

**Proceedings of the 3<sup>rd</sup> Annual  
Thompson Rivers University  
Undergraduate Conference**

**KAMLOOPS, BC  
March, 2008**

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# Contents

Foreword	
Exploration of Art in Research	
Lea Bucknell .....	1
Synthesis of Novel Symmetrical Quaterphenyls	
Daniel Rainkie .....	9
Textured Bodies, Embodied Texts: The Lesbian Body of Twentieth Century Literature	
Jessica Hovanes .....	31
Gender Inequality and University Faculty: The Gendered Institution, Schemas, and Subtle Sexism	
Sabrina Weeks .....	41
Functionality and Evolutionary Conservation of the TNF-Related Apoptosis Inducing Ligand (TRAIL) Pathway in the Common Carp <i>Cyprinus carpio</i> )	
Ben Sutherland.....	53
Crimson Recollection	
Melanie Perreault .....	67
As For Man, His Days are as Grass: The Legitimacy (or Illitimacy) of Revisited and Revised History in Theresa Kishkan's <i>Sister of Grass</i>	
Jennifer Bagan .....	71
Do Pillbugs Learn From the Consequences of Their Behaviour?	
Kristine Teichmann .....	79

Mairie d'Oingies, Hildegard von Bingen and Catherine of Siena: Female Mystics of the Medieval Christian Tradition	
Tara Chambers.....	95
On Finding a Voice: The Struggle to Present Yourself	
Tina Camilli.....	109
Bird Watch	
Jana Sasaki.....	125
Effects of Exogenous Estrogens on the Development and Expression of Sexual Behaviour in Male Guppies ( <i>Poecilia reticulata</i> )	
Vanessa Tonn.....	129
The Secular Christ Figure in Postmodern Quebec Film	
Chantal MacDonald.....	141
The Reinvention of the Monastic Wheel: Cistercian Origins and Aims	
Grant Sawatzky.....	153
The Search for BC Identity	
Laura Wong.....	161
Seymour Arm: A Case Study of Rural Schooling	
Pam Carins.....	171
Olefactories and Blue and Orange	
Zac Pinette.....	191

# Foreword

Le7 re skítscemp pyin te sitq't te stselxemémc-kt;  
Welcome fellow scholars;  
Bienvenue, chers collègues.

The life-blood of every university is the creation, examination, and sharing of new knowledge. Original and innovative knowledge challenges existing orthodoxies while it fuels further academic inquiry. It has a direct influence on our quality of life, and it empowers individuals and their communities just as it propels us forward as global citizens. As such, new knowledge never fails to provide bait for our minds, tempting us—indeed outrightly challenging us—to continue to search for the next set of questions and answers.

The 2008 TRU Undergraduate Research Conference—the third annual such celebration—has succeeded in creating original and innovative knowledge. It has been a triumph for the germination of new data, methods, theories, and applications—all presented here for the first time by dedicated, and promising scholars. It has afforded those who attended the presentation sessions, and those who review the student papers presented in this volume, with an opportunity to glean the future: in sum, student-driven single and cross-disciplinary inquiry without peer. Comprehensive inquiry at a comprehensive university, no less.

The pioneering ideas presented found receptive audiences. To be sure, at the conference sessions, and upon the pages of this volume, we have become a community of thinkers, richly engaged and poised to share new knowledge. Theories of identity, creativity, and spirituality, critiques of social inequality, the presentation fine art in various media, investigations of popular culture, and the latest advancements in nursing and public health all take flight when

shared in such interactive environments as a university research conference. In this unique way, we have shared an adventure made more salient because it has featured the work of the very student scholars who are themselves in search of fresh knowledge and fresh skills. Yet, just as importantly, it has offered members of the wider TRU community the opportunity to participate in a crucible of rich intellectual and scientific engagement—where ideas have been introduced, evaluated, and often critically challenged. That vital dialogue continues.

Conferences such as this are where comprehensive communities of thinkers amalgamate science and the arts. They continue to prove that the scholarship of our students grasps the same vital focus, depth, and applications of their TRU professor mentors and learned international colleagues and ancestors. To that end, we must not forget our scholarly roots: Sir Isaac Newton, reflecting upon his earth-shattering career in maths and physics explained in a letter to Robert Hooke in 1676, “If I have seen further, it is by standing on the shoulders of giants.” Later, Claude Levi-Strauss, the father of 20th century social science, described the essence of any vibrant culture as the reliance upon general exchange whereby each person is engaged, in an eternal circuit of sharing—goods, and often intangible services and knowledge—ever fueling greater social integration and balance. In doing so, we also recall that in Robert Merton’s book *On the Shoulders of Giants*, the 6th century grammarian Priscian, notes wryly, “The younger the scholars, the more sharp-sighted.” Exciting possibilities all.

In sum, the 2008 TRU Undergraduate Research Conference has afforded us the opportunity to ‘see far,’ to exchange ideas, and to celebrate the inspired and dedicated efforts of the next generation of scholars. The names of TRU student researchers who participated here are the same names that we will see in the future. We will remember this conference when we see their work in the near future on the pages of successful research grant applications, as public figures making real difference in the world, as authors of research proceedings and published articles, as thoughtful artists, and as

world-class scholars. To those students, I can announce that I look forward with pride to having your books on my shelves, to benefiting personally from your social contributions, and to enjoying your art in my home and community.

Like the many generous sponsors of this conference, off-campus and on, the TRU faculty research mentors who guided their students to strive for academic innovation and excellence, the conference organizers, most notably Dr Kelly-Anne Maddox, and those students, staff, faculty, and administrators who have laboured to make it the success that it has become in three short years, I offer my respectful best wishes and humble gratitude to you all for a job well done.

Je vous souhaite le mieux pour la réussite de vos projets d'avenir;  
Me7 le7 te cucwéll es st'7ek-emp xwexwéytep;  
With all best wishes in your future endeavours.

Dr. Martin Whittles  
Department of Sociology and Anthropology  
Thompson Rivers University

November, 2008



# **Exploration of Art in Research**

LEA BUCKNELL

## **Abstract**

An extension of an art show of the same name mounted in the TRU gallery last fall, this presentation investigates the connections visual arts has with other academic disciplines, exploring similarities between various areas of study with regards to their interest in creating visual representations of space and process.

The placement of artistic practice within academic research has been challenging to categorize because its outcomes fall under a different set of rules and guidelines than those of the ‘traditional’ or ‘conventional’ research paper in that such artistic practice often culminates in the form of an artwork, exhibition or a combination of these things. The notion of artistic practice as a means for producing and presenting new knowledge is an area of study that is gaining momentum. This spring I will be attending a thematic artist residency at the Banff Centre in Banff, Alberta entitled: Making Artistic Inquiry Visible. This residency provides an arena for artists, writers and curators to contemplate and explore “the various contemporary conceptualizations of artistic research including practice-led research, research creation, artistic inquiry, and art practice as research.”

Personally, this residency will afford me the opportunity to explore concepts of interdisciplinary collaboration while utilizing my degrees in both geography and visual arts. Interdisciplinary by nature, my artwork often involves elements of photography, sculpture and installation. The main objective of the project I aim to create at the Banff Centre is to make the geologic history of Mount Rundle more knowable to a wider audience by employing the medium of the miniature. To this end, I plan to create a number of small-scale sculptural landscapes depicting major stages of deposition and erosion that have occurred to form Mount Rundle over the last 408 million years. I will then photograph the models to create pairings of stereoscopic images which will appear three dimensional when seen through a viewing device. The purpose of creating the stereoscopic images lies in the desire to further miniaturize the subject, and create a more intimate viewing space for the audience, the artworks and the geologic feature the works represent.

My interest in the cross-over between art and research began with a Comprehensive University Enhancement Fund Research Scholarship that funded a project entitled “Exploration of Art in Research.” For this research project I examined the connections Visual Arts could have with the work of faculty members from other

disciplines at Thompson Rivers University (TRU). After conducting a number of interviews with faculty I curated a selection of their works into an exhibition in order to showcase the results. I also moderated a panel discussion to create a forum where faculty, students and community members could transcend the boundaries of academic discourse in the hopes that more interdisciplinary projects might arise.

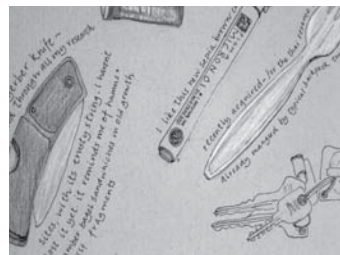
In the following pages I have re-imagined the exhibition brochure I created for my CUEF project. My contribution segues a visual arts project into the more traditional research format of this publication as the text of brochure falls somewhere between the realm of an artist's statement and an academic essay. I have re-imagined portions of the brochure in order to give both a visual and a physical representation of it as an artifact, or stand-in, of an exhibition which took place at TRU in October of 2007.



As a Geography and Visual Arts student I have come to recognize the similarities between these areas of study and practice with respect to their interests in creating visual representations of space and process. This discovery led me to investigate the connections Visual Arts could have with other disciplines at Thompson Rivers University (TRU). In doing so, I conducted nearly twenty interviews with faculty members from a variety of departments, disciplines and divisions across TRU—each with diverse sets of protocols in which creativity and creative expression are an active, even essential, part of their research practice. This exhibition comes from the desire to transcend the boundaries of academic language and highlight the imaginative processes and outcomes of research being done on our campus.

“I find the sketches are really good for locating the information in my head. If I need to find information in my field books I usually do so by flipping through and looking at the images rather than the dates.”

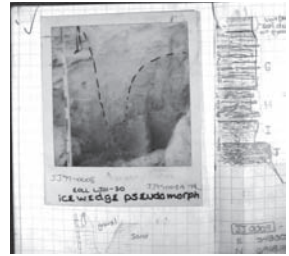
*Crystal Huscroft, Physical Geography*



Crystal Huscroft “Geological Survey of Canada field journal” detail

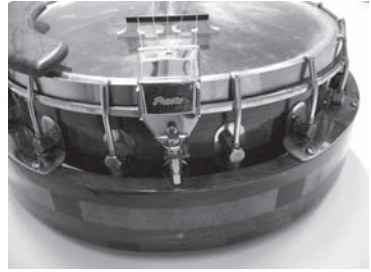
“I believe that there are things that I can only comprehend through pictures. Sometimes when the verbal explanation doesn’t work I force myself to make a picture of it to understand.”

*Lyn Baldwin,  
Biology—Plant Ecology*



Lyn Baldwin "Field Journal" detail

Works of seven faculty members were selected for this exhibition based on their ability to represent a wide-range of manners in which creative process can be utilized in research. In her skilfully illustrated field journals, plant ecologist Lyn Baldwin seeks to distinguish what is actually in front of her from what a textbook example might be. Similarly, the innovative manner in which Crystal Huscroft sketches in her Geological Survey of Canada notebooks exemplifies how drawing has allowed her to develop a personal visual vocabulary for studying physical processes and identifying their resultant shapes within landforms. With Karen



Hank Bangma "Re-imagined Banjo" detail

Hofmann's work we are invited to follow the evolution of a poem, from the object that inspired its inception to its final outcome publication, and all the drafts in between. Hank Bangma used his carpentry skills to re-imagine the conventional form of the banjo

“They [microscopic photographs of dwarf mistletoe] have to be in focus, have the right lighting—uniform, like a passport photo. The results I get are derived from an artistic process, but the images themselves are not.”

*Cindy Ross-Friedman,  
Biology—Plant Anatomy*



Cindy Ross Friedman "Dwarf Mistletoe"



“For me, I feel it would be a conceit to call myself an artist because I don’t have any training in fine art and the images we created were purely for documentation purposes; they were not artistically considered.”

*Diane Purvey, Education*

Diane Purvey and John Belshaw “Roadside Shrine”

as one that sports a wider neck to more easily accommodate his fingers while playing. In Diane Purvey’s and John Belshaw’s images of roadside shrines the viewer is presented with an ironic sense of serenity given the subject matter and the proximity of the shrines to motorways. As a mathematician, Richard Taylor examines how complex patterns arise in nature. Fractal images that never repeat themselves, and go on indefinitely, visually describe the equations he develops. The microscopic images of Cindy Ross-Friedman’s dwarf mistletoe research reveal the intricacies of this small invasive plant species.

While the aesthetic appeal of these works is undeniable, the contributors resist the title of “Artist,” preferring instead to acknowledge themselves as professionals in their own field who happen to be doing art-like things. During the interviews faculty often described how their education and background provided them with a specialized discourse to carry out their research. At times their creative considerations pull their research processes and outcomes toward the realm of Art, but their intent keeps such practice firmly rooted in each of their respective disciplines.



Gallery Installation A



Gallery Installation B

The opportunity to present this exhibition in an art gallery setting not only encourages a reflection on the function of a gallery in a university context, but also considers the contributions of research being carried out on our campus. The works in this exhibition speak to the commonalities that co-exist between departments and disciplines, and will hopefully lead to future opportunities for interdisciplinary research. To that extent, this exhibition seeks to open up dialogue between students and faculty that will further explore the connections between disciplines such as Geography and Visual Arts. Only by increasing these relations can we create the opportunity for such collaborative projects to arise.<sup>2</sup>



## Notes

1 “Thematic Residency: Making Artistic Inquiry Visible.” thebanff centre.ca. 12 March 2008 <<http://www.banffcentre.ca/programs/program.aspx?id=628>>.

2 Text from exhibition brochure, Exploration of Art in Research, TRU Visual Arts Gallery, 2007.

## ***About the Author***

*Lea Bucknell is a fourth-year fine arts student who came to TRU after graduating from Prince George Senior Secondary School in 1999. She has travelled all over Africa, Europe and South America. She volunteered her time to gallery preparation and exhibition installation at the TRU art gallery, and collaborated on a CUEF project entitled “Exploration of Art in Research.” She will work at the Banff Centre for the Arts and as a student researcher this summer.*

# **Synthesis of Novel Symmetrical Quaterphenyls**

DANIEL RAINKIE

## **Abstract**

This presentation explores the synthesis of unsymmetrical quaterphenyls through two different approaches using directed ortho metalation as the main synthetic reaction. Spectral evidence of the products obtained will also be shown.

Aromatic chemistry is a very important aspect of organic chemistry which involves the synthesis and reactivity of aromatic compounds. Aromatic chemicals are of major interest to pharmaceutical and agrochemical industries due to the large variety of aromatic products found in nature.<sup>1</sup> Directed ortho metalation (DoM), originally discovered in 1939, has since become a significant tool in the synthesis of new aromatic compounds, especially those with a complex aromatic substitution pattern.<sup>1</sup> DoM is defined by two major characteristics, a directing group and a metalating group or strong base reagent as shown in Figure 1. A directing group is a functional group which demonstrates two functions. First it has generally an inductive effect on the adjacent (ortho position) hydrogen on the benzene ring, causing electron density to be pulled away from the hydrogen and moved toward the directing group, thus making the affected proton more acidic and hence able to be removed easily with a strong base. Secondly, the directing group also coordinates strong bases, particularly alkyl lithium bases, into proximity of the *ortho* (or benzylic in some cases) hydrogen atom through the complexation of the lone pair of electrons on the directing group and the positive lithium atom on the alkyl lithium base. The strong base then removes the hydrogen atom from the ring and the lithium atom takes the place of the hydrogen atom (*ipso*-lithiation), which creates a highly polar C-Li covalent bond, as seen in the alkyl lithium base. Various functional groups can be added to the newly generated, highly reactive, lithiated aromatic species by adding an electrophile, an electron-deficient compound, to the reaction mixture causing an electrophilic substitution at the C-Li carbon. This DoM electrophilic substitution reaction allows chemists

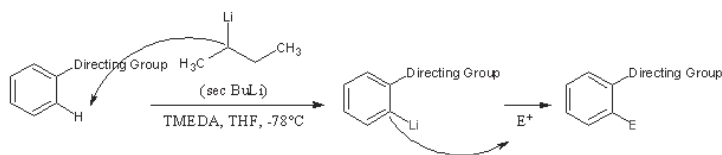


Figure 1. The directed ortho lithiation reaction followed by an electrophilic substitution which follows the classic SN<sub>2</sub> mechanism.

to develop an aromatic substitution patterns that are difficult to obtain using other methods.

Low temperatures are required for the lithiation reaction in order to minimize the possibility of the alkyllithium base attacking the electrophilic directing group and destroying the directing group and the alkyllithium reagent.<sup>1</sup> An inert atmosphere is also required for DoM reactions because any proton-donating sources, such as the moisture in the air, will cause the neutralization of the alkyllithium base.<sup>1</sup> When the directing group is a tertiary amide, the *ortho* lithiation technique involves a 1:1 ratio of *sec*-BuLi and TMEDA at  $-78^{\circ}\text{C}$  in THF for one hour.<sup>1</sup> However, previous research completed at Thompson Rivers University (TRU) has shown that by using an excess of the alkyllithium reagent, a higher reaction temperature and shorter time may be used.<sup>6</sup> This reaction (per hydrogen to be removed) has been optimized by using two equivalents of base and two equivalents of TMEDA at  $-30^{\circ}\text{C}$  in THF for five minutes when using a  $3^{\circ}$  amide as a directing group (i.e. two protons = four equivalents of base/TMEDA).<sup>6</sup>

An electrophilic substitution reaction of a lithiated aromatic species allows us to add various functional groups such as trimethylsilyl ( $\text{SiMe}_3$ , TMS) as well as a variety of boro-halides (halide =  $\text{I} > \text{Br} > \text{Cl}$ ), which are used in the Suzuki-Miyaura cross-coupling reactions. The cross-coupling reactions allow us to link two aromatic rings together through a single carbon-carbon bond through the use of various catalysts.<sup>5</sup> These reactions are illustrated in Figure 2.

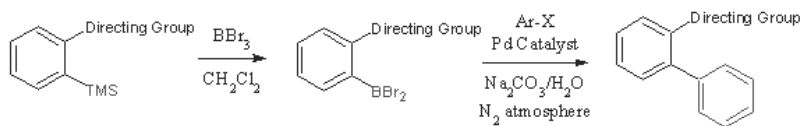


Figure 2. Ipso-borodesilylation to produce the starting material required for the Suzuki cross-coupling reaction.

A new synthetically useful reaction is the electrophilic addition of triisopropylborate to a lithiated ring.<sup>2</sup> In this reaction, the benzene ring, with a directing group, is lithiated using DoM procedures,

and the electrophile triisopropylborate is added, and the reaction is quenched using pinacol.<sup>2</sup> Pinacol is used in the reaction because pinacol derivatives crystallize very easily and are stable borate ester molecules, whereas simpler borate-ester derivatives quickly decompose to boronic acids.<sup>2</sup> To the initial reaction pot, the palladium catalyst and the aryl-halide coupling partner are added and reacted using the Suzuki-Miyaura cross-coupling protocol to create a biphenyl compound.<sup>2</sup> This one-pot reaction is synthetically useful because it does not require the isolation of an intermediate product and thus saves time, solvents and money. This reaction process is illustrated in Figure 3.

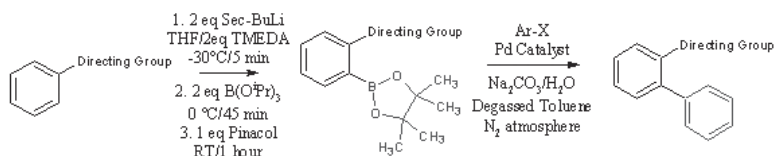


Figure 3. One-pot coupling reaction using the triisopropylborate method coupled to the Suzuki-Miyaura reaction.

The Suzuki-Miyaura cross-coupling method is a widely recognized procedure which involves the formation of a carbon-carbon bond between two aromatic rings including polysubstituted aromatics and heteroaromatic compounds usually under an inert atmosphere.<sup>3</sup> Prior to executing the Suzuki-Miyaura cross-coupling method, an organoboron compound must be made through the reaction of BBr<sub>3</sub> with a TMS compound which can be prepared through DoM procedures. This method requires the use of a Pd(O), Ni(O) or Fe(I) catalyst incorporated with a variety of ligands for effective catalysis. For this project we focused on using a Pd based catalyst with a tetrakisphenyl ligand (Pd(PPh<sub>3</sub>)<sub>4</sub>) since a previous Thompson Rivers University (TRU) student (Reid, 2006) found it effective in the synthesis of tetraphenyl molecules.<sup>3</sup> For the reaction of Pd with organometallics, a general catalytic cycle is followed which includes oxidative addition, transmetalation and reductive elimination sequences as shown in Figure 4.<sup>3</sup> The oxidative addition step is often the rate-determining step in any catalytic cycle.<sup>3</sup> The

process of the catalytic cycle is as follows: The oxidative addition of an aryl-halide to a Pd(0) complex affords a stable *trans*-palladium(II) complex where the aryl-halide decreases in the order of I>Br>Cl.<sup>3</sup> The transmetalation proceeds at room temperature in an inert atmosphere where the organoboron compounds react with aryl-halides in the presence of a base and DME.<sup>3</sup> The reductive elimination step affords a stereocontrolled biphenyl product.<sup>3</sup>

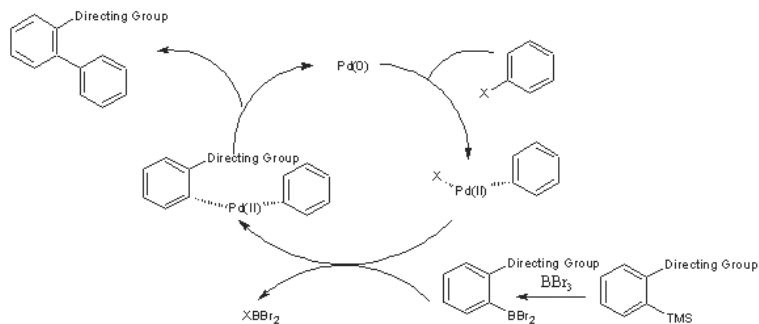


Figure 4. Palladium catalyst cycle for the Suzuki-Miyaura cross-coupling reaction.

## Project Goals

The purpose of this research project was to synthesize a novel macrocycle (**7**) by the use of directed ortho lithiation and Suzuki cross-coupling reactions as described above. The starting material for this experiment was derived from a commercially available para-biphenyl dicarboxylic acid (**1**). The biphenyl dicarboxylic acid functional groups were replaced with a known directed ortho metalation group (**3**)<sup>4</sup> to be used in the directed dilithiation reaction. Once the biphenyl rings were lithiated (**4**)<sup>5</sup>, trimethylsilyl groups took the place of the lithium atom to give us our key starting material (**5**)<sup>6</sup> as illustrated in Figure 5. Reproducible quantitative yields were found for the amine substituted biphenyl (**3**) and the di-TMS biphenyl compound (**5**) through advanced purification procedures. Compound (**5**) has been previously been prepared in small quantities at TRU in project by former TRU students (Reid, 2006 and Key, 2005).<sup>5,6</sup>

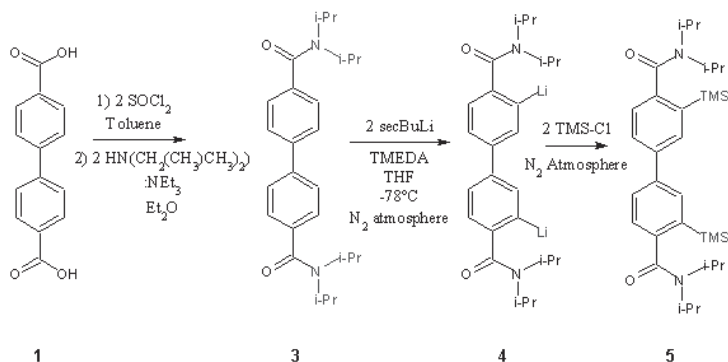


Figure 5. Synthetic route to the key starting material ditrimethylsilyl biphenyl derivative (5).

From this point a novel ipso-borodesilylation reaction (when a boro-dihalide, boro-dibromide in our case, takes the place of the TMS group on the ring) and a Suzuki cross-coupling reaction using a benzylic boro-dihalide (**6**) with aryldibromide (1,3-ArBr<sub>2</sub>) in the presence of the palladium catalyst Pd(PPh<sub>3</sub>)<sub>4</sub> will be attempted on the di-TMS biphenyl derivative (**5**) to produce the macrocycle compound (**7**) as shown in Figure 6. The Suzuki cross-coupling reaction requires a nitrogen atmosphere because the palladium catalyst is poisoned by oxygen in the air.

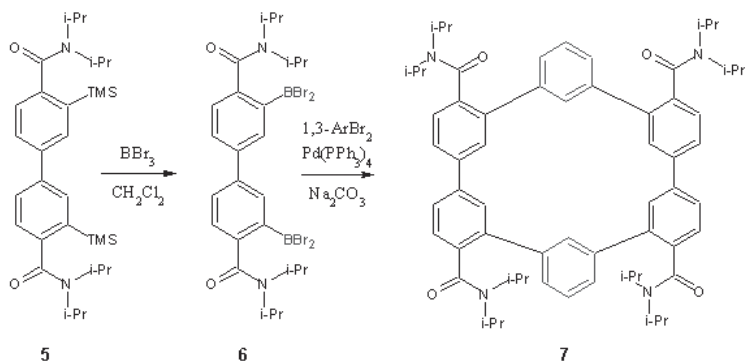


Figure 6. Synthesis plan for the novel macrocycle (7).

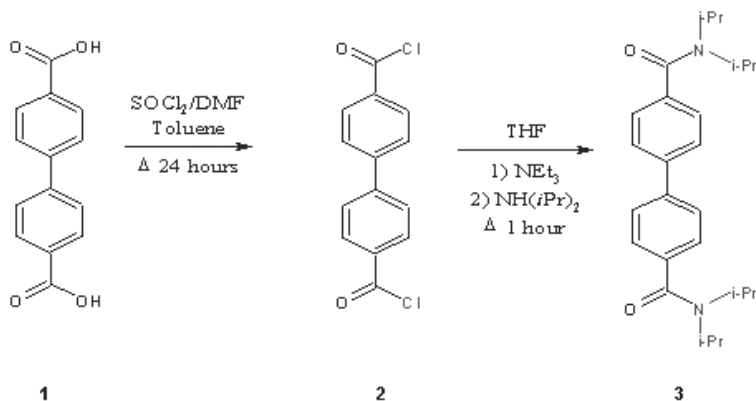
To the best of our knowledge, compound (**7**) has not been reported in the literature. The synthesis of compound (**7**) may have

liquid crystal properties or other unique physical characteristics which could have industrial applications, would add a significant example to the applications of the Suzuki cross-coupling reaction and also have the potential for further directed lithiation reactions. The synthesis of symmetrical quaterphenyls and unsymmetrical quaterphenyls will be attempted using both the TMS/BBr<sub>3</sub> and triisopropyl borate cross-coupling methods.

## Results and Discussion

The slow reflux of the commercially available 4,4'-biphenyl dicarboxylic acid (**1**) in toluene, thionyl chloride and the catalyst dimethylformamide (DMF), yielded the acid chloride intermediate (**2**). Compounds (**1**) and (**2**) were characterized by IR shown in Appendices 1 and 2 respectively. IR analysis of (**2**) versus (**1**) shows a shift of the carbonyl group from 1682.85 cm<sup>-1</sup> in (**1**) to 1777.01 cm<sup>-1</sup> in (**2**) which would correspond to the shortening and strengthening of the C=O bond because of the inductive electron withdrawal of the chlorine versus the weaker inductive effect of the oxygen in the acid moiety in (**1**). Compound (**2**) also shows the distinct signal of chlorine at 758.07 cm<sup>-1</sup> whereas (**1**) does not, which proves the formation of the desired intermediate (**2**). Compound (**2**), which was not purified, was dissolved in tetrahydrofuran (THF) reacted with triethylamine (NEt<sub>3</sub>) followed by diisopropylamine (NH(*i*Pr)<sub>2</sub>) at room temperature and refluxed. The di-tertiary amide biphenyl (4,4'-di-(N,N-diisopropylamide)biphenyl) (**3**) was obtained (Scheme 1) which had a melting point of 207-209.5 °C with a 76% yield after recrystallization from ethyl acetate/hexane. This reaction took a few attempts to yield a procedure that was reproducible because of the heating times required for the reaction of (**1**) to the chloride intermediate (**2**). Heating less than 24 hours did not allow full conversion of (**1**) to (**2**) and heating longer than 24 hours caused impurities to develop, most likely due to oxidative side reactions. The formation of (**3**) was confirmed by proton nuclear magnetic resonance (NMR) (Table 1).

The proton NMR spectrum of (**3**) confirmed the replacement of the

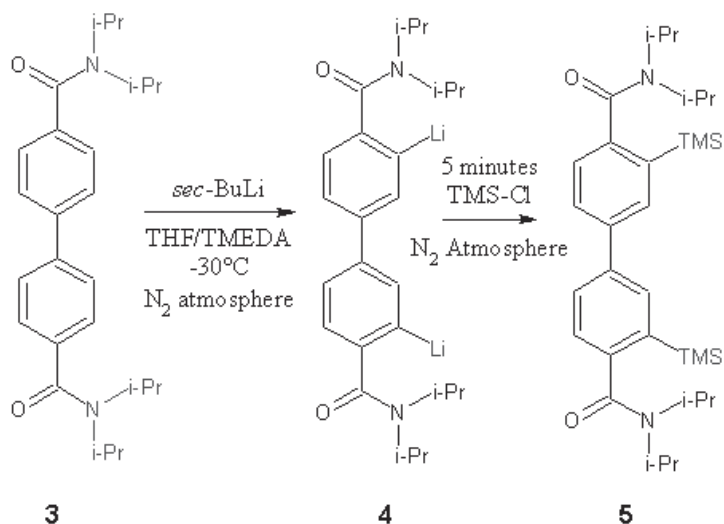


Scheme 1. Synthesis of our starting material 4,4'-di(N,N-diisopropylamide) biphenyl (**3**).

alcohol groups of the carboxylic acid for the two diisopropylamide groups by the appearance of the broad multiplets at 3.7 which integrated for four protons and 1.3 ppm which integrated for 24 protons. These two broad signals are explained by the hindered rotation of the amide C-N bond because of the resonance N has with the carbonyl group. This creates a non-equivalent environment for each of the isopropyl groups, resulting in the two broad signals. The aromatic region of the NMR integrates for approximately eight protons which show two resolved doublets which are representative of classic para-substitution ring spectra.

The amide biphenyl (**3**) was dissolved in THF and TMEDA and dilithiated with *sec*-BuLi at -30°C. These conditions were optimized by a previous TRU student (Reid, 2006).<sup>6</sup> Five minutes later, trimethylsilylchloride (TMS-Cl) was added to the intermediate (**4**) to synthesize the disilyl compound, 3,3'-di-(trimethylsilyl)-4,4'-di(N,N-diisopropylamide)biphenyl (**5**) (Scheme 2) with a yield of 23% (m.p. 181-182 °C) after being recrystallized from diethyl ether. Synthesis of (**5**) was confirmed by proton NMR (Table 2).

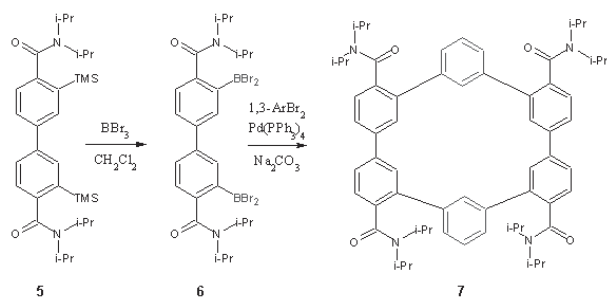
The proton NMR of (**5**) confirmed the addition of the two TMS groups by the appearance of the singlet integrating for approximately 18 protons at 0.38 ppm. The aromatic region of the NMR showed more



Scheme 2. Synthesis of 3,3'-di-(trimethylsilyl)-4,4'-di(N,N-diisopropylamide)biphenyl (5).

complex signals than (3) due to increased hindered rotation and steric crowding from the introduced TMS groups. The isopropyl groups are now clearly resolved. Two septets at 3.5 and 3.9 ppm indicates the two CH groups of the isopropyl moiety and the two doublets at 1.2 and 1.6 ppm shows the eight methyls of the isopropyl groups.

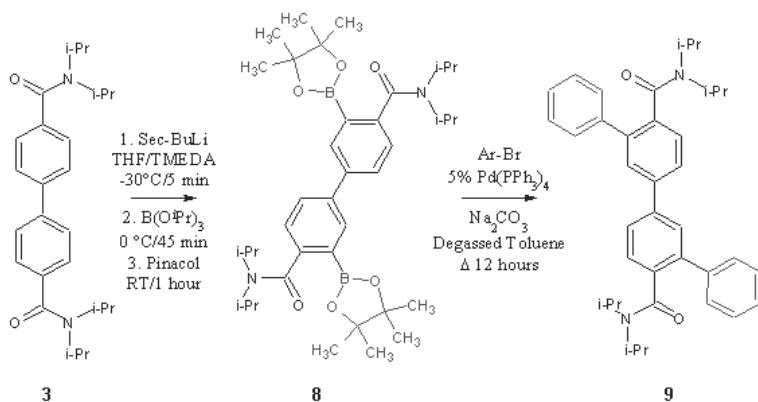
From this point, the synthesis of the novel macrocycle (7) was attempted using the boron tribromide reaction linked to a Suzuki-Miyaura cross-coupling reaction (Scheme 3).



Scheme 3. Attempted synthesis of the novel macrocycle (7).

We came to the conclusion that the first part of this reaction did not proceed to completion as NMR data of the crude product of the reaction showed TMS signals around 0.38 ppm; there should be no signal because the TMS constituents should have been converted to  $\text{BBr}_2$  groups. We linked this problem to a poisoned  $\text{BBr}_3$  reagent bottle because of its interaction with moisture in the air. At this point we began to attempt a new approach as it would take time to get a new bottle of  $\text{BBr}_3$ . This new method is known as the triisopropylborate method, which is synthetically advantageous because it can be completed in one pot, but had not yet been attempted on our molecule.

As a test case, the synthesis of compound **(9)** was undertaken using this different method. 4,4'-di(*N,N*-diisopropylamide)biphenyl (**(3)**) was double ortho lithiated and quenched with triisopropylborate ( $\text{B}(\text{O}i\text{Pr})_3$ ). Pinacol was then added and the solvent was removed by rotovap and high vacuum. The resulting pinacol derivative intermediate (**(8)**), which was not isolated, was reacted using the Suzuki-Miyaura cross-coupling method using tetrakis(triphenylphosphine)palladium(0) ( $\text{Pd}(\text{PPh}_3)_4$ ) as a catalyst to yield the quaterphenyl (**(9)**) as shown in Scheme 4. Quaterphenyl (**(9)**) had been previously synthesized by a former TRU student (Reid, 2006) using the  $\text{BBr}_3$  method above.<sup>7</sup> The crude product was column chromatographed and characterized by NMR (Table 3).

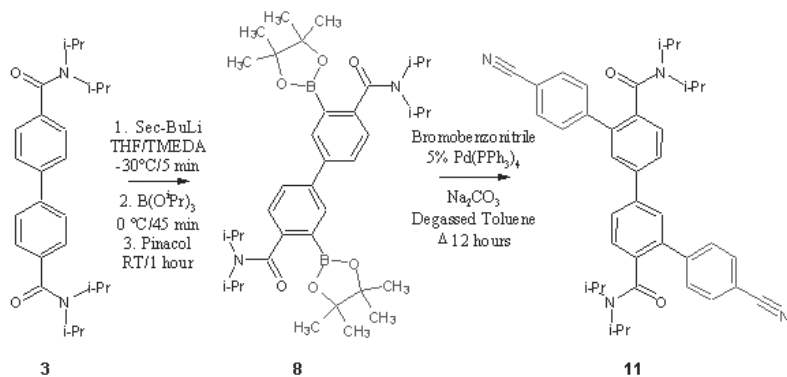


Scheme 4. Synthesis of 3,3'-diphenyl-4,4'-di(*N,N*-diisopropylamide)biphenyl (**(9)**).



NMR data for the synthesis of **(10)** was very convincing because of the diamagnetic anisotropy effects of the phenyl groups on the two methyl groups of the isopropyl, shown by the two doublets at 0.9 and 0.4 ppm. The aromatic region also integrated for 14 protons and shows the classic para-substitution pattern of a benzene ring, represented by the anisole moiety.

