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5-1998

## **A Need for Comparison**

Patricia Alison Bratton  
*University of Tennessee - Knoxville*

James Ryan McCracken  
*University of Tennessee - Knoxville*

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**Appendix D - UNIVERSITY HONORS PROGRAM  
SENIOR PROJECT - APPROVAL**

Name: TRICIA BRATTON & RYAN MCCrackEN

College: BUSINESS ADMIN. Department: MARKETING (MBA)

Faculty Mentor: DR. SARAH F. GARDIAL

PROJECT TITLE: A NEED FOR COMPARISON

I have reviewed this completed senior honors thesis with this student and certify that it is a project commensurate with honors level undergraduate research in this field.

Signed: Dr. Sarah Gardial, Marketing, Faculty Mentor  
Date: May 6, 1997

**Comments (Optional):**

Tricia and Ryan have been great assets to the research project. They have participated in an experience which has allowed them to 1) apply some of the theory they have been learning in the MBA program to a real marketing problem, 2) better understand the research process, 3) learn about the process behind psychometric scaling, and 4) further understand some of the psychological processes which underlie consumer decision making. They have been conscientious members of the team and I believe that they have learned as much as they have contributed.

I am pleased to see that Tricia may continue on with the project beyond this point. I think it will be very beneficial to see it through subsequent stages around scale development and theory testing. This, really, is an interesting exposure for her to academic research, and I think that she certainly has the capability of pursuing a Ph.D. at some point, if that is her desire. We are always keeping our eye out for MBA students who might possibly consider academic careers.

I will be giving both Tricia and Ryan feedback on the report itself. Under ideal circumstances, there is some "shaping" that I would like to have seen. Nonetheless, I believe that the report adequately reflects the scope and merits of their work.

## PROJECT ABSTRACT

### **Does the Need to Compare Exist?**

**Tricia Bratton. 5 year B.A./M.B.A., Department of Marketing.**

**Ryan McCracken. 5 year B.A./M.B.A., Department of Marketing.**

**Dr. Sarah F. Gardial, Mentor. The University of Tennessee.**

Project hypothesis: There is a personality trait in which people have a high Need to Compare, that is reflected through actions and behaviors.

Market researchers and psychologists have proven the existence of several personality traits that affect consumer behavior. The Need for Cognition, Self Monitoring, and High Involvement are examples of such traits. After reviewing the above mentioned personality scales and backgrounds, we considered if a "Need to Compare" existed. We were interested if certain people compare more than others in *every* area of life or in all situations. Do certain people default to a comparison strategy often during everyday life? The research group (Dr. Dave Schumann, Dr. Patribha Dabholkar, Tricia Bratton, Maggie Mayall, and Ryan McCracken) engaged in a series of interviews and meetings to analyze the topic. The purpose of this study was to derive a conceptual definition of the "Need to Compare" and create a list of qualifiers that could be scaled to measure the trait in individuals. The following statement represents our working definition: "A person with a high Need to Compare is someone who examines similarities and differences between issues, objects, or people to note respective levels of quality, quantity or relationships." If the personality trait demonstrates the properties to be measured by a scale, then we will compare the scale to that of other traits previously mentioned. We expect the Need to Compare personality to correlate with Need for Cognition and Self Monitoring, etc. It will probably not be correlated with Intelligence or Sensation Seeking. We will then monitor behaviors to confirm if individuals with a high Need to Compare act as expected.

As the study is not yet complete, we do not have definite conclusions. We are confident, however, that the Need to Compare personality trait does exist.

Linda Lewandowski  
May 30, 1997

### Abstract

The intention of this project is to present the results of a survey which accurately reflect the knowledge, beliefs and attitudes of women at the University of Tennessee, Knoxville about three of the most common diseases afflicting women today: heart disease, breast cancer, and osteoporosis. The survey will discuss what women at UT know about these diseases as well as what women know about prevention of these diseases and preventable risk factors.

The perceived risks of women as identified by the survey will be compared with the real risks of each disease. The knowledge of prevention and risk factors of women at UT will also be assessed and compared with available methods of disease prevention for younger women. This data will give an indication of where the gaps in knowledge about women's health lie for the population of women students at UT. Understanding of these gaps in knowledge will indicate where the educational emphasis could best be applied in order to encourage and empower women at UT to take a proactive role in their health. Programs for health education could then be developed to effectively address the gaps in knowledge to be uncovered by this survey.

Too often, women do not seriously consider major health issues such as the three presented in this report until they are in their late forties or early fifties. There are several reasons why it is crucial for younger women to begin taking a more proactive role in their health. First, research has shown that the most beneficial and least controversial methods of prevention of these diseases involve holistic practices such as eating right, exercising etc. These practices are, in fact, the only options that have been documented by research to be effective for younger women in the prevention of poor health later in life. However, when compared to the "prevention" options that many older women are faced to consider (mammogrammy, hormone replacement, etc.), these simple, lifestyle practices have proven to be more effective in prevention of these diseases and much less likely to promote harmful side effects. These simple lifestyle health practices are recommended to older women too, in addition to the more invasive prevention/screening programs, but these practices are not as effective when they are initiated later in life as they are when they are incorporated into a woman's life early on.

