Wide Angle* 21. no. 1 (January) (1999). 131-148.  
<http://muse.jhu.edu/journals/wan/summary/v021/21.1spielmann.html> (accessed March 7, 2011).

Steinberg, L. *Other Criteria: Confrontations with Twentieth-Century Art*. New York: Oxford University Press. 1972. 14. quoted in Knowles, J. Gary and Ardra L. Cole. "Collage as Inquiry." In *Handbook of the Arts in Qualitative Research: Perspectives, Methodologies, Examples, and Issues*. Thousand Oaks: SAGE Publications. 2008. 268.

Vaughan, Kathleen. "Pieced Together: Collage as an Artist's Method for Interdisciplinary Research." *International Journal of Qualitative Methods* 4, no. 1 (2005): 1-21.  
[http://www.ualberta.ca/~iiqm/backissues/4\\_1/pdf/vaughan.pdf](http://www.ualberta.ca/~iiqm/backissues/4_1/pdf/vaughan.pdf) (accessed January 20, 2012).

*Volunteer Bird Rescuer Training Manual*. Toronto: Fatal Light Awareness Program. 2006.

Weihsmann, Helmut. "Four Elevators/ Lost in Intermediate Space." Hubert Blanz.  
[http://www.blanz.net/e\\_text11.html](http://www.blanz.net/e_text11.html) (accessed January 2, 2012).

"Why We Care," FLAP - Fatal Light Awareness Program, <http://www.flap.org/who-we-are.php> (accessed February 13, 2012).

"Yancey Richardson Gallery > Exhibition." Yancey Richardson Gallery.  
[http://www.yanceyrichardson.com/view\\_works/?object\\_id=202&work\\_id=1689](http://www.yanceyrichardson.com/view_works/?object_id=202&work_id=1689)  
(accessed February 13, 2012).

## Appendix A: 'Fenestration' Exhibition Images



Fig. 19: **Stereopsis** (2012)

Migratory songbirds have a 15-30 degree field of binocular vision, in comparison to 120 degrees for humans.

Photograph, Acrylic, watercolour, and pencil crayon on Mylar

36" x 36"



Fig. 20: **Converging Flyways** (2012)

Migrating birds that pass through Toronto using the Atlantic and Mississippi Flyways can be picked up on weather radar images.

Acrylic, watercolour, and pencil crayon on Mylar

36" x 36"



Fig. 21: **Blue Light** (2012)

Nocturnally migrating songbirds need blue and green light to properly orient themselves for navigation. Red and white lights interfere with this orientation.

Photographs, Acrylic, watercolour, and pencil crayon on Mylar

36" x 36"



Fig. 22: **'Cluster N'** (2012)

In addition to using a star map to navigate, it is theorized that songbirds have a special part of their brain dedicated to nocturnal migration, called 'Cluster N'. They are able to visualize 'North' as a visual pattern on their retinas.

Photographs, Acrylic and watercolour paint on Mylar

36" x 36"





Fig. 23: **Fenestration I (Across Lake Ontario)** (2011)  
Mixed media on Mylar  
72" x 36"



Fig. 24: **Fenestration II (Forest Superimposed)** (2011)  
Mixed media on Mylar  
72" x 36"



Fig. 25: **Fenestration III (Disoriented Ovenbird)** (2012)

Mixed media on Mylar

72" x 36"



Fig. 26: **Fenestration IV (Deceptive Habitat)** (2011)

Mixed media on Mylar

72" x 36"



Fig. 27: **Fenestration V (Fatal Flyway)** (2011)

Mixed media on Mylar

72" x 36"



Fig. 28: **Fenestration I (Across Lake Ontario)** (2011)  
Installation Detail



Fig. 29: **Fenestration III (Disoriented Ovenbird)**  
Installation Detail



Fig. 30: **Fenestration II (Forest Superimposed)**  
Installation Detail



Fig. 31: **Fenestration IV (Deceptive Habitat)**  
Installation Detail



Fig. 32: **Black-capped Chickadee** (2012)  
 Photograph, Acrylic and watercolour paint on Mylar  
 36" x 36"



Fig. 33: **Ovenbird** (2012)  
 Acrylic and watercolour paint on Mylar  
 36" x 36"



Fig. 34: **Dark-eyed Junco** (2012)  
 Acrylic paint on Mylar  
 36" x 36"



Fig. 35: **Golden-crowned Kinglet** (2012)  
 Acrylic and watercolour paint on Mylar  
 36" x 36"





Fig. 36: **White-throated Sparrow** (2012)  
 Photograph, Acrylic and watercolour paint on Mylar  
 36" x 36"



Fig. 37: **Nashville Warbler** (2012)  
 Photograph, Acrylic and watercolour paint on Mylar  
 36" x 36"