Synthesis of a third quaterphenyl, 3,3'-diphenyl(4'',4'''-nitrile)-4,4'-di(N,N-diisopropylamide)biphenyl (**11**), was completed using the same procedure as **(9)** and **(10)**, except using bromobenzonitrile as the coupling partner (Scheme 6). The crude product was also column chromatographed and characterized by NMR (Table 5).



Scheme 6. Synthesis of 3,3'-diphenyl(4'',4'''-nitrile)-4,4'-di(N,N-diisopropylamide) biphenyl (**11**).

The NMR data for **(11)** was also very convincing because of the diamagnetic anisotropy effects of the phenyl groups on the two methyl groups of the isopropyl, shown by the position of the two doublets at 1.0 and 0.5 ppm. The aromatic region also integrated for 14 protons and shows the classic para-substitution pattern of a benzene ring which is present in the benzonitrile moiety.

We were not able to obtain quantitative yield data on any of the quaterphenyl products because these experiments were completed on a very small scale (1 millimol) for only initial analytical confirmation of their synthesis. The next step in this project will be to obtain quantitative data (using larger preparations) for these quaterphenyl

syntheses as well as an attempt at the synthesis of the desired macrocycle (**7**) by either the  $\text{BBr}_3$  or the triisopropylborate method.

## Experimental

**4,4'-di(N,N-diisopropylamide)biphenyl (3):** White 4,4'-biphenyl dicarboxylic acid (**1**) (8.91 g, 36.78 mmol) was placed in a 250 mL RBF and was partially dissolved in 100 mL of colourless toluene. Translucent brown  $\text{SOCl}_2$  (40.27 mL, 15 eq, 0.5517 mol) was added to the charged 250 mL RBF followed by colourless DMF as a catalyst (2.5 mL, 0.88 eq) and then refluxed for 24 hours while stirring which produced a banana-yellow coloured solution with white crystals present. The resulting solution was concentrated on the rotary evaporator, then re-dissolved in colourless toluene (3 x 100 mL), again concentrated using the rotary evaporator to yield the off-white acid chloride intermediate (**2**) and finally put under aspiration overnight to remove the final traces of  $\text{SOCl}_2$ . The off-white crystals were then dissolved with THF (180 mL) and a pressure-equalizing dropping funnel was used for the dropwise addition of the translucent brown  $\text{NEt}_3$  (12.82 mL, 2.5 eq, 91.95 mmol) in THF (10 mL) over three minutes, then  $\text{NH}(i\text{Pr})_2$  (12.89 mL, 2.5 eq, 91.95 mmol) in THF (10 mL) over ten minutes and the brown opaque mixture was refluxed for one hour while stirring. After reflux and cooling to room temperature, 100 mL of deionized water was added and the THF was removed by an aspirator vacuum. The resulting amide in aqueous mixture was extracted using  $\text{CH}_2\text{Cl}_2$  (3 x 70 mL), the  $\text{CH}_2\text{Cl}_2$  layers combined and were washed with 1 M HCl (70 mL), deionized water (70 mL), 7%  $\text{NaHCO}_3$  (70 mL in 320 mL deionized water) and finally with a saturated NaCl solution (70 mL) in a 500 mL separatory funnel. The resulting washed  $\text{CH}_2\text{Cl}_2$  layer was then dried using  $\text{MgSO}_4$ , filtered, and concentrated using the rotary evaporator with the final traces of solvent being removed by high vacuum. The crude product was recrystallized using an ethyl acetate and hexanes combination which yielded 11.3731 g (76%) of a slightly off-white powder. 4,4'-di(N,N-diisopropylamide)biphenyl (**3**) was characterized by a melting point of (207-209.5 °C) and proton NMR (Table 1).

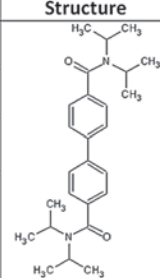
Chemical Shifts	Integration	Multiplicity	Assignment	Structure
1.6 ppm	23.94	Multiplet	Eight CH <sub>3</sub> 's	
3.7 ppm	3.78	Multiplet	Four N-C-H's	
7.3 ppm	7.96	Doublet	Two Aromatic H's	
7.6 ppm		Doublet	Two Aromatic H's	

Table 1. <sup>1</sup>H-NMR Spectral Analysis of 4,4'-di(N,N-diisopropylamide)biphenyl CDCl<sub>3</sub>, at 200 MHz

### 3,3'-di-(trimethylsilyl)-4,4'-di-(N,N-diisopropylamide)biphenyl:

Off-white 4,4'-di(N,N-diisopropylamide)biphenyl (**3**) (3.9983 g, 9.786 mmol) was added to an oven-dried 250 mL RBF and placed under high vacuum for 30 minutes to ensure dryness. The crystals were then purged with nitrogen and distilled, colourless THF was added (100 mL) under an inert atmosphere, and colourless TMEDA (5.91 mL, 4 eq, 39.144 mmol) were added to the 250 mL RBF, resulting in a pale yellow solution. The 250 mL RBF was set in an insulator and the solution cooled to -35°C using methanol and liquid nitrogen. Translucent brown *sec*-BuLi (29.43 mL, 4 eq, 39.144 mmol) produced a small amount of white precipitate which was assumed to be the dilithiated species (**4**). After five minutes yellow TMS-Cl (7.45 mL, 6 eq, 58.716 mmol) was added dropwise. The dark green solution was warmed to room temperature for 45 minutes after 15 minutes of reacting in the insulated cold bath. Saturated NH<sub>4</sub>Cl (50 mL) was added to the dark green solution to quench any unreacted alkyllithium, which produced two layers, a light brown THF layer and a very pale green aqueous layer. The THF was then removed by an aspirator vacuum and the aqueous solution was extracted using ethyl acetate (5 x 30 mL) with the combined ethyl acetate layers washed with deionized water (50 mL) and saturated NaCl (2 x 50 mL) in a 500 mL separatory funnel. The washed organic layer was dried using MgSO<sub>4</sub>, filtered, and concentrated using a rotary evaporator and high vacuum to produce a glassy brown oil. The crude product was then recrystallized using a diethyl ether/hexane combination

which yielded 2.4766 g of yellow crystals that were characterized by melting point of 181-182 °C and proton NMR (Table 2).

Chemical Shift	Integration	Multiplicity	Assignment	Structure
0.4 ppm	15.35	Singlet	Six Si-CH <sub>3</sub> 's	
1.2 ppm	24.76	Doublet	Four CH <sub>3</sub> 's	
1.6 ppm		Doublet	Four CH <sub>3</sub> 's	
3.5 ppm	4.52	Septet	Two N-C-H's	
3.9 ppm		Septet	Two N-C-H's	
7.2 ppm	6.34	Singlet	Two Aromatic H's	
7.5 ppm		Doublet	Two Aromatic H's	
7.8 ppm		Doublet	Two Aromatic H's	

Table 2. <sup>1</sup>H-NMR Spectral Analysis of 3,3'-di-(trimethylsilyl)-4,4'-di-(N,N-diisopropylamide)biphenyl CDCl<sub>3</sub>, at 200 MHz

### 3,3'-diphenyl-4,4'-di-(N,N-diisopropylamide)biphenyl:

Under an inert atmosphere of nitrogen, off-white 4,4'-di-(N,N-diisopropylamide)biphenyl (**3**) (0.4021 g, 0.9841 mmol) was purged with nitrogen and dry THF (20 mL) and dry TMEDA (0.59 mL, 4 eq, 3.936 mmol) were added to a 50 mL oven-dried RBF. The RBF was placed in an insulator and then cooled to -30°C using methanol and liquid nitrogen. Translucent brown *sec*-BuLi (2.94 mL, 4 eq, 3.936 mmol) was added dropwise to the cool 50 mL RBF; five minutes later colourless B(O*i*Pr)<sub>3</sub> (0.905 mL, 4 eq, 3.936 mmol) was added and the 50 mL reaction flask was allowed to react for 20 minutes in the cold insulator and then allowed to warm to room temperature for 45 minutes. The opaque solid pinacol (0.2908 g, 2.5 eq, 2.460 mmol) was added to the 50 mL RBF. After 72 hours (protocol indicates that after addition of B(O*i*Pr)<sub>3</sub> the RBF should be transferred to an ice bath, wait 45 minutes, then add pinacol and remove from ice bath and let sit for one hour) the resulting solution was concentrated in the rotary evaporator and high vacuum and the resulting pinacolate intermediate (**8**) purged with nitrogen. The 50 mL RBF containing

(8) and Pd(PPh<sub>3</sub>)<sub>4</sub> were transferred to a nitrogen inflated glove bag. The pale yellow catalyst (63 mg) was added to the flask, capped and removed from the nitrogen glove bag and attached to the nitrogen purged reaction apparatus. Colourless degassed bromobenzene (114 μL, 1.1 eq, 1.082 mmol), colourless degassed 2 M Na<sub>2</sub>CO<sub>3</sub> (2.46 mL, 5 eq, 4.9205 mmol) and colourless degassed toluene (5 mL) were added to the 50 mL RBF and refluxed for 12 hours while stirring. The solution was allowed to warm to room temperature and poured into deionized water (50 mL). The crude product was extracted from the deionized water using ethyl acetate (6 x 10 mL) and was washed with saturated NaCl (10 mL), dried with MgSO<sub>4</sub>, and concentrated using a rotary evaporator and high vacuum. The crude product, yielding approximately 100%, was run through a short column of silica gel using 50% ethyl acetate/hexanes and recrystallization was attempted using an ethyl acetate/hexane combination, but crystals did not form. Proton NMR of the crude product gives convincing evidence of the biphenyl product (Table 3) but also shows evidence of impurities by the high integration of the isopropyl methyl groups which were determined to be two singlets of the isopropyl alcohol byproduct at 1.25 and 1.22 ppm.

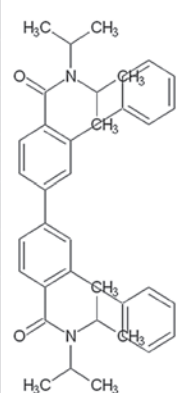
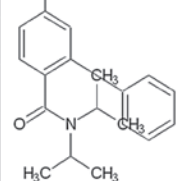
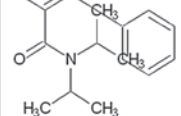
Chemical Shift	Integration	Multiplicity	Assignment	Structure
0.38	29.64	Doublet	Two CH <sub>3</sub> 's	
0.94		Doublet	Two CH <sub>3</sub> 's	
1.30		Doublet	Two CH <sub>3</sub> 's	
1.55		Doublet	Two CH <sub>3</sub> 's	
3.25	3.58	Septet	Two N-C-H's	
3.50		Septet	Two N-C-H's	
7.7-7.15 ppm	14.78	Complex multiplets	14 Aromatic H's	

Table 3. <sup>1</sup>H-NMR Spectral Analysis of 3,3'-diphenyl-4,4'-di-(N,N-diisopropylamide) biphenyl CDCl<sub>3</sub>, at 200 MHz

**3,3'-diphenyl(4'',4''''-methoxy)-4,4'-di(N,N-diisopropylamide) biphenyl:** Under an inert atmosphere of nitrogen, off-white 4,4'-di(N,N-diisopropylamide)biphenyl (**3**) (0.4231 g, 1.0355 mmol) was purged with nitrogen, then distilled dry THF (20 mL) and dry TMEDA (0.625 mL, 4 eq, 4.142 mmol) were added to a 50 mL oven-dried RBF. The RBF was placed in an insulator and then cooled to -30°C using methanol and liquid nitrogen. Translucent brown *sec*-BuLi (3.09 mL, 4 eq, 4.142 mmol) was added dropwise to the cool 50 mL RBF; five minutes later colourless B(O*i*Pr)<sub>3</sub> (0.952 mL, 4 eq, 4.142 mmol) was added and the 50 mL reaction flask was transferred to an ice bath and allowed to react for 45 minutes. The opaque solid pinacol (0.3059 g, 2.5 eq, 2.589 mmol) was added to the 50 mL RBF and removed from the ice bath and allowed to react for our hour. The resulting solution was concentrated in the rotary evaporator and high vacuum and the resulting pinacolate intermediate (**8**) was purged with nitrogen. The 50 mL RBF containing (**8**) and Pd(PPh<sub>3</sub>)<sub>4</sub> were transferred to a nitrogen-inflated glove bag. The pale yellow catalyst (~60 mg) was added to the flask, capped and removed from the nitrogen glove bag and attached to the nitrogen-purged reaction apparatus. Colourless degassed 4-bromoanisole (142 µL, 1.1 eq, 1.139 mmol), colourless degassed 2 M Na<sub>2</sub>CO<sub>3</sub> (2.59 mL, 5 eq, 5.1775 mmol) and colourless degassed toluene (5 mL) were added to the 50 mL RBF and refluxed for 15 hours while stirring. The resulting light black mixture was allowed to warm to room temperature and poured into deionized water (50 mL). The crude product was extracted from the deionized water using ethyl acetate (6 x 10 mL) and was washed with saturated NaCl (10 mL), dried with MgSO<sub>4</sub>, and concentrated using a rotary evaporator and high vacuum. The crude product, yielding slightly over 100%, was recrystallized using ethyl acetate/hexanes but resulted in an oiling out. The solution was then run through a short column of silica gel using 50% ethyl acetate/hexanes and recrystallization was again attempted using an ethyl acetate/hexane combination but crystals did not form. Proton NMR of the crude product gives convincing evidence of 3,3'-diphenyl(4'',4''''-methoxy)-4,4'-di(N,N-diisopropylamide)biphenyl (Table 4).

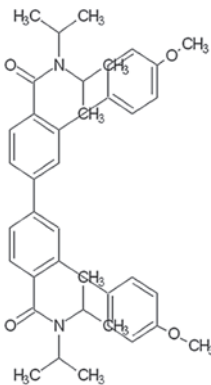
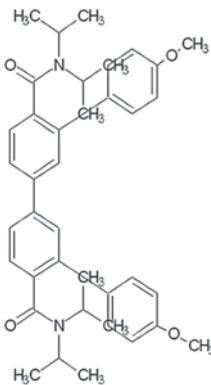
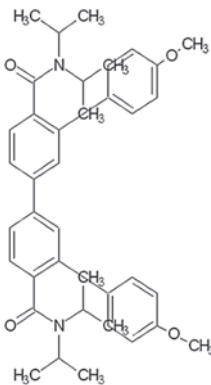
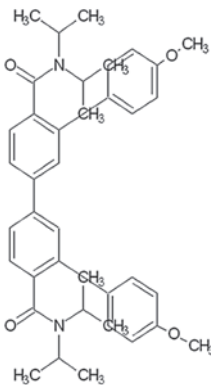
Chemical Shift	Integration	Multiplicity	Assignment	Structure
0.40	23.79	Doublet	Two CH <sub>3</sub> 's	
0.90		Doublet	Two CH <sub>3</sub> 's	
1.32		Doublet	Two CH <sub>3</sub> 's	
1.55		Doublet	Two CH <sub>3</sub> 's	
3.25	3.09	Septet	Two N-C-H's	
3.50		Septet	Two N-C-H's	
3.73	6.50	Singlet	C-O-CH <sub>3</sub>	
3.80		Singlet	C-O-CH <sub>3</sub>	
7.7-7.15 ppm	18.62	Multiplet	14 Aromatic H's	

Table 4. <sup>1</sup>H-NMR Spectral Analysis of 3,3'-diphenyl(4'',4'''-methoxy)-4,4'-di(N,N-diisopropylamide)biphenyl CDCl<sub>3</sub>, at 200 MHz

### 3,3'-diphenyl(4'',4'''-nitrile)-4,4'-di(N,N-diisopropylamide)

**biphenyl:** Under an inert atmosphere of nitrogen, off-white 4,4'-di(N,N-diisopropylamide)biphenyl (**3**) (0.4015 g, 0.9827 mmol) was purged with nitrogen, then distilled dry THF (20 mL) and dry TMEDA (0.59 mL, 4 eq, 3.931 mmol) were added to a 50 mL oven-dried RBF. The RBF was placed in an insulator and then cooled to -30°C using methanol and liquid nitrogen. Translucent brown *sec*-BuLi (2.93 mL, 4 eq, 3.931 mmol) was added dropwise to the cool 50 mL RBF; five minutes later colourless B(O*i*Pr)<sub>3</sub> (0.904 mL, 4 eq, 3.931 mmol) was added and the 50 mL reaction flask was transferred to an ice bath and allowed to react for 45 minutes. The opaque solid pinacol (0.2903 g, 2.5 eq, 2.457 mmol) was added to the 50 mL RBF and removed from the ice bath and allowed to react for one hour. The resulting solution was concentrated in the rotary evaporator and high vacuum and the resulting pinacolate intermediate (**8**) was purged with nitrogen. The 50 mL RBF containing (**8**) and Pd(PPh<sub>3</sub>)<sub>4</sub> were transferred to a nitrogen-inflated glove bag. The pale yellow catalyst (55 mg) was added to the flask, capped and removed from the nitrogen glove bag and attached to the nitrogen-purged reaction apparatus. Colourless degassed *p*-bromobenzonitrile (0.1968 g, 1.1

eq, 1.081 mmol), colourless degassed 2 M Na<sub>2</sub>CO<sub>3</sub> (2.46 mL, 5 eq, 4.9135 mmol) and colourless degassed toluene (5 mL) were added to the 50 mL RBF and refluxed for 12 hours while stirring. The resulting light black mixture was allowed to warm to room temperature and poured into deionized water (50 mL). The crude product was extracted from the deionized water using ethyl acetate (6 x 10 mL) and was washed with saturated NaCl (10 mL), dried with MgSO<sub>4</sub>, and concentrated using a rotary evaporator and high vacuum. The crude product, yielding 94% (0.5623 g), was run through a short column of silica gel using 50% ethyl acetate/hexanes and recrystallization was again attempted using an ethyl acetate/hexane combination, but crystals did not form. Proton NMR of the crude product gives convincing evidence of 3,3'-diphenyl(4'',4'''-nitrile)-4,4'-di(N,N-diisopropylamide)biphenyl (Table 5).

Chemical Shift	Integration	Multiplicity	Assignment	Structure
0.47	23.27	Doublet	Two CH <sub>3</sub> 's	
0.99		Doublet	Two CH <sub>3</sub> 's	
1.25		Doublet	Two CH <sub>3</sub> 's	
1.51		Doublet	Two CH <sub>3</sub> 's	
3.33	4.25	Septet	Two N-C-H's	
3.47		Septet	Two N-C-H's	
7.35-7.83	14.49	Multiplet	14 Aromatic H's	

Table 5. <sup>1</sup>H-NMR Spectral Analysis of 3,3'-diphenyl(4'',4'''-nitrile)-4,4'-di(N,N-diisopropylamide)biphenyl CDCl<sub>3</sub>, at 200 MHz

**Macrocycle (7) synthesis:** Off-white 3,3'-di-(trimethylsilyl)-4,4'-di-(N,N-diisopropylamide)biphenyl (**5**) (0.2389 g, 0.4320 mmol) was placed in a 50 mL RBF and purged with nitrogen. Anhydrous CH<sub>2</sub>Cl<sub>2</sub> (4 mL) was added and the mixture was cooled to 0°C. Colourless BBr<sub>3</sub> (2.5 eq, 175 μL, 1.08 mmol) was added dropwise and a small amount of black precipitate formed upon contact while the solution

was being stirred. The RBF was removed from the ice bath and allowed to warm to room temperature and stirred for another two hours. The  $\text{CH}_2\text{Cl}_2$  was then aspirated off and placed into a nitrogen-inflated glove bag along with the bottle of  $\text{Pd}(\text{PPh}_3)_4$ . Approximately 60 mg of  $\text{Pd}(\text{PPh}_3)_4$  was added to the RBF and placed on a reaction apparatus (condenser capped with a nitrogen adapter and septum) and purged with nitrogen. Colourless degassed DME (8 mL) and colourless degassed 2 M  $\text{Na}_2\text{CO}_3$  were added through the top of the septum. 1,3-dibromobenzene (2 eq, 104  $\mu\text{L}$ , 0.8641 mmol) was mixed with colourless degassed DME (4 mL) in a separate centrifuge tube previously purged with nitrogen and the solution was added dropwise to the 50 mL RBF through the septum over one hour and refluxed for 12 hours.

## Conclusion

We did not achieve our goal of synthesizing the cyclohexaphenyl macrocycle (**7**) but developed additional methods for coupling reactions. The project results demonstrated the synthesis of quaterphenyl molecules using simultaneous double *ortho* lithiations, novel one-pot coupling reactions using the triisopropylborate method and simultaneous di-Suzuki-Miyaura cross-coupling reactions. This was completed by employing parts of well-established techniques for the organic syntheses of aromatic compounds. These results provide an efficient route to achieve the synthesis of symmetrical quaterphenyls that can be a synthetic chemist's playground by further reducing the amide directing group to an aldehyde using a Schwartz reagent<sup>7</sup>, further directed *ortho* metalations or remote directed metalations. Further research is required to explore the potential of synthesizing unsymmetrical quaterphenyls using a combination of the triisopropylborate method and the boron tribromide method (Scheme 7) and the novel cyclohexaphenyl macrocycle (**7**).

In future research I hope to synthesize a variety of potentially useful unsymmetrical quaterphenyls by use of the Suzuki-Miyaura cross coupling and DoM methodologies, as well as macrocycles of the molecule type (**7**). For the synthesis of the macrocycle as well

as the symmetrical and unsymmetrical quaterphenyls please see my honours thesis available June 2008 in the Thompson Rivers University library.

## Notes

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## About the Author

*Daniel Rainkie, who graduated from St. Ann's Academy in 2003, is finishing a TRU Bachelor of Science Chemical Biology Honours degree. He enjoys playing video games, skydiving, rock-climbing, skiing and boating, and has volunteered at Kamloops Fusion Rotaract, Glovers Medicine Center, and the AWANA club of Kamloops. He was awarded a CUEF scholarship in 2007, and won Most Innovative Project and Best Chemistry Poster in the TRU poster showcase in 2008. He plans further study with the goal of becoming a university chemistry professor or a pharmacist.*



# **Textured Bodies, Embodied Texts: The Lesbian Body of Twentieth-Century Literature**

JESSICA HOVANES

## **Abstract**

This presentation uses textual analysis to identify ways in which the lesbian body has been consistently denied the status of “woman” in twentieth-century literature and has instead been represented as a non-gendered “grotesque.”

In seeking to understand the cultural practices and beliefs that shape literary representations of lesbian embodiment, I found myself unable—or unwilling—to completely separate my own voice and experience from that of the literary ancestors I was studying. As a student of literature, I was struck while reading lesbian texts by their systematic erasure from culture, and of the denial of homosexual authors' sexuality after their deaths. Further, with lesbian texts specifically, I had to learn to accept that, probably because of their subject matter, they would never be considered literature *per se*, and so are rarely studied and rarely taken seriously. As a lesbian who grew up in a small town, knowing no other gay women, I can testify to the strength of literary texts, of representation on young lesbians who may have no other cultural mirrors in which to see themselves. While using my own experience and voice in the context of literary criticism may seem odd or unprofessional, in the context of a culture that has at best been marginalized and at worst simply denied existence, the search for lesbian embodiment permeates lesbian literary representation and, I believe, seeps into the lives of all lesbians denied cultural space, voice, and respect.

I used to wear a tee-shirt stating “nobody knows I am a lesbian” around the university campus, the city and, importantly, the university residence in which I was living. In the most specific sense, the shirt was a response to my living situation and the coming out conversations I continually faced in interacting with my peers; after six months of living in residence, people I spent time with every day still seemed surprised when I came out. In their defense, I do admit that I often avoided coming out if possible, believing that my sexual orientation did not matter, but I was still surprised and a little miffed that they did not already know (couldn't they tell just by looking at me?). What I did not realize at the time was the significance of wearing that particular tee-shirt. Literally writing my sexual orientation on my body connected me to a long tradition of lesbians seeking embodiment through writing. And, though unconsciously, this illustrated the cultural forces and beliefs acting on lesbian bodies which seek both to mark lesbian bodies as *other*,

and erase them as non-existent.

So, are lesbian bodies different from female bodies? Are not lesbians women? A great deal of research and theory surrounds the question of female embodiment, probably starting with de Beauvoir's famous question "what is a woman?" (qtd in Conboy 1). The answer to this question invariably involves theories of embodiment. Society creates *woman* through practices, institutions, customs, beliefs, ideals. In this sense, the sign *woman* signifies nothing real but a set of idealized characteristics which women must strive to embody through the manipulation of their physical form. Proximity to this set of ideals determines her femaleness while deviation marks her as grotesque. Of course, the same could be said of men, children and lesbians, but the specifics of the idea(l)s constituting *women* originate in a culture specifically designed to deny women, on the basis of gender, the power, rights and privileges afforded to men. Sandra Lee Bartky identifies three broad areas in which cultural practices inscribe on and creates the female body: "practices that aim to produce a body of a certain size and general configuration; those that bring forth from this body a specific repertoire of gestures, postures, and movements; and those directed toward the display of this body as an ornamented surface" (Conboy 132). These cultural practices describe the actions that reproduce the female body and with it acceptable femininity. While the same cultural forces are at play in the creation of the lesbian body, the specific practices differ. Just as *woman* is not born but made, so too is *lesbian* (I use these categories as endpoints in the cultural practices acting on female bodies) and since cultural expectations which create *woman* differ from those that create *lesbian*, lesbians cannot be said to be women.

*I hadn't cut my hair for four years; it was long, naturally wavy and chestnut brown. Two weeks after moving from the small town of my childhood, I shaved my head, leaving only half an inch of bristly fur for cover. I bought boots at the local army surplus, smoked a cigarette, and thought about liberation.\**

\* All italicized and indented script denotes excerpts from the author's journal

As Terry Castle notes, women have always desired women: the sexual acts associated with lesbians are not an invention of the twentieth century (8). Though I agree with Castle in point, I argue that *lesbian* as a specific, culturally created entity, in fact is a creation of the twentieth century. The term lesbian only took on its modern meaning in the late nineteenth century but was rarely used until the early twentieth century. Before lesbians existed there were sapphists and inverters. This morphological shift in the naming of female-female desire is as striking as it is important. The importance lies in the type of word used to describe female homosexual action. Although all three words are used as nouns in this context, native speakers of English will recognize that “sapphist” relates more closely to the adjective Sapphic and sounds like the group of words used to indicate a profession or occupation signed by the suffix “-ist,” words like “optometrist” or “linguist.” Invert clearly derives its meaning from the verb meaning “to turn upside down” (unless one is speaking of a specific type of sewer pipe, probably known to the male doctor who coined the sexual meaning); and, again signed by its suffix “-ian,” lesbian must denote a noun used to signal a specific type of person or entity, like “amphibian” or “Canadian.” So, in the early twentieth-century, female homosexuals started as adjectives, changed into verbs and then became nouns. This is not just semantics: the evolution in language emphasizes a shift in cultural understanding from the occupation (action) of the female homosexual to her body (actor); or as Castle notes “as soon as the lesbian is named...she is dehumanized” (6). This cultural shift creates *lesbian* as an immutable, inborn identity (body) separate from the category woman; while *women* may practice sapphism as an expression of sexuality, they retain *woman* as their primary identity marker. So, if a lesbian is not a woman, what does she look like?

*While living in residence my search for lesbian embodiment led to a series of elaborate experiments in which I dressed in men's clothing, bound my breasts with a tensor bandage, stuffed my briefs with rolled socks and attempted to 'pass' on campus. While no one could mistake my five-*

*foot frame for that of an adult male, university campuses everywhere swarm with underdeveloped, effeme young men, and I often went unchallenged. But, like Peter Pan, I as a boy could never grow up and I knew I wasn't a man anyway.*

Though *lesbians* are not *women*, they are female since they exist in female bodies. In the binary patterns existent in patriarchal, western culture, their femaleness places them purposefully in opposition to men and the power structures favouring male bodies. However, because culture creates lesbians as separate from women, cultural practices must mark the bodies of lesbians differently from the bodies of heterosexual women. This becomes increasingly clear when looking at literary representations of lesbian bodies, since in literature the cultural ideals marking lesbians take shape and transmit to the readers of the texts. Also, until recently popular visual images of lesbians outside of pornography were not as common as literary images.

*In seventh grade I quietly admitted to myself that I wanted to kiss a girl; that same year Ellen DeGeneres publicly came out as lesbian. I remember being so happy that she didn't look like k.d. lang, the only other image of a lesbian I was familiar with.*

Though not traditionally *great literature*, Radclyffe Hall's *The Well of Loneliness* (1928) is often characterized as the one novel that every lesbian born before 1980 has read (Whitlock 558). Identified as an invert, the image of Stephen Gordon as the stereotypical, mannish lesbian persists even today. She seems the prototype with her wide shoulders and narrow hips, her short hair and propensity for wearing suits. Using conventions of the grotesque, Hall explicitly roots Stephen's inversion in her body using the conventions of sexology to argue that the shape of Stephen's body from birth creates her as something other than a woman: "a narrow-hipped, wide-shouldered little tadpole of a baby"(13.). The recurrent question of Stephen's childhood is not the expected who am I? but the aberrant what am I? indicating that her search for subjectivity lies outside the models of female embodiment available to her.

Even so, Stephen is no less created through cultural practices than any woman. She grooms herself for hours each day, insists on extravagantly expensive tailored clothing and accessories and stunningly manicured fingernails; further, she subjects herself to a rigorous exercise schedule for the purposes of sculpting her strong and muscular body. Though Stephen's birth gave her a bone structure considered mannish, her chosen practices differentiate her body from that considered proper to women in her culture and time. And, since *The Well* became the point of reference of lesbian culture and embodiment, her image and body practices influenced the cultural ideals inscribed on lesbian bodies everywhere.

*I was working at the bingo hall in my senior year in high school. Just months earlier my first girlfriend had left me for the boy who had played the lead in our school's musical production of West Side Story, nobody knew we were in a relationship, nobody knew I was a lesbian. Carolyn walked into the hall and I watched her saunter to a table in the corner: she was tall, had short hair and was wearing jeans a leather jacket that enhanced her shoulders. I thought to myself: there's a lesbian.*

As culture moved away from sexology as the dominant discourse of embodiment and subjectivity, new cultural models of lesbian embodiment emerged that perpetuated and enforced the representation of lesbians as creatures other than women. Since lesbians were no longer identifiable through congenitally atypical physical bodies, culture sought to identify them through other physical means. Patricia Highsmith demonstrates culture's paranoia in this transition in her 1952 lesbian thriller *The Price of Salt*. While publishers issued a host of lesbian paperbacks in the 1940s and 1950s aimed mostly at men and always ending with a *real man* rescuing the wayward girl caught up in a deviant lesbian relationship, Highsmith's novel deviates in its optimistic ending offering the possibility of a continuing lesbian relationship. Before the happy ending however, Highsmith creates a highly paranoid plot structure reminiscent of Bentham's panopticon. Since the lesbian couple look like regular

women but are not, they become trapped in the panoptical prison of culture shown through the constant cultural practices monitoring their actions and motions, represented through the constant sending and receiving of post and the omnipresent registers at the motels. Further, heterosexual culture, shown through the private investigator (the agent of the husband), keeps steady watch on them through covert, mechanical devices such as dictaphones planted in their bedrooms and cameras shooting them from unseen locations. While these conventions act in the novel as suspense-building devices, in the cultural arc of lesbian embodiment they function to identify the bodies of lesbian women: they record the physical elements of lesbianism (voices, images, gestures) for purposes of categorization in a culture that has lost the set of congenital, physical markers previously used to classify deviant bodies. As in Bentham's prison, the lesbians are trapped in a culture that needs to watch and record their bodies, to look at them and see their difference. Highsmith illustrates the impossibility of lesbians escaping the cultural ideas that create their bodies. Here, the representation of lesbians as women gets lost in the overarching cultural obsession to identify them as something other.

*Erica approached me one day and said she needed to tell me something. We had lived in residence together for six months and had often spent time together. "I didn't know you were gay," she said, "and I feel really bad." I was confused and a little stunned:*

*J: "But Erica, I talk about my ex-girlfriend."*

*E: "I talk about my girlfriends."*

*J: "I go to gay bars on the weekend."*

*E: "I thought you were supporting your friends."*

*Silence... then,*

*E: "you don't look like a lesbian."*

The panoptical prison seems to have failed as the 1990s, and third-wave feminism produced Jeanette Winterson and her nameless, androgynous, lesbian narrator of *Written on the Body*. As her title indicates, Winterson specifically addresses the problem of lesbian

embodiment by creating a character that, while identifiable as lesbian, cannot be identified in terms of embodied sex. By having no physical body, the narrator falls into an object (non-subject) position since sex often determines subjectivity (Butler 14); however, the narrator also constitutes the only speaking position in the novel, the disembodied “I.” While Winterson seems to argue that love surpasses the culturally-created boundaries of gender, the argument fails when viewed through the lens of historical representations of embodied lesbianism. Since twentieth-century culture creates lesbians as females but not women, the problem of physical representation culminates in a bodiless character—as no such body exists.

However, her voice persists and her pen writes. While the title indicates that she writes on the body, actually, she writes the body, her body, into the text through her genderless, synecdochic, body descriptions splitting the plot in half: “the cells, tissues, systems and cavities of the body” (113), “The skin” (121), “The skeleton” (127), “the special senses” (135). Though she seems careful to choose ungendered body parts, her inclusion of clavicles in this eroticized context plays on the cultural sexualisation of the female bone structure. Further, by not naming the narrator as woman, female or lesbian, Winterson creates a situation where the character’s body must be understood in terms of action or movement. This brings female desire back into the realm of the verb but does not put the lesbian subject back into the body of either the congenitally disfigured, or the traditionally female. Instead, it gives her authorization to write her own body into the text.

Interestingly, perhaps unfortunately, Winterson frames the sections of the novel specifically addressing the body with disease. The narrator writes her body relationally to that of her lover who is dying of cancer: “I thought difference was rated to be the largest part of sexual attraction but there are so many things about us that are the same...To remember you it is my own body I touch” (129). Here, it seems the narrator tries to literally re-member her lover, to put her lover’s body back together, by touching her own body. But, the narrator describes her lover’s body in meticulous detail so, these

passages indicate that she is not trying to remember her lover's body, but her own. And with no cultural precedent to draw from, her own lesbian body remains untheorized, or dismembered. While beautifully rendered, *Written on the Body* still presents the lesbian body as a conglomeration of parts, a Frankenstein's monster, only visible through the mirror of a diseased woman's body.

*Every time I go to the doctor the nurse asks me if I'm on birth control. Every time I tell her I am in no danger of becoming pregnant since I don't have sex with men. She always looks at me as if I'm being rude. I always wonder where she learned about human reproduction.*

Culture creates bodies. In western culture, the male body has seemingly been taken as ideal with the female always considered deficient, a derivative, a rib. So female bodies have been set against themselves; unable to ever achieve the ideal of male embodiment, they seek the ideal of female embodiment, an imaginary ideal created in a male-dominated culture for the purposes of preserving its dominance. Female bodies become women's bodies through conformation to patriarchal, heterosexual cultural practice. Twentieth-century culture has enforced these practices by contrasting the heterosexual, or *real*, woman's body with that of the lesbian body. By removing the emphasis on the action of female homosexuality and placing it on the actor, culture began a systematic process of representing the lesbian body as female but not *woman*. Through a critical look at the literary representation of lesbian bodies it becomes clear that by creating the lesbian as a female other, the representation of her body can only start as abnormal and end in absence. However, as the continued presence of these texts indicates, while lesbian bodies reconfigure and disappear with culture, lesbian voices persist.

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## About the Author

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# **Gender Inequality and University Faculty: The Gendered Institution, Schemas, and Subtle Sexism**

SABRINA WEEKS

## **Abstract**

This presentation argues that three main factors are responsible for gender inequity in institutions of higher learning, exploring the university as a gendered institution which perpetuates inequality through embedded sexism supported by internalized gender schemas and perpetuated through acceptance of subtle sexism.