In addition, incorporation of a healthy diet and an exercise program in a woman's life makes her feel more in control of her body than does screening or pills, which have a tendency to create undue amounts of anxiety in women. By simply adapting a healthy lifestyle, a woman can work with her body to keep herself healthy.

**Stephan Russ**  
**Materials Science & Engineering**

**Senior Project Abstract**

**“Design of a high temperature stress-rupture testing apparatus for mono-filament small diameter ceramic fibers.”**

As energy use across the world continues to rise alarmingly, energy efficient systems are in greater demand than ever. A key to efficiency in many combustion type processes is an increase in working temperature; however, due to material restraints, efficiency in many applications such as gas turbines or internal combustion engines is woefully low. Ceramics offer excellent corrosion and high temperature mechanical properties, at the expense of poor ductility and the chance of catastrophic premature failure. Ceramic composites have been designed using a ceramic matrix and ceramic fibres to create artificial ductility with some success; however, the stability of these fibers at intermediate temperatures has recently been questioned. Data concerning single-filament testing of these fibers at elevated temperature is extremely scarce; hence the need for a device to test the high-temperature mechanical properties of extremely small (<20 $\mu$ m diameter) fibers. The apparatus must place a known gauge section of the fiber in a uniform temperature and apply a consistent, tensile load. This apparatus was created at the High Temperature Materials Laboratory at Oak Ridge National Lab, and initial fiber testing indicates that indeed the material is unstable at intermediate temperatures (700 deg. C).

## ABSTRACT

The objective of this project was to identify likely sources of fouling on the inner walls of a quench tower and to recommend alternative design and/or control schemes for the quench tower control system. The quench tower, the first of several operations in a waste treatment train, treats gaseous emissions from an industrial incinerator. A simple feedback mechanism controls the quenching process, in which the temperature of the effluent gas regulates the quench water flow. One source of the fouling that was considered was the control system response to variations in the unit's thermal load which stemmed from changes to the after burner chamber gas temperature and stack gas flow rate. Poor control system response might result in excess quench water being delivered to the tower, which may account for the moist particles adhering to the tower walls. Based on the performance of a computer model which adequately simulated control operations for the quench tower's control system, this assumption concerning poor response seem invalid. For each case in which the tower's thermal load was varied, the outlet temperature returned to the setpoint rather efficiently, as indicated by reasonable IAE's (integral of the absolute error). Thus, the process control system as it currently exists for the tower seem adequate, and no recommendations to improve tower operability from a control standpoint are warranted.

**Heather Scott**

**Abstract: KNOXVILLE'S INNER CITY: A COMMUNITY STUDIES PROJECT**

This report surveyed and inventoried the resources and current community development activities in Knoxville's inner city neighborhoods, and evaluated the status and effectiveness of these resources. The Knoxville Leadership Foundation (KLF), a non-profit Christian community development organization, will use the results and recommendations from this study to determine which neighborhoods their organization will target next for community development activities. The areas that KLF has identified as strategic in Christian community development are: economic development, families, housing, racial reconciliation, and youth. Rather than looking solely at needs and demographics, this study focused on leaders, resources and programs already functioning through neighborhood associations, churches, non-profit groups and individual residents. One goal was to find out how to potentially strengthen and support these activities by creating more, by connecting them with resources or by providing consultation. Because of this approach we qualitative and evaluative approaches to the data--having taken most of it from personal interviews.

The survey was done neighborhood by neighborhood—thus, the first task was to identify neighborhoods, active residents and organizations and then prioritize them according to their potential for benefiting from community development assistance. Next we developed questions and interviewed community leaders and developers from each area.

We assessed a comparable study done by the City of Knoxville--the Heart of Knoxville Empowerment Zone Strategic Plan. While the study focused on our target area, gave us valuable data and maintained a broad perspective, we found that it did not meet the needs of KLF. The City's study was a macro look at the inner-city as a whole, with little information on specific neighborhoods. In terms of a resource inventory, the Empowerment Zone Plan primarily took into account the Partnership for Neighborhood Improvement and its corollary agencies. Although our study is still a broad overview, it looked at individual neighborhoods more closely, included names of community leaders and listed specific organizations and programs functioning in each community. Project Change was another study we reviewed. This study was, again, very broad and dealing strictly with racial issues. It could be a valuable resource for KLF in its efforts toward racial reconciliation in that it gives a good history of race relations in the area.

We did not attempt to study neighborhoods that had highly transitional populations (Fort Sanders); nor did we study areas that had moderate or mixed income levels (Fourth and Gill, Westview, Marble City, Burlington, Old North). Vestal had recently been selected as the recipient of a federal development grant, therefore we did not investigate that community.

We found that not much attention had been given to East Knoxville in terms of organized community development. Although there were several active organizations, none of them seemed to have vision or connections with other groups doing similar work. Even in neighborhoods that had been the focuses of community development initiatives, the work had been either unorganized or had lost steam once funding had gone. We also discovered that most of the community development work was focused on housing. Few churches were involved in their neighborhoods, especially in East Knoxville, but a few Christian or church-based efforts were in place--Emerald Avenue Youth Programs being the most active.