Fig. 38: Installation View of paintings of six species of birds

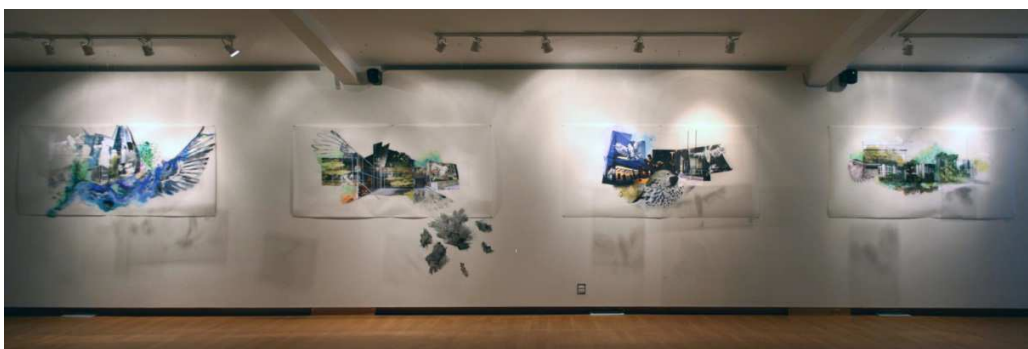


Fig. 39: Installation view of 'Fenestrataion I-IV'



Fig. 40: Installation view of Fenestration 'I-IV'



Fig. 41: Installation view of 'Stereopsis', 'Converging Flyways', 'Blue Light' and 'Cluster N'

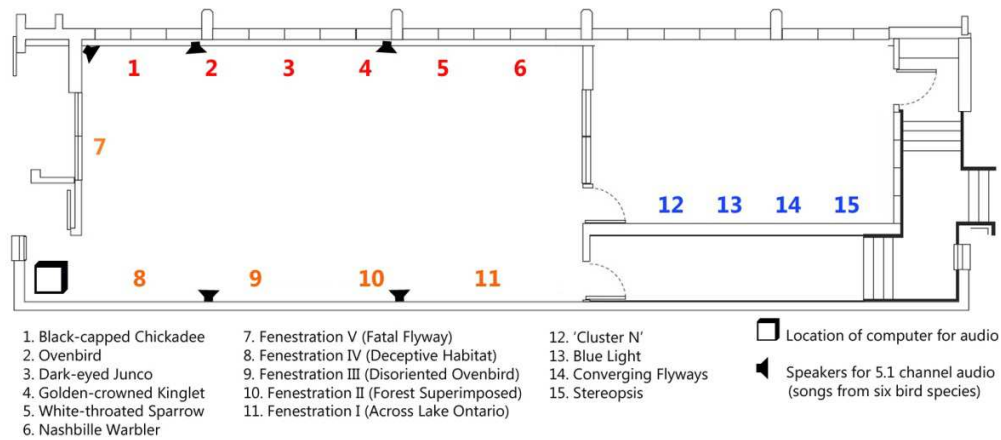


Fig. 42: Floorplan of Gallery 918, and location of artwork for 'Fenestration' exhibition

## **Appendix B: Accompanying Material**

The following accompanying material is available upon request from the Ontario College of Art & Design University Library: a DVD containing the files listed in this Appendix. Anyone requesting the material may view it in the OCADU Library or pay to have it copied for personal use.

### **Fenestration Images (A folder containing the following files)**

- Fig. 19 'Stereopsis'
- Fig. 20 'Converging Flyways'
- Fig. 21 'Blue Light'
- Fig. 22 'Cluster N'
- Fig. 23 'Fenestration I (Across Lake Ontario)'
- Fig. 24 'Fenestration II (Forest Superimposed)'
- Fig. 25 'Fenestration III (Disoriented Ovenbird)'
- Fig. 26 'Fenestration IV (Deceptive Habitat)'
- Fig. 27 'Fenestration V (Fatal Flyway)'
- Fig. 28 Fenestration I (Across Lake Ontario)' Installation Detail
- Fig. 29 'Fenestration III (Disoriented Ovenbird)' Installation Detail
- Fig. 30 'Fenestration II (Forest Superimposed)' Installation Detail
- Fig. 31 'Fenestration IV (Deceptive Habitat)' Installation Detail
- Fig. 32 'Black-capped Chickadee'
- Fig. 33 'Ovenbird'
- Fig. 34 'Dark-eyed Junco'
- Fig. 35 'Golden-crowned Kinglet'
- Fig. 36 'White-throated Sparrow'
- Fig. 37 'Nashville Warbler'
- Fig. 38 Installation view of painting of six species of birds
- Fig. 39 Installation view of 'Fenestration I-IV'
- Fig. 40 Installation view of 'Fenestration I-IV'
- Fig. 41 Installation view of Stereopsis, Converging Flyways, Blue Light, Cluster N
- Fig. 42 Floor plan of Gallery 918, and location of artwork for 'Fenestration'

### **Audio**

Fenestration Audio: Songs from Six Species

*(In the exhibition, this audio piece was played using a 5.1 speaker audio system.*

*The audio file on this disk only uses two channels so most devices can play it.*

*Please see 'Fig. 42' for speaker locations during the exhibition at Gallery 918.)*

### **Video**

Fenestration Video: Exhibition Walk-through