## Introduction

Gender inequity within institutions of higher learning has been a hotbed of debate for several decades, yet the gender-based wage gap and discriminatory processes of promotion remain largely unchanged and unexplained (Ginther and Hayes, 2003; Ornstein & Stewart, 1996). In Canada, one-quarter of fulltime faculty are women and only eleven percent have acquired full professorships (Wyn, Acker, and Richards, 2000). Subsequently, a large body of research has substantiated the existence of gender discrimination within the pay and promotion practices of universities by disproving the effects of other variables in completely explaining the inequity (Ginther and Hayes, 2003; Ornstein and Stewart, 1996; Wyn, Acker, and Richards, 2000 etc.). Variables such as job segregation and workload/task differentiation (Kjeldal, Rindfleish, and Sheridan, 2005; Ornstein & Stewart, 1996), academic productivity (Davis and Asten, 1990; Jackson, 2004; Nakhaie, 2002), and domestic issues such as marriage/common-law relationships and homecare responsibilities (Baxter, Hewitt and Western, 2005; Hochschild, 1989; Sutor, Mecom, and Feld, 2001; Valian, 2004) have been investigated as the source of the disparity, yet each study found that although these variables may play a part in perpetuating gender inequality, they cannot account for the whole picture, and when measures were taken to control for these variables, the disparity remained.

This essay argues that, aside from the variables listed above, three main factors are at play in the continuance and reproduction of gender disparity in institutions of higher learning. First, universities exist as already gendered institutions, and as such, perpetuate inequality through embedded sexism. Second, embedded sexism is supported in part by internalized gender schemas. And third, the support of embedded sexism is often perpetuated through the enactment or acceptance of subtle forms of sexism which exist in spite of actions taken to bring equality to university institutions.

### **Academic Productivity, Job Segregation, and Domestic Issues**

Canadian universities each have their own pay structures based on their size, stature and historical reputation (Ornstein and Stewart, 1996); however, gendered job segregation, meaning “women’s and men’s concentration in different occupations, industries, jobs, and levels in workplace hierarchies,” is a factor that contributes to inequality (Kimmel, 2004, p.188). First, according to Nakhaie (2002), female faculty tend to cluster in less prestigious, smaller universities. These universities often place less emphasis on research, and as such, decrease publication potential which is both an important measurement of academic productivity and a prerequisite in many universities for advancement (Nakhaie, 2002; Jackson, 2004). Second, women have a tendency to find employment within the social sciences, education, humanities and the arts, whereas men dominate fields such as computer science, engineering and mathematics (Ornstein and Stewart, 1996). This has been argued as an explanatory factor for the discrepancy; however, in Canada, the pay differentiations between disciplines are not significant (Nakhaie, 2002; Jackson, 2004; Ornstein and Stewart, 1996). Third, women are predominantly employed within the lower ranks of academia with just over eleven per cent of those employed as faculty holding full professorships (Ornstein and Stewart, 1996). Further, rank of faculty has been linked to academic productivity, meaning that those faculty members holding a full professorship are more likely to produce documents for publication than those of a lesser rank (Nakhaie, 2002; Jackson, 2004). However, it was unclear whether higher rates of publication led to promotion or if the promotion led to higher rates of publication (Nakhaie, 2002). Further, research has found that there was not a substantive gendered difference in faculty publications when variables such as age and rank were accounted for (Jackson, 2004). Fourth, women also make up the greatest proportion of part-time university faculty (Valian, 2004). In fact, women make up only about twenty-five percent of full-time faculty in Canada (Wyn, *et al.*, 2000). Part-time faculty generally have fewer pay increases and promotions.

According to Baxter, Hewitt and Western (2005), researchers have found that married or common-law married women published less than married or common-law married men. This was due predominantly to women's traditional responsibility for the management of the home and children (Baxter, Hewitt and Western, 2005; Hochschild, 1989). Suitor, Mecom, and Feld (2001) posit that female professors, as with most North American women, carry the brunt of household labour, particularly when married, living common-law or parenting. Subsequently, it was argued that married or common-law married women with children spent less time on research as a result. However, after introducing appropriate controls, no gendered difference was found. Furthermore, Valian (2004) argues that childless women are still promoted less readily than men thus predicating the existence of other variables perpetuating the discrepancy.

### **Ideology, Embedded Sexism and the Disembodied Hierarchy**

According to Kimmel (2004), one explanation for the continuance of workplace inequality between men and women is that workplace ideologies have lagged behind in the acceptance of women as equals. Predominantly, the workplace is seen as the arena in which men defined themselves as men. Career-defining attributes such as competency, aggressiveness, and ambition are seen as masculine characteristics and thus disconfirming society's ideals of femininity. Women in the workplace were initially viewed as emotion workers, employed for their supportive and nurturing qualities to lubricate the complexities of the workplace. Femininity was maintained by their obvious position of subordination by nature of their positions as support staff for their male superiors. In the university environment, gendered expectations are less traditional, but nonetheless, these notions of women as subordinate persist (Nakhaie, 2002; Jackson, 2004). Kimmel (2004) argues that the continuance of traditionalism in regards to gender role expectation (man as breadwinner; woman as wife and mother) along with

opposing pressures from changes in economic and social realities has made the contemporary workplace an arena for defining and redefining gender issues.

Kimmel (2004) posits that inequality exists in part due to the nature of the reproducing power of institutions:

Institutions create gendered normative standards, express a gendered institutional logic, and are major factors in the reproduction of gender inequality. The gendered identity of individuals shapes those gendered institutions, and the gendered institutions express and reproduce the inequalities that compose gender identity. (p. 101)

Therefore, universities, as institutions of higher learning, perpetuate gender inequality as a reflection of the internal logic and principles inherent within the institution while reproducing and upholding the dominant beliefs of society at large.

According to Acker (1990), the term gendered institution refers to when “advantage and disadvantage, exploitation and control, action and emotion, meaning and identity, are patterned through and in terms of a distinction between male and female, masculine and feminine” (p. 144). Furthermore, Acker argues that discriminatory gendering is the result of the interplay at least five processes. First, labour tasks and positions are divided by gender where men predominantly hold places of power. Second, symbols and images are constructed that serve to reinforce the perceived normality of the labour divisions. Third, interactions between people—whether between the same or opposite genders—reproduce and support notions of dominance and submission. Fourth, these processes aid in the gendering of the individual which may bring with it an awareness of the three prior components, resulting in choices made in favour of societally deemed gender-appropriate types of jobs, use of language, and personal presentation. The workplace plays a huge role in the development of the self. According to Wyn *et al.* (2000), “the self is crafted in the workplace, through linguistic communication choices, self-significance and bodily habitus in ways that often contradict the diverse entities we embody as private women” (p. 443). In other

words, the institution creates a type of narrow femininity that is specific to the workplace through the reproduction of gendered ideals which serve to subordinate women. Last, Acker (1990) claims that the gendering of our primary structures of socialization such as the family serve as a preface in support of further gendering within other structures, including universities. These processes serve to legitimate inequality in the workplace.

Acker (1990) argues that discrimination is embedded and obscured within institutions. This is accomplished through the illusion of neutral asexual and disembodied conceptions of both the job and the hierarchy. In other words, even though positions within an organization appear to be gender neutral, the most sought-after characteristics of the employee are based on ideal notions of masculinity. Practices such as job evaluation are in fact evaluations based on masculine criteria which place women at an immediate disadvantage. Furthermore, according to Denton and Urla Zeytinoglu (1993), women in academia are stereotyped as being devoid of the characteristics necessary to fulfill the decision-making aspects of higher positions and as such are prematurely discounted as incapable. Consequently, men, by virtue of being male, are already perceived as suitable for and deserving of placement in the higher ranks of academia. This results in the undervaluation of feminine characteristics and the assumptions that those who possess these characteristics are merely less able.

### **Gender Schemas and Internalized Devaluation**

Gender schemas, which are socialized and internalized beliefs as to the norms and expectations around gender performance, play a role in the individual faculty members' acceptance of institutional inequality as normative (Valian, 2004). Based on these schemas, individuals align certain gendered characteristics with certain competencies, worth and abilities. According to Valian (2004), males are thought of as capable of acting independently, as being task oriented, and as having a reason behind their actions. On

the contrary, women are regarded as nurturing, expressive, and behaving with the group in mind. These beliefs influence how we perceive which characteristics are valuable in the workplace, and, as such, affect our assessment of people's capabilities, aptitude and value. This negatively affects women in the workplace because it disallows women to be perceived as leaders by both their superiors and themselves.

Valian (2004) goes on to say that women often feel a lesser sense of entitlement because they perceive themselves as being worth less than their male coworkers. This directly affects women's capacity to negotiate effectively. One place where women are socialized to give themselves less value is in the childhood home. Through early divisions of labour, girls are taught to de-self in service of others with little or no compensation (labour of love) and boys are immediately taught that their work is worth compensation. Valian (2000) claims that women's failure to see themselves as deserving of equality presupposes the continuance of inequity:

Women's lack of entitlement, and people's expectations that women will not behave in an entitled manner, influence the jobs that women are called upon to do and accept... [As a result, women often end up] doing institutional 'housework' and institutional 'labours of love.' These are usually low-visibility, low-power, low-reward, and labour intensive tasks. (p. 212)

Because both gender schemas and embedded sexism of the institution operate predominantly below conscious awareness, women often participate in behaviours and beliefs that impede their own success (Acker 1990; Valian, 2004). In other words, there is a relationship between internalized sexist beliefs, the embedded sexism of the university structure, and the discriminatory practices of promotion.

### **Sexism and the Many Shades of Inequality**

So, what, exactly, is sexism? According to Glick and Fiske (1996), sexism is a multidimensional construct that encompasses beliefs

that are both hostile and benevolent. Men's views of women are formed around issues of paternalism, gender differentiation, and heterosexuality. Each of these issues exists simultaneously in forms that can be viewed as both positive and negative. Paternalism can be experienced as both the need to dominate and the need to cherish. Gender differentiation can be viewed as both competitive, thus necessitating the devaluation of women, or complementary, thus exemplifying societally-deemed favourable traits.

Heterosexuality can be expressed as both the viewing of women as a sexual resource to be conquered, or through affections and feelings of admiration and longing. The cohabitation of both forms of sexism (hostile and benevolent) at once is explained as ambivalent sexism (Barreto and Ellemers, 2005; Franzoi, 2001; Glick and Fiske, 1996; Kilianski and Rudman, 1998). Ambivalent sexism is the form most often internalized, with varying degrees of both benevolent and hostile sexism expressed or felt at any given moment. Furthermore, it is argued that internalized beliefs of ambivalent sexism are part of the make-up of gender schemas and are, in part, a result of institutional gendering.

In an attempt to counter institutional gender disparity, equal opportunity policies were introduced into universities; however, this implementation of formal policy was not able to address the embedded attitudes that produce and reproduce gender inequality (Bagilhole, 2002; Cann *et al.*, 1991). Furthermore, because of these policies, acts of overt sexism were predominantly forced into the background, thus necessitating the dominance of more subtle forms of sexism in their place (Valian, 2004). According to Swim, Mallett and Stangor (2004), "subtle sexism can be defined as unequal and unfair treatment of women that is not recognized by many people because it is perceived to be normative, and therefore does not appear unusual" (p. 117). By definition, subtly expressed ambivalent sexism is embedded and exists in institutions of higher learning and is supported through the beliefs that men have about women and women have about themselves. Furthermore, subtle discrimination exists greatly under the radar of policies because both men and

women see the inequality as an adequate and suitable representation of what they perceive as normal expectations and behaviour (Benokraitis, 1998).

Another form of sexism used to explain the continuance of inequality is modern sexism, which can be defined as an insensitivity and denial of gender inequality as well as an opposition to equalizing remedies (Kilianski and Rudman, 1998). Cameron (2001) explains this form of sexism as a self-protective mechanism employed to maintain the privilege of the dominant group. Furthermore, according to Swim *et al.* (2004), there is a relationship between modern sexism and the enactment of subtle sexist activities. Kimmel (2004) claims that men's privilege is often invisible to them, and because of this, they often experience workplace confusion and resentment as a response to equal opportunity policies that appear to favour women. Furthermore, because women are less readily in positions of power within educational institutions, and are dependant on the leadership of men to impose change, harboured beliefs of sexism hinder the faculty assessment process, thus reproducing disparity (Bagilhole 2002).

## Conclusion

The gendered discriminatory processes of promotion and the subsequent wage gap of Canadian universities has created a substantial body of research. Job segregation, workload and task allocation differences, academic productivity, and the disadvantages related to domestic labour have been studied in an attempt to locate the reason for the disparity. However, each study ends on a similar note – finding that these variables can only account for a portion of the gap. The remaining portion might be explained as being the result of sexism, which exists as a product of embedded beliefs present in the university itself and thrives within an environment which appears to represent gender neutral notions of equality and hierarchy but actually favours masculinity over femininity. The individual university faculty member enters

into the biased environment of the university as an already gendered individual with preconceived gender schemas. These schemas support a sense of self that is aligned with ideal notions of masculinity and femininity which support the view of women as less valuable and less entitled. These internalized beliefs aid in men's and women's acceptance of sexist biases inherent in the institution. Even though equal opportunity policies were introduced into Canadian universities, the biased lens of gender schemas and the invisible nature of embedded sexism rendered these policies greatly unsuccessful. These policies did, however, force most acts of overt sexism underground, but in doing so, necessitated subtle expressions of sexism, which, because of existing gender schemas, were viewed as normative. Unfortunately, the coming together of these factors have created a perfect cycle for reproducing disparity, and unless these factors are addressed, the continuance of gender-based inequality in institutions of higher learning is guaranteed.

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# **Functionality and Evolutionary Conservation of the TNF-Related Apoptosis Inducing Ligand (TRAIL) Pathway in the Common Carp (*Cyprinus carpio*)**

BEN SUTHERLAND

## **Abstract**

Mechanisms and tools involved in programmed cell death cascades have been conserved over multiple vertebrate lineages. This work investigates the presence and functionality of the extrinsic apoptosis machinery in the common carp.

## Introduction

### The Importance of TRAIL

Apoptosis, or cellular suicide, is a conserved mechanism among multi-cellular organisms. It is a controlled and non-toxic process involved mainly in tissue homeostasis, development and old or damaged cell removal (Koschny *et al.*, 2007). Malfunctions in apoptotic pathways can lead to severe consequences such as neurodegenerative disorders or cancer. There are two main pathways through which apoptosis occurs, the intrinsic pathway and the extrinsic pathway (for review on extrinsic pathway see Koschny *et al.*, 2007).

The intrinsic pathway is induced through ultraviolet (UV) irradiation or other forms of DNA damage, heat shock or growth factor withdrawal (Takle and Andersen, 2007). This pathway is stimulated by chemotherapeutics in cancer treatment. It involves the release of pro-apoptotic factors from the mitochondria, the assembly of the apoptosome and the activation of caspase-3, -6 and -7 (Koschny *et al.*, 2007). These effector caspases have many different substrates that they cleave proteolytically, such as DNases, cell-cycle regulators, signalling molecules, cytoskeleton proteins, and repair and housekeeping enzymes (Takle and Andersen, 2007). The substrates are not necessarily degraded by caspase cleavage, but rather are inactivated, or activated. Some functions of these effectors include arresting the cell cycle, inactivating DNA repair, inactivating apoptosis inhibitors and dismantling the cellular cytoskeleton. After apoptosis induction, the cell undergoes blebbing. This is when the cell is split apart into membrane-bound packages of cellular material. These membranes of the packages have signals that attract macrophages, which then engulf the package and recycle the components. At no point are intracellular, and possibly cytotoxic, components released into the surrounding interstitial fluid.

Alternately, the extrinsic pathway occurs when cells are targeted with specific ligands that bind cell receptors and induce apoptosis (Koschny *et al.*, 2007). Cross-talk between the intrinsic and extrinsic pathways can enhance an apoptotic signal originating from either

pathway (Koschny *et al.*, 2007).

Several different extrinsic apoptosis pathways exist, all working by the same basic mechanism as described, but with a different inducer ligand and corresponding receptors. The main extrinsic apoptosis inducer ligands include the Fas ligand (FasL), Tumour Necrosis Factor (TNF)  $\alpha$ , and TNF-related apoptosis inducing ligand (TRAIL). Their corresponding receptors are Fas, CD40 and TRAILR1 and -R2 respectively. FasL and TNF  $\alpha$  induce apoptosis in many cell lines, whereas TRAIL has been reported to induce apoptosis only in tumour cells and not in normal cells (Koschny *et al.*, 2007). For this reason, TRAIL is currently undergoing clinical trials as an anticancer agent (Koschny *et al.*, 2007).

### **TRAIL Cascade**

TRAIL is a transmembrane protein that can be cleaved into a soluble form. It binds TRAILR1, TRAILR2, decoy receptor 1 and 2, and osteoprotegerin (Koschny *et al.*, 2007). TRAIL is mostly expressed by cells of the immune system, such as Natural Killer (NK) cells. NK cells express and use TRAIL, presumably for defence against virus-infected and cancerous cells (Johnsen *et al.*, 1999). TRAIL also plays a role in the homeostasis of certain T cells (Falschlehner *et al.*, 2007). TRAIL mRNA has been detected in many human tissues, while being the most prominently expressed in the spleen, lung and prostate (Johnsen *et al.*, 1999). However, TRAIL is not expressed in the brain, liver or testes. (Spierings *et al.*, 2004).

Current research has shown that three monomers of TRAIL receptors trimerize without recruitment of TRAIL due to high affinity for self-association (Wassenaar *et al.*, 2008). This occurs through interactions of membrane-proximal domains. The monomers trimerize asymmetrically, and the binding of the TRAIL induces symmetry within the complex (Wassenaar *et al.*, 2008). After induction of symmetry, an adaptor molecule, fas-associated death domain (FADD), is recruited from the cytoplasm to the intracellular portion of the receptor through the association of the death domains on both the receptor trimer and the FADD (Figure 1). After FADD

binds, this complex is then called the death inducing signalling complex (DISC) (Koschny *et al.*, 2007). The DISC then recruits and cleaves pro-caspase-8, activating it as initiator caspase-8. Caspase-8 can then activate caspase-3 and Bid. Caspase-3 is an effector caspase, and is responsible for cleaving the substrates previously mentioned, including DNases, which will fragment nuclear DNA (Falschlehner *et al.*, 2007). Activated Bid is a pro-apoptotic factor that can lead to cross-talk and the subsequent initiation of the intrinsic pathway (Koschny *et al.*, 2007).

The resulting effect of both the intrinsic and the extrinsic pathway depends on the presence of other cellular factors. Inhibitors of the process work at many different levels. For example, upon TRAIL binding, caspase-8-like inhibitory protein (cFLIP) can inhibit the activation of caspase-8 (Koschny *et al.*, 2007). The intrinsic pathway is monitored to a great extent by pro- and anti-apoptotic factors, relative amounts of which determine the fate of the cell (Figure 1). Effector caspase inhibitors exist as well (Koschny *et al.*, 2007).

### **Efficacy and Toxicity of TRAIL**

p53 is a transcription factor that is activated following DNA damage. It is important for cell cycle inhibition and DNA repair, as well as for intrinsic apoptosis induction in the event of extensive damage (Hartwell *et al.*, 2000). TRAIL works independently of p53, and therefore TRAIL has been shown to induce apoptosis in chemotherapy-resistant primary tumour cells where p53 is absent (Koschny *et al.*, 2007). Even so, some cancer cells remain resistant to TRAIL treatment. There have been correlations between TRAIL-resistant tissues and enhanced decoy receptor expression (Koschny *et al.*, 2007), although more research in this area is needed. High levels of cFLIP and other apoptosis inhibitors have also been correlated to TRAIL resistance (Koschny *et al.*, 2007).

The lack of toxicity of TRAIL toward normal cells is important for the effectiveness of TRAIL as an anticancer drug (for review see Koschny *et al.*, 2007).

Decoy receptors are TRAIL receptors that do not have intracellular

death domains required to form the DISC (Figure 1). These have been suggested to be involved with both the non-toxicity of TRAIL on non-cancerous cells and the resistance of some tumour cells to TRAIL (Koschny *et al.*, 2007). However, the level of decoy receptors does not always correlate with sensitivity to TRAIL (Koschny *et al.*, 2007). Also, an experiment using a synthetic ligand specific to TRAIL-R2 induced apoptosis in astocytoma, leukemia and breast cancer cells, but was not toxic toward normal astrocytes, primary human hepatocytes, B-cells or T-cells (Koschny *et al.*, 2007), implying that the protection of normal cells is not due to the binding of decoy receptors instead of receptors with death domains. More work is needed in this area.

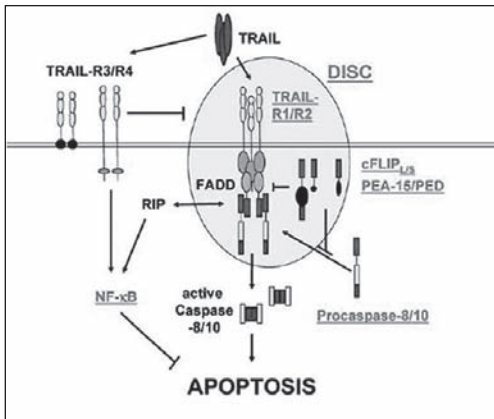


Figure 1.

TRAIL cascade in mammalian cells. TRAIL can either bind receptors with or without internal death domains and either have potential to induce apoptosis or not, respectively. Other pro- or anti-apoptotic factors within the cells will either amplify or inhibit the process depending on relative concentrations (Koschny *et al.*, 2007).

## Receptor-Ligand Complexes

Both TRAIL-R1 and -R2 and TRAIL complexes have been characterized (Hymowitz *et al.*, 1999, Kajiwara *et al.*, 2004). Three TRAIL molecules and three receptors form a hexameric complex that has two main interaction patches (e.g. Hymowitz *et al.*, 1999).

## Conservation of Extrinsic Apoptotic Components

Apoptotic pathway components have been conserved across many species (Sakamaki *et al.*, 2007), and some intrinsic pathway components exist in all metazoans (Eimon *et al.*, 2006). The role of TNFSF members predates chordate lineage, but pre-chordate

ligands use different pathways to activate initiator caspases (Eimon *et al.*, 2006). No TNF/TNFRSF members have been found to date in *C. elegans* (Eimon *et al.*, 2006) and all TNFRSF members containing intracellular death domains have been reported exclusively in vertebrates (Eimon *et al.*, 2006). The development of the extrinsic apoptotic pathway has been suggested to be in conjunction with the evolutionary appearance of vertebrates during evolution (Sakamaki *et al.*, 2007). Homologues of many components of the intrinsic and extrinsic pathways have been recently identified in zebrafish, salmon, sea bass, the Japanese Medaka (*Oryzias latipes*) and the grass carp. (Eimon *et al.*, 2006, Sakamaki *et al.*, 2007, and Chang *et al.*, 2006). Due to the identified homologues, some apoptotic machinery appears to be conserved between fish and mammals.

### **Presence of Teleost TRAIL Pathway**

Some components of the TRAIL pathway have been identified in fish in the infraclass Teleostei. Two different research groups have identified different proteins as being homologues of TRAIL. GC-TRAIL, a putative homologue of human TRAIL was identified by Chang *et al.*, (2006) in the grass carp, and zDL1a, zDL1b and zDL2 are all proposed homologues of human TRAIL that have been identified by Eimon and co-workers (2006) in the zebrafish. The proposed corresponding receptors for the zTRAIL molecules are zOTR and zHDR (Eimon *et al.*, 2006). Homology is seen in both groups to human TRAIL, and in the GC-TRAIL certain amino acid residues important for receptor-ligand complex formation have been conserved (Chang, *et al.*, 2006).

The identification of many components of apoptosis pathways in Teleosts has been performed through genetic analysis as well as through molecular functional analysis. Putative ligands and receptors, as well as other apoptosis components, display high levels of homology to mammalian counterparts.

The purpose of this research is to investigate whether human recombinant TRAIL can functionally substitute for fish TRAIL in carp epithelioma cells, and subsequently successfully induce

extrinsic apoptosis. If so, this would suggest strong conservation of components of the extrinsic pathway, and would infer the importance of the components. Also, if found to be functional, the extrinsic apoptosis pathway of the easily maintained EPC cell line could serve as a model system for future TRAIL research.

## 2. Materials and Methods

### *2.1 Materials*

Sigma was the source for rhTRAIL, Camptothecin, Annexin V-CY3 Apoptosis Detection Kit (Product No. APO-AC) and Hank's balanced salt solution. Zeocin, Trypsin-EDTA 10X concentration, Gibco Minimal Essential Media stock, L-glutamine,  $\text{NaHCO}_3$ , antibiotic/antimycotic, DMSO and fetal calf serum (FCS) were all purchased from Invitrogen. All flasks, pipettes and pipette tips were purchased from Fisher. The fluorescent microscope, inverted scope, microfuge, aliquot mixer and all cell lines were provided by Thompson Rivers University.

### *2.2 Cell Culture*

Cancerous common carp cell line (EPC) was cultured at 28°C in 75 cm<sup>2</sup> tissue culture treated flasks. The EPC cells grew in 10 mL of a stock solution of media. The media consisted of 100 mL of sterile, deionized H<sub>2</sub>O, 12.5 mL MEM stock, 1 mL L-glutamine (29.2 mg/mL), 0.6 mL antibiotic/antimycotic, 10 mL FCS and 0-0.3 mL  $\text{NaHCO}_3$ . When EPC flasks reached 80% confluence they were split 1:4 with Trypsin-EDTA, and 10 mL fresh media was added to each flask.

### *2.3 Solution Preparation*

Stock lyophilized TRAIL was diluted with 0.5 mL of sterile filtered PBS to a stock solution concentration of 20 µg/mL. Half of this was wrapped in tinfoil and frozen at -40°C, and half was diluted to 1 mL, making a stock solution of 5 µg/mL. This 5 µg/mL solution was wrapped in tinfoil and kept at 4°C. Camptothecin was diluted to 1 mM with deionized water, and stored at 4°C.

### *2.4 Apoptosis Induction*

#### *a) Low Dose Trial*

Two confluent EPC flasks were trypsinized, washed with media and aliquoted into three 1 mL microfuge tubes. To the negative control microfuge tube, 1 mL of media and 100  $\mu$ L of the Camptothecin vessel ( $\text{dH}_2\text{O}$ ) were added. To the positive control microfuge tube, 1 mL of media and 100  $\mu$ L of 1 mM Camptothecin, a topoisomerase inhibitor and intrinsic apoptosis inducer (Embry *et al.*, 2006), was added, producing a final concentration of 0.091 mM. To the treatment tube, 1 mL of media and 180  $\mu$ L of 5  $\mu\text{g}/\text{mL}$  TRAIL were added, producing a final concentration of 0.763  $\mu\text{g}/\text{mL}$  of rhTRAIL. The microfuge tubes were wrapped in tinfoil and the cells remained in suspension through semi-inversion with an aliquot mixer for 24 hours.

b) *High Dose Trial 1*

Three confluent EPC flasks were trypsinized, washed with media and aliquoted into three 1 mL microfuge tubes. The positive and negative control tubes were produced in the same manner as the low dose trial (see above), but to the treatment flask, 1 mL of media and 300  $\mu$ L of 5 mg/mL rhTRAIL was added, producing a final concentration of 1.15  $\mu\text{g}/\text{mL}$  rhTRAIL. Treatment of microfuge tubes was the same as the low dose trial (see above), except that they remained flipping for 30.75 hours.

c) *High Dose Trial 2*

Two confluent EPC flasks were trypsinized to produce four microfuge tubes of cells. Two negative controls were prepared in this experiment, one for the positive control treatment ( $\text{dH}_2\text{O}$ ) and one for the TRAIL treatment (PBS). To the positive control, 455  $\mu$ L of media and 45  $\mu$ L of Camptothecin were added, producing a final concentration of 0.091 mM. To the treatment tube, 455  $\mu$ L of media and 140  $\mu$ L of 5  $\mu\text{g}/\text{mL}$  TRAIL were added, producing a final concentration of 1.176  $\mu\text{g}/\text{mL}$ . The negative controls were produced by adding 455  $\mu$ L media to each, and 45  $\mu$ L  $\text{dH}_2\text{O}$  to one, and 140  $\mu$ L PBS to the other. The tubes were wrapped in tinfoil, and then put on the aliquot mixer for 16 hours. After 16 hours, the cells were remixed with a micropipette, and 200  $\mu$ L was taken from each tube to be tested for apoptotic cells. The tubes were put back on the mixer for another eight hours, and then the rest of the cells were tested for apoptosis.

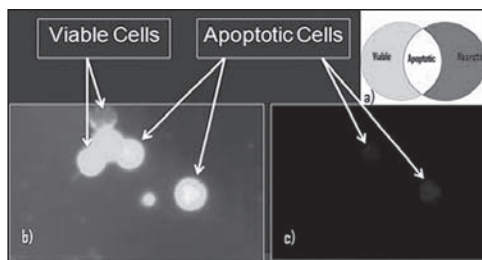
### 2.5. Apoptosis Assay

After treatment time, cells were pelleted through a one-minute cycle at 14,000 rpm in the microfuge. They were then washed twice in 200  $\mu$ L PBS, and then three times in 100  $\mu$ L 1X Binding Buffer (Annexin V-CY3 kit). Cells were then pelleted and resuspended in 50  $\mu$ L double staining solution (Annexin V-CY3 kit) for ten minutes in the dark. Cells were shaken halfway through the ten minutes to ensure contact with double staining solution. Cells were then washed five times with 100  $\mu$ L 1X Binding Buffer, and then kept out of direct light. Cells from each microfuge tube were added to a slide and viewed with the fluorescent microscope at 400X magnification. Pictures were taken of random selections of cells first under white light, then under UV light with an FITC filter, and then a Texas red filter. The position of the slide was not changed for each picture taken. Pictures were used to count numbers of viable, apoptotic and necrotic cells.

### 2.6 Apoptotic Cell Counting

To avoid bias, a different person from the counter would open up computer folders of different cell treatments. The counter would then count apoptotic, necrotic and viable cells from the pictures. Cells that fluoresced under only UV light and FITC filter were considered viable, cells that fluoresced under only UV light and Texas red filter were considered necrotic, and cells that fluoresced under UV light and both filters were considered apoptotic (Figure 2). Reference pictures of what would be considered a fluorescing cell under UV

Figure 2. Schematics on how to distinguish apoptotic or viable cell, shown in a) can be used to interpret the UV-irradiated pictures b) and c). The two pictures are from exactly the same location on the slide, but with different filters used. Viable cells fluoresce only under FITC filter, whereas apoptotic cells fluoresce under Texas red and FITC filters.



light and Texas red filter were kept for measurement standardizing.

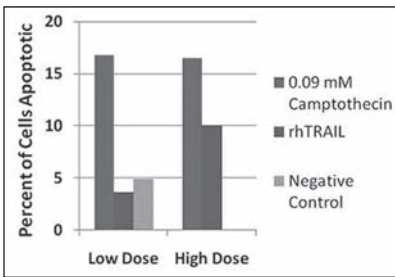
### 2.7. Statistical Analysis

All statistical analyses were performed using a chi-squared test in Minitab 15.

## Results

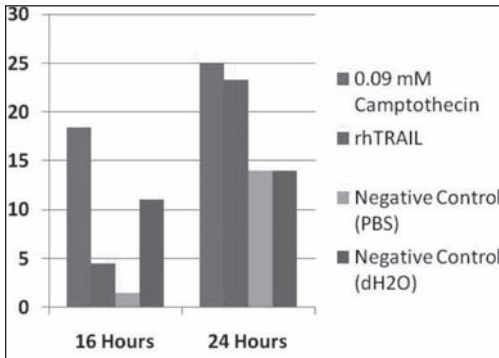
### Apoptosis Assay

The suspended EPC cells exposed to low dose of rhTRAIL (0.763  $\mu\text{g}/\text{mL}$  of rhTRAIL ) for 24 hours did not exhibit a significant percentage of apoptotic cells, and the treatment had a similar percentage of cells apoptotic as the negative control. The rhTRAIL treated cells had 3.6% apoptotic cells, and the negative control had 4.9% apoptotic cells (Figure 3). However, when the dose of TRAIL was increased to 1.15  $\mu\text{g}/\text{mL}$  TRAIL for 30 hours and 45 minutes, it appears that the TRAIL treatment had significantly more apoptotic cells than the negative control ( $P < 0.0004$ ), with 11.4% of cells apoptotic in the treatment and no cells apoptotic in the negative control (Figure 3).



**Figure 3.** Percentage of cells apoptotic after 24 hours treatment with low and high doses of rhTRAIL.

The second experiment, using 1.176  $\mu\text{g}/\text{mL}$  of rhTRAIL, did not show a significant increase in apoptosis in the treatment compared to the PBS and dH<sub>2</sub>O negative controls (4.5%, 1.5% and 11% apoptotic cells respectively) after 16 hours (Figure 4). However, after 24 hours the percentage of apoptotic cells in the treatment increased, and although not statistically significant ( $P = 0.07$ ), there appear to be more apoptotic cells in the treatment than in the controls (23.3%, 14% and 14% apoptotic cells respectively) (Figure 4).



**Figure 4.** Percentage of cells apoptotic from high dose of TRAIL in EPC cells for 16 hours and 24 hours.

## Discussion

rhTRAIL appears to have induced apoptosis in EPC cells in a dose- and time-dependent manner (Figures 3 and 4). Although the initial low-dose concentration of 0.763  $\mu\text{g}/\text{mL}$  of rhTRAIL for 24 hours did not differ in percentage of apoptotic cells from the negative control, when the concentration was increased to 1.15  $\mu\text{g}/\text{mL}$ , and the time of treatment increased to 30 hours and 45 minutes, a higher percentage of cells underwent apoptosis than the negative control ( $P < 0.0004$ ). When this treatment was repeated with 1.176  $\mu\text{g}/\text{mL}$ , it did not induce significant apoptosis over 16 hours. However, after 24 hours, the percentage of apoptotic cells increased to near the positive control of camptothecin-treated cells. Although this was not statistically different from the negative control ( $P = 0.07$ ), the percentage of apoptotic cells appeared to be much more elevated in the TRAIL treatment.

In the first experiment, with low and high doses of rhTRAIL, a PBS negative control was not conducted, and as PBS was the rhTRAIL vessel, it was important to compare the PBS and dH<sub>2</sub>O negative controls after 24 hours. There was no difference between the two negative controls ( $P > 0.5$ ), and therefore the results from previous experiments can be considered valid.

The corresponding ligand to human TRAIL in fish appears to have enough homology to human TRAIL that the rhTRAIL can bind the fish extrinsic apoptosis receptor and induce apoptosis. Due to co-evolution, the components of the receptor have most likely been

conserved as well. However, in each lineage, whether it is in the modern ray-finned fish or the mammalian counterpart, the receptor-ligand complexes changed together, but most likely in a different manner from the other lineage. This would explain why such a high concentration of rhTRAIL is needed to induce apoptosis in the fish cells in comparison to the amount of soluble human TRAIL needed to induce apoptosis in mammalian cells. For example, Pitti and co-workers (1996) found that doses of soluble TRAIL 0.01 µg/mL, 0.10 µg/mL and 1.0 µg/mL induced apoptosis in 25%, 55% and 75% of human lymphoid cell cultures respectively over 24 hours.

If the GC-TRAIL proposed by Chang and co-workers (2006) is actually the homologue of human TRAIL, then it is likely that the conservation of key components of the GC-TRAIL and human TRAIL involved in receptor binding explains why apoptosis can still be induced even though the two full-length molecules shared only 36.3% homology. See Table 1 for important conserved components.

If the zTRAILS proposed by Eimon and co-workers (2006) are the actual fish TRAIL molecules, then it is a different situation. zDL2 is the most structurally similar zTRAIL to human TRAIL, and it binds zOTR and zHDR with low affinity. Since human embryonic kidney cells transfected with vectors encoding zHDR and zOTR show robust (50-100%) cell death effects (Eimon *et al.*, 2006), it may be the case that rhTRAIL is binding these receptors. Ectopic expression of zDL2 (as well as zDL1a and zDL1b) triggers apoptosis in some embryonic tissues (Eimon *et al.*, 2006). This also suggests that this molecule may be the same as TRAIL.

