



ANNUAL REPORT
SCHOLARLY ACTIVITY
1994/95



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ANNUAL REPORT
SCHOLARLY ACTIVITY
1994/95

**HELD IN
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JUNE 1995

SCHOLARLY ACTIVITY COMMITTEE,
OFFICE OF RESEARCH SERVICES AND INDUSTRY LIAISON
AND
VICE-PRESIDENT, INSTRUCTION

SCHOLARLY ACTIVITY ANNUAL REPORT

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INTRODUCTION

On behalf of the Scholarly Activities Committee, I present the annual report prepared for the University College Board, and the University College Community at large.

The UCC Scholarly Activities Committee has a two-fold mandate: (1) to promote scholarly activity among faculty at UCC; (2) to solicit and adjudicate faculty applications for research funds. In keeping with its first obligation, two members from SAC (John Dyck and John Bratton attended the "Research at Small Universities" Conference at the University of Prince Edward Island, May 4-6, 1994. Further, taking into account that many faculty have need to balance research time with their teaching responsibilities, SAC has extended the funding for each successful application from 12 months to 18 months. This means that faculty who receive SAC funding have two summers in which to complete their projects.

It is with pride that the Scholarly Activities Committee supports the diversity of scholarship on this campus. Faculty on this campus are not only engaging in research which facilitates teaching; they are also achieving external recognition through the publication of their research in peer reviewed journals. Some examples of the diversity of SAC funded research follow: In 1991/92 Henry Hubert (English Department) recieved funding for a project entitled: "Anti-Utilitarian Attitudes in English Studies." This has now been included in his new book, *Harmonious Perfection: The Development of English Studies in Nineteenth-Century Anglo-Canadian Colleges*, Michigan State University Press, 1994. F.A. Rice (Med Lab Department) has published two articles, resulting from a SAC grant in 1991/92: "Computer Simulations in Initial and Continuing Medical Laboratory Education," in the *Canadian Journal of Medical Technology*, and "Differentials and Morphologies," in *The Medical Laboratory Observer*. Dan O'Reilly (Philosophy) will have an article "Using the Square of Opposition to Illustrate the Deontic and Alethic Relations Constituting Rights," published in the July issue of *The University of Toronto Journal of Law*, 1995.

Twenty-four faculty were awarded research grants during the year 1994-95 for a total of \$46,613. Their research projects, some of which are ongoing, include: "A New Method for Using a Fully Recurrent Hopfield Network for Classification," by Ralph Brouwer (Computing Department). This paper was accepted for publication in October, 1994, by the *Neural Networks*. Valerie Oszust (Developmental and Regional Programs) is currently working on a project entitled "Academic Listening Task Design." David Williams (Science) is conducting "A Floristic Study of Wells Gray Park". These are just a few of many scholarly contributions which faculty at UCC are making to scholarship in general. In addition, at least two of our faculty, Will Garrett-Petts (English) and Don Lawrence (Visual and Performing Arts) recently received an SSHRC fellowship, 1994, arising out of research funded by SAC.

SAC grants help develop the research ethos of the University College:

- they assist the University-College in developing a substantial research profile comparable with that of similar four-year undergraduate universities;
- they help generate scholarly activity interests in new areas on campus;
- they assist the development of recognized areas of research strength;
- they give faculty experience in bidding for funds that are subject to a peer group review;
- and they act as "seed money"--money that helps attract external funding and helps foster further research or other forms of scholarly activity.

The faculty reports that follow indicate the rich variety of scholarly activity at UCC, activity that plays a vital role in the intellectual life of the University-College.

My thanks to Dr. Paul Webb, Research Coordinator, and to Maryanne Bower, Secretary, for preparing the annual report; my thanks also extend to the faculty members of UCC for sharing their research results; and, finally, my thanks go to the Board for supporting UCC's research community.

Sincerely,

John H.A. Dyck

John H.A. Dyck, Chair
Scholarly Activities Committee

1994/95 Committee Members

Ken Blawatt
John Dyck, Chair
Peter Murphy
Ron Opp
Lakshmi Reddy
Joe Spuller
Paul Webb

PROJECT REPORTS FOR 1994 - 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: History of the University College of the Cariboo Nursing Department:
The First Twenty Years

PROJECT LEADER: Karen Abbott and Sharon Simpson

PROJECT COLLABORATORS: Ms. Glennis Zilm
writer, editor, consultant: expert in nursing history

Ms. Ethel Warbinek
Assistant Professor: UBC School of Nursing

Co-authors of:

Legacy: History of Nursing Education at The University of British
Columbia 1919-1994

CLIENTS/AUDIENCE: Current and former faculty and students of the UCC Nursing
Department. (approx. 800-1000)

Members of the History of Nursing Professional Practice Group of the
Registered Nurses Association of British Columbia

The 25th Anniversary Committee and writers of the History of UCC

Current and former faculty and students of UCC who have a particular
interest in local History

OBJECTIVES:

The purpose of this scholarly activity project are twofold:

- (a) to write a book of the history of the nursing department
- (b) to establish a Nursing Department archives

BACKGROUND AND NEED:

The book will provide an informative and interesting history of the first twenty years of the UCC Nursing Department and will discuss major influences that have shaped the growth and development of the department. As time passes, memories fade and information is lost and forgotten. Our intention is to document our history while many of those who have been significant contributors to this history are still living.

The second part of the project will establish a location and system for collecting information and artifacts. It is our hope that once a system is in place, the Nursing Department will support and promote maintaining an ongoing collection.

METHODOLOGY:

This historical research project will be a description of past events which have shaped UCC Nursing Department's history. Data will be collected from both primary and secondary sources. Primary sources will include interviews with past and current faculty and students and written records such as UCC calendars, minutes of department meetings, and curriculum reports. These sources will be used whenever possible to establish credibility.

Secondary sources will be used to obtain data when primary sources are unavailable for consultation. ex) alternative sources will provide information related to two nursing department leaders who are deceased. Drafts of the book will be circulated to key informants for independent verification for accuracy.

ABSTRACT (PROJECT SUMMARY):

Work has progressed gradually and systematically since the grant was awarded but has proceeded more rapidly over the past winter since Karen Abbott has been able to focus on the research during her winter 1995 semester sabbatical. We are working collaboratively and sharing information with Bronwyn Bolton who is compiling the UCC History for the 25th Anniversary celebrations.

Because our hope is that this twenty year history will accurately represent all programs that have been administered under the nursing department; great care was taken at the outset to draft a detailed outline. This outline has guided both the collection of data and identification of key players who have helped shape each piece of the history. These key informants have been approached to provide taped interviews which provide data for the research and become part of the archives. To date, taped interviews have been conducted with three former chairpersons, six former and current faculty and the UCC President. A number of other interviews have been arranged for the first two weeks of May, 1995.

Draft lists of graduates from the diploma and post-RN program and an "in memorium" list have been prepared. Information was sought through a mail-out to all current and former faculty and is currently being collated on faculty contributions to the department.

Our plan is to have the data collection and initial chapter drafts completed by the end of May. The manuscript will be polished, edited, illustrated and ready for printing in the summer. Our plan is to launch the book in September as part of the UCC 25th Anniversary celebrations.

RESULTS:

The book will be available for purchase in September and will be sold on a cost recovery basis.

We will seek opportunities to publish and present about our experiences once the book is completed. The History of Nursing Professional practice groups are already watching our progress very carefully and are already expressing interest in our results.

BUDGET:

To date we have only accessed \$475.00 of the \$2,000 grant money. Due to the nature of the research, we anticipate that the remainder of the money will be used this summer for editing, indexing and publishing of the book. We have spent \$275.00 for travel to Vancouver and Victoria to conduct interviews of key informants and a portion of the \$200 advance for miscellaneous expenses to cover the cost of audio tapes, lunches for interviewees and travel to conduct interviews in the local area.

PREPARED BY: Karen Abbott and Sharon Simpson

DATE: May 9, 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: A New Method for Using a Fully Recurrent Hopfield Network for Classification

PROJECT LEADER: Roelof (Ralph) Kars Brouwer
Department of Computing Science

PROJECT COLLABORATORS: Dr. B. Palcic, Head of Cancer Imaging
B.C. Cancer Research Center
601 W 10th Avenue, Vancouver, B.C. V5Z 1L3

The project was carried out at UBC, the BC Cancer Research Center, the University of Warwick and UCC.

CLIENTS/AUDIENCE: B.C. Cancer Research Center for Classifying Cervical Cell re: Cervical Cancer

ABSTRACT:

The research was a continuation of the work commenced in the summer of 1992 to develop algorithms for using a Hopfield network in classification problems. At that time a new method was developed by myself to use a Hopfield network to classify cervical cells into their various classes as defined by the BC Cancer Agency and by using their samples of cervical cell data. The method uses measurements of various characteristics of images of cell nuclei. The proposal was to use the images of the cell nuclei directly which eliminates the step of taking measurements of the images. Rather than storing the members of the sets of exemplars (training elements) as stable points, a connection matrix is determined, using perceptron type learning, such that the exemplars are put into basins of attraction. The exemplars from different classes are placed in different basins of attraction, with usually more than one basin per training class. An arbitrary element is then classified by the basin of attraction it falls into. Input to the classification consists in one case of feature vectors derived from the cervical cell images and in the other case of the images themselves. Good results were obtained using this method.

In the period 1994/1995 the method was also compared to the backpropagation method and applied to the classification of MACS(malignancy associated changes in cells adjacent to cancerous cells). In addition a further simplification of the algorithm was developed with success. The modified method requires much less computer storage.

OBJECTIVES:

To simplify the pattern classification method using Hopfield networks, developed by myself, and reduce its memory requirements.

BACKGROUND AND NEED:

Automated screening of cervical cells for detection of cancer is essential because of work loads put on cyto-technicians due to the large screening program in British Columbia. A component of the automated screening involves the classification of the digitized images of cell nuclei. Standard statistical approaches may be used here but that involves extracting features from the images. Neural network approaches however do not require the extraction of these features. Although neural networks with back-propagation have been applied a method based on Hopfield networks has to the author's knowledge not yet been applied successfully.

METHODOLOGY:

The algorithm developed by myself was coded in a computer language called C++ and classifications of cervical cell images provided by the BC Cancer Research Center in digitized form were made.

RESULTS:

All journals and the conference mentioned below are refereed.

- A seminar was presented to the Department of Electrical Engineering at the University of Warwick in October 1994
- A paper prepared and submitted to Neural Networks for publication was accepted for publication October 1994
- A paper prepared and submitted to Analytical and Quantitative Cytology and Histology for publication was accepted for publication January 25 1995.
- An abstract of a paper for presentation at conference IPA '95(Image Processing and its Applications) was accepted.
- A paper has been submitted to IEEE transactions on Neural Networks on October 1994

BUDGET:

Travel to and from University of Warwick and lodging from 94-08-13 to 94-10-10

\$2500

PREPARED BY: Roelof(Ralph) Kars Brouwer
Department of Computing Science

DATE: April 11 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Characterizing Mutagenicity of Pulp Mill Effluent Using a Short-Term Bioassay

PROJECT LEADER: Traci R. Bryar

PROJECT COLLABORATORS: Carolynne Fardy and Val Mackinlay (UCC Medical Lab Technology Program)

All experimental work was carried out in the Med-Lab Program laboratories. Ms. Fardy and Ms. Mackinlay provided the necessary training to those involved in the project. All supplies were ordered by Ms. Fardy.

Ron Smith and Steve Karpuk (UCC Biology Department)

Dr. Smith and myself were the supervisors for Stever Karpuk's Biology 448 directed studies course involving this project.