## **An Assessment and Supplemental Interpretation of Health Status in the East Tennessee Region**

To give an initial indication of health status in the fifteen counties of the East Tennessee Region, a health assessment is presented based on an earlier document completed in 1991 by an East Tennessee task force. This earlier document included data for over 25 health status and health service indicators-ranging from pre-natal care to cancer mortality. The more recent assessment uses the same indicators and methodology as its predecessor with several notable changes. The most recent data available have been gathered for a five year period rather than for a one year period; graphs and tables are included to better explain the data; and the county level assignments have been modified. These level assignments depict the severity of each indicator based on how each county compares to the region rates, state rates, US rates, and the year 2000 goals. Thus, counties needing improvement in particular areas are clearly outlined.

In addition to the assessment, a supplemental interpretation of the data is provided. The assessment depicts indicators on a county basis. The supplement shows counties and, thus, the region on an indicator basis so that a picture of health in these areas can be drawn. The counties are ranked and peculiarities in the figures are highlighted. The region was also broken into four level designations similar to the county levels used in the assessment. Level I includes the indicators for which the region must improve by more than 50% of its current level to reach the year 2000 goals. Level II and III are indicators needing an intermediate range of improvement. Level IV includes those indicators for which the region has already surpassed the year 2000 goals.

The results of the study show that there is still a need for improvement in many areas of health status in rural East Tennessee. Therefore, a final discussion of the literature is given for those indicators receiving a level I rating. Those indicators are tuberculosis and breastfeeding rates and efforts to improve these two indicators are reviewed. This narrative focuses on the current trends in intervention and on expert opinions surrounding the barriers to success.



Michelle Warriner  
"Images of Esther"  
April 17, 1997

### Abstract

With the advent of the women's movement in Twentieth Century America, portraits of women in the Bible have become a significant aspect of biblical scholarship. As one of the few books in both the Jewish and the Christian canons that is named after a woman, the Book of Esther is a significant text in examining the treatment of women in Judeo-Christian traditions. Esther is a Jewish girl who becomes Queen of Persia after the king, Xerxes, banishes his first wife for disobeying him. Through a series of role-reversals, Esther eventually saves her people from destruction, urges the king to kill his wicked advisor Haman, and has Haman's prestigious position filled by her cousin, Mordecai. This biblical text is interpreted in radically different ways by different communities, and this project examines a few of these images of Esther and the values they reinforce.

The pre-feminist view of Esther values Esther as the ideal wife and daughter. Pre-feminist images of Esther are often found in conservative Jewish and Christian communities. These communities suggest the Bible portrays two distinctly separate roles for men and women, and therefore, they present her as an example for young girls to follow. For the most part, these materials praise Esther for her modesty, piety, obedience, and beauty. The Esther doll, which appears to be a regal "Barbie", is an excellent example of this image of Esther.

The early feminist image of Esther is the portrait of a strong female biblical character who is just as honorable and worthy of study as any male biblical character. Early feminists do not challenge the patriarchal structure of the Esther story, but they do challenge the pre-feminist notion that the Bible presents distinctly different ideals for men and for women. Early feminist interpretations often include Vashti, the king's first wife, as a hero, for she is the first woman who dared stand up to the men in her life. Elizabeth Cady Stanton's Women's Bible was the first example of this early feminist image of Esther.

Recent feminist images of Esther often criticize Esther for refusing to challenge the fundamentals of the patriarchal monarchy. They challenge her appearance as every man's ideal woman, gracefully reconciling the demands put upon her by all the men in her life. They consider her to be a powerful woman merely because she knows how to use her femininity within patriarchal structures which remain secure. By contrast, one Jewish Lesbian interpretation of Esther, depicts her abandoning the patriarchal system altogether by running away into the desert.

The images of Esther in both popular media and formal scholarship include Christian, Jewish, Feminist, and Traditional portrayals. These literary and visual images of Esther show that the interpretation of Biblical texts, specifically those concerning Biblical heroines, often changes according to the values of the community interpreting the text, despite the fact that the Book of Esther itself does not change. This project is an example of reader-response criticism, for the meaning of the Esther story is created by the interaction of the reader and the text.

### Outline of Discussion:

- I. Theoretical framework
- II. Explanation of different images (pre-feminist, early feminist, recent feminist)
- III. Recounting the Esther story with examples of each image
- IV. Questions and comments

Kelly Birdwell  
Senior Honors 458  
April 17, 1997

**Title:** Their voices speak: women physicians and their current roles in American medical society

**Abstract:** Current popular literature depicts the quickly growing population of women physicians in the profession of medicine. Women now comprise twenty percent of all physicians, compared to eight percent in 1970, and they include forty-two percent of medical school students. The number of women in leadership positions at medical schools remains comparatively low at ten percent. Such a strong presence of women affects the medical world as well as the women themselves.

To gain a better understanding of the role women physicians are now forming, in depth interviews were conducted with five practicing Knoxville physicians. Each woman represents a different field of medicine including internal medicine, obstetrics and gynecology, surgery, internal medicine with an emphasis on student health, and pediatrics. The meanings behind their words are overt in some expressions and hidden in others, and among the five women common, if not interwoven, themes can be heard. There are five that seem especially prevalent: the balancing of profession with family, the busy pace of their lives, job self-gratification, the empathetic and caring nature of their profession, and their treatment as women professionals.