Whichever is the actual fish TRAIL molecule, whether Eimon *et al.*, (2006) or Chang *et al.*, (2006) are correct, it appears that the extrinsic pathway receptors have been conserved enough to bind TRAIL from a distantly related species and induce apoptosis, implying that the receptors and ligands binding the receptors are very important to the organism. The common carp appears to be a good model system for future TRAIL research.

Residue in Human TRAIL	Corresponding Residue in GC-TRAIL	Function in Human TRAIL System	Relative Importance	Conservation
Cluster near and including Tyr-216	Cluster near and including Tyr-234	Hydrophobic Interaction	Critical	Tyr-216 conserved, and many other hydrophobic amino acid residues in cluster conserved
Cluster near and including Glu-205	Cluster near and including Tyr-234	H-bonding interaction	Important for specificity	Glu-205 not conserved, neighbouring polar amino acid residues are conserved
Glu-155 Ser-159	Glu-161 Lys-164	Polar interactions with receptor amino acid residue Arg-62	Not Critical, however still involved	Glu-155 conserved  Ser-159 not same residue, but amino acid properties are similar
Ser-255	Thr-277	Involved with binding TRAIL-R1 only	Important for specificity of receptor binding	Not conserved, amino acid properties are similar

Table 1. Residues and their Function and Conservation

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### **About the Author**

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# Crimson Recollection

MELANIE PERREAULT

## **Abstract**

In the red study, such daily objects as red bell peppers and buttons arranged on the desk (also red) are signs of current activity and occupation as the desk's owner, on a desperate quest for memory retention, explores a scientific theory about *recordatio perussi* microbes which link memory loss to infrared radiation.

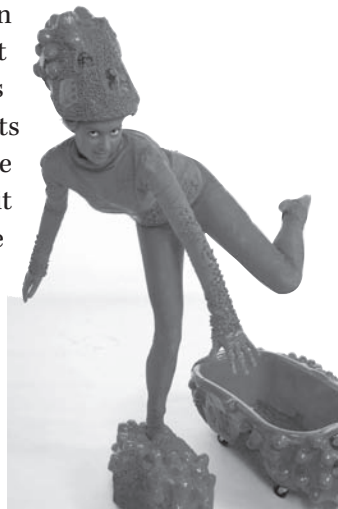
The installation *Crimson Recollection* is a re-creation of a space examining a theory linking memory loss and infrared. The researcher has discovered that human memory emits infrared radiation of the shortest wavelength possible, which is next to red light on the scale of electromagnetic (EM) radiation. She has also formulated theories about microbes which absorb memory through this infrared radiation and has named these organisms *Recordatio Perussi*, which translates from Latin as “consumer of memory”:



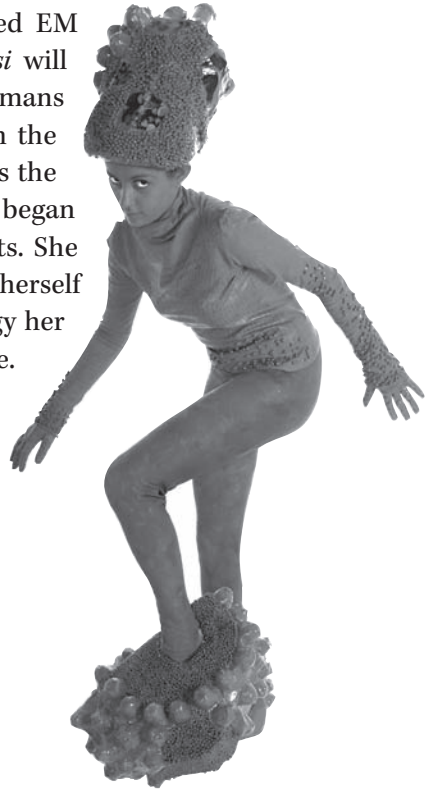
Recordātiō, ōnis, *f.* recollection  
Perūssi, ustum, *v.* to burn up, consume

The constructed office space provides a tangible experience of the researcher’s attempt at defending the mind from these memory absorbing microbes.

Her first endeavour to evade the *Recordatio Perussi* (RP for short) was to use the strategy of camouflage. The researcher found that the RP won’t prey upon their own kind, so she assumed that by looking like a *recordatio perussi* she would not be preyed upon and therefore could retain information more effectively. She created a vibrant red costume and thoroughly studied its effectiveness. Upon studying her results the researcher found that the disguise was somewhat effective only because it was giving off infrared radiation of the same wavelength as that emitted by memory. Based upon the observation that the colour red is the best repellent, the researcher developed a new theory. Her revised theory states: “the sensory receptors of the RP become overwhelmed upon saturation of



stimuli.”<sup>1</sup> If overwhelmed by red EM radiation, the *recordatio perussi* will flee from the area, leaving humans with their memory intact. With the knowledge that the colour red is the best repellent, the researcher began to fill her office with red objects. She believes that by surrounding herself with an abundance of red energy her memory will cease to deteriorate.



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## ***About the Author***

*Melanie Perreault graduated from John Peterson Secondary School in 2004 and is now in the fourth year of TRU's Bachelor of Fine Arts degree program. She loves the visual arts, the outdoors, reading, listening to music, and traveling. She took classes in Germany for three months in 2002 and worked in Australia in 2006. Her future plans include making art, traveling, and either teaching art or working in a museum.*

**As For Man, His Days are as Grass:  
The Legitimacy (or Illegitimacy) of Revisited  
and Revised History in Theresa Kishkan's  
*Sisters of Grass***

JENNIFER BAGAN

**Abstract**

In Aboriginal history, the written word is often inadequate to reveal an authentic and accurate historical experience. This presentation explores how a romanticized view of history in literature and story-telling manipulates and supersedes the accuracy of historical fact in *Sisters of Grass*.

By creating a romanticized picture of Aboriginal life in her novel, Kishkan challenges one of the major generalizations that has been made about the recording of history. Anna, narrator of the novel, construes major assumptions and interpretations about Margaret's Aboriginal lifestyle based on a few artefacts in a dusty box tied with a red ribbon. Using this framework, Kishkan is able to illustrate that the written word is inadequate and often naive when one is trying to reveal the authentic and accurate *experience*. The novel takes a post-modern approach to challenge traditional historical norms by means of interrogation. Contrasting the historical documents found by Anna in the present and the story told about Margaret, *Sisters of Grass* poses a question: how does a romanticized view of history in literature and story telling manipulate and supersede the accuracy of historical fact? There are many elements in *Sisters of Grass* that are used to illustrate the illegitimacy of historical writing about Aboriginal peoples; however, this analysis will primarily discuss how the structure of the novel, the extensive use of the photograph and the description of landscape succeed in illustrating this questioning of Aboriginal history. As no extensive work has been written on the novel to date (although it was reviewed in Canadian magazines and journals when it was first published in 2000), I will use the novel itself to justify my assertions.

Although in parts of the novel the reader can be mesmerized by the beautiful story of Margaret (the Aboriginal character), Margaret's story is being re-told by Anna—with reminders of the historian's presence in Anna's interjections. Kishkan deviates from traditional Western linear structure in her narrative in order to challenge the accuracy of written Aboriginal history. By interrupting Margaret's narrative, Kishkan challenges her readers to assume Margaret's story is not, in its full essence, true and factual. Past authors, particularly those of the Realist school of thought, have written historical fiction according to Coleridge's theory: *the willing suspension of disbelief*. This theory plays on the metaphysical aspects of fiction writing: the reader knows that the narrative is inherently fiction, but chooses to accept the metaphysical as some form of reality. By employing

narrative interruptions, Kishkan relates to her readers that Anna's historical interpretation of Margaret should not be taken as entirely legitimate. Kishkan interrupts the fluidity of Margaret's narrative with Anna's personal perceptions. It is clear that Anna's array of Aboriginal artefacts is inadequate to complete the puzzle of Margaret's life because Anna lacks Margaret's psychological experience. Anna muses: "If only there were a way to decode the memories contained in cottons and woollens, buckskin and beadwork, the shape of bodies impressed in fibres"(56). Here, it appears that written history is incapable of relating the spiritual condition of a past life. Kishkan's post-modern approach forces her readers to question the validity of written Aboriginal history. Without the means to discover psychological and spiritual components of Aboriginal lifestyle, historical writing can only be viewed as a ghostly representation of the person it re-visits.

Kishkan also presents her reader with a post-colonial view of literary (and more specifically, Aboriginal) history. Structurally, how can one accurately place pieces of a mosaic puzzle together when he/she only sees and knows part of the whole picture? Perspective remains an issue in historical literature because the way the pieces are placed is dependent entirely on the one who attempts to complete the puzzle. Anna admits to the challenge of re-creating and re-visiting history when she states she is "taking the unravelled threads from a life and trying to re-weave a companion piece, not the life itself, but its image"(57). Again, Kishkan's concern with the re-creating of Aboriginal history is apparent in Anna's interjection: one cannot reformulate a perfect picture of a life that has already been unravelled, one can only ever create a companion piece – and still the remaining image may *read* nothing like its original. Kishkan's argument on the authenticity of literary history poses to her readers a question left unanswered: where do history and fact begin and end?

Toward the end of the novel, Kishkan illustrates how subjectivity and perspective play a major role in how a photograph is interpreted. Photographs are often used as a primary source of information for Aboriginal history; however, one must question the validity of

its caption because (as Kishkan asserts through the characters of Margaret and her non-Aboriginal friend, Nicholas) much is lost in perspective, and even more is lost in the re-writing of the caption. A caption written by a historian for a particular photograph could prove to be illegitimate compared to the photographer's original intentions. "Nicholas turned to Margaret. 'You see how different your shots are from mine? I swear we looked at the same scene, but you've made something of it I wasn't able to'"(166). This quote asserts that the legitimacy of a photo caption is essentially based on perspective. The image—and specifically in Kishkan's novel, the photographs—is distorted to provide an absence of detail for the viewer. Through photography, Kishkan argues that the perception of a photograph is similar to the act of reading—each is filtered through the individual's perception and personal experiences. This is illustrated through the double captions of each of the photos found in Margaret's box. The experience—of and around the photograph—is essentially lost in its processing and captioning. For example, we find out that Nicholas and Margaret's family portrait of the Jackson family is staged to look traditional and authentic. August's light buckskin and sage bark clothes are not the traditional Aboriginal wear of 1906: they were "old clothing, saved and wrapped in burlap bags that potatoes were stored in"(162). Time is distorted via imagery because, to another viewer, the photograph may appear to be authentic to 1906. Again comes Kishkan's interrogation: if historians can misinterpret a photograph, we need to consider the margin of error in written Aboriginal history as a whole. The question resonates: at what point does factual evidence stop being authentic history and begin being fiction?

Perception thus proves to be one of the main issues in using photography as legitimate historical hard evidence. Kishkan's characterization of Margaret illustrates how one's dreams and memories are filtered through his/her perception of an image. Margaret seems to be taken into a supernatural realm when she views the world around her through her camera; however, what she sees through the viewfinder and what actually is are entirely

different. Her mind is engaged when she is photographing Aunt Alice and Uncle August's family—so engaged that she envisions ghostly representations of children floating through the grass with airy-looking horses off in the distance. Ironically, when she reaches her hand out to experience the reality of the scene, "it [is] as though she [doesn't] exist" (164). Clearly, the image in Margaret's imagination and the photograph captured and archived on film are two entirely separate entities. The complete scope of the scene becomes intangible when it is re-visited via the photograph. Kishkan thus illustrates that the mind and thoughts of a person contain extensive historical value. Unfortunately, thoughts and experiences can only be *imagined* by the historian. Our speaker, once again, reiterates her frustrations with the photograph when she comments: "I've seen the photographs taken in the early years of the century and have looked deeply into their images to find a clue about the lives there. They hover and circle, sometimes surfacing in sleep with a clarity never experienced in dreams, as if they are memories of my own" (160). Anna must retell history as though it were a dream of her own. We see Kishkan's concern with the legitimacy of photography because the photographer is no longer relating hard fact to his/her subjects; he/she is creating a filtered image that is primarily subjective. The photograph provides only a ghostly representation of the past with which the viewer will never be able to fully engage.

Initially, Kishkan seems to argue that landscape and nature provide a curtain into the past, but through the character of Anna we see that this perspective is limited by time. The dry and withered nature of the Nicola Valley was still evident and alive to Anna, but was only "rich with what had passed into memory" (41). Nature, like history, fades and changes. We, again, are left with a companion piece which may contain elements of truth; however, in Anna's writing we see how her perspective of the landscape still does not give her an accurate vocabulary for past events. In one portion of the novel, Anna muses about the landscape in relation to her historical artefacts: "How to allow for access without over-handling, or remember the watchwords 'no interference' in order not to lessen the value of objects as historic

documents”(42). Anna can use nature as an avenue into the past; however, it does not provide her complete access into Margaret’s life. Anna’s predicament lies in the fact that there are limitations in the writing of Aboriginal history; nature could almost be interfering with historical interpretation because the landscape itself evolves and changes over time due to environmental and physical impacts. We must recall that Anna is re-visiting the Nicola Valley a century later; and, as a non-Aboriginal, her view is subjective. Kishkan writes: “what distance between a jacket and its wearer, a little bag of earth and its connection to the human landscape...the way a place is remembered in all its colours and scents, the feel of its dust settling into the lungs”(40).

The language used to describe Kamloops’s landscape is used metaphorically to portray historical writing as presenting only a ghost-like representation of the actual event. History cannot be touched or explained in writing; only its essence is accessible to the writer, as it is to be imagined in a type of spiritual dimension. Kishkan includes a portion of Scripture to emphasize there is a spiritual component to historical artefacts. Margaret’s Aunt Elizabeth sews a sampler with a verse taken from Psalms 103:16: *“As for man, his days are as grass: as a flower in the field, so he flourisheth, For the wind passeth over it, and it is gone; and the place thereof shall know it no more”* (130). Elizabeth stitches clumps of bunchgrass in gold and green around the edges of her textile: green to signify the life that was once strong, and gold to signify the dry, lifeless image of what remains. Once the winds of time pass over, the knowledge and truth of a life is blown away—only to leave some dried and withered nature that once knew the story, but is now incapable of reiterating it to perfection.

Thus, it can be argued that Kishkan’s novel, *Sisters of Grass*, presents its reader with a fiction of a fiction—all to illustrate the ambiguity of writing factual Aboriginal history. The entire novel is written from a non-Aboriginal’s perspective, and thus, we can conclude that Margaret’s life may have been nothing like the picture Anna fabricates. Toward the end of her novel, Kishkan includes

Margaret's death certificate (a piece of Anna's hard evidence on Margaret) to further show the illegitimacy and inadequacy of written history. It states: "Religion: Protestant." On one level, the reader knows differently. Protestantism may have been the Scottish religion of her father's relatives, but the title certainly does not capture her Aboriginal spiritual experiences with her grandmother. On a second level, we are reminded that Margaret's story of religion has been somewhat constructed by Anna, who gives her reader a romanticization of previously assumed "historical" Aboriginal spirituality. And yet, on a third level, we recognize that there is no easy answer to Kishkan's interrogation of history because we have only pieces of evidence (such as landscape) to help us re-visit and imagine what life may have been like for an Aboriginal in 1906.

Therefore, it is plausible to say that Margaret's story may only ever be as large and disjointed as the pieces found in her box, and that written history proves to be more of a piecing together of these parts to produce a puzzle that can never be fully completed. Kishkan discredits the validity of Aboriginal history through her narrative by pointing out the issue of subjectivity: a different perspective means a different story, and although the story is built upon something authentic, it should not be presented as factual history. Her post-colonial view of written Aboriginal history is certainly echoed through the pages of her work, and her interrogations should not be taken lightly.

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### ***About the Author***

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# **Do Pillbugs Learn From the Consequences of Their Behaviour?**

KRISTINE TEICHMANN

## **Abstract**

Following a brief introduction on animal behaviour and associative learning, this presentation will discuss the methods and results of an experiment using a Y-maze apparatus to determine whether the pillbug, a small invertebrate animal, learns through the consequences of its behaviour.

## Introduction

**E**thological theory suggests that an animal's behaviour is organized as a collection of highly stereotyped motor patterns (modal action patterns or MAP) (Drickamer *et al.*, 2004). From a reductionist point of view, such behavioural patterns are a result of the interactions between genes and the environment; therefore, physiological mechanisms are developed (Moriyama, 2004). A MAP is broken down into two parts consisting of 1) a main adaptive stereotyped pattern that results from species specific mechanisms and 2) a minor non-adaptive variant pattern due to genetic variation (Moriyama, 1999). However, there are situations when individuals do not use MAPs and the frequency of variant patterns is higher than the stereotyped patterns. This suggests that observed behaviours may be the result of a decision-making process, not a MAP (although note that 'decision' here may not imply conscious reasoning). If this is the case, an increase in choice behaviour (non-mechanical) may produce behavioural changes by processing stimuli through "psychological mechanisms" (Moriyama, 2004).

Regardless of whether MAPs or other mechanisms are at work, any differences in behaviours between individuals can result from variations in genotype, ontogeny, environment, and/or learning. Behaviour can be defined as the response of an organism to the environment and is considered to be either innate (instinctual) or learned (Drickamer *et al.*, 2002). Learning changes neural circuits in the brain which, in turn, change an organism's behaviour (Wolpaw, 1997). To understand how brain changes affect behaviour requires an approach that first looks at the behavioural change of the organism, and then begins to examine the basis of central nervous system changes.

Over the past hundred years, associative learning, such as classical and operant conditioning, has served as the foundation to understanding many forms of animal behaviour and cognition (Wasserman, 1997). Both Pavlov and Thorndike, pioneers in the field of conditioning, believed that in order for associative learning to occur, close temporal contiguity was crucial; a response followed

by either a reward or a punishment makes it more or less likely that a reoccurrence of the situation will elicit that same response. Operant conditioning is achieved with the modification of voluntary behaviour through the use of consequences, and has been extensively studied using vertebrates such as rats, mice, and monkeys (Skinner, 1966). A reinforcing system detects the presence of a stimulus (positive or negative), and strengthens the connection between the sensory neurons and the motor neurons that produce the response (Carlson, 2004). However, vertebrate brains are complex, making it difficult to determine the processes responsible for generating a specific behaviour (Brembs, 2003).

Invertebrates have been shown to learn by operant conditioning, and because of the more simple structure of their brains they have become important study organisms along the pathway toward a mechanistic model of memory. For example, the pond snail, *Lymnaea*, has been used as a model to study operant conditioning and long-term memory. Lukowiak *et al.*, (2003) used a sharp wooden applicator to probe a snail each time it opened its pneumostome (breathing apparatus). They reported that, after repeated stimulation, snails significantly reduced their attempts to open their pneumostome, suggesting short-term memory was present. Similarly, Brembs (2003) and Xia *et al.*, (1996) showed that fruit flies (*Drosophila melanogaster*) could be taught to avoid elevated temperatures through operant conditioning. In Brembs 2003 experiment, each time flies walked into one side of an experimental chamber the space was heated. Once the animal returned to the non-heated side, the heated chamber reverted back to its initial temperature. After a few minutes the flies restricted their movements to the control side of the chamber even when the heat treatment was turned off. Grasshoppers and locusts have been operantly conditioned using food as reinforcement. Behmer *et al.*, (2005) used a Y-maze experiment to demonstrate that these animals were capable of associating colour with a food reward.

An understanding of the physiological processes and importance

of different learning mechanisms, including operant conditioning, is crucial to improving our knowledge of how animals interact with their environment. Evolutionary theory suggests that in order to maximize an animal's chance to survive and reproduce ('fitness') habitats should be chosen based on several factors including food availability, predator occurrence, and competition. How an animal chooses a habitat may involve responding to a variety of direct (e.g. observation of resource availability) and indirect cues (e.g. conspecific scent) within the environment (Robinson, 2005). Robinson (2005) reported that juvenile pillbugs preferred habitats that were previously occupied by conspecifics although his experiment was not designed to determine the cause of these results. An animal's ability to remember where a habitat is located could improve its chances of survival and reproduction.

Terrestrial isopods (Phylum *Arthropoda*, Subphylum *Crustacea*), or pillbugs, are invertebrates suited to controlled laboratory experiments designed to discover the complexities of animal learning: they are small, easily cared for, and have a high fecundity. Pillbugs have evolved from marine isopods and have developed a gill-like breathing apparatus (pleopod) in association with respiration in air (Edney, 1968). Since dry air reduces oxygen uptake, pillbugs prefer to inhabit dark and humid environments such as under leaf litter, wood, or rocks. Furthermore, pillbugs' cuticles do not contain a waterproofing mechanism which makes them vulnerable to dry air and high temperatures. There have been six types of receptors identified, one of which has tentatively been labeled as a hygroreceptor; pillbugs are known to be hygrogenetic in that they move towards habitats of higher relative humidity (Edney, 1968; Warburg, 1964).

In this experiment the terrestrial isopod, *Armadillidium vulgare* was used to examine how behavioural shifts may occur in response to individuals locating enriched habitat. More specifically, I attempted to answer the question, are pillbugs using psychological mechanisms to remember where they have been in order to return to the same location? This experiment was designed as a series

of trials to test whether animals that traveled down a maze and encountered a favourable habitat were more likely to repeat the same behavior in subsequent trials.

## Methods

### Rearing and Housing of Experimental Animals

For this experiment study organisms were taken from laboratory colonies of *Armadillidium vulgare* housed at Thompson Rivers University (TRU). Juvenile animals were used in this experiment since their dispersal (movement) tendencies appear stronger than in adults (Larsen, unpubl.) and intuitively, one would predict these animals to be able to recognize suitable habitat (Robinson, 2005). To reduce variation in individual life-histories and experiences among experimental juveniles, a breeding colony was established using a plastic container (23×23×8 cm) containing an approximately two-centimeter depth of clay and a 5×5 cm<sup>2</sup> cover object. In mid-February, 2007, three adult male and three adult female pill bugs were placed in the enclosure and left to reproduce. During this time the room was kept constant between 45-55% humidity, 20°C, and a 12:12 hour daylight cycle. In trying to mimic natural conditions as closely as possible, the animals were not disturbed aside from feeding (leafy greens) and misting the container with water every second day.

One day prior to experimentation, juveniles from the breeding colony (7-9 mm in length) were individually relocated to separate, smaller experimental containers (Figure 1). Each of these containers consisted of approximately a two-centimeter depth of sterile potting soil, a 10 cm<sup>2</sup> tile cover object, and enriched, leafy green food.

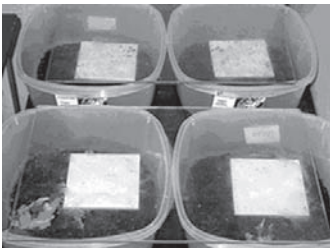


Figure 1: Juvenile housing during experimental period.

Laboratory conditions were maintained at 65-80% humidity, 23°C, and a 12:12 hour daylight cycle using two 40-watt daylight fluorescent lights plugged into a timer.

### Experimental Apparatus

A Y-maze was constructed by duct taping together three 20 cm × 4 cm pieces of PVC tubing (cut longitudinally to make ‘troughs’) at 45° angles (Figure 2). Wood (20 cm×0.3 cm×4 cm) was glued to the inside of the trough using silicone to act as a flat surface. Two contrasting habitats were placed at the two ends of the Y-maze, while the third end was sealed with duct tape and used as the starting point. On one side a favourable habitat was created containing a two-centimeter depth of potting soil and three cover objects (2×5 cm<sup>2</sup>, 1×10 cm<sup>2</sup>). A contrasting unfavourable habitat containing a paper substrate was located on the other side. The favourable soil habitat acted as the reinforcing stimulus which is required for operant conditioning to occur; if pillbugs display no significant preference for the soil substrate, conditioning would not occur. The right- and left-positioning of the two types of habitats was held constant across trials for the same individual (to test the learning response) but was alternated between animals to minimize the possibility of any directional bias on the outcome of the experiment.

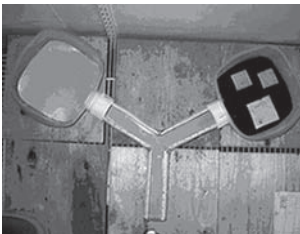


Figure 2: Y-maze apparatus: Favourable soil habitat (right), unfavourable paper habitat (left) and start point (bottom).

### Experimental Design

Sixteen juvenile pillbugs each underwent eight trials per day over four consecutive days, for a total of 32 trials. To begin each trial, each animal was removed from its home container by gently guiding it onto a metal spoon with a blunt applicator. The animal then was

placed at the base of the maze, and timing began using a digital watch. To create points of reference the Y-maze corridors were subdivided into two-centimeter-long pieces by marking the side of the walls with a black pen. As the animals began traveling down the corridors, each turn was recorded in a left-right recording system: the pillbug's location was noted, followed by the direction of the turn (left or right), and concluding at the point in which the animal either i) touched a wall or ii) changed direction.

The animal was recorded as having turned around when it reversed its path and traveled back in the direction it had come from. An animal was considered to be following a wall when it was positioned within 1mm of the side (antenna can touch the wall). The numerous small turns that pillbugs made while following a wall were considered an innate behaviour (turn alternation) and were not considered part of the conditioning. When an animal was initially placed in the maze, any direction changes or climbing behaviour displayed by the pillbug when it was facing the base of the 'Y' was considered escaping behaviour.

Once the animals reached one of the two destination habitats (favourable or unfavourable) the time was recorded and the pillbug was prevented from leaving the habitat (plastic door) for 10-12 minutes. To ensure conditions remained constant between each trial the humidity in each arm of the maze was measured using a hygrometer (Thermo-Hygro, Control Co.) and all corridors were scrubbed with a toothbrush (using a dilute baking soda/water solution) to remove potential scent trails. After each day's trials were complete, the juvenile animals were replaced in their home habitats until the next day's trials began.

This experiment was designed to determine whether pillbugs have both short-term and long-term memory. The eight trials performed by pillbugs in one day tested short-term memory, and long-term memory was to be determined by seeing whether one day's trials influenced the following day's trials.

## Data Analysis

To test whether animals were being conditioned the time and the number of turns taken for the animals to reach the destination habitats, and the percentage of runs where favourable habitat was located were recorded. A chi squared test was used to verify whether juveniles preferred soil habitat over the drier paper substrate.

A regression analysis was used to determine whether time and the number of turns were correlated. It was expected that as the amount of time taken to reach a destination habitat decreases, the number of turns used by animals to locate the habitat would also decrease.

A regression analysis was also performed to test for correlation between the amount of time taken to complete the maze and the sequence of trials. Animals were assigned to one of two groups based on the number of trials that resulted in the animals reaching the favourable habitat. Animals that reached the favourable habitat more often than the total group average were separated from those reaching favourable habitat less often than average. Regression analysis was used to test if the per cent selection of favourable habitat was related to the number of turns each individual pillbug made during its 32 trials. It was predicted that if the reinforcing treatment (substrate type) was having an effect, animals choosing soil habitat relatively often would demonstrate less turns.

## Results

Each of the sixteen test animals ran through 32 trials over a four-day period for a total of 512 trials. Individual pillbugs showed different behaviours upon being placed at the starting point of the Y-maze. Initially some animals stood still, some tried to escape (climb walls), and others immediately turned around and began crawling down the corridor. Generally the movement patterns exhibited by each pillbug were unpredictable within each trial and between subsequent trials. However, animals did show a significant tendency to reach soil habitat over the paper substrate during the course of the entire experiment ( $\chi^2=25.38, P=0.001, df=1$ ). Of the 512 trials, soil habitat was chosen 313 times (61%) while paper habitat

was reached 199 times (39%).

There was a significant correlation between the total amount of time taken to complete the maze and the number of turns that each animal exhibited (Figure 3); as the number of turns decrease, the amount of time it takes for pillbugs to complete the maze also decreases ( $F=9.12$ ,  $df=1$ ,  $P=0.009$ ,  $r^2=0.39$ ).

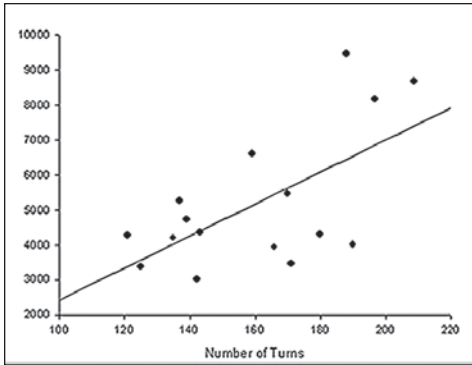


Figure 3: The total time taken to complete all maze trials as a function of the total number of turns that each animal demonstrated en route through the maze.

The total number of turns recorded for each animal did not appear to be related to the percentage of trials that the animal reached the favourable (soil substrate) habitat (Figure 4;  $F=0.4$ ,  $df=1$ ,  $P=0.5$ ,  $r^2=0.028$ ). There was no significant difference in the number of turns taken to reach a destination habitat between the two categories of animals. For example, a juvenile that chose soil

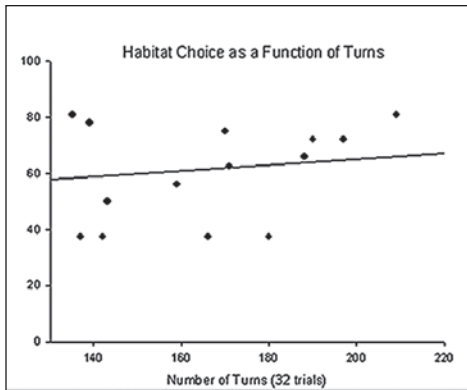
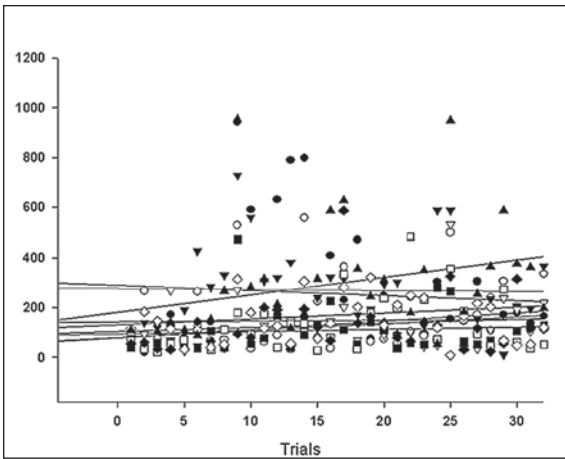


Figure 4: The total amount of turns (32 trials) for each individual based on the per cent selection of favourable habitat.

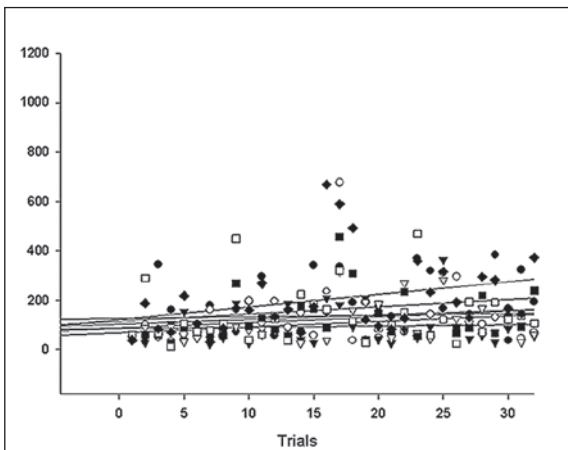
habitat 37.5% of the time performed 137 turns (for all 32 trials) to complete the course while a juvenile that chose soil habitat 81% of the time turned 135 times.

The amount of time taken for each juvenile to reach a destination habitat (either favourable or unfavourable habitat) was measured for all 32 trials (Figure 5a-b). There was no indication that the time taken



a)

Figure 5: The amount of time taken to complete the Y- maze for each individual over all 32 trials during the 4 day experimental period. a) Individuals who chose favourable habitat more than 19 times out of 32 trials (>61%). b) Individuals who chose favourable habitat less than 19 times out of 32 trials (<61%).



b)

to complete a trial (i.e. reaching a destination habitat) changed in relation to the number of trials that each animal had run (all values of  $P > 0.08$  and  $r^2 < 0.83$ ).

## Discussion

Within the parameters of this experiment there appeared to be no indication of operant conditioning in juvenile pillbugs; animals locating the favourable habitat in one trial did not demonstrate an increased tendency to return to that particular habitat. There are several possible explanations for these results.

In order to successfully test for operant conditioning, it was important that the juvenile pillbugs were not locating favourable habitat through the use of sensory information such as scent trails or changes in humidity. Only in this manner can one determine whether they are using memory (learning) to locate a favourable habitat rather than merely using mechanoreceptors (innate). Failure to demonstrate operant conditioning in juvenile pillbugs may be a result of the inability to completely eliminate the cues that the animals may have been using to detect the favourable habitat, even though I attempted to control those variables known to influence movements of isopods (i.e. temperature, humidity, light; Warburg, 1964). If so, it is possible that the animals were able to use sensory, environmental information to guide their movements rather than relying solely on the consequences of previous experience.

Operant conditioning uses either a positive or negative reinforcement for the animal to learn through the consequences of its behaviour. In a previous study, Robinson (2005) showed that pillbugs are attracted to habitats containing conspecific sign (feces/scent and molted carapaces); therefore, to strengthen the reinforcement I did not change the soil habitat between trials. In Robinson's (2005) experiment juveniles were able to roam freely in a single container divided into two equal halves, with only one half containing conspecific sign. After 60 minutes of exploration, Robinson (2005) reported, juveniles showed a distinct preference for the side containing conspecific scent. He suggested this was linked

to the pheromone that pillbugs produce in the mid or hind gut that is excreted out of the body through the feces (Takeda, 1984). It is possible that I may have underestimated the distance at which pillbugs can detect such pheromones, which would explain why juveniles preferred soil habitat over paper and did not show any indication of conditioning. Six receptors have been identified in *Armadillidium vulgare* (Edney, 1968) which may be well developed enough that psychological mechanisms are not necessary for pillbugs to locate enriched habitats in order to maximize their survival and reproduction.

Stress may also account for the lack of operant conditioning shown by *Armadillidium vulgare* in this study. The activation of the reinforcement system is dependent on the presence of particular stimuli as well as the state of the animal (Carlson, 2004). A stimulus that serves as a reinforcer on one occasion may fail to do so in another; a hungry animal may respond to food, but an animal that has just eaten may not. *Armadillidium vulgare* are gregarious animals, and for this experiment, in order to track individuals, they were housed separately during the four-day experimental period. This housing, as well as subjects being physically relocated between trials, may have increased stress levels and subsequently decreased ability to learn.

Further experimental design flaws also may account for the lack of operant conditioning. Kirsch and Erber (1999) conditioned honey bees to use their antennae to touch one of two silver plates. They determined that a minimum inter-trial interval of two minutes was necessary for conditioning to occur. Each juvenile pillbug was removed from the choice habitat after being held inside it for 10-12 minutes, and then immediately placed at the base of the Y-maze to begin the next trial. This may have made it difficult for juveniles to differentiate between the beginning and end of each trial.

Possible experimental flaws notwithstanding, it is possible that pillbugs do not have the psychological mechanisms that are necessary to demonstrate short-term and long-term memory; therefore, they depend primarily on sensory information to locate

a preferred habitat. However, since pillbugs are capable of creating new behaviours when faced with a difficult situation (Moriyama, 2004) it seems possible that they would have the psychological mechanisms to learn from the consequences of previous behaviours. Moriyama (2004) reported that when *A. vulgare* encounter a novel problematic situation they respond by creating a temporary solution. Moriyama attached pairs of equal-weight pillbugs with a string and left them for observation in a circular stadium. Two novel behaviours subsequently were observed; mounting behaviour where one pillbug would mount the other and the pair would then move as a unit and death-feigning behaviour where one pillbug would lie on its back and be dragged by the other). Neither of these behaviours have been observed in nature likely because of innate predator responses and increased desiccation. This experiment forced pillbugs to confront novel problems between their behaviour and stimulus, and their nervous systems were required to mediate difficult situations they had never before encountered. Thus, it seems possible that pillbugs could be capable of modifying their behaviour based on the consequences of their previous actions.