Jack McDonald (Weyerhaeuser Canada)

Mr. McDonald agreed to provide site access to the pulp mill with certain conditions. It was agreed that he would scrutinize our proposed experimental procedures. If the experiments were not based on sound scientific reasoning, access to mill effluent would be denied.

CLIENTS/AUDIENCE: Research community, the pulp mill industry and British Columbia Ministry of Environment.

ABSTRACT:

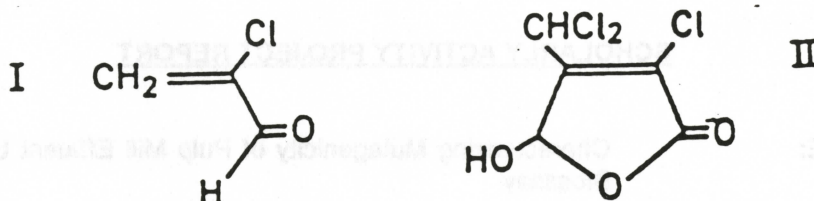
The development of a short-term bioassay for mutagenic activity is not complete. A lactose negative tester strain of *Escherichia coli* has been exposed to known mutagenic compounds such as benzene, carbon tetrachloride, sodium azide and ethidium bromide. Although some reversions from Lac-negative to Lac-positive have occurred, indicating mutagenic activity by the chemical, the results are not statistically meaningful at this stage. Further experiments are necessary before this test could be used on a routine basis.

BACKGROUND AND METHODOLOGY:

The acute toxicity of pulp mill effluents has been studied extensively (Anon., 1987). Regulations for release of effluent to receiving waters are based primarily on these acute effects. There has been general recognition that effluents could have sublethal or long term biological effects, but determining the extent of ecosystem impact involves considerable time and expense. Typical measurements on fish include red blood cell and white blood cell counts, blood lactate levels, haemoglobin synthesis, muscle glycogen content, liver enzyme activity, liver and gonad size and bile contents (Balk, 1993). Another possible method of investigating long term effects of effluents, is to determine the potential for changes to genetic material. Short term bioassays can be used to determine the mutagenic potential of effluents or hazardous wastes (Houk, 1991).

Examination of wood pulp effluents for mutagenic activity began in the late 1970's (Ander, 1977; Eriksson, 1979, 1982; Bjorseth, 1979; Lee, 1979; Klekowski, 1979). When relatively high mutagenic activity was found in these samples the emphasis of most research switched to the chemical separation and identification of the mutagenic components. Since chlorine was the commonly used bleaching agent at the time it was not surprising to find a number of chlorinated compounds in the list of mutagens (Kringstad, 1981; Douglas, 1981; Holmbom, 1981; Carlberg, 1986; Tachibana, 1989).

2-chloropropenal (I) and 3-chloro-4-dichloromethyl-5-hydroxy-2(5H)-furanone (II) were among the most active.



More recently, the chemical stability and degradation of (II) and related compounds have been studied (Holmbom, 1989; Miettinen, 1993). In addition, chlorinated phenols, thiophenes, dioxins and furans in effluents and sediments have also been found to be toxic (Sarkka, 1993; Morales, 1992; Lunde, 1991; Paasivirta, 1993; Whittle, 1993; Koistinen, 1992). Nonchlorinated mutagenic compounds such as polyaromatic hydrocarbons, phenols, fatty and resin acids and phthalate esters have also been isolated from pulp mill effluents, fish and sediments near pulp mills (Kinae, 1981; Morales, 1992).

Pulp mills throughout British Columbia use a variety of pulping processes including sulphite process, the Kraft process and mechanical pulping methods. Effluents from each type of mill should show different mutagenic activity. In addition, there will be variation in mutagenicity with the different bleaching processes used. Chlorine bleach is being replaced at many plants with chlorine dioxide or hydrogen peroxide. This study will systematically compare the mutagenicity of effluent from several mills in the province. We will deduce if there are correlations between mutagenicity and process type. Before the systematic comparison of mills can begin, experimental parameters such as sampling method, storage, delay time before analysis and frequency of sampling must be investigated. This project will also include testing of sediments, aquatic plants and benthic invertebrates for mutagenic activity. This would explore the sinks and catchments of mutagenic components in the receiving ecosystem.

The *Salmonella typhimurium* reverse mutation assay, developed in 1975 (Ames, 1975) is still the most commonly used initial screening procedure when testing for mutagenicity. However, the Ames assay has some drawbacks. Therefore, the Ames test will not be used as the bioassay for mutagenicity in this study. An alternative short-term mutagenicity test using *Escherichia coli* will be investigated. A lactose negative strain of *E. coli* with a point mutation in the Lac-Z gene has been used by coworkers with some success. This bacteria is capable of reversion to lactose positive if exposed to a mutagenic compound. This assay will be validated by comparing the results to published Ames test data. If the *E. coli* assay proves effective it could replace the Ames test as a cheaper and simpler alternative.

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- G.C. Carlberg, *et al.* "Identification of Chlorinated Compounds in the Spent Chlorination Liquor from Differently Treated Sulphite Pulp with Special Emphasis on Mutagenic Compounds", *Sci. Total Environ.* 48:157 (1986).

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- K.E. Eriksson, *et al.* "Studies on the Mutagenic Properties of Bleaching Effluents, Part II", *Sven. Papperstidn.* 82(4):95 (1979).
- K.E. Eriksson, *et al.* "Studies on the Mutagenic Properties of Bleaching Effluents, Part III", *Sven. Papperstidn.* 85(9):R73 (1982).
- B.R. Holmbom, *et al.* "Isolation and Identification of and Ames-Mutagenic Compound Present in Kraft Chlorination Effluents", *Tappi* 64(3):172 (1981).
- B. Holmbom, *et al.* "Chemical Stability of the Mutagens 3-Chloro-4-(dichloromethyl)-5-hydroxy-2(5H)-furanone (MX) and E-2-chloro-3-(dichloromethyl)-4-oxo-butenoic acid (E-MX)", *Chemosphere* 18(11/12):2237 (1989).
- V.S. Houk and D.M. DeMarini, "Characterizing the Genotoxicity of Hazardous Industrial Wastes and Effluents Using Short-Term Bioassays", *Research Journal of the Water Pollution Control Federation* 63(4): 465 (1991).
- N. Kinae, *et al.* "Studies on the Toxicity of Pulp and Paper Mill Effluents -
1. Mutagenicity of the Sediment Samples Derived from Kraft Paper Mills", *Water Res.* 15:17 (1981).
- N. Kinae, *et al.* "Studies on the Toxicity of Pulp and Paper Mill Effluents -
2. Mutagenicity of the Extracts of the Liver from Spotted Sea Trout (*Nibea Mitsukur*)", *Water Res.* 15:25 (1981).
- E. Klekowski, *et al.* "Mutagens in a River Heavily Polluted with Paper Recycling Wastes: Results of Field and Laboratory Mutagen Assays", *Environ. Mutagen.* 1:209 (1979).
- J. Koistinen, *et al.* "Identification of Aromatic Coeluates of Polychlorinated Dibenzo-*p*-dioxins and Dibenzofurans in Pulp Mill Products and Wastes", *Environ. Sci. Technol.* 26(12):2499 (1992).
- K.P. Kringstad, *et al.* "Identification and Mutagenic Properties of Some Chlorinated Aliphatic Compounds in the Spent Liquor from Kraft Pulp Chlorination", *Environ. Sci. Technol.* 15(5):562 (1981).
- E.G-H. Lee, *et al.* "Biological Characteristics of Pulp Mill Effluents (Part II)", CPAR Project Report 678-2, BC Research, Vancouver, Canada (1979).
- A. Lunde, *et al.* "Identification, Mutagenicity and Origin of Chlorinated Thiophenes in Kraft Bleaching Effluent", *Pap. Puu (Fin.)* 73(6):522 (1991).
- I. Miettinen, *et al.* "Biochemical and Chemical Degradation of 3-Chloro-4-(dichloromethyl)-5-hydroxy-2(5H)-furanone (MX) in Surface and Drinking Water", *Chemosphere* 27(9): 1707 (1993).
- A. Morales, *et al.* "Analysis of Pulp Mill Effluent Contaminants in Water, Sediment and Fish Muscle - Chlorophenols and Related Compounds", *Water Environ. Res.* 64(5):669 (1992).
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- J. Paasivirta, *et al.* "Estimation of the Environmental Hazard of Organochlorines in Pulp Mill Biosludge Used as a Soil Fertilizer", *Chemosphere* 27(1-3):447 (1993).
- J. Sarkka, *et al.* "Organic Chlorine Compounds in Lake Sediments. VI. Two Bottom Sites of Lake Lagoda Near Pulp Mills", *Chemosphere* 26(12):2147 (1993).

S. Tachibana, *et al.* "Reactions of Selected Nucleophiles with 2-Chloropropenal, a Mutagenic Constituent of Softwood Kraft Chlorination Effluent", *Environ. Toxicol. Chem.* 8:1133 (1989).

D.M. Whittle, *et al.* "Canadian National Dioxin Sampling Program: Dioxins and Furans in Biota Near 46 Pulp and Paper Mills Using the Chlorine Bleaching Process", *Chemosphere* 27(1-3):279 (1993).

RESULTS:

1. Steve Karpuk completed Biology 448 directed studies. His report will be submitted to the library.
2. No publishable data to date. Since I am resigning my position at UCC this summer, this project will be put on hold until I am established elsewhere or until a UCC faculty member takes on the work. The initial experiments give interesting results. It will be possible to apply to BC Ministry of Environment or the Fraser River Action Plan for more substantial research funds for this project.

BUDGET:

1. Chemicals and Supplies (Interdepartmental Invoice from Med-Lab Department) \$541.95

A total of \$1850 was requested for this project. The remainder of the unused funds will be used to cover extra costs accrued from my 1993 scholarly activity project.

PREPARED BY: Traci Bryar

DATE: May 3, 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Noise Cancellation Techniques in Speech Signals

PROJECT LEADER: Surinder Dhanjal
Department of Computing Science
UCC, Kamloops

PROJECT COLLABORATORS: Dr. M.P. Beddoes, Professor Emeritus
Department of Electrical Engineering
UBC, Vancouver

Prof. Jagmohan Singh
Department of Computer Science and Electrical Engineering
Punjab Agricultural University, India

CLIENTS/AUDIENCE:

1. Digital Speech Processing Research Community
2. Digital Speech Processing Industry

ABSTRACT:

A new noise cancellation technique "Delayed Linear Prediction Noise Cancellation" (DLPNC) was described by the author in a recent paper [1]. In this technique, the current clean speech sample is *predicted* as a *linear* combination of the past *M* *noisy* speech samples *delayed* by one pitch period *T*. That is why this technique is named "Delayed Linear Prediction Noise Cancellation."

The work to be completed is based on another paper written by the author [2], in which the DLPNC technique has been compared with two well-known noise cancellation techniques, Wiener Noise Cancellation, as formulated by Marvin R. Sambur [3] and Adaptive Noise Cancellation [4] as modified by Marvin R. Sambur [5]. The quality of the processed speech was judged by informal perceptual listening tests throughout this work. Criteria being the quality of the processed speech and the computational load, the preliminary results reported in these papers indicate that DLPNC [1-2] ranks close to WNC [3] and ANC [4-6] in its noise cancellation capabilities.

OBJECTIVES:

The main objectives/goals of this project are:

1. to design new noise cancellation techniques in speech signals, and
2. to compare the performance of these new techniques with existing techniques.