A careful review of the themes says much about what issues women face in modern medical society. While the information they provide may be of particular interest to anyone going into the field of medicine, there is a much more universal lesson behind their words. They show through the power of wise choices, dedication, and compromise that it is possible for anyone to balance both personal and professional lives for a fulfilling existence.

Katie Lehnert

Chemical Engineering

**Formulation of a Biodegradable and Biosynthetic Latex Paint**

Faculty Sponsor: Paul Frymier

In this study, I developed a formula for a biosynthetic and biodegradable latex paint, which would lead to a quick, easy, environmentally safe, and effective removal method by microorganisms as well as an environmentally benign manufacturing process. The key ingredient in the formula of a biodegradable/biosynthetic paint is the polymer emulsion. The emulsion used in this study is based on the copolymer PHBV, a combination of 3-hydroxybutyrate and 3-hydroxyvalerate which are thermoplastic polyesters that are biologically produced. The biodegradable latex formula is based upon a control latex paint containing an emulsion similar to the biodegradable polymer. The emulsion used in coating applications with the closest characteristics to PHBV is based on a copolymer consisting of butyl acrylate and methyl methacrylate. By designing a control paint with this copolymer, I determined a formula and an experimental protocol for the production and testing of a biodegradable/ biosynthetic latex paint. The essential properties of the paint are tested through various treatments such as scrub and water tests, while the biodegradability of the paint is determined through tensile testing. Research in the area of paper coatings has already shown the potential for a biodegradable latex formula and uncovered the need for blending and heat treatments to obtain the desired properties.

**Bethany Taylor**  
**Senior Project Abstract**  
**4/17/97**

For my senior project, I am writing an handbook on the basics of urban backpacking. The working title of the book is *Urban Backpacking: What Every Beginning Backpacker Needs to Know*. The book is not intended to replace travel guidebooks to cities, countries and regions but rather to serve as a supplement to these guidebooks. The information in this handbook is general information on how to prepare for a backpacking trip regardless of destination. The book should be read before departure in order to arrange a smooth trip.

The book is separated into six chapters. Each chapter begins with general information on the topic. It is then broken into sub-topics and the information becomes more detailed. In addition, each chapter ends with a list of important tips that relate to that chapter's subject. The chapters included are:

**Pre-departure Planning** - This chapter covers all the odds and ends that travelers need to handle before they leave for their trip. Topics include documentation and health concerns.

**Transportation Options** - This section discusses the different modes of transportation available backpackers to get to their general destination and to get around inexpensively and conveniently once they are there.

**Money Matters** - The purpose of this chapter is to explain to travelers how much to prepare to spend on their trip. It also details the advantages and disadvantages of using traveler's checks, credit cards, ATM cards and cash to finance their traveling.

**Backpacking Essentials** - This chapter, the most important in the book, informs backpackers what to pack, what to pack it in, and how to pack it.

**Affordable Accommodations** - This section, which outlines inexpensive lodging options, concentrates mainly on describing what hostels are and how they work.

**Travel Safety** - The last chapter deals with teaching travelers be smart travelers in order to help them ensure their own safety on their trip.

# Undergraduate Research Fair

April 3, 1997

**You will need to bring 20 copies of your abstract to present along with your poster on April 2.**

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Student Name(s): NORMA M EDWARDS

Title of Presentation: CLONING OF THE DNA SEQUENCES ASSOCIATED WITH A GENE,  
THE MUTATION OF WHICH CAUSES FEMALE STERILITY IN DROSOPHILA MELANOGASTER

Faculty Sponsor: RANJAN GANGULY

Division of Entry: NATURAL SCIENCE - ARTS AND SCIENCES

**ABSTRACT: (Type: 12 pt. font to fit in the box below)**

A recessive female sterile mutation in *Drosophila melanogaster*, known as *fs(100C)*, occurred when the genomic DNA at the 100C region of the third chromosome was disrupted by a P-transposon insertion. The purpose of this project was to clone the genomic DNA which was disrupted in the *fs(100C)* flies in order to use it for isolation of the complete gene apparently involved in female fertility. This was first attempted by using the inverse PCR method, but this experiment did not provide any positive results. Therefore, a second method was employed, and this required the construction and screening of a genomic library of the mutant flies. The genomic library of the *fs(100C)* flies was constructed in  $\lambda$  bacteriophage. About 10 genomic equivalents of phages were screened using P-element DNA as probes. Of the 16 recombinant phages which hybridized to the probes, one was chosen for DNA isolation. Southern blot hybridization was performed and a restriction map was constructed for this clone. Through these analyses, it was determined that a minimum of 2.3Kb and a maximum of 14Kb of the recombinant  $\lambda$  clone DNA is, in fact, the genomic DNA disrupted by the P-transposon in the *fs(100C)* flies. This DNA can now be used to clone the gene involved in female fertility in *Drosophila melanogaster*.