In natural environments some animals, including pillbugs, are said to follow a linear path since it is considered the most efficient strategy when the animal lacks precise information about its surroundings (Moriyama, 1999). When an obstacle forces a pillbug to turn it can resort to an innate behaviour called turn alternation. For example, if a pillbug reaches a wall and is forced to turn left, a right turn may immediately follow. This correction of direction prevents the animal from going in circles, and may appear to an observer that the animal is following the wall. I did not consider this innate response in the data analysis, and this may have possibly influenced the results. When a juvenile was placed at the starting point in the Y-maze there were times when the animal reached a side and followed the wall the total distance to the destination habitat on that side, regardless of whether it eventually reached a favourable or unfavourable habitat. In the future it may be useful to reduce the diameter of the runways of the Y-maze to the width of a

pillbug in order to minimize the influence of turn alternation.

Past studies at TRU have demonstrated a possible ultraviolet (UV) or blue light sensitivity in pillbugs (Cox, 2006 (unpublished)). Reinforcement is essential for conditioning animals, and perhaps a stronger reinforcement, or a negative reinforcement such as UV or blue light, may be sufficient to condition *Armadillidium vulgare*.

In this study I tested pillbugs for their ability to use experience to guide their future decisions. The data provide no indication of operant conditioning, and although this may be due (at least in part) to one or more confounding factors, this work provides the first attempt to test for operant conditioning in pillbugs. As such, it provides a useful foundation for future and more elaborate studies into the behaviour and movement ecology of this group of animals.

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# **Marie d'Oingies, Hildegard von Bingen and Catherine of Siena: Female Mystics of the Medieval Christian Tradition**

TARA CHAMBERS

## **Abstract**

This paper explores the lives of three female Christian mystics who, through their religious devotion and deeply personal relationships with God, were able to transcend the paternal bonds of the medieval Catholic Church, and use their influence to instigate social and political change throughout the early middle ages.

Due to new agricultural techniques and a warmer climate, eleventh-century Europe experienced higher crop yields, which ushered in three hundred years of economic expansion, wealth, and population growth.<sup>1</sup> Throughout Europe, trade and urban development expanded, making way for a new merchant class. This latest prominent class of people were for the most part literate, and their urban concerns began to gain prominence in medieval society, including the realm of the church. This wealthy urban laity began sponsoring vernacular translations of the Scriptures that were read by many people who had little formal theological training, producing widespread heretical movements. The church, “which had always stressed renunciation, detachment, and the new model of apostolistic poverty,”<sup>2</sup> found its theology beginning to be challenged by these new theological thinkers.

One of the products of these modern changes was a “new mysticism”<sup>3</sup> where theological thought shifted from the traditional belief that only those who received proper training and had taken the appropriate vows could gain direct contact with God, to the idea that “God could be found directly and decisively, anywhere and by anyone.”<sup>4</sup> Mystical works began to be produced inside as well as outside monasteries, with these works known for their descriptions of expressive individual mystical experiences. After 1200, the new mysticism experienced a gender shift, as women began to acquire an important place in the mystical tradition by bringing “women’s imagery and philosophy to the service of Christianity.”<sup>5</sup> The visions and charitable work of Marie of Oingies from the Beguine movement, the music and writings of Hildegard of Bingen, and the public and political work of Catherine of Siena are a testament to how mystical religious activity empowered medieval women to degrees never before afforded by medieval culture.

Because of the overwhelming number of women wishing to take part in the new religious movement, women’s houses attached to the Cistercians, the Dominicans, and the Franciscans were filled to overflowing; therefore, they were in no position to include all of the women who wished to join. It was also difficult to designate a new

convent to a religious order, as the orders only accepted communities wealthy enough to sustain all of their members without requiring the assistance of alms. Only when a women's religious community had the good fortune to receive a land donation, or when wealthy women who owned property joined, was it possible for these communities to gain recognition from an order. Because of the strict criteria, these houses "only opened their doors to the very influential or wealthy."<sup>6</sup> Unfortunately, many women who desired a religious life could not meet these conditions, so they began to live singly or in groups.<sup>7</sup> The pious women who represented a "distinctly feminine expression of popular piety"<sup>8</sup> became known as the Beguines.

The Beguines were devoted to lives of contemplation and mystic visions, and they gained popularity in the Low Countries and the Rhine valley throughout the thirteenth century.<sup>9</sup> While they pursued their spiritual goals, the Beguines laboured and served the poor and sick populations of their communities. Because they earned money by their own labour and led lives at "the highest level of Christian perfection,"<sup>10</sup> the Beguines had the ability to live independently of the male influence to which women were normally subjected due to marriage or religious hierarchy.<sup>11</sup> Nonetheless, the Beguines led a chaste existence and experienced freedom from governance by the monastic rule, so they were separated from ordinary women as well as from nuns, which caused tension between them and some others in secular and religious society.<sup>12</sup> In 1247, the Franciscan Gilbert of Tournai remarked in his work, *Collectico de scandalis ecclesiae*, "there are those among us women whom we have no idea what to call, ordinary women or nuns, because they live neither in the world nor out of it."<sup>13</sup> Nevertheless, in 1315 an ecclesiastical minister, Jacques de Vitry, recorded the life of one of the first Beguines from the Belgian diocese of Liege,<sup>14</sup> who exemplified this new female lay piety, with the hope that her story could be used to combat the growing number of women gravitating toward Catharism.<sup>15</sup> By chronicling the life of Marie of Oignies (1177/8-1213),<sup>16</sup> de Vitry endeavoured to introduce an orthodox option for women who desired independence from the male authority of the

Catholic Church, while pursuing their own spiritual goals.<sup>17</sup>

According to de Vitry's biography, Marie was born in Nievilles near Liege, to a wealthy family of lower nobility.<sup>18</sup> Although Marie showed a desire for holiness at a young age, her parents wished her to live a secular life, and married her at the age of fourteen to an impressionable young man named John.<sup>19</sup> However, Marie would not let marriage become an obstacle to her pursuit of holiness, and she was able to convince her husband that it was in their best interests to dedicate their lives to chastity and charity.<sup>20</sup> Marie devoted her life to the imitation of the poverty of Christ—she owned nothing, lived by her labour, and begged door to door.<sup>21</sup> The young couple converted their home into a hospital where they attended the sick and leprous.<sup>22</sup> Marie also subjected herself to harsh physical abuse by donning a rope girdle that chafed her until she bled and by refusing to wear warm clothes.<sup>23</sup> Marie believed that by imitating Christ and subjecting herself to such harsh living conditions, her mystical experiences would increase. Her way of life was of great benefit to her because she was subject to visitations by many divine presences, frequent ecstasies, and out-of-body raptures, and became known for producing “abundant tears that flowed in streams, covering the ground of the church in her muddy footprints.”<sup>24</sup> According to her biographer,

*When the priest was raising the host she saw between the hands of the priest the outward appearance of a beautiful boy and an army of the heavenly spirits descending with a great light...when the Lord appeared to her in the likeness of a boy tasting of honey and smelling like spices.*<sup>25</sup>

Besides her visions of Christ, Marie was also said to possess the gifts of clairvoyance, prophesy, and healing. By laying her hands on those who were distressed with various illnesses, she was reported to have the ability to completely heal their afflictions.<sup>26</sup>

By using the model of Marie's life, de Vitry attempted to develop the idea that women did not have to drift toward heresy in order to live a religious life outside of the confines of male-dominated institutions.<sup>27</sup> Pope Honourous III was convinced enough by de Vitry's biography of Marie to informally approve the Beguine movement,<sup>28</sup>

but the aftermath of the Fourth Lateran Council and its prohibition of new orders<sup>29</sup> as well as moral and heretical scandals brought about the Beguine's decline.<sup>30</sup> However, the spirit of Marie lived on, and even after her death she continued to assist her loved ones by allegedly warning them of dangers and "removing from their hearts all doubt by certain and secret signs."<sup>31</sup>

Over half a century before Marie of Oignies chose her independent path to spirituality, a notable woman by the name of Hildegard of Bingen (1098-1179) was the first of her kind in many religious, artistic and literary respects.<sup>32</sup> Known as the "Sybil of the Rhine," Hildegard became famous not only for her piety, but also as the author of major works of theology, visionary writings, treatises on natural history, music, and sex. Hildegard was also celebrated as a miraculous healer who cured the ailing through exorcism, touch, and prayer.<sup>33</sup> Born in Bockelheim on the Nahe, Hildegard was the tenth child born to a noble family.<sup>34</sup> As was customary practice of the time, her family immediately dedicated Hildegard to a life of service to the Catholic Church.<sup>35</sup> At the age of three, Hildegard's mystical life began when she "saw such a light that my soul trembled, but because I was just an infant I could say nothing of these things"<sup>36</sup>; therefore, she hid this gift from everyone until she was an abbess in her forties.<sup>37</sup>

At the age of eight, Hildegard was sent to an anchorage attached to a Benedictine order in Disibodenberg.<sup>38</sup> The anchoress was a woman named Jutta, who led the life of an extreme ascetic. The group of girls in her care usually numbered around twelve, and all of them were required to live in one room adjacent to the church. Other than a small window, Jutta and her young charges were shut off from the rest of humanity, and their lives were spent in contemplation, prayer, handiwork, and rudimentary education<sup>39</sup> which consisted of reading and singing Latin psalms.<sup>40</sup> Hildegard was a sickly child, and it is now believed that the migraines she endured throughout her lifetime were the cause of most of her visions. According to Hildegard:

*I also asked one of my nurses whether she also saw similar things. When she answered no, a great fear befell me...I would relate future things, which I saw as if present, but noting the amazement of my listeners, I became more reticent.<sup>41</sup>*

Jutta noticed Hildegard's gifts, and informed a monk named Volmar who, with permission from his abbot, became Hildegard's secretary.<sup>42</sup> When Hildegard was 38 Jutta died, and Hildegard was elected to be the head of the convent where she had been trained for the last thirty years.<sup>43</sup> In 1141, at the age of 42 years and seven months, Hildegard's life would take a dramatic turn with a "vision that would change the course of her life."<sup>44</sup> Hildegard claimed that she experienced God, and through her vision, she all at once "knew the meaning of the exposition of the scriptures."<sup>45</sup> According to Volmar, not only had God explained the meaning of religious texts to Hildegard, He also urged her to write down everything she saw in her visions.<sup>46</sup> Eventually Hildegard overcame her feelings of inadequacy as a woman, and humility because of her gift, and dictated her visions to Volmar. Soon word of the great Abbess Hildegard spread, and it became common knowledge throughout religious communities that when Hildegard spoke, "she spoke with the authority of God."<sup>47</sup>

After her life-altering vision, Hildegard's existence was transformed from one of contemplation to that of an active monastic with lofty goals.<sup>48</sup> The twelfth century was rife with schisms and religious stimulation, and with the blessing of Pope Eugenius, Hildegard continued her religious writings,<sup>49</sup> preached against the schematics, especially the Cathars, and advised people of all occupations.<sup>50</sup> People wrote to Hildegard and received timely answers. Crowds of people flocked to hear her words of wisdom, and they received advice regarding bodily and spiritual ailments.<sup>51</sup> Throughout the second half of her life, Hildegard made many journeys in the name of her love of the church, visiting and advising religious houses throughout Germany as well as receiving audiences with the Emperor Frederick Barbarossa.<sup>52</sup>

Besides counselling and working to combat heresy, Hildegard became proficient at writing religious music. "She described it

[music] as a means of recapturing paradise”<sup>53</sup> and her hymns were written in honour of saints, virgins and Mary.<sup>54</sup> One of Hildegard’s hymns, “De Patriarchis et prophetis” (“Of Patriarchs and Prophets”), may only be twelve lines, but the beauty of the poetry is without a doubt evident even by today’s standards.

O vos, felices radices  
 cum quibus opus mirculorum  
 et non opus criminum .  
 per torrens iter perpiciuae umbre plantatum est.  
 Et o tu, ruminans ignea vox,  
 praecurrens limantem lapidem,  
 subvertentm abysssum  
 gaidete om capite vestro.  
 Gaudete in illo.  
 quem non viderunt in terries multi  
 qui ipsum ardentem vocaverunt.  
 Gaudete in capite vestro.<sup>55</sup>

{O you, happy roots, with whom the crop of miracles and not of crimes was planted on the burning path, in lucid foreshadowing—and you, contemplative and fiery voice heralding the whetstone, demolishing the abyss, rejoice in him who is your summit! Rejoice in him, whom many did not see on earth, though they called for him ardently. Rejoice in him who is your summit!}<sup>56</sup>

According to Susan McClary, this twelve-line hymn encapsulates “the divine trajectory from the Old Testament fathers to John the Baptist to Christ,”<sup>57</sup> and to hear Hildegard’s lyrics put to music is apparently what angels would sound like to us if we could hear them.<sup>58</sup> An interesting aspect of Hildegard’s musical endeavours is that although her music is still thought of today as a representation of beauty without parallel, she was never trained in music and singing.<sup>59</sup>

As well as liturgical songs, Hildegard wrote extensively on spirituality, nature, and sex. Her first visionary work, *Scivias* (*Know the Ways of the Lord*), brought her great fame throughout Germany and more of Hildegard’s spiritual writing soon followed. After moving her convent from Disibodenberg to Bingen, Hildegard continued to write not only her music, but moral plays, two other visionary writings, and books on natural science drawn from ancient

Greek cosmology and the corresponding four humours. In a unique turn for a woman known for her well-known degree of chastity and piety, Hildegard also wrote on the subject of sex and pleasure from a woman's perspective.<sup>60</sup>

Until the end of her life at almost eighty-one, Hildegard continued to enjoy an extremely active, if not controversial, existence. At the age of eighty, Hildegard had to endure a serious spiritual trial when she defied an order from the clergy of Mainz to disinter an excommunicated man who happened to be buried in her convent's cemetery. She chose not to obey the order since the man had received last sacraments, and therefore, in her opinion, was reconciled with the church.<sup>61</sup> Unfortunately for Hildegard, the archbishop did not see things in the same way, and an interdict was imposed that barred her convent from holding divine services. The eighty-year-old abbess held her ground, and eventually managed to convince the archbishop of Mainz to lift the interdict.<sup>62</sup>

Along with Hildegard of Bingen, Catherine of Siena (1347-80) was one of the medieval mystics who had the greatest influence with the highest levels of society. Although Catherine did not live the long life afforded to Hildegard, in her thirty-three years she gained recognition as a mystic, prophet, healer, ambassador for the pope, and as a determined supporter of the papacy's return from Avignon to Rome.<sup>63</sup>

Catherine Benincasa was born into a wealthy Sienese dye-making family. She was the second youngest of twenty-two<sup>64</sup> children, and from about the age of six she had the gift of religious vision.<sup>65</sup> At the age of seven, Catherine dedicated her virginity to Jesus; however, her vow did not fit her parent's plans for her future, and by the time Catherine was twelve, Giacomo and Lupa (Catherine's parents) were searching for a fitting marriage match for their daughter. She thwarted their plans by cutting off her hair, sleeping a mere quarter of an hour a day, drinking only water, and wrapping a chain around her body so tightly that her skin chafed.<sup>66</sup> In the end, Catherine's religious fervour was stronger than her parent's marital determination, and at the age of eighteen she joined a Dominican order known as The

Sisters of Penance.<sup>67</sup> According to her biographer, Raymond of Capua, Catherine lived in a small room at her parent's home for three years, and followed a harsh routine that consisted of severe asceticism and intense prayer.<sup>68</sup> Trances dominated Catherine's younger years, and sometimes they became so profound she was reported to levitate in the midst of an ecstasy.<sup>69</sup> Catherine gave herself so completely over to asceticism and fasting that her dedication resulted in her vivid vision of being wed to Christ.<sup>70</sup> According to Catherine, Jesus placed a gold ring encrusted with pearls and a diamond on her finger,<sup>71</sup> and when the vision faded Catherine lovingly wore the ring that only she could see.<sup>72</sup> After her mystical marriage to Christ, Catherine had another vision in which He appeared before her with His heart in His hands. She believed that He opened Catherine's left side, and placing His heart inside her, said: "As I took your heart away from you the other day, now you can see, I am giving you mine, so that you can go on living with it forever."<sup>73</sup>

As well as receiving mystical visions, Catherine also accepted the divine call to serve society and assist the church in overcoming the obstacles plaguing it. In 1376, she traveled to Avignon in order to speak with Pope Gregory XI about organizing another crusade, reforming the Catholic Church, ending his war with Florence, and moving the papal court back to Rome. Due to her reputation for holiness, Catherine was granted an audience with the pope; however, she was instantly stricken by the corruption resulting from the papal court's wealth and power. Her admonishment that the papal court "which should have been a paradise of heavenly virtues, had the stench of all the vices of hell"<sup>74</sup> must have had some influence on Gregory, since he moved the papacy back to Rome in 1376.<sup>75</sup> Gregory also requested that Catherine lead a mission into the Sienese countryside in order to save souls and stimulate interest in a crusade, and in 1378, he sent her to Florence as his envoy in an uprising against the papacy. Gregory died in that same year, and the cardinals who decided instead to back Clement VII almost immediately deposed his successor, Urban VI. Clement took the cardinals and the papacy back to Avignon, and by doing so, divided the loyalties of the Western Christian Church

between two popes, thus creating the Great Schism. Urban requested that Catherine come back to Rome in order to help substantiate his claim to the papacy, and although her body was ailing, she did all she could to convince the Christian world that Urban VI was the rightful pope, and that Rome was the papacy's legitimate location. It was during this period of poor health and in a state of ecstasy that Catherine dictated her book, *Dialogues*, to Raymond de Capua, as well as an enormous quantity of correspondence concerning the schism. There was little strength left in Catherine's extremely frail body, and soon her health failed to the point where she could no longer eat or swallow water, eventually becoming paralysed. Catherine died in Rome on April 29, 1380.<sup>76</sup>

Christian mysticism and the gender shift it experienced after the eleventh century brought a level of empowerment to some holy women in the middle ages. While Christianity was regarded as a religion based on the acceptance of established doctrine and external acts of piety, these women were able to turn their religion into a living spirituality based on their personal relationships with God. Chastity, harsh poverty, penance and contemplation directed the lives of the women dedicated to Christ. However, through their suffering, they encountered acceptance on a political and religious level, while developing an exceptionally deep love of God that is wholly unique to the female mystic.

## Notes

1 Steven Fanning, *Mystics of the Christian Tradition* (New York, 2001), 85.

2 Fanning, 85.

3 Fanning, 85.

4 Bernard McGinn, "The Changing Shape of Late Medieval Mysticism," *Church History* 65, no. 2 (1996): 195.

5. Renee Neu Watkins, "Two Women Visionaries and Death: Catherine of Siena and Julian of Norwich," *Numen*, 30 no. 2 (1983):175.

6 Herbert Grundmann, *Religious Movements in the Middle Ages (Notre Dame, 1995)* 139.

7 Fanning, 94.

8 Carol Neel, "The Origins of the Beguines," *Church History* 14, no. 2 (1989): 323.

9 Fanning, 94

10 Bishop of Lincoln, Robert Grosseteste, as quoted by Herbert Grundman, *Religious Movements in the Middle Ages*, 141.

11 Neel, 325.

12 Neel, 325.

13 Gilbert of Tournai, *Collectio de scandalis ecclesiae*, as quoted by Carol Neel, "The Origins of the Beguines," 323.

14 Fanning, 95.

15 Neel, 326.

16 Steven Fanning, 95.

17 Neele, 326.

18 Fanning, 95.

19 Neel, 327.

20 Neel, 327.

21 Fanning, 95.

22 Neel, 328.

23 Neel, 328.

24 Jacques de Vitry, *The Life of Marie d'Oignies*, as quoted by Steven Fanning, *Mystics of the Christian Tradition*, 97.

25 de Vitry, 97.

26 Fanning, 96.

27 Neel, 326.

28 Grundmann, 140.

29 Neel, 327.

30 Grundman, 140.

31 de Vitry, 96.

32 Kristina Lerman, "Life and Works of Hildegard von Bingen (1098-1179)," *Internet Medieval Sourcebook*, ed, Paul Halsall, <http://www.fordham.edu/halsall/med/hildegearde.html> (accessed February 26, 2007).

33 Fanning, 82.

34 Francis Mershman, "St. Hildegard," *Catholic Encyclopaedia*, <http://www.newadvent.org/cathen> (accessed February 26, 2007).

35 Lerman, The custom of tithing included giving up the tenth child for service to the church as opposed to paying "one-tenth" of a household's income in taxation, so literally...Hildegard was born for the job.

36 Hildegard, as recorded by Volem as quoted by Steven Fanning, *Mystics of the Christian Tradition*, 83.

37 Lerman.

38 Mershman.

39 Lerman.

40 Mershman.

41 Hildegard *Scivius*, as quoted by Francis Mershman, "St. Hildegard." 1.

42 Fanning, *Mystics of the Christian Tradition*, 83.

43 Lerman.

44 Lerman.

45 Fanning, 83. Fanning's quote of this passage differs from Halsall's in

wording, but the meaning is the same.

46 Lerman.

47 Fanning, 83.

48 Fanning, 84.

49 Lerman.

50 Fanning, 82.

51 Mershman.

52 Mershman.

53 Susan McClary, "Of Patriarchs...and Matriarchs Too. Susan McClary Assesses the Challenges and Contributions of Feminist Musicology," *The Musical Times* 135 (1816) (1994): 364.

54 Lerman.

55 Hildegard's *Symphonia harmoniae caelestum revelationum* ('Symphony of the harmony of heavenly revelations'), as quoted by Susan McClary, *The Musical Times*, 364-365.

56 McClary, 365.

57 McClary, 364.

58 Lerman.

59 Fanning, 84.

60 Lerman.

61 Mershman.

62 Fanning, 82.

63 Fanning, 82.

64 Fanning, 129.

65 Renee Neu Watkins, "Two Women Visionaries and Death: Catherine of Siena and Julian of Norwich," *Numen*, 30, no. 2 (1983):175. Fanning is the source that gives six as the exact age Catherine was when her visions began.

66 Fanning, 129.

67 Fanning, 129.

68 Raymond of Capua, *The Life of St. Catherine of Siena*, as quoted by Karen Scott, "St. Catherine of Siena 'Apostola,'" *Church History* 61, no. 1 (1992): 35.

69 Fanning, 129.

70 Scott, 35.

71 Raymond of Capua, *The Life of St. Catherine of Siena*, as quoted by Fanning, 130.

72 Steven Fanning, *Mystics of the Christian Tradition*, 130.

73 Raymond of Capua, *The Life of St. Catherine of Siena*, as quoted by Fanning, 130.

74 Raymond of Capua, *The Life of St. Catherine of Siena*, as quoted by Fanning, 131.

75 Scott, 34.

76 Fanning, 131.

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## About the Author

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# **On Finding a Voice: The Struggle to Present Yourself**

TINA CAMILLI

## **Abstract**

Both teachers and society can impact students' abilities to emote an authentic voice by silencing, distorting, and oppressing their ideas. This presentation explores voice as a complicated concept intertwined with society, individuality, political stance, race, class, and gender that is difficult to create and express.

## Introduction

This is a world of text where individuality is hard to find; yet each of us is unique. We are constantly searching for new ways to express our ideas and to be heard. At the same time, each is searching for a way to understand and absorb another's voice, and, as such, "voice is viewed as dynamic, changing as it develops and appropriates language, and as an expression accumulated through experiences" (Cappello, 483). Voice can further be defined as a critical consciousness where students are encouraged "to understand the decisions they make when using language" (Pace, 3). Yet, we expect students to produce written work that uses their own voice and their own writing style, though many are unfamiliar with the term of voice, and are unable to even describe their own writing style.

As such, the concept of voice is complicated since it is intertwined with society, which takes one culture—humans—and then breaks it up further by creating imaginary boundaries, which result in one person from one group or culture believing he or she should not or could not associate with another. This may be due to a lack of communication skills, or it may be due to communication differences. Teachers and employers are constantly asking for improved performance and are looking for those who go "above and beyond" in their writing and speaking performances. But how do people improve their performance when they do not know what needs to be improved and how to improve it? The main way to improve performance is to find your own style of voice or your own style of presenting and integrating your voice and personality with information while focusing on being consistent in the use of your voice. That is to say, the "language used in multiple rhetorical situations both reflects and creates ... multiple social identities" (Pace, 1).

It is not an easy process to assist students in developing their own voices, especially since voice is very difficult for students to define. Furthermore, I have found that the concept of student voice has become "highly visible and influential in current discussions of curriculum and teaching" (Ellsworth, 308). Some believe that it is being taught and others fear that feminism and other social

movements have come in the way of teachers discussing voice and style in the classroom (Pace, 4-6). I have also found that there is little advice on how to improve and build upon student voice skills. There has been very little previous research; however, in every literary text there is a chapter that provides definitions, and sometimes examples, on finding your own writing style. Unfortunately, these details are not helpful because they only provide a definition of the difference between a good style and an excellent style. At the same time these definitions lead readers to think that a style of voice has some formula that anyone can follow instead of stating what steps can be taken for improving student voice. Furthermore, these definitions do not provide suggestions for adapting student voice to different contexts or genres. We use words as a social means to engage in conversation and restructure relationships; in other words, our voice and the interpretation of our words “involves assuming a certain stance toward other people and toward the world” (Smagorinsky, 29).

The purpose of this article is to explore voice as a complicated concept that is difficult to create and express given that it is intertwined with society, individuality, political stance, race, class, and gender.

Are people comfortable with their own voice? Can people have different voices in different places? Are all voices equally acceptable? And, do these differing voices affect how we see people? These questions have led me to think about how we perceive and respond to individuals from different socioeconomic backgrounds and educational genres. As a society we tend to categorize by stereotyping an individual's ideas when attempting to “give meaning to, and to construct and reconstruct, the answers that their students provide” (Gilliatt and Hayward, 161). In doing so, society tends to resort to “common sense or taken for granted concepts, many of which involve labeling” (Gilliatt and Hayward, 161). The words we use and how we categorize and characterize ourselves and others are the very words that label us. For example, some of us want to be recognized for our neatness, organization, or humour, yet we say that others are extremists in these categories or we wonder if they are presenting

a false front. I think it is important for us to remember that these very differences can help us in our comprehension of information. It is also important for teachers to empower students of differing race, class, and gender positions to “speak in self-affirming ways about their experiences” (Ellsworth, 409). By not allowing students to speak freely, we force them to conform to some preconstructed or stereotypical norm that has been predefined by society. Here the term norm refers to the act of regarding others and themselves for values and virtues that reflect what the teacher wants to hear and is “a matter precisely of becoming a certain sort of person—one who is capable of taking moral issues and questions seriously, and who is no less seriously committed to self-improvement than to the improvement of others” (Carr, 173, 178).

Keep in mind that the idea of a norm is also the absence of voice where communication “is dead, mechanical, faceless. It lacks any sound ... it is as though the words came through some kind of mixer rather than being uttered by a person” (Elbow, 288). In opposition, a “real” or “true” voice is seen as having “lively sound of speech. It has good timing. The words seem to issue naturally from a stance and personality” (Elbow, 292).

### **Differing Writing Voices**

I have found that there are two different, and almost acceptable, categories to describe voices: the radical voice and the narrative voice. Radical voices have a profound affect on our perception of the ideas being promoted. Those who speak through radical voice believe in extreme or radical ideas, where the origins of the radical voice are “from theological and religious tutelage” (Fromm, 46). The modern usage of the radical voice is where one uses preconceptions, attitudes, and experiences and creatively uses alternative ideas and feelings (Heath and Kreitzer). The radical voice may help individuals comprehend difficult information; however, it is possible that the radical voice offends more people than it enlightens, or it may stop thoughts from moving in a new direction altogether.

The radical voice is usually delivered via direct and forceful

language that does not allow for any other interpretation; there is no room for ambiguity. These statements tend to be striking and grab attention, and furthermore, may cause people to deploy defence mechanisms. Children often use this style of voice as it “reflects the struggle to negotiate the opposing expectations of what the world should be like around them” (Cappello, 490). Furthermore, it is impossible for these ideas to contain exceptions to a rule—the delivery is an “all or nothing” approach. The words chosen give the radical voice its power through the use of strong and clear adjectives that paint extremist statements that may be perceived as venting or over-generalizing. For example, if you just “examine them ... you threaten the very structure” (Firestone, 94) of what is being conveyed; it is very difficult to realise that your own thoughts could be drastically wrong or stereotypical. It is not easy to change how you think or what you believe in order to give students the freedom to express their own ideas using their own voice or writing style.

If someone attempts to defend their views against the radical voice they will likely encounter arguments, which leads to closed mindedness and the closing of communication. It appears that people are more focused on the external integration of ideas as opposed to internal integration when the ideas are voiced with a strong and personal meaning.

Here is an example of a radical voice from one of my students: “Well, when a baby is born it is not decided whether it is left- or right-handed. Sleeping on the right side will make all the main cells and functions move to the right side thus making the baby right-handed. Further studies show that when a baby is born its brain and other functions are very flexible. The handedness of the baby is determined within the first 50 hours. If the baby shifts sides or is put to sleep on the back then there is a good chance of being ambidextrous. Some people disagree with this so further study is needed” (Student, practicum 2008).

When responding to the questionnaire, this student stated that he felt his writing voice could be adapted to fit any writing assignment, and that his style is unique because it is very detailed

and realistic (Student, practicum 2008).

Contrary to the radical voice is the narrative voice. The narrative voice is accomplished through using stories to convey ideas. The concept of the narrative voice has been around for thousands of years; the ancient Greeks, medieval people, and the writers of the Bible all employed the narrative voice. The way the narrative voice is conveyed may affect how we comprehend ideas by helping us get in touch with our emotions, and as a result can help us see the concepts being presented, as we may be able to relate on an emotional level. Furthermore, the narrative, presented in a story form, is therefore slightly removed from real life and is centred around a moral, allowing listeners to create their own feelings and thoughts around the content (Burgess, 294). However, emotionally charged voices can also control what we hear because we can miss the ethics or morals of the issue.

The narrative voice may be complete with speaking lines, characters, thoughts, plot, and emotions of the speaker. This style tends to come alive as it is highly descriptive and assists people in understanding and feeling exactly what the speaker is trying to paint as if it was being lived—it appears real. Children use this style of voice as they believe that telling stories of what the world is like around them is the basis for good writing and gives them voice (Cappello, 490). Hence, we can be controlled by this narrative voice and our views can be created for us. However, some of us bring our own biases and past experiences to the forefront and are too quick to make judgements on what is being presented (another form of defence mechanism), so we are unable to fully listen to the narrative voice. The thought of someone else being right or having a different view disturbs us. As a result, we start to defend our views with counter-arguments instead of thinking through what is being presented or attempting to sympathize with the ideas being presented.

Here is an example of a narrative voice from one of my students: “If I could pick any job to do right now for a day it would have to be to be a captain of a really big boat. I would say something like a cruise ship. I think this would be really neat to make all those people

happy. Although, now that I think of it I don't know how to drive a boat as I am only in grade 7. But I guess that's what my crew would be for. I suppose they could help. But then I don't think that I would be believable as the captain because I don't look old enough. Well, although, if this was imaginary then I guess it could be done, but that would be strange if I could do this job for a day and it was imaginary. Anyway, enough of this" (Student, practicum 2008).

This student when responding to the questionnaire stated that he feels his writing style is "kinda like your own personal journal. It's your thoughts from your head." He also felt that he had difficulty with writing assignments when there was a length limit (Student, practicum 2008).

### **Influences on Writing Voice**

From this discussion on radical and narrative voice we can determine that voice appears strongly linked to societal and personal beliefs. It may even be argued that "society constructs voice, that identity is shaped by social forces beyond any individual's control" (Smagorinsky, 175). But is this really true or do we, as teachers, help construct student voices? There is, after all, a built-in hierarchy in the school system between teachers and students. Ellsworth asks a pertinent question: "how does a teacher 'make' students autonomous without directing them?" It is possible that our own biases and beliefs that we bring to school direct the instructions and communications with our students and, in fact, teachers may influence students' expressions by helping them find their voice. Lev Vygotsky, in 1978, stated that language is social; in 1981 Mikhail Bakhtin expanded this concept by adding that language cannot be neutral or impersonal as it is developed through the personal experience (Cappello, 483). Furthermore, our personal identity is shaped by our gender, age, race, social, economic, and political tensions (Smagorinsky, 116). These concepts help shape students' positioning in the classroom based on their identity and how they assert their voice (Cappello, 490). To go one step further, it may be said that student voices are being silenced, distorted, and oppressed by merely being in the formational

classroom and immersed in a culture, all of which cannot be avoided (Ellsworth, 409).

## Research

The following table is a list of questions I gave a grade six/seven class of 25 students in 2008; it includes all answers given with total number of students providing the same answer in parentheses. I asked the students to help me complete a paper I was working on, told them that they did not have to put their name on it, that it was not for marks, there are no right or wrong answers, all responses are appreciated and important to help me become better at teaching Language Arts and creating writing assignments, and that they could take the questionnaire home and talk to their parents about the questions. Four students either declined to fill out the questionnaire as it was not for marks, felt it was too difficult to answer, or did not want to do it.

## Question

*What is a definition for a writing style / writing voice?*

## Responses

1. How you write anything. Small print, large print, bubbly, heart dots. (4)
2. How you write and how you say it. It is your specific style. (5)
4. Everyone's is different. (3)
5. Having detailed, captivating or realistic writing. Writing that is really good.
6. When someone's writing sounds different because everyone's writing is different. (4)
7. When you use your favourite words and phrases.
8. When you double space or single space and the paragraphs or sentences. Could be a poem too.
9. It is kinda like your own personal journal. It's your thoughts from your head. (2)

*Has anyone ever talked to you about writing style/writing voice? If so, what was said?*

1. No, not really only that it was a good story or good work. (5)
2. No. (5)
3. This was the first time someone told me about this, but it would be helpful to have known this. I can use this now.
4. Some teachers have, but I didn't know what it meant, but now I do. (2)
5. Miss Camilli says something like you should try to write from your own self and try not be someone you aren't and don't be afraid to use descriptive words and to be different. (3)
6. My mom says she likes how I word things.
7. Yes, they said to make it more like me.
8. Try to be more consistent with ideas and not copy. (3)

*How can you tell your writing style/writing voice from someone else's?*

1. Different printing, different words, different morals.
2. I don't know. I just can. (5)
3. I write in small sentences.
4. I use different words. (2)
5. I like to like use like a lot.
6. My beliefs and words and sentences. (2)
7. How neat it is. (2)
8. I try to make things rhyme some of the time. 9. I try to use different elements like characters, quotes and descriptions etc.
10. I like to put more descriptive things into my writing and how I explain things. (5)

*What makes your writing different from others?*

1. Different printing, different words, different morals.
2. I write in small sentences.
3. I have different ideas. (7)
4. I vary my words and my sentence length. (2)
5. Not sure exactly, but I know I can tell whose writing it is by reading it. (5)
6. The hearts and big round letters.
7. More realistic and more detailed. I kinda go on and on about some things and never really know when I should stop.
8. I think I describe things better and use more word descriptives. (3)

*Can you describe your writing style/writing voice?*

1. My writing and ideas are messy.
2. No it's hard to describe it. (6)
3. Very descriptive and different ideas. (4)
4. Sometimes it's flowery and about love type stuff.
5. It is hard to define, but this question is an example of a boring and stiff style.
6. Try to write about friendly things, you know happy and bubbly.
7. I use hearts for o's and dots.
8. Novel like, I try to keep it realistic and detailed.
9. It is sort of a mix between descriptive words and wording. (4)

*Have you ever received positive comments for your writing style/writing voice? If so, what was said?*

1. My story was very good. (3)
2. No. (4)
3. Good descriptive words, good job, nice techniques, good perspective, interesting character portrayal. (5)
4. Good sentence structure and good organization. (3)
5. When it is neat. (2)
6. I was told it is at a grade 10 level.
7. Some teachers have said I have a good way of writing things down. I think I get this more now from the survey.
8. My ideas and writing were very good and descriptive, unique. (3)

*Have you ever received negative comments for your writing style/writing voice? If so, what was said?*

1. No. (8)
2. Said it was hard to understand and confusing thoughts. (3)
3. When it is messy. (2)
4. Not really, except maybe it could be negative that I should try to change some of my ideas and characters.
5. Yes, need to work on flow. (2)
6. Yes. Need to be more creative, unique. (3)
7. Need own ideas. (2)

*Are you encouraged/discouraged to use your writing style/writing voice? If so, how?*

1. No I am not discouraged. (3)
2. I am not encouraged because I have never heard of this before.
3. Didn't know what it was til now. (3)
4. Not everyone likes my hearts and my big round letters.
5. Sometimes I'm afraid it wont be as good as others. (4)
6. Kinda discouraged because of the length of assignments so I have to take out lots of details and make things not so long. (2)
7. I am encouraged to write I think because I enjoy it.
8. Maybe people will laugh or hate the writing. (6)

*Do you find the criteria for writing assignments stops you from using your writing style/writing voice? Explain.*

1. Yes and no because we can't write freely. (3)
2. No. (3)
3. No, I can always adapt criteria to fit what I like to say. (2)
4. I can pretend to be someone else to make it work.
5. It does affect my writing style. I have difficulty with business and letter writing styles.
6. The neatness criteria is frustrating, I'd rather type. (2)
7. Some assignments kill my writing skills. (2)
8. Only when there is a length limit.
9. Not all of the time only when I have to pretend to be someone else.
10. Yes because I can't always think like I'm supposed to and too many rules. (3)
11. I don't like formats or requirements for pages or paragraphs. I like to write what I want to write and how I want to write it.
12. Yup! Sometimes it is like too hard to be specific and detailed and use those fact thingys and still write my way.