BACKGROUND AND NEED:

1. Background:

In general, the received speech waveform is almost always corrupted by some form of unwanted noise components. Depending on the amount or type of noise, the quality of speech can be slightly degraded, and the speech can become unpleasant and annoying to be listened to, or the speech can even become totally unintelligible. Many speech researchers have confirmed that the problems imposed by the presence of ambient noise can be formidable.

The difficulty arises because the noise statistics are generally unknown and therefore, it is not easy to specify a criterion which would lead to a "best" estimate of clean speech signal. Consequently,

many noise cancellation techniques have been proposed in literature. Some representative details can be found in the partial list of the literature reviewed given below.

2. Literature Reviewed:

- [1] Surinder Dhanjal, "Delayed Linear Prediction Noise Cancellation in Speech Signals", Canadian Conference on Electrical and Computer Engineering (CCECE-92) Proceedings, September 1992, pp. WM9.25.1-25.4.
- [2] Surinder Dhanjal, "Noise Cancellation Techniques in Speech Signals (DLPNC)", Canadian Conference on Electrical and Computer Engineering (CCECE-93) Proceedings, September 1993, pp. 281-284.
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- [4] Bernard Widrow et al., "Adaptive Noise Cancelling: Principles and Applications", Proceedings of the IEEE Vol. 63, #12, December 1975, pp. 1692-1716.
- [5] Marvin R. Sambur, "Adaptive Noise Canceling for Speech Signals", IEEE Transactions on ASSP, Vol. ASSP-26, #5, Oct. 1978, pp. 419-423.
- [6] Bernard Widrow & S.D. Stearns, Adaptive Signal Processing, Englewood Cliffs: Prentice-Hall, 1985.
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- [8] J.S. Lim (Editor), Speech Enhancement, Englewood Cliffs: Prentice-Hall, 1983.
- [9] Thomas Parsons, Voice and Speech Processing, New York: McGraw-Hill Book Co., 1987.
- [10] J.R. Deller, Jr., John G. Proakis, J.H.L. Hansen, Discrete-Time Processing of Speech Signals, New York: Macmillan Publishing Co., 1993.

Chapter 13 [9] and chapter 8 [10] try to summarize the basic ideas presented in most of these techniques.

However, it is a widely accepted fact among the speech research scholars that no single noise cancellation technique is optimal for all kinds of noisy speech signals.

3. Need:

Since no single noise cancellation technique is unanimously top ranked, the need to conduct research in the area of noise cancellation techniques has been, and will continue to be, "hot" and "active," searching for better and more efficient techniques.

METHODOLOGY:

1. Record several speech sentences
2. Conduct linear prediction analysis to extract parameters (Linear Prediction Coefficients, Voiced/Unvoiced Decision, Pitch Detection and Gain)
3. Synthesize speech
4. Corrupt clean speech by additive noise
5. Synthesize noisy speech
6. Cancel noise using Noise Cancellation Technique(s)

7. Synthesize noise-cancelled speech
8. Compare 3 and 7. The closer they are, the more efficient is the noise cancellation technique.

RESULTS:

The results of this project are being recorded in a paper. The paper will be presented in a future conference.

BUDGET:

1. Subscriptions to IEEE Journals (March 1994)	\$ 160.00
2. Subscriptions to ACM Journals (October 1994)	240.03
3. Subscriptions to IEEE Journals (February 1995)	348.76
4. Research Books (March 1995)	183.98
5. International Conference (ICASSP-95)	<u>1100.00</u>
	<u>\$2032.77</u>

PREPARED BY: Surinder Dhanjal

DATE: May 1, 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Education and Practice Collaboration in the Delivery of Community Health Nursing Education

PROJECT LEADER: Susan Duncan

METHODS:

The research objectives for the study have been expanded from a specific focus on the continuing education needs of public health nurses to include the education needs of community health nurses entering the profession as well as those who are currently expanding their skills and knowledge. The findings are expected to contribute to the evaluation and development of both basic and continuing education in community health nursing.

Data collection is currently underway with focus group interviews being conducted with practicing nurses and nurse administrators in various community settings including rural and first nations communities, mental health, public health and continuing care. Approval to interview nurses has been obtained by health units in both the Thompson and Cariboo regions.

Interviews are being conducted by Susan Duncan and Kris Weatherman, a public health nurses and graduate student. This collaborative approach between practice and education is essential to the development of community health nursing education and is therefore a valuable feature of this research project.

BUDGET:

Funds will be accessed in the near future to fund travel to the Cariboo region and for the production and processing of the data.

TIME LINES:

The data collection will be completed by September 15, 1995. The final research report will be completed in January, 1996.

PREPARED BY: Susan Duncan

DATE: May 19, 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Synthesis and Structural Studies of Diflavanoids: Synthesis of 8-Bromocatechin

PROJECT LEADER: M.R. Granger

PROJECT COLLABORATORS: Dr. E. Kiehlmann
Department of Chemistry
Simon Fraser University

CLIENTS/AUDIENCE: General chemical research community

ABSTRACT:

In a route to synthesize 8-bromocatechin from catechin the methoxymethyl and ethoxymethyl groups have been introduced as blocking functions on the hydroxyl groups of catechin to produce two previously unreported compounds: 3,5,7,3',4'-penta-O-methoxymethylcatechin (IIa) and 3,5,7,3',4'-penta-O-ethoxymethylcatechin (IIb). Compound IIa has been brominated to produce, albeit in low yield, what is believed to be 8-bromo-3,5,7,3',4'-penta-O-methoxymethylcatechin (III). Similar attempts to brominate compound IIb were unsuccessful. It is anticipated that removal of the methoxymethyl groups from compound III by mild hydrolysis will result in the desired 8-bromocatechin (IV).

OBJECTIVES:

The objective of this project is to prepare 8-bromocatechin from the naturally occurring substance, catechin. Once prepared, 8-bromocatechin will be used as an intermediate in a series of chemical reactions intended to provide information on the chemical structures of diflavanoids.

BACKGROUND AND NEED:

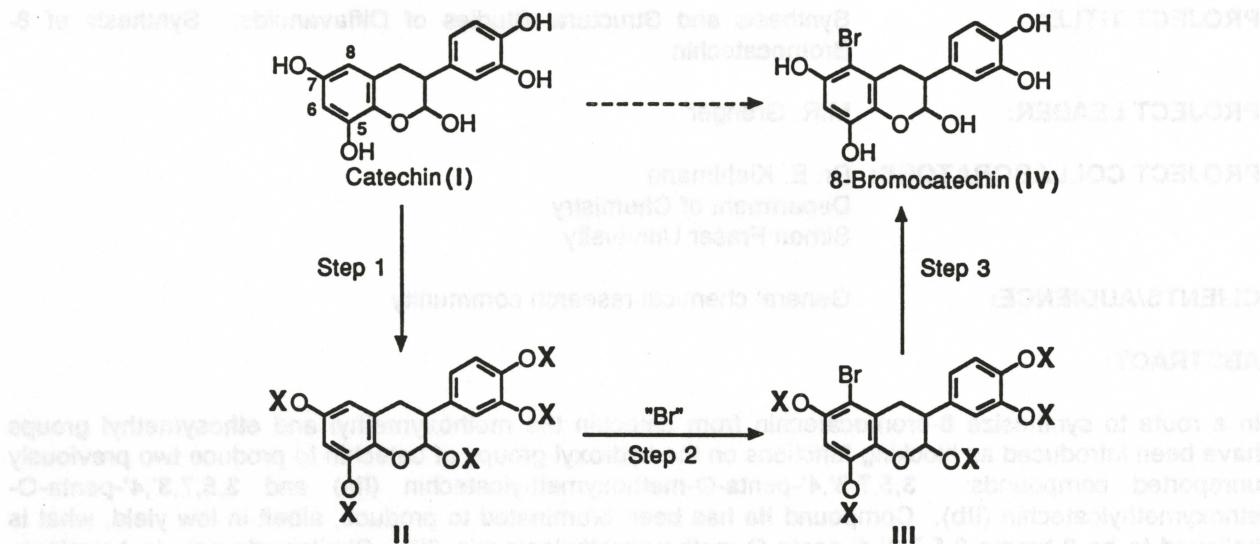
Condensed tannins are found in relatively high concentration in the barks of a variety of tree species; in British Columbia, most notably the Douglas Fir. These substances have commercial applications in leather tanning and as wood adhesives. The chemical precursors of these tannins are smaller, but nevertheless still somewhat complex molecules called diflavanoids. To properly understand the chemistry of tannins it is necessary to determine their chemical structures and the structures of their diflavanoid precursors. In the present study the approach taken in determining the chemical structures of diflavanoids is to synthesize them in the laboratory starting with molecules of known structure and using chemical reactions with known outcomes. A comparison will then be made of the synthesized material of known structure with the material obtained from a natural source. If the synthesized and natural substances are the same in all respects, the structure of the natural substance is proven.

Necessary starting materials for the preparation of the desired diflavanoids are 6-bromocatechin and 8-bromocatechin. An efficient method for the preparation of 6-bromocatechin has been developed by E. Kiehlmann (1) but a successful preparation of 8-bromocatechin has yet to be accomplished.

METHODOLOGY:

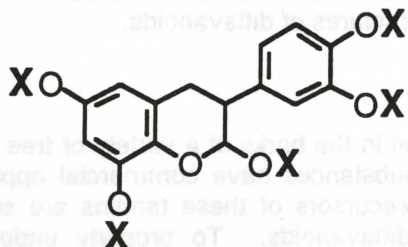
The direct bromination of catechin produces a mixture of three compounds: 6-bromocatechin, 8-bromocatechin and 6,8-dibromocatechin. In order to prepare exclusively only 8-bromocatechin the scheme outlined on the following page is proposed. The intent is to first introduce large bulky groups (X) at carbons-5 and -7 in catechin (step 1). These groups should effectively block carbon 6 from further reaction and direct subsequent bromination (step 2) to carbon-8 by default. Once bromination at carbon-

8 has been accomplished, the blocking groups at carbons-5 and -7 will be removed by simple hydrolysis to recover the desired 8-bromocatechin (step 3).



RESULTS:

Work to date has centred around attempts to introduce protective groups (X) onto the OH groups in catechin (step 1). The methoxymethyl and ethoxymethyl groups have been introduced following the method of Townsend et al (2) to produce two previously unreported compounds IIa and IIb, respectively. The structure of these compounds have been proven by proton NMR spectroscopy.



Compound IIa: $\text{X} = \text{CH}_2\text{OCH}_3$

Compound IIb: $\text{X} = \text{CH}_2\text{OCH}_2\text{CH}_3$

After repeated attempts following Townsend's procedure, the yields of these products after purification have been rather low: compound IIa 22%; compound IIb 11%. Because of the low yields, other reported methods of introducing a methoxymethyl group onto phenolic hydroxyl groups are going to be attempted. These include the use of a crown ether solvent to solubilize alkali metal salts of phenols (3), the use of dimethoxymethane as a source of the methoxymethyl group (4) rather than using chloromethyl methyl ether as the source as in Townsend's procedure, and thirdly the use of phase transfer catalysis (5).

Although compounds IIa and IIb have so far been obtained in only the rather low yields reported above, attempts have been made to brominate these compounds with one equivalent of bromine using pyridinium hydrobromide perbromide (step 2). Following the method of Roux (6) we have successfully brominated compound IIa but only in rather low yield (33%). Both high resolution proton NMR and elemental analysis of the product we obtained are consistent with a compound containing only one bromine atom. Unfortunately the NMR data do not unequivocally indicate whether the bromine has been introduced at carbon-6 by the neighboring methoxymethyl groups.