In the United States, adolescent birth rates are higher than most developed countries. In 1992, the rates dropped slightly, but not enough to call it progress. Adolescent pregnancies and parenting are a difficult situations that must be addressed. This study takes a new look at the problem; instead of examining the females that became adolescent mothers, it examines the females that avoided adolescent motherhood. The procedure used for this qualitative study was one on one interviews. The questions were planned, but the researcher was allowed room to investigate other avenues presented by those interviewed. The subjects were twenty female college students who were not adolescent mothers. The researcher reviewed the transcripts for similarities between the females who abstained, the females who had sex, and the group as a whole. The results concerning the influences on their sexual decisions varied only slightly. The biggest influences were goals, fear of pregnancy, family, others' opinions of them, and religion. However, specific influences impacted individuals differently. The females backgrounds included similarities and differences. All of the women came from two-parent homes. Only two of the females had mothers who were teenage mothers. None of the women felt pressure as adolescents to become mothers. Of the females who abstained from sex, fewer felt pressure to become sexually active and fewer had sex education in high school as compared to their sexually active counterparts. The abstainers also knew fewer pregnant teenagers on average than the sexually active females. This information about these twenty women provides a pilot study of sorts for research into the "flip side" of teen parenting. More areas need to be researched. This researcher recommends additional research into 1) the role of the family in adolescent sexual decision making, and 2) the shifting of attitudes regarding the "sinfulness" of premarital sexual activity and the shame of adolescent pregnancy.

## **Manic Depression and Artistic Creativity**

### **I. Definitions of Manic Depression**

### **II. The Link Between Manic Depression and Artistic Creativity**

- A. Research**
- B. How they work together**

### **III. Genetics of Manic Depression**

- A. Twin and Adoption Studies**
- B. Family History of Alfred, Lord Tennyson**

### **IV. Treatments of Manic Depression**

- A. How Lithium Affects the Brain**
- B. Side Effects of Lithium**
- C. Lithium and Artistic Creativity**

### **V. Conclusion**

**ABSTRACT**

This report gives a thorough view of manic depressive illness and its link to artistic creativity. It begins with the diagnostic criteria and symptoms of manic depression. Subsequent to this is the major focus of the report where evidence is presented that some artists have a higher incidence of manic depression than the general population. This proof is given through research studies and family histories. The report then discusses the genetic inheritance of the disease using twin and adoption studies for evidence. The final part of the report examines treatment of manic depression. It explains how the illness is caused and how lithium combats it. It also discusses why many artists want to refuse treatment.



## Abstract

DuPont's waste water biotreatment facility in Singapore treats a combination of four streams that originate from plants on site. An increase in organic emissions occurs when the feed streams to the treatment facility change. This can require a one or two month shutdown of the facility before an acceptable emission level can be obtained.

For most DuPont facilities it is possible to treat waste streams by using large biotreatment ponds. However, this option is not available at the Singapore site because of the limited amount of land available, the associated high cost, and the strict environmental regulations. As a result, an enclosed aerobic treatment facility has been utilized. The wastewater treatment facility at the Singapore facility begins with four inlet pollutant streams entering into a well mixed tank. This combined feed stream then flows through an anoxic fluidized bed where the nitrates are removed, and it then flows through an aerobic sludge tank reactor so that any remaining organics can be removed.

Currently it is suspected that the problems in the biotreatment process are the result of transitions between steady states as the feed streams are changed. Once these changes occur, microbes in the biomass are unable to adequately remove the organics; this situation can continue for up to two months. The growth, death, and metabolic rates of the microbes significantly affect the performance of the biotreatment system.

A mathematical model was developed in order to predict the growth, death and metabolic rates of the microorganisms as changes in the feed streams occur. This model also depicts how degradation (removal) rates of the pollutants change as the feed conditions change. The model is based upon the use of kinetic parameters which are unique to a particular microorganism growing on a particular substrate (pollutant). Extensive literature searches were performed in order to determine these parameters, but parameters which applied to the particular wastewater treatment facility in Singapore could not be found. The conclusion was made that in order to determine accurate kinetic parameters for the plant, laboratory experiments must be performed on samples taken from the actual plant in Singapore. With the mathematical model in place, this project may now be continued by a graduate student whose task will be to perform the experiments needed to determine the parameters. Once these values are incorporated into the existing model, plausible recommendations may then be given to DuPont on how to better control the plant and prevent future shutdowns.

## Athletic Heart Syndrome in the Sled Dog

R. F. Garza

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**ABSTRACT:** Athletic heart syndrome is a medical condition common to the endurance athlete, whether human or canine. It is characterized by the presence of bradycardia, arrhythmia in the form of P wave amplitude increase, QRS wave voltage and amplitude increase, ST segment elevation, and QT segment lengthening. Also indicative of athletic heart syndrome is hypertrophy of the cardiac muscle, mostly the left ventricle and ventricular septum, and presence of systolic murmurs. These findings are concluded through the use of auscultatory means as well as electrocardiography. Causes of

athletic heart syndrome are most likely attributed to the physiologic response of the heart to endurance training, but genetics, hormonal responses, environment, and nutrition may all have an effect. Research in the field of canine athletic heart syndrome is severely lacking, and further elucidation of the causes and consequences of this medical condition in the canine endurance athlete may prove to be useful in both humans and canines in the related conditions of systolic anesthetic complications, training, nutrition, and sudden death syndrome.

Key Words: Athletic Heart Syndrome, Endurance Training, Sled Dogs

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## Abstract

The High Flux Isotope Reactor (HFIR) at Oak Ridge National Laboratories is currently being upgraded to lengthen its life and increase its usefulness as a scientific tool. This project deals with the upgrade to beam tube HB-2 which creates a thermal neutron beam guide hall. Five thermal beam guides are being designed to direct neutrons from near the center of the reactor, through HB-2, through a beam room which will contain personnel, underground, and finally into a new guide hall facility. The neutrons will be used in the guide hall facility for neutron scattering experiments. HB-2 will be enlarged to allow for the new beam guides.