The 21 students who chose to respond to my questionnaire struggled with the concept of voice. The range of definitions was from a complete misunderstanding (voice is the design of your letters) to an understanding that voice is related to your own ideas and personal choices. Unfortunately, most students did not have a good understanding of voice, yet, as a teacher, I expect my students to

produce quality writing without a good understanding of who they are, where and how they get their ideas and what a strong writing style can do for their writing. I have found that student voices may be silenced, distorted, and oppressed in the very classrooms where acceptance and inclusion are paramount beliefs. Furthermore, I was not shocked but saddened that some of these students are afraid to write from their hearts and feel that they need to perform or produce writing for “requirements for pages or paragraphs,” “fact things,” or “neatness criteria” hinders students’ ability to work on and complete assignments.

To further illustrate the difficulties that students face when writing and expressing themselves I refer you to the poem in Appendix 1. In 1999 I wrote this poem as representative of how students perceive the expectations and the struggles of writing assignments as they attempt to express themselves while conforming to assignment criteria.

## **Implications**

It is important for children to express themselves and to not erase and rewrite. This can be called “second guessing your voice,” and may lead children to become “preoccupied with finding exactly the right word, ironically, [where] rarely [they] found the right word” (Twitchell). Children “need to have a place where they can just simply write, and write regularly; a journal or diary is a good place” (Twitchell). Teachers need to provide opportunities for students to explore their identity and their style of expression without imposing preconceived standards of form and language on them (Smagorinsky, 117). One way of doing this is to have students write fiction where they get to control the story elements and make their own choices (Palmer, 54). It is important to provide lots of opportunities for students to “assert their perceptions about literacy through oral, written, and visual expressions,” as well as to give them opportunities to express their emotions, fears, disappointments, and dreams (Cappello, 482; Palmer, 4). Before, during and after reading, have students answer and raise questions to prompt them to express themselves and make personal connections to the story elements (Palmer, 6). This

will help students find a sense of independence, self-regulation, and accountability (Cappello, 482). It is important to have students read their own work and the work of others; to look for personal reactions, language used, sentence rhythms, and overall emotional feeling (eg. arrogant, whiney); and have students alter these qualities (Rankin, 74). Students can take this a step further if asked to scrutinize sentences, identify the parts of speech, and then rewrite them by paraphrasing the content into their own words (Pace, 8). I think Elizabeth Ellsworth stated it well when she said that teachers need to find “ways of working with students that enable the full expression of multiple ‘voices’ engaged in dialogic encounter” (409). Teachers, however, must be careful to not teach form as style as it can be very destructive; style is not “just a set of prescriptive rules” that can be followed (Pace, 6).

## **Conclusion**

In a world of over six billion people, who are all individuals, it is truly an art to find a voice that will communicate to the many instead of the few. Furthermore, each of us sees things differently and requires a different perspective in order to receive the greatest understanding and comprehension. We must also remember that each group leaves a mark where they have been, and each group is different, unique, and has its own way of communicating. Some final thoughts: are people only concerned with their own niche, and think that other voices should adopt a particular style—their style? And, furthermore, is this focus on one’s self hurting the efforts to eliminate negative labelling?

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## Appendix 1

### Diamond Minded

Roaming words off the page.  
A three dimensional plane.  
Uphill, downhill, up and over, around.

A diamond mine of untamed thought.  
Wordless places of no pictures past.  
No time in the future, no time right now.

Scribbles, dribbles,  
Over paper folds.  
A life absorbed, a life lost.  
In a mist, in a dream, in a ghost.

No one knows the certainty of the end.  
A massive unbalance of equal space.  
Letters sharing, letters stealing.  
A flowing forced forcing flow,  
From beyond and below,  
Spinning within, a top overturned,  
An unseen chapter of blinding words.  
An untouched thought grasping phrases.  
An unheard voice of deafening sounds.

The smell of scentless ink put to the test.  
Within a diamond mind of unchartered plains.

It spews out great thoughts,  
Emptiness turned into shapes,  
Sheet after sheet,  
Of glowing hate and ugly love,  
Emotions tied to no single point,  
No return, no going back,  
Only across and down,  
In this crossworded place,  
Of words off the page,  
From a pointed tool, a polished dull,  
An unending book full of sparkles and darkness,  
A solid place of unsurity,  
Mining diamonds cut into the paragraphs of life.

### ***About the Author***

*After graduating from Chase Secondary School in 1993, Tina Camilli earned both a Bachelor of Arts and Bachelor of Science degree, and is now in her last year of TRU's Bachelor of Education degree program. She enjoys sewing, reading, writing, traveling and construction. She won the Neil McRae Award and the Can-Ital Ladies Auxiliary Award. She plans to work as a teacher-on-call after she graduates this June.*



# **Bird Watch**

JANA SASAKI

## **Abstract**

To demonstrate the power of the authority of representation, this presentation uses photographs of birds which are reminiscent of the Pictorialists' photographs of the latter nineteenth and early twentieth centuries and of the balance that their work held between documentary and artifice.

“Bird-watch” is made up of a sequence of photos that deal with the idea of perception and how many people tend to look at a photograph and believe that what they see is real.

These photographs ostensibly document birds outdoors in their natural environment. Documentary photography is commonly thought to capture unmediated realities, to record or demonstrate sometimes unnoticed aspects of everyday places or events. From the birth of photography the camera has been accepted as, primarily, a documentary device, a tool like a pen, writing with light. And even though a photograph may not capture reality, it is a picture of the world as it was seen and recorded by the photographer. It is evidence.

Each bird has seemingly been photographed outdoors in a foggy and overcast environment. I have taken the photos with a shallow depth of field, the light soft and diffused. The style evokes the Pictorialists’ photographs of the latter nineteenth and early twentieth centuries, especially in terms of the balance that their work held between documentary and artifice. Each photo has been made with consideration to aesthetic and technical choices.

At first it isn’t obvious that the birds aren’t real. But, if you spend any time with the photos you will start to see oddities that become visible. In bird-watch, a repetition of similar bird shapes and various props and wires start to stand out.

These photographs comment on the history of photography and photographic manipulation. Even though photographic manipulation dates back to the early 1860s, the advent of digital cameras and editing software has prompted renewed scepticism regarding the legitimacy of images. Many people say that as long as you can provide a negative, then the photo is deemed real. The authority of representation is, itself, a powerful tool. I hope that these photos will draw the viewer in, and invite a second look.



***About the Author***

*Jana Sasaki graduated from high school in Merritt, BC. She went on to get her BA and Fine Art Diploma from University College of the Cariboo before graduating from TRU's BFA program in 2008 and receiving the Helen Pitt Award. Her area of study concentrated on printmaking and photography. Jana's future plans include becoming involved in the Kamloops Printmakers Association, pursuing an artistic career and exhibiting her work. Currently Jana lives and works in the North Thompson Valley as a self-employed graphic designer. When time allows she pursues her other interests that include music, travel and outdoor recreation.*

# **Effects of Exogenous Estrogens on the Development and Expression of Sexual Behaviour in Male Guppies (*Poecilia Reticulata*)**

VANESSA TONN

## **Abstract**

Estrogens, present at synthetically-active levels in aquatic environments via wastewater effluent, have been shown to change characteristics of male fish. This presentation describes a study which identified potential activational or organizational roles estrogens may have on male guppy reproductive behaviour.

## Introduction

Endocrine-disrupting chemicals (EDCs) have been found to alter many developmental and reproductive processes in vertebrates.<sup>1</sup> Estrogenic chemicals are a highly researched group of EDCs, particularly for their presence in aquatic environments.<sup>2</sup>

The effects of estradiol on fish populations are extensive. These effects include reduced or absent egg production and fertility, skewed sex ratio, reduced male gonadosomatic index, decreased sexual behaviour and sexual characteristics in males, appearance of intersex organs, reduced sperm count and delayed sexual maturity.<sup>3</sup> Definitive data from a whole-lake exposure indicates reproductive failure and near extirpation of a population.<sup>4</sup>

Feminization of behaviour as a result of estrogen exposure has also been shown in a study by Toft and Baatrup, where exposure of males to the natural female hormone 17 $\beta$ -estradiol resulted in significant changes in both physical sexual characteristics and male courtship behaviour in *Poecilia reticulata*.<sup>5</sup>

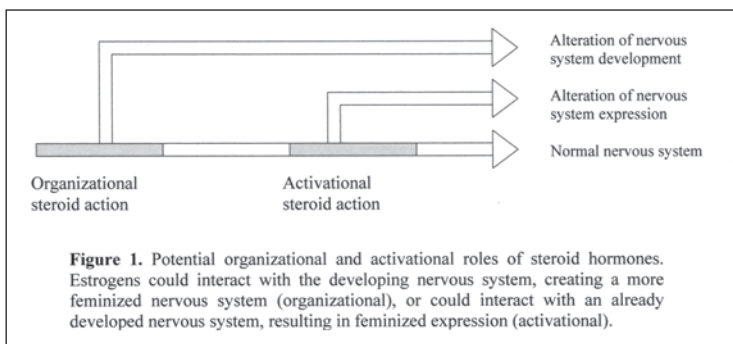
Behavioural displays are an accurate biomarker for the effects of estrogen exposure,<sup>6</sup> especially the thoroughly-described sigmoidal displays.<sup>7</sup> When a male initiates courtship he places himself sideways within view of the female. He then displays by rapidly curving his body into a c- to s-shaped position. The presence of sigmoidal behaviour has been positively correlated with reproductive success.<sup>6</sup>

While it is clear that exposure to estrogens hinders sigmoidal displays in guppies, it is not fully clear how estrogens affect the males. That is, previous studies could not determine whether exposure modified the development of the male nervous system, or affected the level of nervous system activity at the time of expression, or a combination of these. Indeed, clear distinctions can be made in the actions of hormones exposed at different periods (Fig. 1).<sup>8</sup> During periods of development sex-steroid hormones target neural tissues, developing and organizing the nervous system (i.e. having an organizational effect). This development is either directed toward feminization or masculinization, and will depend on concentrations of specific hormones. During adulthood the same hormones target

the existing neural network and activate the expression of appropriate mating behaviour (i.e. having an activational effect). This process is related to the development of male and female genital systems and the later activation of reproductive functions.

An understanding of this interplay of effects could provide the basis for research to develop adequate safety measures and preventatives to feminizing wild fish stock with EDCs. The purpose of this study is, therefore, to experimentally examine the effects of estrogens on the development and expression of sexual behaviour in male guppies. Do estrogens have an organizational effect, altering nervous system development? Assuming this, we would expect that guppies exposed to estrogens in early development would spend less time doing displays than control males.

Alternatively, estradiol could influence behaviour as a result of its direct effect on nervous system activity. In this case males exposed to estrogens during later development are also expected to spend less time doing displays. Results as such would indicate that estrogens play both an organizational and activational role in the feminization of sexual behaviour. The behaviour of males exposed to estrogens during only one of these periods should permit an evaluation of the relative importance and independence of activational and organizational events.



## Materials And Methods

### Animals and Exposure

Young feeder guppies (*Poecilia reticulata*) were exposed to estrogen dissolved in ethanol during their development. An isolated group of control guppies were exposed to an ethanol placebo at the same time.

17 $\beta$ -estradiol was obtained from Sigma Co. and dissolved in ethanol at 0.4g/L. The solution was further diluted with distilled water to an estradiol concentration of 0.5ug/L. An acute LC50 was not necessary in this case, as previous research showed no excess mortality in adult guppies exposed to 10ug/L estradiol.<sup>6</sup> To maintain constant concentrations a half-life was determined and replacement estradiol was added on a daily basis.

Gender became evident in the guppies at approximately 1.4 cm, either by the presence of gravid spots in females or the elongated gonopodium in males. At this time females were separated from males to maintain isolation until courtship. Males remained in their respective testing tanks and continued their exposure. Due to the difficulty in obtaining babies and the subsequent addition of pet store fish at various times, exact exposure for each of the males cannot be determined. However, pet-store-bred males were exposed for either 49, 46, 32 or 21 days. Females, who were not being tested and therefore did not require further exposure, were placed in a community tank. Isolation continued for an additional 60 days after exposure conditions ceased.

Fish were exposed to a regular 12-hour light cycle, maintained at 25°C and fed similar diets of fish flakes or bloodworms at constant times during the day. Once weekly the tanks were cleaned, which included a 2.4L water change and the removal of excess algae on the sides of the tank. Each tank possessed an Aquaclear20 water filter, which contained a foam insert and an ammonia-remover insert. Inserts were changed monthly on a rotating two-week schedule.

## Observation of Sexual Behaviour

After approximately 90 days of maturation and development, male fish were placed in glass tanks similar to the housing and exposure tanks except being divided in half by a glass divider. A female was placed on the other side of the divider so that the male was able to see the female without physical interaction. Females were selected for similar sizing as the male: between 1.5 to 0.5 times the male's size. Due to lack of females of appropriate size some females were used more than once. The fish were transported to the testing tank in their own water and allowed 10 minutes to acclimatize to the new tank. The tank was covered on all sides by white paper to prevent outside distractions and interactions, filled with 8L of water, and maintained at 20-24°C.

For both the test and control groups, half the fish chosen at random were exposed to estrogen so that there were four different experimental groups: Males exposed to estrogen during development and during courtship ( $E_{DC}$ ;  $n=6$ ), males exposed to estrogen during development but not during courtship ( $E_D$ ;  $n=5$ ), males exposed to estrogen during courtship but not during development ( $E_C$ ;  $n=6$ ) and control males not exposed to estrogen at either development or courtship ( $C$ ;  $n=7$ ). A fifth group was also created of males exposed to none of the control or testing parameters (herein called the ethanol-control group,  $n=8$ ) to ensure that the presence of ethanol did not account for any of the observed results.

During a 10-minute period the sexual behaviour of the male was monitored, specifically the time spent in proximity to the female and time spent in displays. Time spent in proximity to the female was quantified based on the time the male spent within 7cm of the glass partition; it was assumed that by being within that 7cm region the male was making an active choice to be near the female. Time spent in displays was recorded based on the presence of sigmoidal displays. Each testing period was video recorded to aid in determining length of each display.

Female proximity to the male was also recorded to determine if behaviour of the female biased any behavioural reaction shown by

the male. After the 10-minute testing period the males were placed in a Petri dish filled shallowly with water. Digital pictures were taken to aid in analyzing the percentage of body pigmentation, and body and gonopodium length were recorded. Females were not measured for these characteristics.

## Results and Discussion

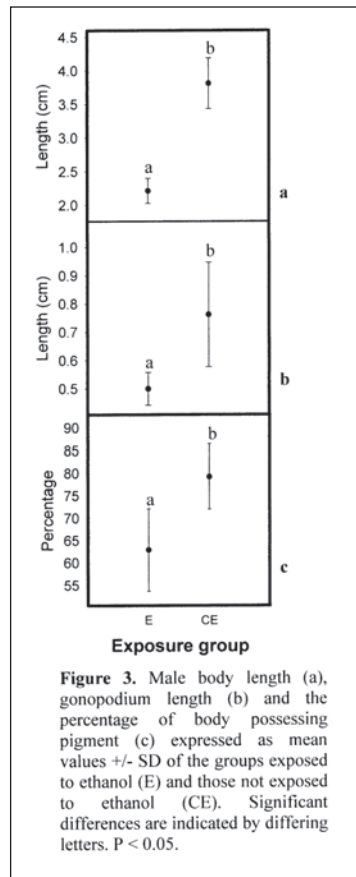
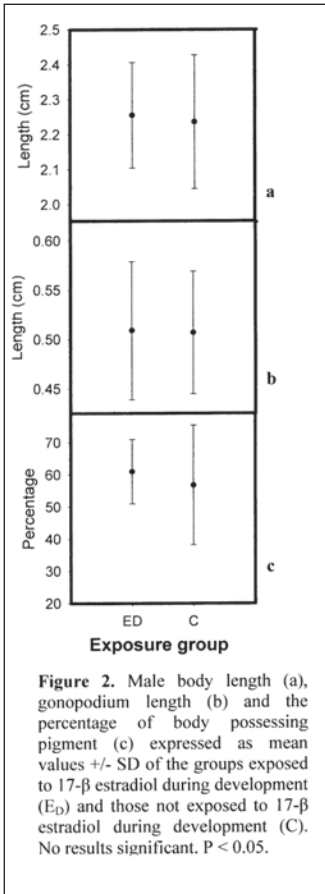
To determine if secondary factors were playing a role in any behavioural changes noted, the male body length, gonopodium length and per cent body coloration were recorded, along with the female proximity time. There were no correlations present between these characteristics and either the male display or proximity times, indicating that these characteristics did not influence changes in male behaviour. However, there was a correlation between male proximity time and male display times ( $\rho=0.464$ ,  $0.005 > P > 0.0025$ ). This is most likely due to the tendency of the males to be in proximity to females while conducting displays.

As body length, gonopodium length and pigmentation of the body are factors that are determined during development and cannot possibly be altered during a 10-minute exposure during courtship, data for these three characteristics were regrouped into two groups: males exposed during development (EDC and ED), and males not exposed during development (EC, C).

None of male body length ( $T=-0.27$ ,  $P=0.791$ ), gonopodium length ( $W=144.5$ ,  $P=0.9563$ ) and per cent body color ( $T=0.67$ ,  $P=0.507$ ) were significantly affected by estrogen exposure (Fig. 2). Previous research resulted in significant increase in body length and decrease in orange spots after exposure to  $0.5\mu\text{g/L}$  estrogen; length of gonopodia were significantly increased at this and smaller concentrations.<sup>5</sup> However, a study with wild male mosquitofish (*Gambusia affinis holbrooki*) collected downstream and upstream of sewage effluents showed that gonopodium lengths were smaller in specimens collected at the contaminated downstream sites when compared to those collected upstream.<sup>9</sup> These two contrasting effects may be reproductively equivalent, as it was extrapolated from previous data that there is an

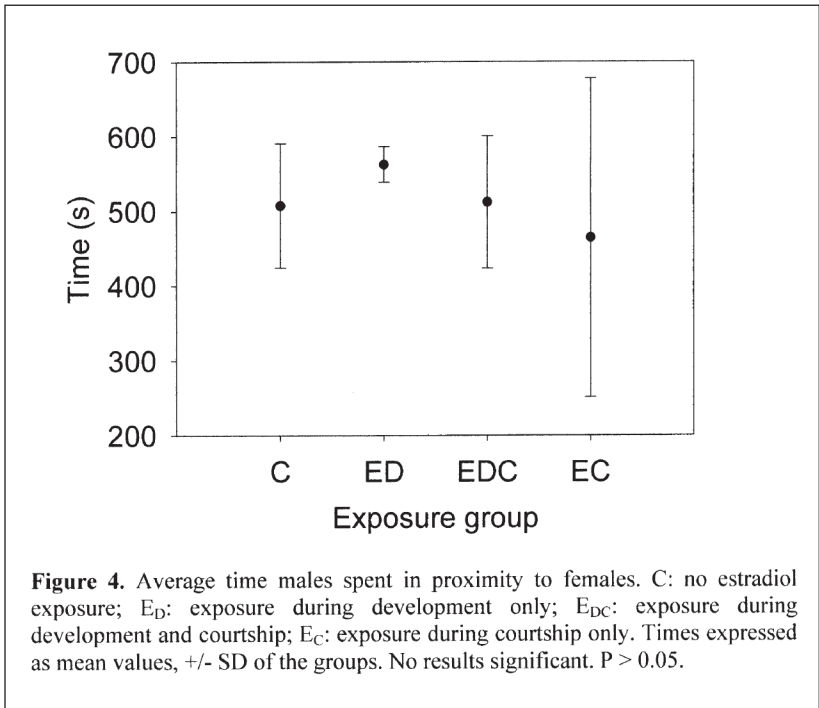
optimal gonopodia length, and any increase or decrease from that length reduces copulatory success. Regardless, these results indicate that more research is required to determine the specific effects contaminants are having on physical characteristics of fish.

Differences were found, however, between the secondary characteristics of the control and the ethanol-control guppies (body length:  $T=-10.18$ ,  $P=0.00$ ; gonopodium length:  $W=88$ ,  $P=0.007$ ; per cent pigment:  $T=-3.86$ ,  $P=0.002$ ), with the ethanol-control group having larger body sizes, longer gonopodium and a higher percentage of body colour (Fig. 3). While these differences could indicate that the ethanol treatment affects the growth and development of male guppies, it most likely reflects the fact that the ethanol-control group was not composed of the same batch of guppies as those exposed to the ethanol treatment. These guppies were much older, and consequently of a larger size. The differences in colour among the two groups could be due to maturation or different genetic strains. However, as none of the secondary characteristics were found to correlate to changes in behaviour, it is likely that these differences are not significant in terms of the behavioural responses measured. Indeed, neither the male proximity times ( $W=52$ ,  $P=0.1832$ ) nor the male display times ( $T=-0.54$ ,  $P=0.599$ ) were significantly different between the two control groups. As such, the ethanol treatment does not appear responsible for any results found in the four ethanol-treated groups.



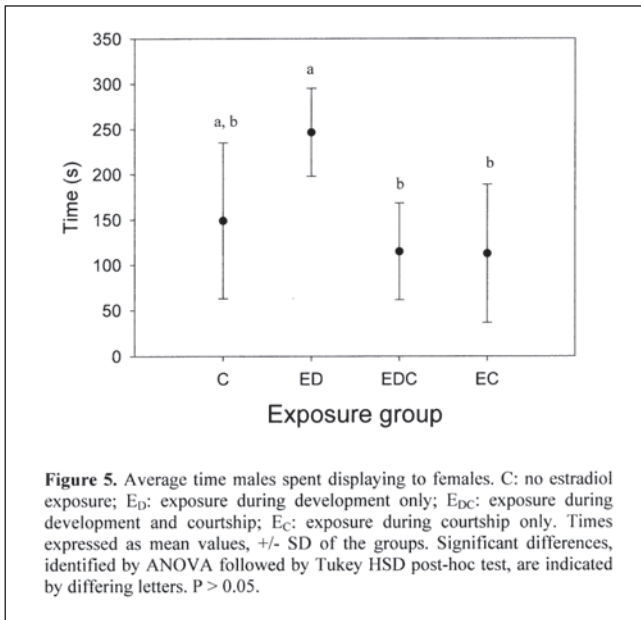
### Figures 2 and 3

Males exposed to estrogen during development spent, on average, a longer time in proximity to females than other males, while exposure during courtship appeared to decrease the amount of time spent in proximity to females (Fig. 4). Despite this, none of the four treatment-exposed groups showed statistically significant differences (H=1.228, P=0.746). Male proximity time is not a characteristic of behaviour well discussed in the literature.



#### Figure 4

As with proximity times, exposure to estrogen during courtship appeared to decrease the amount of time males spent in display, while exposure during development appeared to increase the amount of time spent in display (Fig. 5). The control group was not significantly different from any of the estradiol-treated groups (E<sub>D</sub>, E<sub>DC</sub>, E<sub>C</sub>); however, males exposed to estrogen only during development spent significantly more time in display than the males exposed to estrogen only during courtship and the males exposed during both development and courtship ( $F=4.277$ ,  $P=0.017$ ). Exposure during both stages produced a decrease similar to that observed with exposure at courtship, with the two groups not being significantly different.



### Figure 5

An increase in reproductive behaviour in males exposed during development is in disagreement with many previous studies. Previously it was found that this behaviour was decreased in males exposed to 0.01, 0.1 and 0.5 µg/L estradiol.<sup>5</sup>

Exposure to males at courtship has not been as closely studied as exposure at development. These results illustrate that a very different effect occurs for males exposed at this time. Similar changes have been illustrated by exposing fully developed males to estradiol for a period of one month, followed by recording of courtship behaviour ten days later; the result was a complete lack of sigmoidal displays when the males were later faced with females.<sup>6</sup> It is possible that we are seeing the same activational effects of estrogens in both of these experiments; however, these results indicate that the effects continue for some period of time after the exposure has ceased.

Most troubling are the results from prolonged exposure to estradiol, which seem to indicate that even if the effects of estradiol exposure during development are positive, those effects are

overridden by exposure during courtship; this would imply that short exposure during breeding seasons could be just as hazardous to fish populations as prolonged exposure.

Furthermore, prolonged exposures have been shown to produce vast problems. A seven-year whole-lake exposure to  $17\alpha$ -estradiol illustrated extensive alterations in fat-head minnow ecology, including delayed spermatogenesis, decreased sperm production and general reproductive failure.<sup>4</sup> However, it should be noted that the effects of such exposure do depend greatly on life-history characteristics of the species. In the same lake study, another longer-living fish did not exhibit the same the reproductive failure and near-extirpation symptoms.

The concentration of  $0.5 \mu\text{g/L}$  estradiol that produced such changes in fish behaviour is higher than that found in effluents. In England the maximum concentration of three main estrogens,  $17\beta$ -estradiol,  $17\alpha$ -estradiol and estrone, was  $0.05 \mu\text{g/L}$ ,  $0.007 \mu\text{g/L}$  and  $0.08 \mu\text{g/L}$ , respectively.<sup>2</sup> In Canada effluents and receiving waters generally have between  $0.006$  and  $0.005 \mu\text{g/L}$   $17\alpha$ -estradiol.<sup>4</sup> However, despite the much-higher magnitude of estradiol used in this and other experiments, we would expect some degree of change in reproductive behaviour in fish exposed to more relevant concentrations; reproductive characteristics of wild male mosquitofish mentioned above were altered in natural environments downstream of sewage effluents.<sup>9</sup>

## Conclusion

It is evident that estradiol affects the reproductive behaviour of male guppies at different periods during their lifespans, and that these effects are most damaging during later periods of activational control; therefore, estrogens could potentially cause problems in fish populations faced with long-term estrogen exposure, or short-term exposure of reproductive adults. Future research should focus on developing better safety measures, including more effective methods of removing estrogens from wastewater. It would also be beneficial to determine the specific effects of exposure during critical development

and reproductive periods to relevant levels of estrogens. Research on the effects of estrogens on females would also be valuable.

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## About the Author

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# **The Secular Christ Figure in Postmodern Quebec Film**

CHANTAL MACDONALD

## **Abstract**

This paper examines secular Christ figures in three films to demonstrate that the life of Christ reflects the death of traditional Quebec and the rise of secular capitalist culture as depicted by postmodern Quebec cinema, which is traditionally concerned with the rapidly changing character of French-Canadian society.

Postmodern Quebec cinema is traditionally concerned with the rapidly changing character of French-Canadian society. The Catholic Church was once the dominant authority in Quebec; however, following the Quiet Revolution of the early 1960s, the Church lost its hegemony as the province underwent widespread secularization. The secular Christ figure used in many Quebec films reflects the evolution of French-Canadian culture and address contemporary issues of modernization.

As the title suggests, Denys Arcand's *Jesus of Montreal* (1989) presents a clear and straightforward representation of a Christ figure on film. The plot follows the story of Daniel Coulombe, an actor who is asked by the Catholic priest, Leclerc, to modernize Montreal's annual Passion play on Mont Royal. Leclerc's desire to modify the play reflects Quebec's loss of interest in the Catholic Church's outdated doctrine. A secular Christ figure, Daniel represents a modern saviour who embodies the true essence of Christ free of the distortions made by the Catholic institution.

The names of both Daniel and the priest refer to their roles in the film: the French name Leclerc translates to "the cleric," while Daniel is the name of a prophet in the Bible. Daniel's last name, Coulombe, is linked to the explorer Christopher Columbus who was instrumental in spreading the Catholic faith in Latin America. In his book *Open veins of Latin America*, Eduardo Galeano documents Columbus's role in eradicating Aboriginal cultures by directing the military campaigns that devastated native populations. Galeano explains, "The epic of the Spaniards and Portuguese in America combined propagation of the Christian faith with usurpation and plunder of the native wealth" (Galeano 14). Daniel Coulombe is therefore the namesake of both Biblical prophet and colonial oppressor. This duality is present in the Catholic faith as Jesus' message of peace and love has been manipulated to justify war and hatred.

Daniel is given the task of gathering his actors, who represent Jesus' disciples. The disciples are composed of his friends Constance, Mireille, Rene, and Martin. An unwed mother who feeds the homeless, Constance symbolizes the Virgin Mary as she takes Daniel

into her home to care for him. Mireille's character exploits her body in the advertising industry, thus representing the prostitute, Mary Magdalene. Rene's profane career is in dubbing pornographic film, while Martin is the narrator of a scientific documentary on the cosmos. In Martin's first scene, his narration undermines creationism and highlights modern secular thought by stating: "It is impossible to speak of the creation of the world or the beginning of the universe" (Bowie & Shoebridge 355). When Mireille, Rene and Martin leave their blasphemous professions to join Daniel's holy production, the actors exemplify the conversion of faith by Jesus' followers.

Daniel and his disciples modernize the play by incorporating contemporary scientific knowledge of Christ in spite of its incompatibility with traditional Catholic doctrine. In her book, *A Postmodern Cinema*, Mary Alemany-Galway comments on *Jesus of Montreal's* modern revelations:

The film both criticizes traditional accounts of Jesus and gives us an account of that life based on new archeological finds which put into question Jesus' miraculous birth. Although rooted in a precise cultural context, *Jesus* is concerned with issues that have become important in the world at large and are part of the postmodern debate. (Alemany-Galway 125)

Thus, by incorporating scientific facts regarding the life of Christ, Arcand comments on the archaic rigidity of the Catholic doctrine. As a modern Christ figure, Daniel, along with his fellow actors, offers a progressive look into the Story of Jesus, an enlightened interpretation of the Catholic faith for a postmodern audience.

Although the revised version of Daniel's play is successful in drawing a faithful audience, Leclerc is in opposition to the modern exposé. Fearing that the new theatrical production may jeopardize his position, the priest notifies his superiors who ultimately cancel the performance. Here, Leclerc comes to embody Judas, the disciple who betrayed Jesus, leading to Christ's crucifixion and enabling his martyrdom. It is later revealed how, like Judas, Leclerc's treachery facilitates Daniel's symbolic crucifixion and resurrection.

Despite the Catholic Church's disapproval of the play, Daniel

and the other actors are determined to perform one last time. The resolve of the players to carry out their production corresponds to the faith and conviction of Jesus and his disciples. Prior to their final performance, there is a scene where the actors are having pizza with red wine while overlooking the modern city of Montreal, paralleling Christ's last supper on Mount Zion outside Jerusalem. The pizza (or bread) and red wine are symbols of the Eucharist which Christ introduced at the Last Supper. This meal on the Mount would be Daniel's last as well.

During the final performance of the play, the police are called by Church security and a skirmish occurs where Daniel is seriously injured while still tied to the crucifix. When Daniel regains consciousness after symbolically dying on the cross, he is correspondingly reborn a prophet. For example, upon descending into the Metro station, Daniel warns his flock of commuters: "If someone says to you: "The Saviour is here," don't believe them. What? Don't believe them! False saviours ... false prophets ... (Bowie & Shoebidge 421). Through his prophetic admonition, the line between actor and literal Christ figure becomes blurred.

Daniel's warnings of false saviours address a divergence from Jesus' original message and the corruption of institutionalized religion. Leclerc proves that the priesthood is biased and thus unqualified to convey the word of God when he claims "You can make the gospels say whatever you like. I know it, through my own experience" (Bowie & Shoebidge 385). Daniel's warning also addresses false idol worship, as increased capitalism and consumerism in Quebec culture replaces traditional modest values.

The parallel between man and saviour is further supported when Daniel dies and his friends opt to donate his organs. The doctor tells Constance and Mireille that Daniel's Type O blood is a "Godsend," followed by a scene where Daniel's body is fastened to the operating table, arms stretched again in reflection of Christ's crucifixion. We later see how Daniel has given of his body and is symbolically resurrected, miraculously curing the blind and healing sick patients.

The final symbol of the secular Christ figure is presented when the

disciples form a theatre company in Daniel's memory. The theatre company directly reflects the creation of the Christian faith following the martyrdom of Christ; however, it also suggests the departure from Christ's original message in the formation of a religious institution. Daniel's former lawyer, Richard Cardinal, guides the creation of the theatre company and suggests that Martin be the president. The appropriately named "Cardinal" depicts Satan, who is successful in seducing the actors to create a stratified social order by naming Martin president of the capitalist venture. This symbolic gesture parallels the formation of the tiers of power within the Catholic corporation. Through the institutionalization of Christianity and the creation of a religious hierarchy, Christ's revelations have subsequently been manipulated to serve the Catholic establishment and its conservative leaders.

Thus, in *Jesus of Montreal*, Arcand presents a postmodern criticism of Catholicism by exposing the history of Christ through the play as well as through parallels in Daniel's life. Daniel is closely linked with Christ as he lives modestly, is not tempted by luxury and gives of himself to the needy, providing the audience a glimpse of Christianity's humble roots. In contrast, the second Arcand film presents a reluctant secular Christ figure deeply entrenched in capitalist values.

The film *The Barbarian Invasions* (2003) is a sequel to Arcand's earlier work *The Decline of the American Empire* (1986). Of *The Decline*, Mary Alemany-Galway remarks, "Arcand showed how the Quebecois, having lost their political and religious faith, now believed only in the immediate satisfaction of desires" (Alemany-Galway 124). The cast of *The Decline's* insufferably hedonistic characters are revisited in the sequel, their children having grown into adults. What we discover in *The Barbarian Invasions* is that from this flock of heathens, a secular Christ figure was born.

*The Barbarian Invasions* begins with Remy, a womanizing history professor who is on his death bed in a crowded Montreal hospital. Remy's ex-wife Louise calls their son Sebastien to return from Europe to help care for his ailing father. A successful oil trader,

Sebastien holds capitalist values which diverge from his father's faithful socialist beliefs, thus causing great conflict between father and prodigal son.

Although Remy resents Sebastien's choice of work and lack of higher education, Louise reveres her first born. The most innocent of the aforementioned heathens from *The Decline*, Louise symbolizes the Virgin Mary, while her son Sebastien represents Jesus. In defense of Sebastien, Louise tells Remy: "He may not read, but he earns more in a month than you in a year." Louise's admiration of her son's earnings exemplifies Quebec society's modern values. In order for Sebastien to earn such an income, he had to leave Quebec, speak English, and trade within the global market.

In his article, *Quebec National Cinema*, Bill Marshall describes the character of postmodern Quebecois's rapid evolution from conservative Catholics to globalized citizens:

The "modernization" of Quebec would deliver the benefits, but also dilemmas, of "modernity": the replacement of tradition, the creation of a secular society based on free individual citizens and consumers, the idea of a nation and its participation on the world stage, and above all, a society and existence, marked by perpetual change. (Marshall 286)

The dilemma of Quebec's rapid evolution toward modernity is evident through the relationship between father and son. A product of the Quiet Revolution, Remy is deeply resentful and disrespectful of the Catholic Church while remaining loyal to Quebec and its secular institutions. In contrast, Sebastien appears indifferent to the Church, as he has never felt its oppression. The son appears equally unmoved by the disintegration of Quebec's secular institutions as he urges his father to seek treatment in the USA.