Attempts to brominate compound IIb by similar methods have proved unsuccessful with no bromination product being obtained. It is possible that the larger ethoxymethyl group so deactivates the ring as to prevent bromination occurring at a reasonable rate at any position in the molecule. Even the slightly

smaller methoxymethyl group may have a sufficient deactivating effect to account for the low yield of bromination product from compound Iia.

Rather than attempting to directly prove that the bromination product obtained from compound Iia is indeed the 8-bromo compound, we intend to concentrate on improving the efficiency of the bromination reaction perhaps by exploring some of the other methods of brominating phenols using such reagents as benzyltrimethylammonium tribromide (7), N-bromomethylamine and N,N-dibromomethylamine (8), dioxane dibromide (9), and bromine in acetonitrile (10). Once we have succeeded in producing the bromo compound in better yield we will attempt to remove the protecting methoxymethyl group (step 3) either by acid catalyzed hydrolysis or by a method using diphosphorus tetraiodide as reported recently by Saimoto and coworkers (11). Once the protective groups have been removed, the product will be able to be confirmed as 8-bromo- (or 6-bromo-) catechin by established NMR techniques (12), (13).

BIBLIOGRAPHY:

1. E. Kiehlmann, P.J. van der Merwe and H.L. Hundt, *Org. Prep. Proc. Int.*, 15, 341 (1983).
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10. E. Kiehlmann, unpublished results.
11. H. Saimoto, Y. Kusano and T. Hiyama, *Tet. Lett.*, 27, 1607, (1986).
12. E. Kiehlmann and A.S. Tracey, *Can. J. Chem.*, 64, 1998 (1986).
13. E. Kiehlmann and A.S. Tracey, *Mag. Res. Chem.*, 26, 204 (1988).

BUDGET:

My 1994-95 SAC grant provided \$2,500.00 for the purpose of chemicals and miscellaneous glassware and supplies. Approximately \$2,400.00 has been expended to date for these purchases.

PREPARED BY: Maurice R. Granger

DATE: May 2, 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Maritime Beginnings: Early English Studies at Fredericton, Windsor and Halifax

PROJECT LEADER: Henry A. Hubert
Department of English and Modern Languages

PROJECT COLLABORATORS: The conference paper was offered as an introduction to extended collaboration toward a published paper. Co-collaborators on the project were Mary Mar (Concordia), Laura Atkinson (University of Manitoba) and Jean Sanborn (University of Main).

The paper for the University of Toronto Quarterly was not a collaborative project.

CLIENTS/AUDIENCE: This project prepared a paper and a conference presentation for the English professoriate in Canada and the United States. The paper was presented at the annual conference of the Canadian Association for the Study of Writing and Reading in Fredericton in May, 1994. The paper, submitted to the University of Toronto Quarterly, is now in press.

The objective of this research is to raise the profile of composition studies in Canadian universities. See the abstract below.

ABSTRACT:

The conference collaboration did not proceed as projected by conference organizers, so the collaboration has been carried forward to this year's conference. In preparation for that, extensive e-mail conversations have already taken place.

The research concurrent with the conference in Fredericton, however, led to new information now being integrated into my ongoing scholarship.

The University of Toronto Quarterly article uses some of the information gained by my Maritime university research. Using the results of recent Canadian and American research on the focus of English studies, that article points out the strong focus on reading in English studies, especially in Canada. This focus on reading leaves the English studies focus on composition severely compromised in most institutions across the country. Indeed, owing to the reluctance of many English departments in Canada to teach writing, more and more faculties are hiring their own instructors to teach English. For example, the Simon Fraser Engineering faculty has a full-time English professor as part of its teaching staff. The difficulty with such arrangements, of course, is that such faculty members lack the professional support that their own departments can offer.

OBJECTIVES:

The main objectives or goals of my ongoing research, including the present project, are to determine the causes of present attitudes toward writing in Canadian universities, with the ultimate goal of raising the profile of writing. Canadian college graduates must become skilled professionals in settings where

communication skills are increasingly valuable. My research suggests that faculties outside of English understand these professional needs much better than faculty within English departments.

BACKGROUND AND NEED:

See the abstract and objectives sections above.

METHODOLOGY:

The approach for this project focused on historical and contemporary library research, including preliminary studies on the growth of English studies as reflected in Statistics Canada publications. Ongoing research will include my own surveys, in addition to already existing surveys the results of which are listed in my bibliography.

RESULTS:

This year, tangible results of my ongoing research include a published book, The Development of English Studies in Nineteenth-Century Anglo-Canadian Colleges (U. of Michigan Press, 1994), the publication of a further article ("A History of College Rhetoric in the U.S. and Canada: Different Traditions" in Social Reflections on Writing: To Reach and Realize. Winnipeg: Literacy Publications, 1994), and the forthcoming University of Toronto Quarterly article, "Babel AftEr the Fall: English Literature and Language." My research has also been presented at numerous conferences in Canada and the U.S.

I have attached two external notices about my work: 1). a reference by a professor at the University of Waterloo to a query from a researcher at Concordia, and 2). a review by Choice magazine (February 1995).

BUDGET:

Travel and Accomodation	Fredericton	\$1652.44
	Vancouver	610.00
		<u>\$2262.44</u>

PREPARED BY: Henry A. Hubert
Department of English and Modern Languages

DATE: May 1, 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Gender Identification in the Burrowing Owl, *Athene cunicularia*

PROJECT LEADER: Dr. Mairi E. MacKay, Biological Sciences

PROJECT COLLABORATORS: Biology 448 students Kathy Kimmell, Alex Parker and Kathleen Wallach

CLIENTS/AUDIENCE: Kamloops Wildlife Park, B.C. Burrowing Owl Recovery Team, Geneticists and Conservation Biologists

ABSTRACT:

The Burrowing Owl (*Athene cunicularia*) is an endangered species in Western Canada and efforts are being made at several centers to breed the birds in captivity for release into the wild. We have been attempting to develop a DNA fingerprinting test to determine relationships between adults and offspring in a captive breeding population at the Kamloops Wildlife Park. We would also like to use this test to determine the sex of the offspring, whose appearance does not display clear sexual dimorphism. We have found that the oligonucleotide CT₂₀ hybridizes to highly polymorphic "microsatellite" fragments of HaeIII-digested Burrowing Owl genomic DNA and may be useful for determining relationships among the captive population. In addition we are comparing currently used measures of sex (tarsus length and presence of brood patch in nesting females) with specific DNA fragment profiles.

OBJECTIVE:

To develop a DNA fingerprinting test to determine relationships between adults and offspring in a captive breeding population at the Kamloops Wildlife Park. We would also like to use this test to determine the sex of the offspring.

BACKGROUND AND NEED:

The Burrowing Owl (*Athene cunicularia*) is an endangered species in B.C., mostly due to limited availability of habitat and intensive use of pesticides in agriculture. As part of a province-wide effort to re-establish the species in the central interior, Burrowing Owls are being bred in captivity at the Kamloops Wildlife Park (KWP) for release into the wild. For the past two years, at the suggestion of the KWP staff, fourth year Biology students and I have been developing a DNA fingerprinting protocol for the captive breeding population and their offspring.

DNA fingerprinting has become widely used in wildlife biology because it enables individual animals to be identified using a simple blood test, and often allows paternity and maternity of offspring to be established. The technique involves taking a small blood sample from each bird for isolation of DNA and "hybridizing" the sample with a "probe" (Jeffreys *et al.*, 1985; Vassart *et al.*, 1987; Georges *et al.*, 1988). Several such probes are currently available and have provided valuable information about the breeding habits and genetic diversity in many other species of birds (Westneat, 1990; Longmire *et al.*, 1992). We hope that DNA fingerprinting will answer several questions about the parentage of the fledglings obtained from the captive breeding program and whether or not the offspring in a single nest are the result of a single pairing or multiple matings of a single female. Ultimately, elucidation of the parentage of the fledglings will enable Wildlife Park staff to make decisions about which animals to retain for future breeding stock to maximize genetic diversity.

In addition, several DNA fingerprint probes have been developed in recent years which positively identify the sexes in different species of birds (Longmire *et al.*, 1991; Rabenold *et al.*, 1991; Longmire *et al.*, 1993). However each species is different with respect to the probes which detect sex-specific DNA.

Since Burrowing Owls, especially young birds, display little sexual dimorphism in their appearance, our aim has been to develop a simple, inexpensive DNA test which will positively identify male and female birds. This information will be invaluable for selection of potential breeding pairs for the release program.

REFERENCES:

Georges, M., A.S. Lequarre, M. Castelli, R. Hanset and G. Vassart (1988). DNA fingerprinting in domestic animals using four different minisatellite probes. *Cytogenet. Cell Genet.* 47: 127-131.

Jeffreys, A.J., V. Wilson and S.L. Thein (1985). Hypervariable "minisatellite" regions in human DNA. *Nature (London)* 314: 67-73.

Longmire, J.L., et al. (1991). Use of sex-linked minisatellite fragments to investigate genetic differentiation and migration of North American populations of the Peregrine Falcon (*Falco peregrinus*) in "DNA Fingerprinting: Approaches and Application" (T. Burke, G. Dolf, A. Jeffreys and R. Wolff, eds.) pp. 217-229. Birkhauser Press, Basel.

Longmire, J.L., G.F. Gee, C.L. Hardekopf, and G.A. Mark (1992). Establishing paternity in Whooping Cranes (*Grus americana*) by DNA analysis. *The Auk* 109(3): 522-529.

Longmire, J.L., M. Maltbie, R.W. Pawelka, L.M. Smith, S.M. White, O.A. Ryder, D.L. Ellsworth and R.J. Baker (1993). Gender identification in birds using microsatellite DNA fingerprint analysis. *The Auk* (in press).

Rabenold, P.P., W.H. Piper, M.D. Decker and D.J. Minchella (1991). Polymorphic minisatellite amplified on avian W chromosome. *Genome* 34: 489-493.

Vassart, G., M. Georges, R. Monsieur, H. Brocas, A.S. Lequarre and D. Christophe (1987). A sequence in M13 phage which detects hypervariable minisatellites in human and animal DNA. *Science* 235: 683-684.

Westneat, D.F. (1990). Genetic parentage in the indigo bunting: a study using DNA fingerprinting. *Behav. Ecol. Sociobiol.* 27: 67-76.

METHODOLOGY:

Small blood samples are taken from a vein in the wing of the birds. DNA is isolated by standard chemical procedures and samples are digested with the restriction enzyme HaeIII. DNA fragments are separated by gel electrophoresis and blotted onto a nylon membrane. The membrane is incubated with a radioactively-labelled nucleotide "probe" which detects fragments containing specific DNA sequences. Several probes have been tried in search of one or more that will detect polymorphic fragments (of different and unique sizes) in different individuals and will differentiate between the DNA of different sexes.

RESULTS:

Over the past 2 years, several fourth year Biology students and I have been trying different DNA fingerprinting probes which had been previously used to identify individuals, parentage and gender in various species of birds. We have finally overcome some of the technical difficulties inherent in setting up the technique in a new species and have managed to optimize DNA digestion and probe hybridization conditions. Two of the three probes we have tried have been disappointing. However a third, oligonucleotide CT₂₀, has given us very promising preliminary results. This probe detects CT base repeats in Burrowing Owl DNA which are highly variable in size from individual to individual, and has detected sex-specific bands in other species of birds. At present we are using this probe on DNA from

the breeding stock and 1994 offspring to see if we can establish the relationships between the adults and offspring. We are also cross-checking DNA patterns with phenotypic gender characteristics such as tarsal length (shorter in males) and the presence of a brood patch in breeding females.

These preliminary results will be presented at a scientific posted session at the Meetings of the Canadian Federation of Biological Sciences, June 14-17 in Saskatoon. Once finalized, the results will be publishable in a scientific journal and will be of much use to the Kamloops Wildlife Park captive breeding program and the Burrowing Owl Recovery Project. In addition, this project has given Biology students (and me) valuable experience in research techniques.