There are many radiation shielding issues which must be resolved in order for the HFIR upgrade to move forward. This project recommends a shielding design for shielding wedges between the thermal beam guides to knock down the initially high amount of neutron and gamma radiation which will pass through HB-2 around the beam guides. The project also recommends a cavity plug design for the area between the beam tube and the biological shield. Finally, this project recommends a shielding design for the beam room outside the biological shield to reduce the remaining radiation before it reaches personnel.

The design strategy for the upgrade was divided into five phases: preliminary research, shielding wedge design, cavity plug design, biological shielding design, and final dose and thermal loading calculations performed using DORT and MCNP4a. A Kerma detector was used to determine the volume averaged energy deposition in the concrete of the biological shield cavity plug. A point detector was used to determine the neutron and photon flux at 30 cm from the surface of the shielding, and a volume averaged detector was used to determine the average dose in the beam room. A variety of shielding materials were used in multiple computational runs to help optimize the design. While our results are not finalized, our preliminary design consists of borated polyethylene used in the shielding wedges with concrete used to fill the cavity plug area. Work on beam room shielding will be completed after initial dose estimates are calculated based on the finalized shielding design for the wedges and the cavity plug. We believe both the DORT and MCNP models will confirm that our design meets the constraint of reducing the dose to personnel in the beam room below the maximum allowable dose of 2.5 mRem/hr. Models may be modified as composition and geometry are finalized.

## Abstract

The Department of Energy has a large reserve of highly radioactive waste sludge located at the Hanford facility. The storage tanks that hold this material are approaching the end of their expected life cycles. The potential of disaster such as leakage or explosion is increasing with every passing year. This report presents the preliminary design of a system to process a large volume of this sludge to low-level waste.

The processing of this waste requires leaching with 3 M sodium hydroxide before entering the system. The system design includes using the ion exchange resin Crystal Silicotitanate to remove the radioactive cesium ions from the waste stream. The high level waste radioactive ions are taken away to be stored in a safer waste facility. The rest of the waste sludge can then be treated by acidification, crystallization, and electrochemical reduction to re-claim most of the sodium which is recycled and used as leaching solution. This design will process 25,000 gal/hr of solution and has an expected annual operating cost of \$164 million. The major expense is the annual waste disposal cost of \$6.1 billion. The current design has a life cycle of three years. It is recommendation that a lower flowrate that will increase the life cycle of the plant and allow the cost to be incurred over a greater number of years be investigated.

#### **4 Criteria for Differentiating Transition Governments from Consolidating Democracies**

- 1. The threat of an alternative system of government has decreased to the point that reversal to a previous form of government is not realistic.**
- 2. Political competition can and does occur within the system including two or more viable parties that can and do participate freely within the system.**
- 3. The economy has stabilized to the point of becoming manageable . Economic strategies can then be developed in the long-term rather than solely as responses to economic crises.**
- 4. Primary problems faced by original transition government have been at least partially resolved, and the focus has shifted to the resolution of secondary problems. Secondary problems are those directly resulting from the solutions or strategies for solving primary problems.**

The research I am doing into Carlos Menem's first term as President of Argentina is based on the assumption that the Argentine government has transformed from a transitional government to a consolidating democracy during the period coinciding with that first term in office, 1989-1995. While the criteria are mainly subjective in nature, there is quantitative data that aids in making the case for the relative stability of Argentine democracy. While "consolidating" does not imply invulnerability, it does signify a great deal of progress toward a stable, democratic system.

Non-Contact Temperature Measurement of a Printer Fuser Assembly  
Julie Paddleford, Mechanical Engineering  
Dr. W.S. Johnson, mentor

The sponsor company, Lexmark, wanted to examine the possibility of a non-contact method of measuring the temperature of the hot roller fuser assembly in their low end laser printer. The current method involves a thermistor mounted on a thin film which contacts the roller. This contact leads to premature wear of the roller and the buildup of impurities under the film. By finding a way to make the measurement remotely, the life of the roller could be extended such that it would match the life of the printer; thus eliminating three changes of the roller assembly.

The primary limitations in the design were size, effectiveness, and cost. This eliminated such choices as fiber optics and photoconductive infrared detectors. The design should be as small as possible and require few modifications to the current cover and assembly. Effectiveness is determined by the following: The measurement design should be able to control the fuser assembly lamp such that the aluminum roller can be held at a nominal temperature  $\pm 5$ . The final design of a thermistor based bolometer was chosen. A bolometer is a configuration of two thermistors connected in a bridge circuit. One thermistor is Active and the other is the shielded or "compensating" thermistor. This shielded thermistor accounts for changes in the ambient temperature as the roller assembly is in use.

At this point it appears that the bolometer will produce acceptable results. By manipulating the data after collection we were able to obtain a reasonable degree of certainty regarding the temperature reading. The data manipulation consists of taking the log of the ratios of the resistances from the two thermistor. Currently we are trying to find a circuit that will perform this transformation in the hardware, rather than the software, to ease the implementation of the design into production.