Thus, Remy and Sebastien exemplify the rapid transformation of Quebecois culture in just one generation. Both factions seek instant gratification; however, Sebastien lacks respect for the secular institutions which his father's generation fought to achieve and maintain. Through his rejection of Quebec's social system in favour of international privatization, Sebastien presents a form of faith in

globalization where traditional nationhood is outdated.

This postmodern film therefore presents globalization as religion, with Sebastien symbolizing the capitalist Christ figure. Sebastien's inverted depiction of Christ as an opportunistic industrialist is representative of postmodern Quebec's rapidly changing values. Although estranged from his father, Sebastien intuitively takes on the role of saviour, providing salvation for his dying father with the best care that money can buy.

Sebastien's first pious act is to provide his father with privacy, buying off the corrupt union so that Remy may have an entire floor of the hospital to himself. In working with the deeply corrupt union, Sebastien is comparable with the Son of God. It is said that "Jesus was thought by his brothers to have been associating with thieves and harlots" (Spong 183). This parallel is further supported when Sebastien engages in a friendship with Nathalie, a heroin addict who supplies and administers the drug for the relief of Remy's pain.

To provide his father further comfort, Sebastien also assembles all of Remy's close friends (featured in *The Decline*) who are now spread across the globe. This act may be seen as a symbolic gathering of Christ's disciples. The secular group is also joined by Sebastien's girlfriend Gaelle, an art dealer.

Gaelle is the capitalist Mary Magdalene to Sebastien's Christ figure. There is a scene where she is invited to the Catholic Church to appraise relics stored in the basement of a cathedral. In accord with the film's postmodern view of religion and Quebec's secularization, Gaelle says that the relics are "worthless."

As Remy's condition worsens, Sebastien takes his father to the cottage where the previous film unfolded. Not long before Remy's final hour, Sebastien performs a miracle by providing his father with a video of Syvainne, Remy's daughter who is out at sea. This symbolic miracle was enabled through advancements in technology, which further supports the capitalist Christ figure theory.

Through his father's passing, Sebastien evolves to embody much of Christ's compassion and goes on to help others. Inspired by Sebastien's virtuous acts and the love for his father, Nathalie finds

the strength to quit her addiction to heroin. Sebastien facilitates Natalie's recovery by offering Remy's empty apartment until she is able to care for herself once more.

Thus, by providing comfort to his father in death, and by helping to heal a heroin addict, Sebastien ultimately embodies the compassion of Christ. Although his capitalist values are not in accord with those of Jesus, Sebastien presents a postmodern variety of Saviour, where wealth is a sacred virtue. The third secular Christ figure to be examined embodies both the compassion and healing powers of Christ; however, he is a reluctant saviour who grapples with his exceptional abilities.

Directed by Jean-Marc Vallee, *C.R.A.Z.Y.* (2005) follows the story of Zac, the fourth child in the Beaulieu family of five boys. Born on December 25<sup>th</sup>, 1960, Zac is clinically dead before being resurrected by the doctors. Through his miraculous birth and resurrection, Zac is immediately identified as a secular Christ figure. Mrs. Beaulieu, Zac's mother, refers to her son as "baby Jesus," and represents the Virgin Mary. Instead of being visited by three wise men, Zac is visited by his three older brothers, one of whom drops the newborn on the hospital floor.

As Zac ages, it is revealed that like Christ, he has been endowed with the gift to heal others. Upon curing his baby brother of colic, Zac visits the woman they call "the Tupperware lady," a mystic who assures him of his gift. Although Mrs. Beaulieu is supportive of her son's gift, Mr. Beaulieu is more concerned that his son is gay, and sends him off to camp to straighten him out. While away at camp, there is a psychic connection between Zac and his mother, insinuating an evolved form of spirituality.

The healing powers of Zac and the Tupperware lady along with the psychic bond between the boy and his mother highlight the postmodern recognition and acceptance of religious pluralism. Alemany-Galway explains, "Postmodernism advocates an acceptance of diverse points of view, and an avoidance of dogmatism and all social and philosophical determinism" (Alemany-Galway 125). Thus, Zac's mother represents the postmodern view, embracing her unique

son and his evolved spirituality, while Mr. Beaulieu symbolizes pre-Quiet Revolution Quebec, entrenched in conservative values.

When Zac reaches his teenage years, we learn that he has become an atheist, attending midnight mass only on his birthday to please his mother. During one such service, Zac imagines that the chorus is singing the Rolling Stones song, "Sympathy for the Devil." As everyone in the Church joins in the singing, Zac begins to float toward the ceiling, his arms outstretched like Christ on the crucifix.

The classic Rolling Stones anthem implies that Zac, a non-believer, has sympathy for Satan, as Zac does not adhere to the doctrine being preached. Nevertheless, this scene simultaneously insinuates that Zac embodies the divine as he rises above the congregation. Thus, although Zac has abandoned his Catholic faith, the midnight mass scene reveals that his new religion is music.

The rejection of traditional church hymns for 'seventies rock and roll epitomizes the secularization of Quebec during the Quiet Revolution. Zac and his friends are open to new expressions of music while Mr. Beaulieu again represents Quebec's past, listening to the same French-Canadian song every Christmas.

As a teen, Zac creates his room as a place of worship to the gods of rock. His walls are painted like the Pink Floyd album cover, *The Dark Side of the Moon*, and display several posters of musical deities. In emulation of rock star David Bowie, Zac paints his face like the rock god and sings to his album while looking in the mirror. Over Zac's shoulder is the reflection of the earth, giving the impression that he is in Heavens.

Zac's blissful moment of connecting with the divine through music is interrupted when his brother abruptly notifies him that the neighborhood kids are outside watching. Humiliated, Zac closes his door and leans against it with his head lowered and arms stretched at either side. Directly above Zac's lowered head is a poster of Bowie. The position of Zac's body below Bowie's face mimics Christ's crucifixion, and symbolically marks the pain and torment that Zac must endure for his sexual disorientation.

In spite Mrs. Beaulieu's reverence for his gift, Zac continues to

downplay his divine abilities and instead concentrates on being the man that his father envisions. Regardless of Zac's efforts, Mr. Beaulieu becomes convinced of his son's homosexuality and condemns Zac at a family wedding. This traumatic event catalyzes Zac's departure to Jerusalem.

Throughout Zac's life he takes great risks while confused and in denial of his sexuality. By overcoming life-threatening acts, Zac hopes to also conquer his homosexual thoughts. First, he erratically speeds toward a red light on his motorbike, believing that if he makes it he'll be cured. The result is that Zac is hit by a car, his mother stating that it was a miracle he survived. The second challenge involves walking home in a severe blizzard, which he also barely endures. The third trial takes place in Jerusalem.

The night following his first homosexual experience, Zac walks out into the desert alone. Mythologist Joseph Campbell explains the significance of the solo expedition: After Baptism by John the Baptist, Jesus went into the desert for forty days; and it was out of the desert that he came with his message. Moses went to the top of a mountain and came down with the tables of the law. (Campbell 136)

Thus Zac is embarking on a spiritual journey in search of his true self. Although his trek into the desert is a near-certain death wish, Zac is miraculously saved once again. After collapsing in the sand, Zac has another psychic connection with his mother in Quebec who feels the heat of the desert and splashes water on her face. In Jerusalem the water correspondingly materializes as a Bedouin nomad trickles water onto Zac's sunburnt face. Through this cleansing act Zac is resurrected and symbolically baptized.

When Zac returns to Montreal, his brother Raymond is dying in the hospital from a drug overdose. Although Zac is unable to save his brother, the event serves as an awakening to Mr. Beaulieu who comes to appreciate Zac in spite of his homosexuality. Thus, Mr. Beaulieu abandons the strict Catholic doctrine that condemns homosexuality and becomes an open-minded and loving father. This personal transformation epitomizes Quebec's religious and cultural

evolution following the Quiet Revolution.

Zac's character therefore embodies a postmodern Christ figure, not simply for his healing powers, but because he evokes love, acceptance and compassion. Although these attributes have always been postulates of Christ, Biblical interpretations have led to bigoted beliefs. In observing the events in the life of Zac, *C.R.A.Z.Y.* follows the Quiet Revolution and highlights important issues of postmodern society.

An examination of the secular Christ figure in three postmodern films shows how the life of Christ is paralleled to reflect the death of traditional Quebec and the rebirth of modern society. Each unique character embarks on a journey which results in revelation. The mythologist Joseph Campbell explains,

Essentially, it might even be said there is but one archetypal mythic hero whose life has been replicated in many lands by many, many people. A legendary hero is usually the founder of something- the founder of a new age, the founder of a new religion, the founder of a new city, the founder of a new way of life. (Campbell 136)

Through each film, the two-thousand-year-old story of Christ is paralleled and made relevant to the secularization of modern Quebec society. Although Quebec has freed itself of Catholic authority, as Quebec evolves in postmodern times, religious themes and characters will continue to penetrate the cinematic stage.

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## About the Author

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# **The Reinvention of the Monastic Wheel: Cistercian Origins and Aims**

GRANT SAWATZKY

## **Abstract**

An exploration of the Cistercian monastic movement which aimed to return to the wellsprings of the apostolic ideal by rethinking and resolving the problems of western Christian monasticism, a practice which allowed this schismatic group to flourish as the dominant monastic franchise of the late middle ages.

In 1098 a modest group of Benedictine monks left their Cluniac monastery in Molesmes, France. Their goal was simple: To form a new and separate house with the implicit goal of observing the holy Rule of Saint Benedict. By the year 1152 there would be no less than 333 Cistercian monasteries scattered throughout Europe. The ultimate aim of the Cistercians was to get back to the apostolic ideal as viewed through the eyes of monasticism of the mid-eleventh through the twelfth century. The immense success of the Cistercians stemmed from their innovative thinking and flexible restructuring of the institution of monasticism. This can be shown in their socio-economic restructuring of monasticism by their use of conversi, renewed theology with regard to the doctrine of the Cross as it related to asceticism, and in the political reorganization of their order.

European society in the eleventh and twelfth centuries could be divided into three categories: “those who fought, those who worked and those who prayed.” Monasticism fell within the confines of the latter group, and as such, was inextricably intertwined with the nobility which relied on the prayer of the monks as a boon for their endeavors. What evolved was a relationship between the aristocracy and monasteries, which resulted in prayer eventually overshadowing other requirements of monastic life, such as working in the fields. Chapter 48 of St. Benedict’s Rule stated that manual labour was to be a daily part of the monk’s life. Its purpose was to maintain monastic self-sufficiency, and to keep the monks humble. But the needs of the aristocracy, which provided the monasteries with large endowments of land, gifts and initiates, outstripped the Rule’s ordinance for a balance between physical work and prayer. Thus, what had started out as a counter-culture movement of hermits gathering together with a common purpose from as far back as the third century had by the eleventh century become an institution bound to the economics of medieval society. Janet Burton, a monastic scholar from the University of Wales, refers to this as “the crises of cenobitism.” In short, for the radical Cistercians the spiritual integrity of Cluny was unwinding before their eyes through the growing demand for ostentatious prayer. As a consequence, the Cistercians were moved

to action to restructure their order. But how was this monastic overhaul to take place? Was it possible to maintain the daily balance of prayer and manual labour as the Rule required?

An early Cistercian history, *The Little Exhord*, states that in the beginnings of their movement the Cistercians tried to follow the Rule to the letter in regard to the balance of liturgy and labour, but discovered that it was impossible to do so. Instead, they seized upon a brilliant idea which would become a hallmark of Cistercian invention. They decided to “hire” a group of “half-brothers” who would provide the much-needed labour force for the logistics of both building and maintaining hospitable monasteries. Granted, these *conversi* would not be allowed to pray the liturgy, but this novel idea produced prolific results insofar as it had great appeal to the lower classes. It is not difficult to see why this idea worked. The masses could become part of a religious order which would look after their physical and spiritual needs; in turn the Cistercians would fulfill their desire to be true to the apostolic ideal, as seen through the template of St. Benedict’s Rule, and the monks and abbots would be free to do the liturgical work of God. With this connection it is difficult to view the charismatic Bernard of Clairvaux putting in the Rule’s prescribed daily time in the garden while fulfilling his prolific and varied monastic-ecclesiastical duties. Thus, in some sense, the Cistercians could be seen as progressive, as they solved the problem of cenobitism with the unique idea of *conversi*.

It is a curious feature of the middle ages that during the time of Cistercian beginnings (1098-1112) the first crusade was preached by Pope Urban II (1095). These two events, in a broad sense, present us with one of the great incongruities of the reformation of the twelfth century: monastic renewal set against the crusades. The cenobitic tradition can be seen as an attempt to avoid the demonic from within the walls of the monastery (the flesh), while the crusades can be viewed as an effort to eradicate the demonic outside the walls of Christendom (the infidel). Therefore, it should not surprise us that Bernard not only wrote sermons on the Song of Songs, which are Hebrew love poems set in the Bible, interpreting them metaphorically

as love for Christ and wrote hymns such as “O Sacred Head Now Wounded,” which are steeped in atonement theology, yet was known as the chief preacher north of the Alps for the second crusade.

Jaroslav Pelikan points out that crusade means “to take up the cross,” and it was within this context that the schismatic Cistercians wrote in glowing terms of “crusading” in their ascetic monastic renewal efforts. Cistercian historical memory, as recorded in *The Vita Prima*, recalled these times and focused on their newfound ascetic campaign. *The Vita Prima* recorded that “Clairvaux...had once been a hide-out of robbers and was formerly known as the Valley of Wormwood...It was in that place of horror and desolation that these righteous [Cistercian] men established themselves and turned a den of iniquity into God’s temple and a house of prayer.” Indeed, while knights waged war against the corporeal enemy of Muslim armies in Palestine, the Cistercians crusaded against the unseen enemy of the flesh and the devil. As a result, another early Cistercian historiography, *The Little Exhord*, played dramatically on themes of men hacking out a new life of salvation in “woodland,” “wilderness” and “thorn bush.” But how accurate were the Cistercians in depicting their hostile spiritual environment? And what was the purpose in proposing such austerity?

The Cistercian wilderness ascetic experiences were embellished. Cistercians chose their locations for new monasteries with the intention of agrarian infrastructure built around water courses, and F. Donald Logan, Professor Emeritus of History from Emmanuel College (Boston), adds that “not all the land taken [by the Cistercians] was uninhabited.” Hence, these histories must be interpreted as rhetorical devices used to point to a different, but not necessarily stricter, asceticism by which the Cistercian historiographers could proselytize converts to the newfound monastic franchises. These sincere reports of a revived asceticism took root in new members of the abbeys, but perhaps more importantly, they won the hearts and minds of aristocratic landholders who endowed the Cistercians with their so-called “wastelands” on which to construct their monasteries. For example, *The Little Exhord* tells

how Odo, Duke of Burgundy, provided them with gifts of land and livestock, and saw to the building of the first Cistercian monastery in Cîteaux. Undoubtedly, the marginal “wilderness” lands granted to the Cistercians served their ascetic yearning by allowing them to hide away from populous villages while providing the necessary ingredients for them to fulfill their interpretation of what it meant to carry the Cross of the Christ.

But Cistercian austerity would find its expression in more than just desolate locations and wood buildings. Tangible new symbols of faith would become part and parcel of the Cistercian spirituality. Their crosses were made out of wood and not of precious metals. Their habits were made of undyed wool (thus they were known as “the white monks”). Cistercian chalices were made of iron, and their churches were without ornamentation. All of which pointed to an innovative simplicity of faith and asceticism over and against the purported ostentations of their former allegiance, the Cluniacs, so much so that a contemporary of Bernard, Peter the Venerable from Cluny, laid the accusation against the Cistercians of being a “new race of Pharisees.” In this instance, the primitive Church’s stinging condemnations of the earliest form of the rabbinic tradition of Judaism served the two fold purpose of Peter the Venerable by both attacking the Cistercians and defending the integrity of Cluny in his polemic.

Of course, to further accompany their increased asceticism, more organizational restructuring would be needed if a schismatic religious institutional like the Cistercians was going to succeed. It appears that the Cistercians were up to the task. Most of their reorganization is chronicled in *The Charter of Charity* (1119). First, there is an appeal to unity in worship. Judging from the attention paid to the desire to use “the same” books, observances and liturgy, and the overall emphasis on “oneness” in the text, it is clear that there were differences in manuals of worship used among the Cluniacs. Dissimilar resource material for worship could only lead to dissension, and the Cistercians wanted to ensure that nothing of the sort would occur in their new houses.

Perhaps the most remarkable gem of Cistercian ingenuity

associated with the ideal of renewal is hidden in *The Admonition of Stephen Harding*, where the Cistercians solicited the Jewish community for assistance with textual criticism of the Bible. Set against the backdrop of the infamous “peasant’s crusade,” where Jews were slaughtered on the way to Constantinople, this act showed an extraordinary mark of open-mindedness and tolerance. Moreover, the discernment of the need to have an accurate Biblical text to work from points to a dialectic approach to Biblical scholarship well ahead of its time.

Next, the Cistercians embarked on grassroots political reshuffling. This was necessary insofar as the Rule of St. Benedict, as Lorenzo Sena points out, had at its core the spiritual wellbeing of the community with a built-in awareness of practical matters. Whereas Cluny operated from a dominating hierarchical structure in its daughter houses, the Cistercians realized that filial relationships between the motherhouse of Cîteaux and all of the Cistercian franchises would result in a tighter bond of unity. The abbots from all the monasteries were required to get together to work out their problems while yielding precedence to the motherhouse of Cîteaux. Moreover, the abbot from Cîteaux was required to physically visit each daughter house on an annual basis to ensure that the Rule and regulations of *The Charter of Charity* were followed. The houses were mutually codependent on each other, and would meet as a political body where they could make decisions and impose admonitions even if the abbot from Cîteaux could not physically make it to the meeting. As a matter of fact, if the abbot of Cîteaux became lax in his duties the daughter houses were allowed to reprimand him, and if necessary remove him from his position. In this way they could guarantee that their institution was successful.

Cistercian renewal at the turn of and into the twelfth century evolved out of a growing disillusionment with the Cluniac strain of Benedictine monasticism. Its success, both in terms of numbers of monasteries, new enrollment and renewal of faith within the confines of middle-age ecclesiology, was due in great measure to the originality and resourcefulness of those first few monks who would

charter its course. Their ability to gain a mass following through the use of *conversi*, thereby solving the conundrum of self-sufficiency set against strict obedience to the Rule, along with a renewed vision of the Cross through an evolving asceticism and their capacity to see clearly to the practical matters of a religious institution, would led to the flowering of an order that would carry well beyond the middle ages.

## Notes

- 1 "The Little Exhord," in *The Cistercian World: Monastic Writings of the Twelfth Century*, ed. Pauline Matarasso (London: 1993), 5-6; Curia OCist, "The Charter of Charity, 1996," *Internet Medieval Sourcebook*, ed. Paul Halsall, <http://www.osb.org/cist/charter.html>, accessed (9/21/07).
- 2 Janet Burton, *Medieval Monasticism*, *Monasticism in the Medieval West: from its origins to the coming of the friars*, ed. Judith Loades (Oxford: 1996), 37.
- 3 Burton, 7-8.
- 4 Saint Benedict, "Rule For Monasteries," in *Readings in Medieval History*, 3rd edition, ed. Patrick J. Geary, (Peterborough: 2003), 1:188-189.
- 5 Although, some would argue that Monasticism had its roots in the eremitical heritage of the Therapeutae who date back to before the time of Christ. cf. Eusebius of Caesarea, *Ecclesiastical History: Books I-V* (Cambridge: 2001), 2: 147-157.
- 6 Burton, 19; Brenda Bolton, *The Medieval Reformation: Foundations of Medieval History*, (London: 1983), 22.
- 7 "The Little Exhord," 7.
- 8 1098 is the date given for the initial split of Abbot Robert from Molesmes while 1112 is the traditional date of Bernard's entry into Cîteaux.
- 9 Joseph H. Lynch, *The Medieval Church: A Brief History* (New York: 1994), 204.
- 10 Jaroslav Pelikan, *Jesus Through the Centuries: His Place in the History of Culture*, (New Haven: 1999), 99.
- 11 William of St. Thierry et al., "The Vita Prima," in *The Cistercian World: Monastic Writings of the Twelfth Century*, ed. Pauline Matarasso (Toronto: 1993), 26.
- 12 "The Little Exhord," 5.
- 13 Adriaan H. Bredero, *Christendom and Christianity in the Middle Ages: the Relations Between Religion, Church, and Society*, (Grand Rapids: 1994), 133.
- 14 F. Donald Logan, *The History of the Church in the Middle Ages*, (London: 2002), 140.
- 15 "The Little Exhord," 6.
- 16 Logan, 141.
- 17 OCist, 2.
- 18 "The Admonition of Stephen Harding," in *The Cistercian World: Monastic Writings of the Twelfth Century*, ed. Pauline Matarasso (London: 1993), 11-12.
- 20 Logan, 124.
- 21 Lorenzo Sena, "The History of the Interpretation of the Rule of Saint Benedict," in *American Benedictine Review*, ed. Rev. Terrence Kardong (Richardton: 2005), 394.
- 22 OCist, 3.
- 23 OCist, 3-7.
- 24 OCist, 6.

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# **The Search for BC Identity**

LAURA WONG

## **Abstract**

Using examples from literature, this paper examines how BC writers demonstrate the province's diversity and seeks to discover if multicultural BC has a unified identity unique from the rest of Canada, or if the province is still in the adolescent stage of cultural evolution.

This year I received the Chinese Cultural Association Scholarship. When I first found out, my most immediate reaction was “Oh no, I don’t look Chinese enough ... I’m not Chinese enough.” I briefly and comically considered wearing a bit of eyeliner to enhance the Asian in me. I was truly concerned the donors would be upset with how un-Chinese a Wong their recipient was. And I did receive some shock: “You don’t look Chinese. Are you Chinese? Is that your married name?” All the pride of my heritage fizzled into a puddle on the floor, leaving me, the emptied cultureless carcass, resigned to not ever really being seen as a part of the Chinese culture I hold so dear. Nor am I, in fact, connected to that of my mother’s side, a strong mid-western American birthright, from which she moved away from and to which I, being born in Canada, have never really related. I am a first-generation Canadian of mixed race. On application forms I am neither a minority nor a majority; I am other. I have no genetic historical links to my country or province, yet am distinctly not a member of either parent’s nations, and I feel British Columbian to the core. I am not alone. Over one-quarter of BC’s population are immigrants. With this in mind, consider how many first-generation British Columbians make up the province. In the absence of ancestry in this place we call home, floating in multicultural mishmash, where does our social identity come from? What makes us collectively British Columbian? This paper seeks to not only clarify the seeds of culture, but also to suggest a common strain in BC literature linking our fragmented province. We are all searching for a contemporary cultural identity and it is this search, in fact, that connects us and creates our collective construct.

As an expression in city plans the western world over, Culture goes nowhere without the Arts. National identities are founded on, verified by, and expressed in the arts and culture that society produces. As noted by Danielle Schaub in her essay *Reflections on Identity and Language*, “Fiction provides legitimate and externalized communicative space for dreams of self-fashioning ... Literary representations reveal degrees of resistance or adherence to cultural inheritance and rapidly changing material reality” (8-9). The rapidity

of the constant flux of Canadian cultural identity is particularly pronounced. As Canada is an amalgam of many ethnicities of ever-changing proportions, a united perception is difficult to acquire and, at best, infrequent and unpredictable states of re-manifestation occur. Multiculturalism, while being a source of pride, is also a source of confusion about who we are. This typically adolescent dilemma makes further sense when the age of our country is considered. Canada is still in its infancy next to the grandfathers of civilization. While First Nations archaeology dates back over millennia to stone tools in Beaton River, only a minority of British Columbians can draw any direct lineage to Aboriginal ancestors because, for many of us, Mom came from one country and Dad came from another. We exist as a vast canvas painted by a student artist whose studied techniques appear as a collage of concepts, not yet having melded them into a dominant mature style all their own. Editors of *Identity, Community, Nation: Essays on Canadian Writing*, Schaub and Verduyn clearly express this issue in their introduction:

Canadians have attempted to establish firm boundaries while simultaneously engaging-consciously or unconsciously-in cross-cultural exchanges that question those very boundaries. With the intermingling of histories, memories and cultures resulting from multiple waves of immigration, internal boundaries of community and nation have come to intersect at increasingly diversified axes. Consequently, identities in Canada can no longer be grounded in certainty or defined in clear-cut terms. (Schaub xi)

This confused cultural hybridity could arguably be a larger homogenous Canadian dilemma as it is regarded in the aforementioned quote; however, it is BC's specific trial of identity we are attempting to establish. For these national concerns, British Columbia acts as a magnified microcosm. Why is this? Geography, population, and perceptions of place all come into account. As the far west of the nation, B.C. was the last frontier, the last to be explored. It is the far margin of Canada, the centre being Ontario and Quebec as the original Upper and Lower Canada. Although also at the edge, Newfoundland and the Maritimes acted as a starting point

for Canada's epic exploration, placing their historic cultural basis as beginning before the centre's. Remnants of a strong European heritage emerge in eastern Canada through unique traditions of fiddling, foot-stomping, folklore, food, and pronounced dialectal differences. The European influence seems far less prevalent in B.C. There is greater linguistic homogeneity, yet a cohesively unique culture has not developed. What folklore we do have is more akin to myth; the Sasquatch and the Oogoo are the superhuman members of our sloganned Supernatural British Columbia, a title indicative of the monumental stature of our environment. Higher mountains, denser forests, and a vast wild ocean set up our Edenically mystified province as a place to seek. It is also, not contradictorily, a place in which to get lost. The domestic migration and international immigration to BC is as staggering as the scenery. In a competitive lunchtime discussion on the best province, the Newfoundlanders stand behind their rock, Saskatchewanites uphold their open skies, but "everyone" is living in B.C. and no one, despite the glory of their home province, will concede any desire to move back. Globally and locally, this province acts as a Mecca to an increasingly alien nation. Members of this swelling mass may be looking for community, anonymity, or the divine, as do people all over the world. We seek an understanding of self and how we fit into this world. The newness of this province provides a particularly *apropos* forum for this pursuit. While neither specific to British Columbians nor entirely inclusive of them, it is a common enough pilgrimage for most of us, a uniting factor in the definition of such a diverse population with so little else seeming to link us together. This is B.C. identity; we are the people at the ends of the earth seeking, Sisyphus-like, themselves, knowledge which is destined to remain a fluid unknown, suffering "the geographical frustrations of searching for utopia" (McGill 253). This hypothesis at once agrees and argues with Griffith's scathing critique from *The Arbutus/Madrone Files: Reading the Pacific Northwest*.

I do not think the Northwest will produce a form—whether in painting, sculpture, poetry, or fiction—that is peculiarly identifiable as its own ... A regional culture

results only from a long period of isolation and insulation  
 ... The Northwest, not much more than a century old in  
 settlement, hasn't much of a culture to look back upon.  
 (qtd. in Ricou 24)

An identity is touted, yet, ironically, derived from a lack thereof. Disheartening as this prediction is, BC's position as the mystical Eden at the edge of the world is a complimentary reputation to have. The paranoia of being in the peripheral is, at the same time, a point of pride. In *At the Edge: Canadian Literature and Culture at Century's End*, Dvorak points out how, in the postmodern world, "The 'ex-centric' or off-centre is valued over the centre, and identity is asserted through difference and specificity...This postmodern reassessment valuing diversity and plurality is undoubtedly linked to the visible role that ethnic and racial minorities play in Canadian culture today" (Amossi 29). Far from centre, BC asserts a loner-like confidence, acting as a sort of rebel without a culture. Geographic instability acts as a mutual metaphor for our provincial identity crisis, the magnitude of our fragmented multiculturalism reflecting that of our mountains. To find our way out of this confusion, we subscribe back to Canadian icon Margaret Atwood's wisdom:

A piece of art, as well as being a creation to be enjoyed,  
 can also be ... a mirror. The reader looks at the mirror  
 and sees not the writer but himself; and behind his own  
 image in the foreground, a reflection of the world he lives  
 in. If a country or a culture lacks such mirrors, it has no  
 way of knowing what it looks like; it must travel blind.  
 (qtd. in Gerson xiv)

To ensure no such ignorance, I have selected three contemporary BC works: Timothy Taylor's novel *Stanley Park*, and the plays *Mother Tongue* by Betty Quan and Joan MacLeod's *Hope Slide* to be our mirrors. They will be examined to demonstrate the uniting element found in our diversity. We are all pilgrims, potentially journeying to and from very different places; we meet on the path; action, not adjective, links us. All three pieces find their protagonists on journeys for self-identity.

*Hope Slide* is chronologically the earliest work, first produced in 1992 in, interestingly, Toronto and not B.C., whose history and

setting play so integral a role. This one-woman monologue shows Irene as both a woman and a girl, in each age struggling for answers. As a teenager she looks for community and inspiration in the Doukhobors. Later, this angst and passion translate to her feelings surrounding AIDS and, specifically, her friend Walter's death. Her confession as a youth to her truant officer of her "present occupation: [as a] spirit wrestler" (Hoffman 429) applies similarly to the mental conflict she suffers as an adult. We are also informed by the young Irene that "Doukhobors means spirit wrestler" (431). They and Irene have escaped into the Interior of BC, from real and perceived social ridicule, to find a safe haven for their uniqueness. MacLeod states that "BC informs all that [she is and does] ... absolutely ... a BC girl through and through" (qtd in Hoffman 421). Although the parentage of Irene is unknown, she is presented as a BC girl, and we might easily assume a multigenerational Canadian link. Despite this possibility and probability, she still feels at the periphery of a society already on the periphery. Whether she is thirty-seven or fifteen, she sits in "liminal spaces—living on the edge or the in-between, geographically or psychologically" (Wasserman). She is at two emotional cusps; that of adolescence and that of death. It is not just her friend Walter's death that she is dealing with, but the loss of that chosen family is emphasized by and emphasizes her age, a time when the realism of having one's own family begins to wane. Ginny Ratsoy's analysis of the young Irene as fulfilling "both distinct BC stereotypes... [being] in equal measure idealistic and jaded ... non-conforming yet desirous of a community" (Hoffman 423) does not entirely dissipate with adulthood. Her search for connection with the Doukhobors, however failed an attempt, and her current career as an actor on tour demonstrate how "the utopian impulse to plan ideal communities is both irresistible and bound to fail" (Wasserman).

Where MacLeod's Irene wrestles to find connection and identity in community, Quan's Mimi seeks her own identity and wrestles to break free of the cultural box in which she feels enclosed. All three central characters in *Mother Tongue* find themselves restricted in some capacity. Steve's deafness and resulting embarrassment

to speak is the most obvious. The most culturally related are the problems faced by Mimi and her mother, who has failed to become confident in English even though she has lived in Canada for over two decades. She is frightened to function without Mimi's fluency. She has also never learned sign language to communicate with her son and thereby has increased her dependency on Mimi. Fear of isolation is not unfounded, but at this juncture seems self-inflicted and stems from an unwillingness to adapt to the new culture and circumstances before her. She criticizes her westernized children as "strangers who have my eyes, my skin, my hair, but whose souls have been stolen by invisible spirits" (448). Strangely, it is Mimi's strong understanding of Chinese family responsibility which makes her acceptance of the scholarship and moving away so difficult. She understands what is expected of her by her mother, but staying with her family directly conflicts with what would be the obvious move to make in western society, to take the scholarship. It is her desire and necessary for her own personal growth, yet she does not want to affront or abandon her heritage. The Jingwei traditional story is interwoven to demonstrate this link, acting as a metaphor for Mimi's tormented departure. Although her flight to find herself has her leaving the West, the cultural conflicts of *Mother Tongue* feel deeply regionally significant. In the *Vancouver Fiction* introduction from 1985, David Watmough is already "sorely conscious of the classic exception of those major ethnic constituents from Asia who are not represented ... people who have already resoundingly shaped our local food habits, our architecture, our visual arts, and such visibly noticeable factors as our politics, our educational structures and our Pacific Rim awareness" (9). A decade later, *Mother Tongue* premiered at Firehall Theatre on the edge of Vancouver's Chinatown, a major advancement in the visible hybridization of B.C.

Timothy Taylor's *Stanley Park* breaks into the 21<sup>st</sup> century. Vancouver is an urban metropolis where Chef Jeremy Papier seeks an individual and a collective identity, both of which seem to be lacking in a concrete city of Crips. The latter is a term used in Taylor's culinary world to define the faction of chefs and gourmands who prescribe

to a post-modern fusion style and health-oriented philosophy of food. The other faction, to which Jeremy belongs, upholds traditional cultural origins and is known as Blood. The Blood versus Crips contrast may perhaps be best illustrated as the yolks versus whites or butter versus extra virgin olive oil. Either way, food is the main cultural vehicle in this novel. Literature may be our means of finding it, but food reigns supreme when seeking an immediate cultural connection. Claude Lévi-Strauss declares,

... cooking is the mediator between nature and culture. His famous culinary triangle demonstrates the conjunctive and disjunctive relationships between the raw (belonging to nature/the non-elaborate), the cooked (elaboration in the form of cultural transformation), and the rotten (elaboration in the form of natural transformation) ... cooking is what makes a man a cultural animal. (qtd in Amossi 43)

This describes Jeremy and his father. As his father states, they are doing research to much the same end, to know the place they are in and to live and feel how they are connected to it. Strangely, Jeremy's studies in France are what "have made [him] Blood" (Taylor 45). The flight overseas or away from family now typifies a young person's path to self-discovery, but it is Jeremy's desire to find out what comprises Blood in his home city which brings him back to passionately spiral into the Monkey's Paw, the restaurant he creates. While in Europe he seeks his own family origins, lost in the nomadic ancestors of his mother and the non-existent ones of his father. This is also the topic of discussion between his Dad and himself. The special Sabatier knife, a gift from Dad, bears the engraving "*Chef Jeremy, We are reminded of our beginnings*" (64). I, like Jeremy, have sought out the meeting places of parents in distant lands, only to return to Vancouver still somehow unfulfilled and searching. Over dinner, Jeremy's friend Olli scathingly comments "Who needed roots in the first place? Somebody told us we needed them and we believed ... When the future is a promise that we can be anything we want to be, those with roots lose out." (165). This is the antithesis of the Papier pursuit. These gentlemen perceive the search for origin and identity as valid research with or without conclusive evidence. Jeremy ironically filibusters the fooderati

critic Kiwi with his riff on Gerriamo's as a 'restaurant of *no* place ... belong[ing] to no soil, no cuisine, to no people, and to no culinary morality ... post-national' (364). This is far from his true hopes for Vancouver. His part in making a B.C. identity is a continual struggle but not one he gives up on. He takes on the mission of the father, an act creating tradition itself. For, 'in our rootless day and age, our time of strange cultural homelessness ... it's all about roots and place. It's about how people relate to the land on which they stand' (136). Few of us have the opportunity to walk in the exact footsteps of our ancestors. The modern world does not permit this luxury, however; rather than a loss of culture, we may perceive it as manifestation of a new culture. We are not eggs that break when they fall from the nest but seeds that may travel thousands of miles in the stomach of a bird to be deposited in a distant land, formed partially by parentage and partially by the soil in which we choose to root ourselves.

In an introduction to the collection *The Vancouver Stories*, local author Douglas Coupland concludes with perhaps the most positive spin on B.C.'s fragmented adolescence. "There is joy to be found in being young. There is joy to be found in not being fully formed" (5). To this, I add that there is joy in the journey regardless of a destination ever reached, in the means and method even if there is never an end point, and if we search and never find what it is we think we were looking for, there will have been purpose in that too. Identity, communal or individual, is neither stagnant nor stationary, but continually evolving and if, to other more established cultures, we have only just emerged from the primordial swamp, let us wallow happily in that confused sludge, for we are together, becoming ... a province and people of infinite possibility.

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## About the Author

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# **Seymour Arm: A Case Study of Rural Schooling**

PAM CAIRNS

## **Abstract**

This presentation describes a research project examining the connections between communities, schools and the government by focusing on a small isolated area on Shuswap Lake in the BC Interior. Numerous interviews and primary research are used to give this history a personal perspective.