BUDGET:

Oligonucleotide probes (Regional DNA Synthesis Lab, University of Calgary)	\$247.50
Enzymes	102.89
Radioisotope for labelling probes	<u>135.00</u>
	<u>\$485.39</u>

PREPARED BY: Mairi MacKay

DATE: May 5, 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Prison Journal

PROJECT LEADER: Dr. P.J. Murphy

PROJECT COLLABORATORS: Dr. Alexander M. Forbes, Department of English, University College of the Cariboo

CLIENTS/AUDIENCE: Previous subscribers to Prison Journal; academic community

ABSTRACT:

To investigate/research whether funding could be obtained for continuing publication of this journal (of which I was formerly editor and which was published by SFU Institute for the Humanities until 1992 when funding was terminated with the cancellation of the SFU Prison Education Programme.

BACKGROUND AND NEED:

Prison Journal was a unique forum for the expression of views in a critically informed manner on the complex phenomenon of the prison world. In addition to writings by prisoners, it also welcomed writing by those outside of this context (Timothy Findley, Brian Fawcett, for example). It also was attracting more and more contributions from an international perspective, particularly from the U.S. and England. Hence its suspension of publication resulted in the loss of an important organ for the expression of the viewpoints referred to above. There was clearly a need to re-instate it or to replace it.

METHODOLOGY:

To approach various funding agencies; to discuss future issues of Prison Journal with interested parties (at SFU and in Federal Correctional Institutions).

RESULTS:

After extensive canvassing of funding sources, it was evident that adequate and secure funding for the revival of Prison Journal could not be obtained; however, extensive consultations with Professor J. Zaslove, Director, SFU Institute for the Humanities, resulted in an alternative proposal: namely, that the Institute, in conjunction with another publisher (for distribution purposes), would publish a book-length collection entitled Sentences and Paroles: Prison Writing in British Columbia, which would include selections from previous issues of Prison Journal. This project has now been completed and the manuscript will be at the publishers by mid-summer 1995. Dr. Forbes and I will also be publishing in other academic journals some of the materials and interviews we collected.

BUDGET:

Project Leader (visits to Institutions, SFU; travel and per diem) \$1500.00

Project Collaborator (visits to various Institutions to interview writers/solicit literary contributions) 500.00
\$2000.00

PREPARED BY: P.J. Murphy

DATE: April 26, 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Images and Cosmology-Shift

PROJECT LEADER: Merv Nicholson

Work on this project remains in progress. I presented a paper in the UCC/UBC lecture series last November entitled "Imagethinking," which deals with the way that people think in images (not just in abstract ideas), and the effect of this article to the scholarly journal Literature, Interpretation, Theory on food semiotics--that is the forms of imagethinking that shape social perceptions of food and food production. My expenditures have included money for a research trip to the University of Calgary, as well as funds for necessary journals and books to keep up. Thus \$865 went to travel for research; the remainder of my grant has been spent on journals, supplies, and books required for the work I have been doing. I continue, of course, to publish work based on this ongoing project, and look forward to pursuing my research in the next few months.

PREPARED BY: M. Nicholson

DATE: May 3, 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Academic Listening Task Design

PROJECT LEADER: Valerie Oszust

PROJECT COLLABORATORS: Gloria Tang (UBC), Dale Fitzpatrick (BCIT)

CLIENTS/AUDIENCE: Language education researchers, in particular, Bernard Mohan and Gloria Tang at UBC; and instructors in English for Academic Purposes.

ABSTRACT:

This project is an extension of the main study entitled "The Effects of Key Visuals on the Listening Comprehension of ESL Students", in which an experimental group with key visuals performed significantly better than a control group with no task supports. The purpose of the extension is to separate out vocabulary from graphic organizers, thereby eliminating vocabulary as a confounding variable.

OBJECTIVES:

To determine the effects of lists of key vocabulary on the abilities of ESL students to comprehend academic mini-lectures.

BACKGROUND AND NEED:

When the results of "The Effects of Key Visuals on the Listening Comprehension of ESL Students" were submitted to TESL Canada Journal, the reviewers expressed some concern that the vocabulary labels, rather than the key visuals, may have been responsible for the superior performance of the experimental group. In their extensive work on key visuals, Mohan (1986) and Early and Tang (1991) make no distinction between vocabulary labels and graphic nodes. While theories of listening comprehension support a contextual approach to instruction (Brown, 1977; Byrnes, 1984; Nord, 1980), and research has explored the benefits of contextual redundancy (Fitzpatrick, 1989, MacWilliam, 1986), this research has tended to view context wholistically. A search of the literature on listening comprehension studies which use vocabulary as an independent variable proved unsuccessful.

METHODOLOGY:

An experimental group, consisting of 28 volunteers who had written the pre-test, were given a package of task supports (4 lists of vocabulary). All attempts were made to ensure that task conditions were identical to those of the main study except for the variation in task supports in the students' test packages.

RESULTS:

Results are currently being compiled and will be put through a statistical run.

REFERENCES:

Brown, G. 1977. Listening to Spoken English. London: Longman.

Byrnes, H. 1984. The Role of Listening Comprehension. Foreign Language Annals. v. 17, n.4, p. 317-323.

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Fitzpatrick, D. 1989. The Effects of Visual Format and Mode of Presentation of Nonnative Speakers Comprehension of Verbal Information. UBC: Unpublished Masters' Thesis.

MacWilliam, I. 1986. Video and Language Comprehension. ELT Journal, v.40, n.2, p.131-135.

Mohan, B. 1986. Language and Content. Reading, Mass.:Addison-Wesley.

Nord, J.R. 1980. Developing Listening Fluency before Speaking: An Alternative Paradigm. System v.8, p.1-22.

BUDGET:

Compensation for project collaborators	\$125.00
Prizes and compensation for assistants/subjects	80.00
Travel to Vancouver	200.00
Meals in Vancouver	150.00
	\$555.00

PREPARED BY: Valerie Oszust

DATE: May 1, 1994

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Social, Economic and Cultural Context of Intravenous Drug Use in Kamloops.

PROJECT LEADER: Lakshmi Reddy

PROJECT COLLABORATORS: N/A

CLIENTS/AUDIENCE: Scholarly Community.

OBJECTIVES:

The intention to undertake this project was to study the socioeconomic background of intravenous drug use in Kamloops.

BACKGROUND AND NEED:

Injection drug use is one of the major routes of transmission of HIV (Human Immunodeficiency Virus), which is believed to be the cause of AIDS (Acquired Immune Deficiency Syndrome). With no cure in sight, preventive education is the best available alternative to prevent the spread of HIV. Understanding the demographics of drug users in Kamloops, would be extremely useful to community organizations to develop programs to stop the spread of HIV.

METHODOLOGY:

The study was undertaken with the co-operation of the community organizations such as Street Beat, Food Bank and Street Clinic. Volunteers include 30 men with an age range between 14 and 40 years and 11 women with an age range of 16 and 35 years, who provided information by filling a questionnaire.

RESULTS:

The drug using population studied was mainly young with 40% of teenagers and fit the typical profile of less educated with poor socio-economic background. The links between drug use, poverty and street life is very evident in the study and confirms reported studies.. 90% of the subjects were drop outs from secondary education, where as only 6% had University Education. 70% of them are on welfare and the income of the rest varies from \$ 300 to \$ 1,000 a month. 20% of the subjects lived in foster homes and 25% were from divorced families. 35% of the subjects come from families with a history of alcoholism and drug use.

22% of the subjects were initiated to drugs before reaching 10 years of age and 78% of them in their teen ages. Introduction to drugs in 70% of the subjects studied was by a friend and 15% of them by a relative and 15% by a member of the family.

Marijuana is the drug most frequently used by men and women, followed by cocaine. Amphetamines, heroin, barbiturates and other recreational drugs are also in common use. 20% of the subjects studied reported using drugs in combination. The most commonly used drugs in combination were Mushrooms with LSD, barbiturates with alcohol and marijuana with hash. 25% of the subjects have been to detoxification centers ranging from 2 to 6 times in the past five years.

Attempts are being made to undertake a more detailed study of motives, incentives and decisions that lead people to try and adopt drug use.

PREPARED BY: Lakshmi Reddy

DATE: May 18, 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Variation in Ginsenoside Content of Ginseng Root and Root Fibers.
(Please note that the project title has changed from that submitted on the original SAC Application.)

PROJECT LEADER: Dr. Ron Smith
Department of Biology

PROJECT COLLABORATORS: David Caswell and Barb Zielke, B.Sc., Biology 448

CLIENTS/AUDIENCE: This work will be of interest to the scientific community in general and ginseng growers in particular. It should be noted that Kamloops Ginseng Company donated the plant material for this study and Canadian Imperial Ginseng supplemented my SAC grant with the aid of NRC-IRAP and the Provincial Matching Funds Programs.

ABSTRACT/OBJECTIVES/BACKGROUND AND NEED/METHODOLOGY/RESULTS:

These parameters of my report are all covered in the papers I've completed (copies are available for review). The papers were prepared by Dave Caswell and Barbara Zielke, my Biology 448 students. I envision that these works will be publishable with some additional data collection and editing that I intend to pursue this summer.

BUDGET:

The project was budgeted at \$1,958.00. These funds were all used to purchase materials and supplies.

PREPARED BY: Dr. Ron Smith, Department of Biology

DATE: May 10, 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: 98%-Effective Lot-Sizing for Assembly Inventory Systems with Backlogging

PROJECT LEADER: Daning Sun

PROJECT COLLABORATORS: Derek Atkins, University of British Columbia

CLIENTS/AUDIENCE: The intended users of this project will be the research community and industry in production and inventory control.

ABSTRACT:

We consider an assembly production/inventory system with backlogging allowed at its final product. We show that the average cost of any feasible policy is bounded below by the minimum of a set of series systems, which we have shown that the average cost of the best power-of-two frequency lot-size heuristic is within 2% of the optimal. Then we show that the problem can also be reduced to a special case of a polymatroidal network flow problem. Therefore, the optimal power-of-two frequency policy, which is within 2% of the optimal, can be found in $O(n^6)$ time.

OBJECTIVES:

A primary motivation for the study of systems with backlogging is our long term goal to apply these models to the case of stochastic demands. All models with stochastic demands must deal with the risk of not satisfying demand when it arises, by allowing unsatisfied demand to be either backlogged and satisfied later, or lost forever. Given that stochastic models with backlogged demands have proven to be somewhat more tractable in general than those with lost sales, we plan to concentrate on stochastic models with backlogging. We believe that future research on multistage stochastic models will benefit from an in-depth understanding of their deterministic counterparts with backlogging.

BACKGROUND AND NEED:

In an elementary inventory textbook, we can find that the classic EOQ (Economic Order Quantity) model with one product is easily extended a model with backlogging. However, to extend the model with backlogging to a multi-product case is extremely difficult.

METHODOLOGY:

The method we are using is called the power-of-two frequency heuristics. By using this heuristics we can formulate assembly systems with backlogging as a non-linear integer programming problem. We show that the average cost of an assembly system is bounded below by a series system, to which can use our previous research results. And therefore, the best average cost for the assembly system given by the power-of-two frequency heuristic is within 2% or 6% (depending on whether the base lot-size is variable or fixed) of the (unknown) optimal cost. Finally, we show that our problem can be reduced to a special case of a polymatroidal network flow problem. Accordingly, we can find the optimal power-of-two heuristic in polynomial time.