Todd Bruce

University Honors 458

Abstract

The Relationship between Magic and Christianity  
in Selected Medieval and Modern Arthurian Texts

Magic and Christianity have an interesting relationship in the Arthurian texts. They are both integral to the story, but their presence together is difficult to reconcile. In medieval minds, magic was evil and not to be dealt with. Their definition of magic was narrower than some scholars', excluding, as it did, miracles and acts which stemmed from God. Since Arthur was seen as a Christian king, magic which was outside of or opposed to his court was acceptable. Unfortunately, Merlin is an important part of the story, and some of his acts are definitely wrong. If Merlin's characterization is important to the author, some sort of compromise must be worked out, or else Merlin must be relegated to the background. In Geoffrey of Monmouth's works, Merlin is presented as a figure with ties to antiquity, while Robert de Boron sets him up as a character who maintains a balance between heaven and hell. In modern works the tension is not so pronounced since Arthur's Christianity has often been relegated to the background. However, Stephen Lawhead and Marion Zimmer Bradley both deal with the relationship between magic and Christianity in their works. Lawhead uses the relationship to express a message of the truth of Christianity, while Bradley explores the nature of a religiously pluralistic society.

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Michael Wittkamp  
Senior Project Abstract  
April 1997

### **Of Autumn Apples and Dying Boys**

Romania (or Rumania, by some conventions) was the slave of the powerful Ceausescu regime until its overthrow in December 1989. While most of Eastern Europe had peaceful departures from communist overlords to new progressive governments, Romania suffered a short, but bloody revolution in the streets. The fighting began with the attacks on a priest and his revolutionary followers, continued with the shooting of student rioters in the streets of Bucharest, and ended with the summary execution of Ceausescu and his wife. Though the perpetrator of many of the country's evils is dead, it almost as if his ghost remains in the myriad problems today's Romanians face. One overlooked dimension that has been lost in the raging issues of corruption and economic reform is pediatric AIDS.

Through government imposed medical practices, Romania caused itself to become the home to 50% of Europe's pediatric AIDS cases. While many argue over the how and why of it all, the reality still exists: there are little or no resources to offer these children, most of whom are orphaned. In response, international relief agencies have gone to Romania to offer help. One such charity is Children in Distress which works through its St. Laurence Children's Hospice in Cernavoda, Romania. This facility cares for about 60 children and is located in rural Romania in the Dobrogea region. It was home, work, and family to me for nine months during 1995 and 1996.

Romania is a fascinating country with a long and tumultuous history. Modern Romania is a strange synergy of this history with the fast moving currents of reform that sweep over it today. This paper seeks to reveal a bit of this richness through stories of the country's past, its present, and its people. Central to the story are the lives of the children of St. Laurence's. Their lives are a poignant reminder of a darker day. They serve as a moving case example of the injustices that originated in a misled past and still grip a country and its people today. Most of all it is story about a people not recognized by our American press. The tragedy that exists in this Eastern European, third world nation is passed over for the stories of success and bounty in nations such as the Czech Republic and Poland. It is important to realize that the end of communism and dictatorship for some was just the beginning of an equally oppressive time of poverty and despair.

This work lends itself to representing concerns that most Americans never knew about or considered. Additionally, it is an exercise of self-discovery. Interwoven through the tales are the realizations with which I struggled and conclusions at which I arrived. The sharpness of the incidents related will hopefully serve not just to educate others on a very personal level, but also raise consciousness and concern for the issues that are quite often ignored by our Western society.



# The Treatment of Marginalized Groups Within Opera

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Abstract -- Kevin Burdette

The renowned composer, Richard Wagner, believed opera to be the highest form of art, the height to which all other art forms aspire. From its inception, opera has been a product for and by the nobility and the wealthy. Originally, it was only the wealthy who could afford to produce such lavish events. And, even with the opening of public opera houses, the popularity of opera never fully extended beyond the inner circles of mainstream, upper-echelon society. Because of this, opera was written for, produced for, and, hence, very much influenced by the nobility. Consequently, the ideas espoused in the texts of operas reflect to a great extent the feelings and thoughts of mainstream society. A close look at the texts of operas, the musical expression of different aspects of the setting, and the staging of operas reveals a distinct trend toward the stereotyping and ostracizing of certain marginalized groups within society, a trend which served to propagate persecution within those societies. The treatment of women -- specifically, gypsy women, witches, and widows -- Jews, and Moors in the text, music, and staging of operas shows certain stereotypes attributed to these groups and feelings directed toward these groups in the societies in which these operas were written.

The treatment of women, Jews, and Moors in both the plots operas and the compositional techniques of the composers reveals much about the treatment of these two groups in mainstream society. The gypsy in 19th century Italy was viewed as a dirty, impure entity who had the power to call on the supernatural and destroy children and families. Similarly, the musical treatment of witches and widows indicate an association with the supernatural and an inherent lack of trustworthiness. The Jew in 19th century Germany was seen as a deformed, greedy, high-voiced entity who, too, had certain powers of witchcraft, and could ostensibly be the down-fall of man. It is unclear, however, if these operas were a result of the sentiment of the times or if they in fact influenced the sentiment. With the ubiquitous hand of the wealthy elite over the production of opera, it is clear that much of what was written was written to serve them. In this sense, the plots of operas were influenced by the feelings of mainstream society. The depiction of gypsies as unclean and Jews as smelly and hunchbacked certainly served to appease and humor those who paid the bill of the productions. But not all of the stereotypes were as obvious as a dirty shirt or a large-nose. Many of the musical portrayals were subtle references, references which were not necessarily consciously understood by the audience. It was through subtle references that opera exerted an influence over the culture to which it played. By giving gypsies low voices, Verdi effectively marginalized gypsies in the ear of the listener. But employing his multi-layered characterizations of Jews, Wagner marginalized Jews. In this way, opera served to perpetuate stereotypes, and simultaneously reflect and influence the persecution of marginalized groups within society.