British Columbia, with its rugged topography and unevenly distributed population, has been one of the last frontiers of small-scale rural schooling. Some one-room schools still exist today, but in the 1930s rural and assisted schools were common. For example, in 1932 there were 773 schools in rural districts: of those, 106 were one-room schools and 598 were provincially assisted one-room schools. Together they served 23.4% of British Columbia's students.<sup>1</sup> The term 'rural schools' referred to schools that had twenty or more students. An 'assisted school' referred to schools that were eligible for provincial subsidies and had an enrolment of less than twenty.<sup>2</sup> Despite their earlier popularity, by 1989 there were only twenty-one one-room schools in British Columbia.<sup>3</sup> Why did one-room schools become so popular? Why did the numbers of these schools decline? By comparing one community's history and the contemporaneous provincial policies, it is possible to develop an answer.

Located deep in the interior of British Columbia, isolated Seymour Arm offers a unique setting in which to conduct this study. The community's history is comprised of optimistic upswings countered with deterioration and decline. Seymour Arm boomed during three eras. The first surge occurred in the 1860's, the next began in 1910 and the most recent expansion originated in the late 1970s. During the latter two eras, schools served the community, but during the first boom no school developed. A close examination helps to illuminate the history of one-room schools in British Columbia.

Seymour Arm, nestled against mountains on the northeast arm of Shuswap Lake, has its own unique environment. The heavy precipitation allows a dense forest of cedar, fir, the occasional pine and a variety of deciduous trees. In the summer and fall the area is a virtual pantry of berries, mushrooms, and edible plants. It is home to the second largest salmon run in the Shuswap system. The Secwepmec regularly took advantage of the bounty in the summer and fall. They occasionally defended the area against raiding parties from the Blackfoot and Okanagan. Pictographs remain to document the resulting skirmishes. The raiding tribes travelled a trail through the mountains that would later become the prospectors' conduit to

the Big Bend gold fields in the 1860s.<sup>4</sup>

Although settlers began moving into the area around 1810, it was not until the Big Bend Gold Rush (1860-1866) that the community became a boomtown. The town was called Ogden City, or Ogdenville, after Peter Skene Ogden who had served as joint Hudson's Bay Company (HBC) Chief Factor in the 1850s.<sup>5</sup> On March 6, 1866, the town officially became Seymour Arm City, named after Frederick Seymour, Governor of the Crown Colony of British Columbia. The town grew rapidly. In April, the town had twenty buildings including two butcher shops, one hotel, one saloon, one bakery and two general stores.<sup>6</sup> Six weeks later, when the lake was free from ice, Seymour boasted a population of five hundred, and claimed six saloons, five bakeries and three restaurants within its limits.<sup>7</sup> The town was hurriedly assembled: most of the buildings were dug several feet into the ground to reduce the amount of building and materials needed.

During this era there was no schooling in Seymour for several reasons. First, the colonial government had no mandate to provide schooling for the population. The colonies of Vancouver Island and British Columbia merged in 1866, but it was not until Common School Ordinance, 1869 that public schooling was legislated.<sup>8</sup> Also, the population was largely transient so no community identity emerged. Without a strong sense of identity, the population was unable to articulate goals or work together. The town attracted adventurers, mostly men, and not families.<sup>9</sup> Finally, the city did not last long; by late 1866 the gold rush was dwindling and the population of the town declined.<sup>10</sup> By November of 1867, the Hudson's Bay Company (HBC) made the decision to leave Seymour. Soon after, a fire destroyed the remnants of the boomtown. By 1877, the Geological Survey of Canada reported, "The settlement of Seymour is now entirely abandoned, not a single building remaining intact."<sup>11</sup>

By the turn of the century settlers were once again moving into the area on a small scale. Amongst them was a blacksmith, Forest Nelson Daniels, from Ontario. He and his wife, Caroline, settled near Bughouse Bay in 1905, and had thirteen children, all of whom would attend school in the community. The Daniels family became

an important influence in Seymour Arm. They donated land and contributed to fundraising activities. They were active in the area for three generations. As founding members of the community, their influence is still felt in many forms. For example, the floating store named for them still serves the locale and the current community hall is built on their property.<sup>12</sup> However, despite scattered homesteaders like the Daniels, settlement was sparse compared to the activity during the gold rush.

While Seymour City was in decline, the newly formed provincial government took steps to create a system that would provide access to education for all British Columbians. In 1872 the first superintendent of schools, John Jessop, completed his initial tour of the province. It seemed to Jessop that the answer to the sprawling population and forbidding geography was to open a government run boarding school along with several centralized day schools.<sup>13</sup> However, by 1890 when the premiere boarding school in Cache Creek closed in the midst of controversy, this plan was abandoned.<sup>14</sup> Instead an emphasis was placed on one-room schools as the favoured method to provide rural schooling. Each defined district had a small number of schools, usually no more than two, and its own three-person school board which at the peak resulted in 830 school boards.<sup>15</sup> The one-room school became the predominant form of rural schooling for the next several decades.

At the turn of the century, Seymour Arm attracted the attention of Ontario investors who created Seymour Arm Fruit Lands Limited. The corporation purchased 7000 acres just north and northeast of the original town site and subdivided 440 acres into five-acre blocks. The five-acre blocks were advertised at \$100–\$125 an acre and were promoted as far away as England. The terms were promising. The company estimated the total outlay at \$2312 for a ten-acre orchard, which included clearing and preparing the land, planting and the first years' cultivation. The settler could sign up by putting down one fifth and paying the balance in four annual payments. The company also promised to carry, interest-free, the debt of anyone unable to work because of illness or weather and it offered jobs in the construction of

public buildings and other infrastructures. In return for purchasing land, the company promised to provide amenities, such as a school, for the community. They built a cannery, a store, a post office and a hotel for the village. They provided passage to Salmon Arm on a company owned steamer called the *Distributor* and kept the route open with the icebreaker the *Maud Annis*.<sup>16</sup>

The company lived up to its promise of providing a community school. The directors began by inviting Thomas Leith, Inspector of Schools, to visit the town in 1910. He "...found a sufficient number of children to warrant the establishment of an assisted school."<sup>17</sup> The company paid for the school building and supplies. Annual discretionary grants from the provincial government would compensate the teacher. The community would be responsible to form a three-person Board of School Trustees who would hire teachers, maintain the schoolhouse and provide school materials.<sup>18</sup> The creation of the school in this era was largely due to the organizing influence of the company, but could not have been opened without community or government support. The homesteaders shared common goals of settlement and supported the school. Provincial policies and attitudes were conducive to the formation of assisted schools in the absence of any alternatives: boarding schools were a failed experiment and correspondence courses were not yet available.

In late 1910, Miss Adelaide Graham travelled to Seymour Arm to become the town's first teacher. She conducted school in temporary quarters in the hotel. The first year she only had nine pupils and she taught thirteen subjects at five different levels. Graham was the first of many teachers in the rural school. In the twenty-six years the school was open between 1910 and 1937, at least sixteen different educators taught in Seymour Arm. Few planned to stay in the community; most wanted jobs with better pay, increased social opportunities, or less work.<sup>19</sup>

Teaching in a rural one-room school was a great deal of work. Aside from the lessons, teachers were responsible for other duties. These duties might include cleaning and beautifying the school, cooking

hot lunches for the students, and making sure the schoolroom was warm and water available. Teachers also corresponded with the trustees and the superintendents and documented visits to the school.<sup>20</sup> Finally, teachers were required to complete administrative duties documenting students' progress. In the first two full years of school, Miss Graham wrote 237 reports to parents, the equivalent of a report every second month for each student enrolled.<sup>21</sup>

By 1911, Seymour Arm boasted a population of two hundred, making it the second largest town on the Shuswap after Salmon Arm. As the community grew, so did the number of pupils. The students soon outgrew their quarters in the hotel and a schoolhouse was built. The schoolhouse promptly became home to weekly dances and the site of numerous meetings from the Conservatives to the Farmer's Institute. The school provided entertainment such as Christmas Recitals or Spelling Bees and became a focal point in the community. Under the company's direction the homesteaders worked together to turn Seymour Arm into a bustling town. By 1913, the community even boasted oil standard lamps to light some of the intersections and wood piping to supply water to the community.<sup>22</sup>

The town suffered its first misfortune with the outbreak of the Great War when many settlers joined the forces. Some of the families stayed and tried to continue, but the loss of workers was a blow. Most families were farmers or trappers, or logged in a small scale. Mining supplemented the incomes of some families, including the Daniels. In 1910, "surface showings of silver-lead ore" were discovered in the area.<sup>23</sup> However, the difficulty of transportation and in removing the ore ended the mine as a commercial enterprise. The community faced another tragedy during the winter of 1916 when a heavy black frost destroyed many of the young fruit trees and berry plants. The frost was so heavy that cattle froze where they were standing in fields near Seymour.<sup>24</sup> More settlers left to seek work in the larger centers.

The population decline was reflected in the attendance at school. Enrolment peaked in 1913 with twenty-three students registered, but dropped to ten by 1918. The community was in transition, but the school provided a rallying point. In 1921 the compulsory attendance

clause of the School Act was amended to read that children over seven and under fifteen years of age were required to attend school for six months of the year regardless of whether they lived in rural or urban settings. Correspondence courses were available, but suffered because once the lake froze over mail was not delivered until the spring thaw. Therefore, remote homesteaders with school age children would sometimes choose to live in town when school was in session, providing a boost to the local economy and school. The presence of a school attracted people and strengthened the community. The school was an integral part of the town's identity, providing education, entertainment and a source of pride. Also, the townspeople had to raise funds to pay for supplies and the upkeep of the school and the resultant weekly dances and basket socials built a sense of community in the remaining population.<sup>25</sup>

The community was becoming more diverse with the arrival of a Ukrainian contingent. The Schwab Land Development Company, registered in Winnipeg, began development in Seymour around 1919. Schwab promoted Seymour Arm as an excellent farming opportunity with a pleasing, moderate climate, and the company convinced many Ukrainian settlers from the prairies to sell their homesteads and move. Fifty families moved into the area around Gilman's Bay and rejuvenated the population. School attendance climbed to twenty in the 1921–1922 school year. With the arrival of the Ukrainians, more children lived near Gillman's Bay than by the old school site, so in 1920, the community built a new schoolhouse closer to the bay. However, the Ukrainian settlers soon realized the area fell short of the promises made, and demanded restitution. Eventually the Schwab Company relocated the immigrants to Grindrod and by the end of 1922 the Ukrainian influx was merely a memory.<sup>26</sup>

Attendance in 1923 dropped to nine after the Ukrainian children left, the lowest number of pupils since the schools' inception.<sup>27</sup> The schoolhouse remained at Gillman's Bay but the new setting was less than ideal. It was not easily accessible for all the students attending. The Daniels children had to walk around the bay, row across the water or traverse the ice to go to school, but they persevered.<sup>28</sup>

Although the school building was an important gathering point for the community, the fluidity of the community meant the location and type of building often changed. By 1928 the school moved yet again "...accommodated in an empty house, to suit convenience of pupils, who are all on the south side of the lake."<sup>29</sup>

Schools and communities have a symbiotic relationship: each needs to thrive for the other to succeed. Conversely, when a community suffers economically, as Seymour did in the 1920s and 1930s, people leave and the school struggles. When the Seymour Arm schoolhouse closed for a year in 1926, at least one family moved temporarily to Anstey Arm to allow the children to continue their education.<sup>30</sup> By 1935, school was held again in the hotel. By 1936, only members of the Daniels and Hooper families were attending school in Seymour Arm. When Alf Hooper, who was also the teacher, withdrew his children from school in 1937 to move from Seymour Arm, the school was forced to close. This meant that Daniels family needed to decide how best to educate their children. They chose not to abandon Seymour Arm, but moved temporarily for part of each year to be closer to a school.<sup>31</sup> The community would not see another school for almost half a century.

There were several reasons that the Seymour Arm school remained closed during this time. First, transportation systems in most of the province had improved, but Seymour remained dependant on water access making it less attractive for potential settlers. There were also changes in the school system. Beginning in 1886 the provincial government had worked towards decentralizing the power and funding systems of schools, but as early as 1919 signs of a reversal had been apparent. In that year, inspectors could be empowered to be official trustees for rural school district, effectively removing the power from local hands. With time, larger schools and consolidation became popular. Larger schools offered benefits such as increased opportunities for students, reduced workloads for teachers and reduced administration costs. As well, the improved provincial infrastructure, lower vehicle cost and greater vehicle reliability made travelling in the interior much easier and consolidation feasible. Of

course there were drawbacks such as reduced local control and the need to transport the students to the school, but these were deemed insignificant beside the benefits of increased efficiency.<sup>32</sup> It seemed only a matter of time before one-room schools were forsaken. Nonetheless, they never completely disappeared. British Columbia still has one-room schools today.

Seymour Arm was never completely abandoned either, but during the 1940s its population continued to decline. In 1947 the lack of inhabitants resulted in the post office closure, making the area even less attractive to potential settlement. Nonetheless, small-scale logging and trapping continued. People visited the area to fish, hunt and picnic; and some bought land.<sup>33</sup> By the end of the next decade, several families were living in the area year-round again. The sixties saw the return of schooling to Seymour Arm when three families had their children enrolled in correspondence courses.<sup>34</sup>

The late seventies were another active period in Seymour Arm. With the completion of Mica Dam in 1974, came the need to build power lines over the mountains to connect the power generated to the people who would use it. The power lines were not to be built through Seymour Arm, but rather several kilometres farther inland. Nevertheless, the British Columbia Hydro crews and their supplies travelled through Seymour Arm. This necessitated a regular ferry service and an airstrip. Tourists wanting a taste of British Columbia's natural beauty now had access to Seymour Arm.<sup>35</sup> The 1970s saw a building boom and economic growth in the community.<sup>36</sup> This did not immediately result in a new school, but the foundations were laid early during this period.

The Seymour Arm Resident Ratepayers Association (SARRA) was an active force in the area in the early seventies. One of its most influential projects was the completion of a community hall. The SARRA applied for, and received a Local Initiatives Project (LIP) Grant.

SARRA constructed the hall over the fall and winter of 1974-1975. The hall was an important step in the strengthening of the community. The building itself allowed people to work toward a common goal and once it was completed it became a central

point in the community. The hall was home to the lending library, which volunteers opened for an hour a week. It was also the site of potlucks, open microphone nights, parties, dances and movies. The hall was important in building community spirit, but it also played an important part in bringing a school to Seymour Arm.<sup>37</sup>

In 1986, parents of correspondence students petitioned the School District under Section 19 of the School Act. Section 19 concerns “schools that provide tutorial services or other supplemental educational services to school age children...”<sup>38</sup> The parents wanted a part-time teacher in the community to help their children with their correspondence classes. They were successful in their appeal. The school was located in the community hall and operated one week a month, providing the students with assistance and giving them an opportunity to socialize and work with other children.<sup>39</sup> The first teacher of the second era of school in Seymour Arm, Lee Hansen, arrived in September 1986. She taught for the fall term before being replaced by Eleni Morris.<sup>40</sup>

Morris knew the Seymour Arm job would be perfect for her despite having husband and children in Salmon Arm. She had grown up in a rural setting in the Kootenays in a “very homestead kind of lifestyle” and would be able to handle the frontier-style duties required like “...starting up the generator so I could show educational videos and starting up wood fires and hauling water...” She realized that it would be more than a teaching job. She would have to bring drinking water to the school and be her own custodian. She would be working with few supplies. She looked forward to the experience as an adventure. As well, teaching jobs were hard to acquire in the 1980s and Seymour Arm would allow her to gain experience and credentials to teach closer to home.<sup>41</sup>

In her first year, Morris was paid by her students’ completed assignments: if the assignments were not mailed to the correspondence teacher Morris’s paycheck was less. Morris remembers the first place she stayed in a little log cabin where “...the chinking was falling out... and the water froze in the buckets, because they didn’t have running water...” She soon moved to one of the cabins behind the

hotel where she had heat, electricity and running water for at least part of the day when the generator was on. Neither facility had a shower or bath, but parents would often invite her dinner and offer her the use of their bathing facilities. In her second year, Morris negotiated for and received a salary based on her time and travel expenses rather than her students' work. She also began working in Seymour Arm two weeks out of every month. She boarded with two families who had children in the school and found the arrangement "worked better because you'd come home and the house would be warm, because even the motel room would be cold, and they would cook for me, so that was really nice."<sup>42</sup>

The community hall was lacking amenities as a school. The first year, students did not even have desks. They worked together on shaky folding tables that would vibrate whenever a child used his or her eraser. Morris found a district school with 'obsolete' desks and piled them on the barge to solve the problem. The school received donations from the community and other district schools. A piano was donated, as well as a set of chipped recorders, and mats for gymnastics. When someone donated an old slide, Morris used her construction background to build a playground for the children. Morris did a lot of creative problem solving and put in extra time to make up for the lack of amenities. The school once again acted as a focal point for the community. Musicals, demonstrations and exhibits helped fill the community calendar.<sup>43</sup>

The community was also an integral part of the school. Morris drew on the local expertise, asking a geologist to talk to the children about minerals and rocks. He took them on hikes to see samples in their natural settings. He played matching games with the children by putting out samples of the raw materials as well as some finished products and asking the children to pair them. Morris asked a European trained gymnast to help teach the children gymnastics and a member of a band to help with music. The enrichment activities combined learning with social interaction in a way that correspondence school alone could not approach.<sup>44</sup>

The part-time school provided a combination of individualized

learning and group activities that was ideal for many families. However, by 1988 circumstances were conspiring to change the face of schooling in Seymour Arm. A Royal Commission, directed by Barry M. Sullivan published its, "A Legacy for Learners." The equality of the rights all learners was stressed, as well as the need for equal access to learning resources to fit individualized situations. Specifically, Sullivan Report commented on the benefits of multi-age groups and changed the funding formula, giving the school district a financial incentive to open a full-time school.<sup>45</sup> The Correspondence Branch was undergoing reorganization as well and Section 19 support was being withdrawn. Concerned citizens petitioned School District #83, North Okanagan/Shuswap, hoping to obtain a school for the community.<sup>46</sup>

An exploratory committee for School District #83 went to Seymour Arm to investigate. The Seymour Arm faction displayed convincing arguments. They quoted the School Act, which still stated wherever ten or more children may be found within 4.8 kilometers along local roads from the schoolhouse, a school may be established.<sup>47</sup> Bussing the students to the nearest school was out of the question since it was too far.<sup>48</sup> In the spring of 1989, there were sixteen children between the ages of six and twelve living in Seymour Arm. If a school had over fifteen students, the district would be fully compensated by the provincial government.<sup>49</sup> Therefore, in spite of a half century of closing one-room schools and consolidation, a one-room school was officially opened in the community hall in October of 1989.

The school was definitely a benefit to the community: it attracted people to the area, provided a community focal point, and increased cash flow. The school opened with twenty-four students; eight more children than had been on the application.<sup>50</sup> It is reasonable to assume that the presence of the school added to the year round population. There were numerous events throughout the year at the school. The community supported these events, even members without direct links to the school. As McKee remembers, "It was a central point, using the hall meant that it was warm all winter so other functions could occur, the social calendar was full with school events. It pulled

the community together.” The school also input money into the local economy. The school district paid the community association rent for use of the hall, hired support staff from the community, and paid to keep the road ploughed in the winter. The school district also helped the community with capital improvements to the hall to bring the structure to area standards.<sup>51</sup>

The hall in which Section 19 teachers had worked in for three years was no longer adequate under the stricter guidelines for a full-time school. O'Reilly remembers struggling with the original generator and wood heater. He would “start the generator up in the morning for electricity but it was so noisy that by, certainly noon, we'd turn it off, because it [the sound] was unbearable.” He would tussle with the central wood heater, but it would never put heat out. In the first few weeks he would “throw the doors and windows open to let the heat in, because it was warmer outside than it was inside.” Eventually the school district subsidized the cost of a new generator and an oil/wood furnace. A two-way radiotelephone, septic tank and flush toilets were other improvements made to bring the school to standard. By 1991, when Yeltsin taught at the school she believed, “We had all the facilities of a modern town school...”<sup>52</sup> Throughout the life of the school the district and parents continued to look for ways to improve the schooling the children received. The school increased the community's ability to build its infrastructure and strengthened its appeal.<sup>53</sup>

The arrival of a full-time school at Seymour Arm was not all positive. The stricter guidelines and increased bureaucracy made some aspects more complicated. The playground that Morris had built was destroyed “because it wasn't regulation equipment...not that it was unsafe in any manner.” The new school was an elementary school and students were supposed to graduate and leave after grade seven. Most went back to correspondence, and many would visit the school to do their work there especially if they wanted to take part in the music or social activities of the school day. As more students 'graduated' the number of children attending school but not on the roster grew. The teachers understandably did not want the additional

responsibility added to their already heavy workload, but it did not make sense to prohibit the students from at least the social aspect of the school. Eventually a compromise was reached and a support worker was hired for the correspondence students.<sup>54</sup>

The school changed the lives of many people in Seymour Arm. Some of the parents chose to live in Seymour Arm because they liked the idea of quality time with their children and correspondence lessons. One parent remembers that her children would usually finish their schoolwork a month early on correspondence because they were efficient workers. The full-time school changed that: the students were required to attend for the entire school year. As well, the school brought more uniformity and regimentation the children and their lives and not everyone saw that as a benefit. When a child died in a tragic incident soon after the school opened, one teacher wondered if the suicide was precipitated because the child was overwhelmed by the thought of school everyday. Overall, the school resulted in positive changes for the community, but the drawbacks should not be ignored.<sup>55</sup>

Schooling in Seymour Arm soon underwent difficulties as well. The Year 2000 ideals were modified with time to a more traditional model. Provincial declines in enrolment meant less money was available for education. Community economics and politics also resulted in changes in the support to the school. The British Columbia Hydro crews finished work. Without the regular users, the ferry service became less profitable and less frequent. The local economy faltered because of fewer tourists and work crews. The school was not enough to attract any new families to the area and so its enrolment continued to decline as students graduated. The school continued until 1997, but when the projected enrolment for the following fall was only three, the school district withdrew its support and closed the Seymour Arm School. In his official termination letter, the Secretary-Treasurer wrote, "Seymour Arm School provided a unique learning situation that would be reconsidered should enrolment stabilize to again require a school situation."<sup>56</sup>

Despite the Secretary-Treasurer's reassuring words, it is unlikely

that another school will open in Seymour Arm. There are several reasons for this. First, enrolment is declining throughout the province and schools are closing. It seems unreasonable that money would be found to subsidize a one-room school in this political and economic climate. Second, technology is improving making correspondence lessons more interactive and personalized. It also allows a broader scope of offerings. Lastly, urban settings continue attract people in greater numbers than the rural alternatives. However, “since the 1940s, books and articles have stated that the days of the one-room school are numbered” but they have not been eradicated.<sup>57</sup> With a change in educational philosophy, government policy, economic situation, or population growth the possibility of a school remains.

This examination of schooling in Seymour Arm shows that schools are created by a combination of factors. The community needs to have a strong economy and population base. It also requires the desire or need to support a school. Some form of group identity and organization is needed to facilitate the community’s application to the provincial government. In the second era, this identity came from the Fruit Lands Company and in the third, it came from the S.A.R.R.A. Government policies need to be supportive and the provincial economy strong enough to sustain and subsidize the school. Once in place schools benefit the community by becoming a uniting force, attracting people to the area and injecting money into the economy, but a school alone is not enough to maintain a community. The area needs to be economically attractive and accessible to appeal to people. If it is not, the community falls into decline and school enrolment falters. This happened in both schooling eras in Seymour Arm. Schools are formed when local desires and government policies coordinate. They falter and fail when the community can no longer support them.

## Notes

1 *Annual Public School Reports of British Columbia*, 1932, pp. 10-11.

2 The distinction first appeared in 1901. Patrick A. Dunae, "Rural and Assisted Schools, 1901-1946," Malaspina University-College, <http://www.mala.bc.ca/homeroom/content/Schools/Public/sddefs.htm#1901>, accessed July 23, 2007.

3 Paula Fitzgibbon, "One-Room Schools in British Columbia," M.Ed. University of Victoria, 1992.

4 Bradley Family, *Historical Outline of Seymour Arm Area*, 1860–1970. (Sicamous, B.C., 1978), p. 1. Also partially available online at <http://www.milligan.ab.ca/seymourarm>.

5 A. D. Abercrombie, Sicamous: Mara to Three Valley. *Gateway to the Okanagan: Land of the Shimmering Sunset Waters*. (Cloverdale, B.C., 1985), p. 33.

6 *Colonist*, April 23, 1866 quoted from Edward L. Afflect, "The Big Bend Gold Rush of 1865," *B.C. Historical News*, 35:2 (2002) p.19.

6 Bradleys, *Historical Outline*, p. 4.

6 *Victoria Colonist*, September 21, 1865 and December 14, 1865 quoted in Gwen Bauer. *History of Seymour Arm*, (Salmon Arm, 1980), pp. 9 and 11.

6 A. D. Abercrombie, Sicamous: Mara to Three Valley. *Gateway to the Okanagan: Land of the Shimmering Sunset Waters*. (Cloverdale, B.C., 1985), p. 33.

6 *Colonist*, April 23, 1866 quoted from Bradleys, *Historical Outline*, p. 5.

7 Letter, May 27, 1866 quoted from Bradleys, *Historical Outline*, p. 5.

8 *Annual Public School Reports of British Columbia*, 1872, 2.

9 While no census numbers exist for the 1860s in the area, numbers for similar communities in the 1870 Census show the population was predominately male with low rates of marriages and births in the community. Statistics Canada. *BC Table I - Statement of the Population, 1870 - British Columbia* (table), 1870 and *BC Table II - Occupations, Marriages and Births, 1870 - British Columbia* (table), 1870 - Census of British Columbia (database), Using E-STAT (distributor). [http://estat.statcan.ca/cgi-win/cnsmcgi.exe?Lang=E&ESTATFile=EStat\English\SC\\_RR-eng.htm](http://estat.statcan.ca/cgi-win/cnsmcgi.exe?Lang=E&ESTATFile=EStat\English\SC_RR-eng.htm) (accessed: March 29, 2008)

10 Bauer, *The History*, p. 17.

11 NSHSA, Canada, *Geological Survey of Canada, Report of Progress for 1877-78*, p.22B from notes.

12 Abercrombie, *Gateway*, pp. 88-89.

13 Quoted in Thomas Fleming, "A Century of Concern: B.C.'s Rural Schools - 1872-1988." *B.C. Historical News*, 24:4 (1991): p. 12.

14 Norton, Wayne. "The Cache Creek Provincial Boarding School, 1873–1890." *B.C. Historical News*, 29:2 (1996) p. 38.

15 *Annual Public School Reports of British Columbia*, 1932, p. 11.

16 Documents from the NSHS: Bradleys, *Historical Outline*, p.7 and Abercrombie, *Gateways*, pp. 83-84.

17 *Annual Public School Reports of British Columbia*, 1810, p. 30.

18 Robert Wright, "The Plight of Rural Women Teachers in the 1920s." *B.C. Historical News*. 28:1 (1994): pp.26-27 and *Annual Public School Reports of British Columbia, 1909–1938*.

19 Wright. "The Plight." and *Annual Public School Reports of British Columbia, 1911* "Table A (p. li) and Table B (p. lxxi).

20 McGuffey, Verne. *The Differences in the Activities of Teachers in Rural One Room Schools and of Grade Teachers in Cities*. (New York City, 1929); Charyk, John C. *The Little White Schoolhouse, The Pulse of the Community, Syrup Pails and Gopher Tails: Memories of the One-Room School*; and Cochrane, Jean. *The One-Room School in Canada*.

21 *Annual Public School Reports of British Columbia, 1912 & 1913*.

22 *Salmon Arm Observer, 1911-1914*.

23 Abercrombie, *Gateway*, p.83.

24 *Ibid.*, p. 85.

25 *Annual Public School Reports of British Columbia, 1911-1937; A History of Public Education*, p. 56; Abercrombie, *Gateway*, p.91 ; "Clayton Pederson Interview," Shuswap Historical Society, archival file "Seymour Arm.," Annual Public School Reports of British Columbia, 1911-1937; Benson, Lynne. "Nellie and Vernon Daniels: Their Years in Seymour Arm." 2<sup>nd</sup> section, Shopper's Guide. November 28, 1972. North Shuswap Historical Society, archival file "Seymour Arm."

26 Leonard Baron, <http://www.milligan.ab.ca/seymourarm/ukrainian/families/1920.htm> 2005. Also NSHSA, Dolores Weber, A history of the Ukrainian People in Grindrod. 43 rd Okanagan Historical Society (photocopy).

27 *Annual Public School Reports of British Columbia, 1923* "Table A."

28 The Daniels' children were plentiful. The first generation born in Seymour Arm numbered thirteen and two of the brothers, Clarence and Vern remained in Seymour Arm. Clarence had three children and Vern had seven. All the children attended school in Seymour Arm. Benson, "Nellie and Vernon Daniels." and Alice Hucul, "Seymour Arm School Opens." *Okanagan History* 54 (1990) p. 22.

29 Ella McPhee, *Teachers' Bureau Surveys for Seymour Arm School, 1923 and 1928*. Courtesy of the B.C. Archives.

30 Clayton Pederson Interview," Shuswap Historical Society, archival file "Seymour Arm."

31 Benson, "Nellie and Vernon Daniels."

32 Johnson, *A History of Public Education*, pp. 101-115 and Joan Adams and Becky Thomas. *Floating Schools and Frozen Inkwells: The One Room Schools of British Columbia*. (Madeira Park, B.C., 1985) p.9.

33 Abercrombie, *Gateways*, p.331.

34 Hucul, "Seymour Arm School," p.23.

35 *Eagle Valley News, 1974-1980*.

36 *Eagle Valley News, 1974-1980*.

37 *Eagle Valley News, 1974-1975* and interview with Mona Winters. Resident. May 23, 2007.

38 <http://www.bced.gov.bc.ca/legislation/schoollaw/k/i2-98.pdf> accessed July 17, 2007.

39 Interviews with Winters; Eleni Morris. Teacher. May 24, 2007; and Amanda McKee. Resident/Teacher's Aide. July 13, 2007.

40 Pseudonyms have been used to protect privacy.

41 Interview with Morris.

42 Ibid.

43 Ibid.

44 Ibid.

45 British Columbia Ministry of Education. Royal Commission on Education: A Legacy for Learners. Victoria, 1988. p. 261.

46 Interview with McKee.

47 In 1988, the Act required the school to close if regular attendance fell under eight. Section 182 of the School Act.

48 The nearest school is approximately an hour and a half away over primarily radio-controlled logging roads.

49 Items from the SD89 file.

50 Ibid.

51 Interview with McKee.

52 The appliances were run on generator power: BG remembers this causing the computer to “sometimes ebb and flow.” As well, the television and computer were isolated, that is not connected to the outside world: there was no cable or internet service. In 1992, the school district was looking at the feasibility of erecting a satellite dish so the students could “access education television programs such as the Knowledge Network.” SD 83 file, Letter from Dawn Benson, Director of Instruction to Paul Montgomery, Correspondence Branch. October 14, 1992.

53 Anders O’Reilly, Teacher. Interview May 24, 2007; and Natasha Yeltsin, Teacher. Questionnaire July 20, 2007.

54 Interviews with Morris and McKee.

55 Ibid.

56 Items form SD 83 files, including a letter from BW Deggerton to Mr. Hannigan, president of the SACA, from the school district files on Seymour Arm. April 17, 1997.

57 Fitzgibbon, “One-Room Schools,” p. 2.

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# **Olefactories and Blue and Orange**

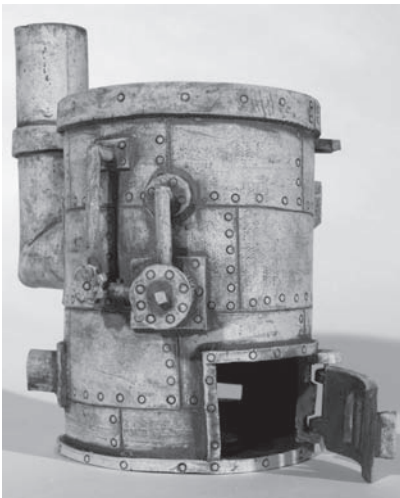
ZAC PINETTE

## **Abstract**

This presentation uses ceramic potpourri-burning “Olefactories,” miniature furnaces and smelters reminiscent of aesthetic and technological forms of the industrial revolution, which, though giving off a pleasant aroma, appear as and allude to polluting and potentially harmful machines.

My distrust of industrialized Western nations' accepted status quo, coming in part from my studies in history and the social sciences, has manifested itself in challenging accepted social conventions, and conventions in art. Much of my work revolves around observing that mass production has created many norms in our culture, and that even concepts of what is feminine and masculine are driven deeper by this process. Cultural ideas are strongly polarized by marketability, so that certain aesthetic qualities are gendered as female and more pleasant, whereas other qualities become male gendered, and are made to appear more rugged. In fact, it seems that when most people seek to acquire something new, their first thought is usually about what is the newest commercially available product another man or woman is likely to find enviable, rather than a customized or original article which might better suit their needs.

It seems that the notion of a personalized or hand-crafted item has gone the way of the horse-drawn carriage and houses that were built to last. I can't help but see this trend of accepting the norm as being comparable to cities like Manchester, the "Cottonopolis" of the Industrial Revolution, which exploded economically by means of textile manufacturing, with "the forest of chimneys pouring



forth volumes of steam and smoke, forming an inky canopy which seemed to embrace and involve the whole place,” as W. Cook Taylor described it in 1842. The so-called strength of the financial system based on factory labour worked very well to grind down the labourer, just as Marx has predicted. It doesn’t seem to be very common any longer for people to make what they want, or even to have hobbies that involve the creation of something tangible. Hobbies are being replaced by major league sports, video games, MSN Messenger and the latest season of *Lost*.

I’m as guilty as anyone, while I sit in front of a 100-inch Toshiba projector, nearly in a comatose state, watching “The Lord of the Rings” for the 22nd time. But sometimes I notice the pottery that the characters are holding – unique items, and each one a testimony to the skilled hand of the maker. The next day while in the ceramics studio, I throw some pots of my own, just enjoying the process of creating something semi-precious. Creating the Olefactories was something like that. Looking at what we have today, and wanting something different, something no one else has, something built exactly to the specifications of my own imagination, something no one would expect, something abnormal. Why should I just throw another pot, or shape another bust, or even make a somewhat predictable stein? Losing track of time, getting hungry but not wanting to stop to eat because I’m “in the zone,” I just don’t want to take a break and carry on until I’ve brought my work to some measure of completion. Feeling my skin dry-out and crack as the clay sucks the moisture from my fingers is part of the fun, like sweating hard in a soccer game or the sensation of exhaustion in your as you fly down a hill on a snowboard.

The Olefactories are a sincere attempt to make something that mainstream society has said should be feminine and to transform that notion into something masculine, while poking fun at industry by stealing the aesthetic look of the Industrial Revolution itself. They are like caricatures in reverse, showing everything that a stereotypical potpourri burner is not.

The painting “Blue and Orange” comes from a similar desire for

non-conformity. While there's nothing wrong with a rectangular frame, I don't just want to make one because, hey, that's what you do. I wanted to make it different. Why should the norm be accepted just because it's the norm? So rather than letting the shape of the canvas hold sway over where any cropping that might occur on the image, I let the image hold sway over the cropping of the canvas. The shape of that canvas would never be mass produced, or found at any art supply store. As such, the investigation of working with complimentary colours, blue and orange, became secondary to the wish to push away from the standard Western expectation. I sought after images of places that would be exhilarating and edifying to experience: the foreground is an anonymous ancient building in



India, and in the doorways are images of an eastern European city, the Northern Lights, and a sailing ship at sea. The overall theme behind them was that life should not be a struggle for acquisition, but an enterprise of ongoing experiences.

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*Zachary Pinette graduated from Anne Stevenson Secondary School in Williams Lake, BC in 2000 and is now in his fourth year of TRU's Bachelor of Fine Arts degree program, and has also completed three years of a Bachelor of Arts degree. He traveled across Canada, the US, and Mexico and enjoys keeping up with foreign and domestic issues and being a part of the Canadian arts community. He volunteers for Sunday school and the "Out of the Cold" program for the homeless, and plans on attending graduate school in 2009.*





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