RESULTS:

The result of this project is submitted to Operations Research, the flagship journal (refereed) in the area of Operations Research for publication and will also present in INFORMS International Meeting at Singapore on June 28, 1995.

BUDGET:

Travel to Vancouver (searching for references and doing research with
Professor Derek Atkins at UBC)
Books, membership fee, subscribe to journals
Computer Hardware

\$ 960.00
396.00
500.00
\$1,800.00

PREPARED BY: Daning Sun

DATE: April 24, 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Reading by Rhyming Analogy and Recoding Letter-Sounds: Evidence for an Order of Development

PROJECT LEADER: Dr. Patrick Walton

PROJECT COLLABORATORS: Helen Dalin (research assistant), Kathleen Hill (research assistant), Angela Lawrence (research assistant), Lona Walton (research assistant), Mary Angus (teacher), Dawn Beck (teacher), Darlene Phelps (teacher), Nola Renfrew (teacher).

CLIENTS/AUDIENCE: The intended audience includes researchers in the field of education, practicing teachers, and students in teacher education programs. I was invited to a conference at the University of Toronto (May 23 - 27) to present the findings of this research for the Shuswap students at Sek'lep.

ABSTRACT:

Forty kindergarten children from four local elementary schools (Ralph Bell Elementary, Beattie, John Tod, and Sek'lep) were randomly assigned to one of four treatment groups. The treatment groups received teaching in phonological and orthographic skills related to beginning reading (e.g., rhyming, letter-sounds). The activities took place with small groups of children and lasted for about 15 minutes, twice a week, for 10 weeks.

The project is complete and I am currently analyzing the data.

OBJECTIVES:

The primary objective of the project is to examine the minimum skills that are necessary to teach prereading kindergarten children to read.

The following hypotheses were tested: Teaching specific phonological and orthographic skills will have varying results on (1) rhyming ability; (b) phoneme identity; (c) letter-sound knowledge; (d) and word reading. It was anticipated that experience with rhyming and letter-sounds will enhance phoneme identify and word reading.

BACKGROUND AND NEED:

The purpose of the project is to study the relationship between phonological awareness, especially rhyming skill, in prereading children and their success in beginning to read. A strong link has been found between rhyming skill and beginning reading. A possible explanation is that the ability to recognize rhyming words may form the basis for noticing that these words typically share common spellings (e.g., '-at' in 'cat' 'fat'). The analogy that is made from common rhyming sound to common spelling is defined as an orthographic analogy.

Longitudinal studies have linked preschool rhyming skill with later reading and orthographic analogy ability. However, the effects of teaching orthographic analogy and rhyming with beginning readers remains virtually unexamined.

METHODOLOGY:

The project used a true experimental design and so incorporated random assignment and comparison groups. The design was a four-group, pre-test-post-test design, with prereading skills measured pre- and post and reading ability measured only in the post-test. The treatment groups varied the particular prereading skills that were taught so that effects on prereading skills could be examined as well as the relationship between competence in these skills and reading.

RESULTS:

Preliminary data analyses suggest that the prereading skills of rhyming, phoneme identity (the ability to identify sounds within words), and letter-sound knowledge are related. In addition, children appear to require direct teaching in reading strategies (e.g., orthographic analogy) before they can use their prereading skill abilities to read.

BUDGET:

<u>Date</u>	<u>Description</u>	<u>Amount</u>	<u>Balance</u>
June, 1994	CSSE Conference	\$478.00	\$2500.00
November, 1994	materials prep	132.00	2022.00
February, 1995	research assistants (\$200.00 x 4)	800.00	1090.00
March, 1995	research assistants (\$200.00 x 4)	800.00	290.00
January, 1995	statistics programs	110.00	180.00
March, 1995	laminating	39.64	140.36
March, 1995	materials prep	137.50	2.50

PREPARED BY: Patrick Walton

DATE: May 3, 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: A Floristic Study of Wells Gray Park

PROJECT LEADER: R. David Williams

PROJECT COLLABORATORS: Trevor Goward, Naturalist and Lichenologist, UBC.
Connie Veer, Biology 448 Student (Directed Studies)

CLIENTS/AUDIENCE: Biology and Forestry Students; Professional Foresters; Professional Educators and Researchers in the area of Forest Ecology, Mammology, Ornithology, etc.

ABSTRACT:

In order the better manage natural systems, ecologists have attempted to understand the intricate interrelationships that make up such systems. The very foundation of any ecological system is its primary producers, which in most systems comprises the plants. All management decisions must come from a basic understanding of the natural flora and how distribution is related to the biodiversity and abiotic (non-living) factors such as climate and soil parent material.

Wells Gray Park is a unique wilderness park containing an entire watershed within its boundaries and a broad variety of biogeoclimatic zones, thus lending itself to a long term study of the natural flora as it will be undisturbed in perpetuity. We could consider this a long-term 'control' area for the management practices occurring in like-areas outside the park.

OBJECTIVES:

The purpose of the present study is to continue to lay the groundwork for what will be a five to eight year floristic study of Wells Gray Park. This floristic study will form the foundation, and be part of, a comprehensive biodiversity study of Wells Gray Park, involving the collaboration of sicientists in a number of disciplines, for example: mensuration, forest ecology, mammology, ornithology, entymology, limnology, ichthyology, mycology, lichenology, bryology, etc.

BACKGROUND AND NEED:

The only previously published floristic research in Wells Gray Park and adjacent areas is that of Hamet-Ahti (1965a, 1965b & 1978). This work was based on six weeks field work in summer 1961. The very popular guidebook "Nature Wells Gray" (1989) also contains a wealth of information on the natural history of the park.

METHODOLOGY:

The 1994/95 research year has seen the curating, cataloguing and verifying of Trevor Goward's vascular plant collection of some 1730 specimens (unpublished). In addition approximately 300 specimens have been collected from the area adjacent to the Wells Gray Education and Research Centre as part of a phenology study. This study followed the development of every species within the study area and included a complete photographic record (unpublished). Duplicates of these plant specimens and photographs will be housed at the Wells Gray Education and Research Centre and the UCC Kamloops Campus Herbarium. All collection data has been entered into the database filmmaker Pro to facilitate the ongoing floristic study.

RESULTS:

1. Research Herbarium

This herbarium will be housed at or near the Wells Gray Education and Research Centre, with duplicates housed at UCC. This collection now amounts to some 1730 in the Goward collection and the approximately 300 specimens collected, curated, catalogued and verified from the 1994 field season.

2. Technology Transfer

Field data, herbarium specimens and technical support was given to the Wells Gray Natural History Interpretation Centre, thereby benefiting the 1,000's of people who visit the park annually. Specimen duplicates housed in the UCC Kamloops Campus Herbarium will be utilized by the 100's of students in the Biological Sciences and IRS/Forestry program.

3. Taxonomic and Ecological Training

This study is an initial step in a five to eight year project which will employ students. They will get taxonomic and ecological training and field experience which will be invaluable should they wish to pursue a career in botany, ecology, forestry, natural resource science, botanical research, etc.

4. Publications/contributions - Lichen & Vascular Plant Macrophotography

Lichen macrophotographs have been contributed and published in the following:

Pojar, J. & A. MacKinnon. 1994. Plants of Coastal British Columbia. Lone Pine Publishing.
Goward, T. Lichens in an Antique Land. Nature Canada, Summer 1994.

The following publication will include approximately 100 photographs of both lichens and vascular plants.

Plants of Southern British Columbia. Summer 1995.

The phenology study will be continued in the 1995 field season and published in Fall 1995.

BUDGET:

Expenditures to May 1, 1995.

Travel	\$ 846.00
Herbarium Supplies	250.00
Reference Books	75.00
Miscellaneous - developing, mailing	66.83
Salary contribution to Partners in Science	800.00
	<u>\$2037.83</u>

Partners in Science Grant

The 1994 field season was carried out in collaboration with two students working out of the Wells Gray Education and Research Centre as natural history interpreters. The students were funded by a \$14,850 Partners in Science grant which has subsequently been renewed for the 1995 field season.

PREPARED BY: R. David Williams

DATE: April 30, 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Cross Border Industrial Relations and Employers' Association: 1900-1930

PROJECT LEADER: Andrew Yarmie

PROJECT COLLABORATORS: The project has been reviewed and approved by specialists: Dr. John Belshaw (UCC, History) and Dr. Bob McDonald (UBC, History)

CLIENTS/AUDIENCE: The article in progress is intended for publication in a peer-reviewed journal such as Labour/Le Travail and would be read by academics, students, etc.

ABSTRACT:

My research focused on a comparative analysis of Canadian and American industrial relations. The overall objective of my research was to investigate the influence and impact of American employers' association on British Columbia's industrial relations during the period 1900 - 1930.

The industrial tactics of B.C. employers' associations ranged from co-operation to outright attacks on unions. These strategies were determined by both local and outside influences. Numerous references to American employers' associations and the direct adoption of their union breaking tactics led to this study of "Cross-Border" industrial relations. In particular, the existence of a formal alliance between Washington State and B.C. employers' associations in the form of the Pacific Coast Federation of Employers warranted further investigation. A number of case studies, and specific strikes such as the 1903 transportation strike, 1911 building trades strike and the 1919 general strike were selected for comparison. These are to be evaluated and developed into an analysis of the impact of American industrial ideology in British Columbia.

OBJECTIVES:

The objective was to conduct preliminary research into employers' association both in Vancouver and Seattle. This investigation of their records and other primary documents was designed to reveal the cross-border connections.

BACKGROUND AND NEED:

While the employers' role in shaping industrial relations is generally acknowledged, research on employers' organizations and their impact remain few in number. M. Bliss, A Living Profit, Studies in the Social History of Canadian Business, 1883-1911, and P. Craven, An Impartial Empire, Industrial Relations and the Canadian State, 1900-1911, provide the ground work for further research, but employers' associations are not central to either study. My article, "The Right to Manage: Vancouver Employers' Associations, 1900 - 1923", B.C. Studies, 90 (Summer 1991) 40 - 74 has provided the first analysis of the organizational structure and industrial tactics developed by employers' associations in western Canada.

A comparative analysis with the U.S.A. still remains necessary. Two pioneering books have investigated and compared radicalism and urban development in B.C. and Washington State, but they do not examine industrial relations thoroughly. [See respectively, C.A. Schwantis, Radical Heritage: Labour, Socialism and Reform in Washington and British Columbia and N. MacDonald, Distant Neighbours: A Comparative History of Seattle and Vancouver. My research is intended to fill this gap in our historical knowledge by a cross border analysis of industrial relations.

METHODOLOGY:

In order to document the growth, tactics and interaction of cross border employer alliances, numerous documents were investigated within libraries and archives in Vancouver and Seattle.

RESULTS:

Major sources of evidence were investigated at the UBC library (Special Collections) and the Vancouver City Archives. Primary documents such as the Council for Forest Industries, B.C. Electric Railway Company and the Shipowners Association revealed connections to American associations. At the University of Washington archives the records of the following associations were investigated: Associated Industries of Seattle, Pacific Northwest Loggers' Association, West Coast Lumbermens' Association and the National Association of Manufacturers. These documents revealed the American industrial philosophy and in some cases their connection to Canadian associations.

Collectively, this research was an important stage in the collection of data on cross border industrial relations.