Much of what was depicted on stage in the past three centuries can be seen today in Western society. Roots of the philosophy which propelled Hitler into power can be traced to the writings and compositions of Wagner. Even today, two armed guards stand outside the oldest Viennese synagogue, because in 1991 a fundamentalist group planted a bomb therein. And tour books for Italy still warn the wealthy to avoid groups of gypsies, for they are lowly and cannot be trusted. The persecution so aptly depicted in the opera of the past three centuries remains even today.

Michael Wittkamp  
Senior Project Abstract  
April 1997

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**Presenter: Claire Mizne**

**Project Title: Addressing Cultural Issues in the ESL Classroom: The Connection Between Culture and Language**

**I. Background**

- A. Sociolinguistic competence**
- B. Importance of culture in language learning**

**II. Project Objectives**

- A. Testing method of teaching culture and sociolinguistics directly**
- B. Determining how helpful the students find this approach**

**III. Method**

- A. Subjects**
- B. Teaching**
  - 1. Phase One--Culture**
  - 2. Phase Two--Sociolinguistics aspects of a speech act**
- C. Survey**

**IV. Results and Comments**

## **Addressing Cultural Issues in the ESL Classroom: The Connection Between Culture and Language**

Claire Mizne

**Abstract:** Many English as a second language (ESL) classrooms today are designed to help students achieve communicative competence in English. Communicative competence in a language consists of many factors, one of which is sociolinguistic competence. Sociolinguistic competence includes knowledge of politeness and appropriateness of speech in the target language, and is one of the last skills acquired in both the first and second language learning processes. Both production and recognition of sociolinguistic conventions in the target language are necessary for the student to achieve communicative competence.

Helping students who are studying English as a second language to achieve sociolinguistic competence is a most challenging feat. One of the factors that makes teaching sociolinguistic aspects of language so difficult is the fact that in a target language setting, the cultural context shapes the meaning of what is being said. ESL students lack native speakers' extensive cultural knowledge of the target language society, and teaching this cultural knowledge to them is most challenging. One way teachers in the ESL classroom can help students achieve sociolinguistic competence is by explicitly teaching cross-cultural issues in the classroom.

In this paper, a method is tested in which a class of advanced level students participate in two phases of teaching with the overall goal of increasing cross-cultural awareness. In the first phase the students are shown how socio-cultural values vary across cultures using an adapted version of the Kluckhohn Model. They are asked to locate areas where their culture might differ from the target language culture, which in this case is middle-class American society. The second phase involves giving a detailed account of how to give and respond to compliments in American English. In the case of speech acts such as compliments, pragmatic transfer often occurs when the learner tries to compensate for lack of cultural knowledge by applying the pragmatic rules of his or her native language to the situation. What sometimes results is that the non-native speaker produces a very unnatural sounding construction, or the non-native speaker misinterprets what is being said by a native speaker. This miscommunication between the participants is often followed by frustration, confusion, and even hurt feelings. In this teaching approach, special attention is paid to explaining the pragmatic structuring of these speech acts, relying on specific speech act research as opposed to native speaker knowledge since the latter is often not adequate in revealing norms of speech act interaction. It is hoped that the student through an explicit breakdown of the sociolinguistic factors of this speech act process will be better able to communicate his or her intentions in a more native-like manner. Combining this lesson in sociolinguistics with the student's newly acquired knowledge of American culture from the first lesson, it is hoped that the student will become more aware of differences in speech act behavior between Americans and his or her own native culture, and see these differences as stemming from different ways of viewing the world, not as silly or incompetent ways of expression. Following the class, the students and the teacher will be asked to evaluate the usefulness of this approach in the language learning process.

You Are What You Read: An Analysis of Literary Allusion and  
Characterization in Doris Betts' Heading West

Although Doris Betts is an author not widely known outside academic circles, the complexity of her novel Heading West earns her a place in the literary tradition. Some aspects of the novel have been studied, particularly character analyses of the protagonist Nancy Finch. A thorough evaluation of the allusions within the novel has not been completed to date even though these allusions link the novel to many of the greatest minds in literature, philosophy, religion, myths and legends, and popular culture. Heading West contains almost two hundred allusions of varying significance to the novel, particularly to characterization. These allusions also show the skill and scholarship of Doris Betts.

This thesis explores primarily three types of allusions: literary allusions, allusions to myth, legend and fairy tales, and religious and Biblical allusions. While some of these allusions are used merely for poetic description, often the literary allusions give new insight into the character who makes the allusion or insight about whom the allusion is made. Allusions are a unique and multi-faceted way of expressing the complexities of human existence through characterization.