BUDGET:

SAC Grant Awarded	\$1475.00
Supplies: Xeroxing	\$ 45.00
Travel - Seattle	250.00
Vancouver	200.00
Accommodation and Subsistence	
Seattle	490.00
Vancouver	490.00
	<u>\$1475.00</u>

PREPARED BY: Andrew Yarmie

DATE: April 27, 1995

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: A Study on Deletable Graphs and N-Critical Graphs

PROJECT LEADER: Roger Yu, Department of Mathematics and Statistics, UCC

PROJECT COLLABORATORS: None

CLIENTS/AUDIENCE: Research community

ABSTRACT:

Over the last few years, the main interest of my research is to investigate the structure and basic properties of n -critical graphs and deletable graphs. This study includes the relationship between n -critical graphs and n -extendable graphs and also the connection of these two families of graphs with other graphic parameters, the deletability for different type graphs, and the extendable feature of some highly symmetric graphs such as edge-transitive graphs and Cayley graphs. Because these will continue to be one of my main research direction, the following statements will provide the motivations and objectives of my future research.

In order to study the structure of graphs with perfect matchings and to determine precise lower bounds on the number of different perfect matchings in a graph, Lovász (1972) began to develop a new structure theory for graphs for perfect matchings, and introduced two important new families of graphs - bicritical graphs and elementary graphs. He showed that in a certain sense any graph with a perfect matching could be constructed using only elementary bipartite graphs and bicritical graphs as building blocks. This decomposition can be pushed one step further by decomposing bicritical graphs into bricks. The new decomposition is referred to as Brick Decomposition and for a 1-extendable graph it is uniquely determined (up to isomorphism and the multiplicity of edges). Brick Decomposition has also turned out to be very useful in the study of matching lattice (Lovász (1987)). He proved that the dimension of the perfect matching polytope of a 1-extendable graph with n vertices, m edges and r bricks is $m-n-r+1$. Subsequent to these works, the study of these two classes of graphs was continued by Lovász and Plummer (1977). Today much attention is still focused on understanding the structure of bricks as, unfortunately, their structure is still quite unclear. Plummer (1980) studied the properties of n -extendable graphs and showed that every 2-extendable graph is either bipartite or a brick. Motivated by this result, many researchers have recently focused on the structure and classification of n -extendable graphs. Since any $2n$ -critical graph is n -extendable graph, the results and structure about n -critical graphs will be great help for understanding the structure of n -extendable graphs.

Regarding the structure of n -extendable graphs, Saito posed a critical-type conjecture in the research section of Discrete Mathematics which states that if a connected graph G is n -extendable and G is not $K_{r,r}$ or K_{2r} for some r , then there exists an edge not in G such that $G \cup e$ is n -extendable. Györi and Plummer found a counterexample to this conjecture and I showed that the conjecture is true if G is bipartite graph and that if G is not bipartite, then for any edge e not in G , $G \cup e$ is $(n-1)$ -extendable [8]. So, in light of Györi and Plummer's counterexample, this result is the best possible to the posed problem. Another conjecture about the extendability is posed by Schrag and Cammack [7] also in the research section of Discrete Mathematics, which states that for $k \geq 3$ the generalized Petersen graph $GP(p, k)$ is 2-extendable if and only if $p \neq 2k$ or $3k$. I confirmed this conjecture by using the symmetric properties of the generalized Petersen graphs [10].

Recently, I have obtained the characterization of n -critical graph [9]. Liu and I [1] introduced the concept of (m, n) -extendability (for any matching M and any set of n distinct vertices u_1, u_2, \dots, u_n of a graph G no one of which incident with any edge of M , there exists a perfect matching M^* of G such that $M \subseteq M^*$ and $u_i u_j$ is not in M^* for any $i \neq j$) which is a generalization of n -extendability. We have obtained partial results about the structure of (m, n) -extendable graphs. The characterization of n -extendability and the

knowledge of n -critical graphs are very likely to have significant impact on the study of the structure of n -extendable and bricks.

REFERENCES:

- [1] J.P. Liu and Q.L. Yu, Matching extensions and products of graphs, .Annals of Discrete Mathematics, 55(1993), 191-200.
- [2] L. Lovász and M.D. Plummer, On minimal elementary bipartite graphs, J. Combin. Theory, Ser. B., 23(1977) 127-138.
- [3] L. Lovász, On the structure and the matching lattice, J. Combin. Theory, ser.(B) 43 (1987), 187-222.
- [4] L. Lovász, Matching structure and the matching lattice, J. Combin. Theory, ser.(B) 43 (1987), 187-222.
- [5] L. Lovász and M.D. Plummer, On minimal elementary bipartite graphs, J. Combin. Theory, Ser. B, 23(1977) 127-138.
- [6] M.D. Plummer, On n -extendable graphs, Discrete Math. 31 (1980) 201-210.
- [7] G. Schrag and L. Cammack, On the 2-extendability of the generalized Petersen graphs, Discrete Math. 78 (1989) 169-177.
- [8] Q.L. Yu, A note on n -extendable graphs, J. of Graph Theory, Vol. 16, no. 4, 349-353 (1992).
- [9] Q.L. Yu, Characterizations of matching extension in graphs, Australasian Journal of Combin. 7 (1993), 55-64.
- [10] Q.L. Yui, Classifying two-extendable generalized Petersen graphs, Discrete Math. 103(1992) 209-220.

METHODOLOGY:

Focus of my effort on n -critical graphs and deletable graphs is the following problems:

- (1) Characterization of deletable graphs.
- (2) The complexity of computing the deletibility of a graph.
- (3) The relation between the deletibility and Hamilton-connected, or chromatic index, or binding number.

The method for these problems will be the characterization of n -critical graphs and the properties of (m, n) extendable graphs (which is introduced and studied by Liu and Yu [1]).

RESULTS:

With joint effort of G.Z. Liu, we have obtained a series of results on n -deletable graphs and n -critical graphs. They are included in the following papers.

[1] G.Z. Liu and Q.L. Yu, Toughness and perfect matching in graphs

Abstract: Let G be a graph with even order p and let k be a positive interger with $p \geq 2k + 2$. It is proved that if the toughness of G is at least k , then the subgraph of G obtained from G by deleting any $2k - 1$ edges or $2k$ vertices has a perfect matching. Furthermore, we show that the results in this paper are best possible.

[2] G.Z. Liu and Q.L. Yu, Star-factors with prescribed properties

Abstract: A $\{K_{1,1}, K_{1,2}, \dots, K_{1,n}\}$ -factor or $(1, n)$ -star-factor of a graph G is a spanning subgraph of G each components of which is isomorphic to one of $\{K_{1,1}, K_{1,2}, \dots, K_{1,n}\}$. If for any subset S of $V(G)$ and $|S| = k$, $G - S$ has a $(1, n)$ -star-factor, then we say that G is (k, n) -star-critical. A necessary and sufficient condition for a grpah to be (k, n) -star-critical is given. The properties of (k, n) -star-critical graphs are discussed. Furthermore, the relationship between star-factors and toughness of graphs is studied.

[3] G.Z. Liu and Q.L. Yu, K -factors and extendability with prescribed components deleting the vertices of a subgraph which is isomorphic to H the remaining graph of G has a k -factor. In the paper we study the properties of (k, H) -extendable graphs and obtain the characterization of (k, H) -extendable graphs. Furthermore, it is proved that if the toughness of G is at least $n (\geq 3)$, then G is $(2, nK_1)$ -extendable.

BUDGET:

This project was awarded \$1,850. The following are the details of the spending:

1. Professional Memberships (Institute of Cominatorics and its Application)	\$ 55.00
2. Computer Software and Accessories (Microsoft Office Suite, Computer Accessory TI-85 Graphing Calculator)	773.00
3. Travel and Accommodation	<u>868.00</u>
	<u>\$1696.00</u>

PREPARED BY: Roger Q.L. Yu

DATE: April 20, 1995

**FINAL PROJECT REPORTS OF STUDIES
SUPPORTED BY SAC IN 1991 - 1992 AND 1992 - 1993**

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: "Cradle to Grave: Nuptiality and Fertility in B.C., c.1870-1914"

PROJECT LEADER: John Douglas Belshaw

PROJECT COLLABORATORS: None

CLIENTS/AUDIENCE: Research community, reading public, etc.

ABSTRACT:

This study examines the main demographic contours of life in two late nineteenth century British Columbian settler communities. Specifically, it initiates a larger study of the province's historical demography by identifying the sex ratios, rates of nuptiality, age at first marriage, and levels of fertility in two middling cities: Kamloops and Nanaimo.

OBJECTIVES:

The primary goal of this exercise was to identify the extent to which natural population increase rivalled the numerical effects of immigration. In terms of the 'big picture' of Canadian history, it aimed to challenge the caricature of the west as overwhelmingly male.

BACKGROUND AND NEED:

The implications of such research for Canadian history are considerable. The orthodox understanding of 'frontier' population patterns is based almost entirely on factors unrelated to reproduction. Along the frontier immigration waves continued to play a critical role, but it remains to be shown whether the Sifton years (1896 - 1905) were ones of substantial *natural* increase as well. Second, an analysis of frontier marriage and birth records will reveal the extent to which the experience of families living on the Canadian periphery in the last quarter of the 19th century was uniform.

METHODOLOGY:

The factors influencing marital fertility and family size were central to this inquiry. In involved assembling data on sex ratios, nuptiality, marital fertility, and infant and maternal mortality. It has also demanded an appreciation of economic influences, particularly employment opportunities for adults and children, as well as the role played by mass education, the availability of land and markets.

The major sources for this study have been manuscript nominal censuses, parish/church records, voters lists, city directories, and community newspapers. Local and provincial archival resources were also utilized. The nature of the project demanded considerable fieldwork, much of it in cemeteries.

RESULTS:

In the case of sex ratios, it was discovered that the balance between adult non-Asian/non-aboriginal men and women was much closer than earlier surveys of the population history of B.C. suggested. Rather than being a frontier of unmarried men, this west was one in which married men and women constituted an important component. Second, the incidence of marriage was much higher among Nanaimoite women than among their sisters in Kamloops, producing differential marital fertility levels. The average age at first marriage, however, was almost identical in the two communities, suggesting an emergent pattern of behavioural and moral norms on the frontier. Finally, the fertility rate of Kamloopsian women was considerably greater than was the case in Nanaimo where, incidentally, fertility rates were high by international standards.

All of this points to two primary conclusions: (1) that the British Columbian frontier was the scene of considerably greater family activity than has hitherto been assumed; and, (2) the role of the children -- who constituted between 25 and 35% of the two community populations -- are by far the most underrepresented group in the historical literature to date.

The results of this study will be presented at the Canadian Historical Association's annual conference in Calgary next week. Another aspect, in which mortality rates are the focus, will be the subject of a second paper, "Death Takes a Holiday: An Examination of Demographic Behaviour on Two British Columbian Frontiers", which will be delivered at the B.C. Studies Conference in October, 1994. Publications will likely follow from this research.

BUDGET:

Travel (Kamloops to Victoria; Kamloops to Vancouver)	\$ 775.00
Accommodations	850.00
Meals (at \$40 per diem)	680.00
Materials (books, film, processing, stationery, discs, postage, archival photographs, etc.)	<u>300.00</u>
	<u>\$2605.00</u>

PREPARED BY: John Belshaw

DATE: June 8, 1994

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Self Perception as a Determinant of Salesperson Performance

PROJECT LEADER: Ken Blawatt

The project has taken a slight shift in direction that will improve the expected results.

Data for interview with Xerox Corp. and J.W. Thompson Co. in Toronto are being processed and will be used to develop a research questionnaire that will be administered directly to corporations in the lower mainland and eastern Canada.

RESEARCH:

1. Develop questionnaire
 - process existing interviews
 - discussions with companies in Vancouver (Summer 1994)
2. Administer questionnaires
 - mail out to eastern firms
 - delivery to and pick-up from Vancouver firms (early Fall 1994)
3. Process data (late Fall 1994)
4. Preliminary paper (December 1994)

PREPARED BY: Ken Blawatt

DATE: June 30, 1994

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Study of Floating Drops and Leidenfrost Droplets

PROJECT LEADER: Roland Cobb

PROJECT COLLABORATORS: Frank Curzon (UBC)

CLIENTS/AUDIENCE: Physicists, engineers

ABSTRACT:

Liquid drops can be induced to float above a liquid surface if the environment and temperature are controlled. The mechanism which provides lift and prevents a drop from coalescing with the substratum is uncertain. The effect of vibration on the lifetime of drops is also not well known.

Usually, we observe floating liquid drops when they possess a suitable velocity over the liquid surface. This suggests that a drop experiences fluid-mechanical lift. A theoretical consideration of the effect has now led me to believe that lift is due to an asymmetric movement of the point of separation for the flow around the drop. I believe such an asymmetry would arise in the vicinity of a liquid surface for flow with Reynold's numbers between about 10 and 1000 and this corresponds to the Reynold's numbers which we have for drop velocities observed.

OBJECTIVES:

To my knowledge, the mechanism I believe responsible for the lift has not been proposed or studied before. My objective is to attempt a theoretical calculation of the lift and compare the calculated value with measured values for various Reynold's numbers.

Since the mechanism I now believe responsible for the lift is different that I at first thought, the experimental arrangement will have to be modified somewhat. However, due to illness and work overload, not too much time has been wasted on making the measurements as first envisaged. Most of the work overload occurred because of my duties as Engineering Coordinator. These duties took most of my non-teaching time. Arguing that I have had no time to do scholarly activities, I have been successful in obtaining a one semester assisted leave. I have also given up the Engineering Coordinator's duties for at least one year. This should allow me to obtain some definite results this coming year.

METHODOLOGY:

Laboratory measurement and theoretical calculation.

RESULTS:

None to date.

BUDGET:

\$1,700.00

PREPARED BY: Roland Cobb

DATE: June 27, 1994

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Study of Electrically Produced Surface Waves on a Fluid

PROJECT LEADER: Unsure at this time.

PROJECT COLLABORATORS: Roland Cobb, Joseph Spuller, Tom Walton

The project was enthusiastically suggested by my UBC colleague (Frank Curzon) who is an authority on electrically produced waves. The project appeared ideal for UCC because the cost would be very low for a Physics experiment and because the results would be most likely publishable in a refereed journal. Since I already had a project, I recommended the experiment to others here at UCC. Joseph Spuller and Ben Guidici indicated their interest and so a request for funds was made. Since that request, Ben Guidici has realized that he is so overloaded with work that to spend any time on the project would leave no time for his wife and children and has asked to withdraw from the project. Joseph Spuller has been faced with an unexpectedly heavy workload this past year due to the new Acoustics course and has had little time to spend on the project.

The present status regarding collaborators is this: I will find time to work on the project when I get my assisted leave; Tom Walton has stated his interest in contributing to the project; and Joseph Spuller has indicated his continued interest (but at a less enthusiastic level as I understand him).

CLIENTS/AUDIENCE: Physicists, Engineers, Physics Students

OBJECTIVES:

The first objective is to acquire the material and electrical components to begin the project. The most expensive component is a transformer. Last year, there was a quote from a company for the manufacture of a suitable transformer.

Unfortunately no order was placed at that time because we were advised that a transformer could be obtained as a donation. The donation never materialized and in the meantime the company from which the quote was obtained has gone out of business. The engineer in the electronics shop at UBC is currently looking for another company able to manufacture the transformer. I am concerned that time is running out.

METHODOLOGY:

Design a construction of experimental apparatus.

RESULTS:

None yet.

BUDGET: \$1550.00

PREPARED BY: Roland Cobb

DATE: June 29, 1994

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: The Effects of a Staff Education Program on Incidents of Physical Aggression by Confused Elderly Residents Towards Nursing Staff in a Long-Term Care Facility

PROJECT LEADER: Brad Hagen

CO-INVESTIGATORS: Brad Hagen RN, BSc, MScN., Senior Instructor: School of Nursing, University of Victoria. (Formerly Nursing Instructor: University College of the Cariboo, Kamloops, B.C.)
Dorie Sayers RN, Staff Education Coordinator: Overlander Extended Care Hospital, Kamloops, B.C.

RESEARCH PROBLEM:

Nursing aides and registered nurses at a 200 bed long-term care facility in the Cariboo region of B.C. identified the most significant clinical problem encountered daily was physical aggression directed towards them by confused elderly residents. However, there was no existing documentation on the actual extent of the problem.

The nursing staff had identified that a staff education program on patient aggression might be of some help. The question was how to evaluate such an education program as to its effectiveness at reducing residents' physical aggression towards staff.

RESEARCH PURPOSE:

The research's purpose was: (1) to devise/pilot an accurate, confidential and anonymous method to measure resident aggression towards nursing staff, (2) using this method, to assess the "normal" incidence of physical aggression by confused elderly residents towards staff, and (3) to determine the effects of a staff education program on such aggression.

METHODOLOGY:

After consulting nursing staff and the literature, a "check sheet" was developed and piloted. Using this check sheet, the nursing staff anonymously and confidentially documented occurrences of physical aggression by their elderly residents for eight consecutive days. Data were collected on the number of aggressive incidents, the time and nursing action when the aggression occurred, the type of aggression, and whether the aggression caused injury.

After the initial eight day data collection, the 200+ nursing staff was offered an educational inservice consisting of three 20 minute modules. These modules were aimed at helping the staff to understand dementia in the elderly and why it might lead to aggressive behaviour. The third module examined nursing actions that might help to prevent/reduce such aggression. Three months later, almost ninety percent of the nursing staff had completed the inservices. Staff again was asked to document the incidents of aggression by elderly residents for another eight day period.

RESULTS:

Most incidents of aggression happened during times of personal care, between 0800 - 0900, 1000 - 1100, and 1900 - 2100 hours. Almost half (48.4%) of the incidents occurred while "dressing or changing" residents, with another 22% occurring during "transferring or turning" residents. The largest category of aggression by type was "pinching or grabbing" (42%) followed by "hitting or punching" (30%).

During the eight day period prior to the inservices, 181 incidents of aggression were reported (average = 22.6/day). This was compared with 93 incidents during the eight day period after the inservices (average = 11.6/day). This represents a dramatic decrease in reports of physical aggression directed towards nurses.

CONCLUSIONS/NURSING IMPLICATIONS:

This study documents the extensive problem of physical aggression towards nursing staff in long-term care facilities. It also identifies particularly "hazardous" times and/or nursing activities when aggression is most likely to occur.

The nursing staff who participated in this study had little or no previous knowledge of dementia and its role in aggression in the elderly. Our findings suggest that inservice training for such nursing personnel may prove quite useful in helping the staff to prevent and reduce some -- but not all -- elderly residents' physical aggression towards them.

If you have any questions regarding the staff education inservices or the study, please feel free to contact me at 721-6462.

PREPARED BY: Brad Hagen

DATE: June 28, 1994

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Vancouver's New Play Centre: Writing Out of Genre

PROJECT LEADER: James Hoffman

CLIENTS/AUDIENCE: Canadian theatre research community; Canadian play development centres

ABSTRACT:

The phenomenon of the play development centre is largely ignored in the critical literature. Vancouver's New Play Centre, for example, celebrating over twenty years of existence, declares itself "invisible", that it is "one of the best-kept theatrical secrets in Canada." Why is this? A solution may lie in examination of the Centre as a genre that is resistant to analysis. In this paper, I consider the New Play Centre as a tentative genre existing within certain limiting theatrical boundaries and within host genres but at the same time possessing distinct possibilities of being a metagenre.

Certain characteristics of the Centre, revealed in key formative documents and confirmed in recent interviews with directors and playwrights, argue for a highly dynamic constitution as genre. For example, its relationships with constituents—with the community, with its writers, even with the theatre—have been the site of unstable generic expectations. In addition, the pattern of movement from one genre to another, as in the case of directing and dramaturging, has been one of conflicting claims and therefore ambivalence with regard to genre. At the same time, the Centre has had a strong social function; that is, specific details regarding the writer's relationship with the theatre and community have been signalled in ways that have, among other things, determined certain genres of drama, especially those of realism and political conservatism. Finally, examination of the Centre's representation of the artist, as well as its theatrical/dramaturgical aesthetic, provides evidence of an institution particularly constructed to function in an elusive space between metagenre and non-genre.

RESULTS:

This paper was read to the Association for Canadian Theatre Research at the Learned Societies Conference in Calgary, Alberta, in June, 1994. It is subsequently being revised for submission to the journal, Theatre Research in Canada. The paper has also been requested by the Saskatchewan Playwrights Centre in Saskatoon for examination (dramaturge: Patti Shedden).

BUDGET:

Travel to Vancouver; Recording Equipment \$1,400.00

PREPARED BY: James Hoffman

DATE: August 10, 1994

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Anti-utilitarian Attitudes in English Studies

PROJECT LEADER: Henry Hubert
Department of English and Modern Languages

PROJECT COLLABORATORS: This project was undertaken as a personal research venture. However, conference participation related to this research has been supported by the Social Science and Humanities Research Council of Canada, by the Canadian Society for the Study of Rhetoric, by the Canadian Association for Writing and Reading, and by the University College of the Cariboo.

CLIENTS/AUDIENCE: This project prepared a paper and conference presentations for the English professorate in Canada and the United States, with paper presentations in both countries and a formal paper submitted to English Studies in Canada, the official journal of the Association of Canadian College and University Teachers of English.

ABSTRACT:

The last decades of the nineteenth century saw major developments in English Canadian higher education. Between 1875 and 1900, the curriculum in Canadian universities shifted from a predominantly unified core of studies for all students to a series of choices, based on the specific interests of students. This curricular shift, of course, took place within the rise of specialization within both the Arts and Sciences.

Among the courses of study affected by this specialization, English itself experienced a major shift in focus, from an emphasis on rhetoric (speech and composition) to an emphasis on poetics (reading and literary analysis). The core of the new poetics curriculum became the classical texts of British literary history, from Beowulf to Robert Browning, Matthew Arnold, and Lord Tennyson. With this shift in curriculum came a shift in ideology as well, from a utilitarian focus in the former rhetoric program to a distinctly idealistic focus in the new literary program. Rhetoric, perceived as useful in commercial pursuits and personal advancement, was considered secondary to literature, which refined and elevated the human spirit.

The new polarization between rhetoric and poetics derived from a polarization in British education, especially in England, where Matthew Arnold's works like Culture and Anarchy and Essays in Criticism presented classical and British literature as the antidote to the empiricist, utilitarian, middle-class concerns associated with the theories of Jeremy Bentham and John Stuart Mill.

The new idealist positions were introduced to Canadian higher education in the first generation of English specialists: William J. Alexander of Dalhousie (later at the University of Toronto), James Cappon of Queen's and Archibald MacMechan of Dalhousie (after Alexander left for Toronto).

The idealist, anti-utilitarian attitudes of that first generation of English specialists still prevail in English studies in Canada, with literature courses numerically strongly favoured over composition courses, oral rhetoric courses in Canada having virtually disappeared.

OBJECTIVES:

The objectives of the project were to develop an historical perspective on the marked privileging of literature over composition in contemporary practice in English studies in Canada--and, insofar as the same developments apply, in the United States as well.

METHODOLOGY:

The research for this study was conducted exclusively in libraries and archives in Kingston, Toronto, Ottawa, and Vancouver, as well as through inter-library loans from other libraries and archives.

RESULTS:

The research from this project appears in my recent book, Harmonious Perfection: The Development of English Studies in Nineteenth-Century Anglo-Canadian Colleges (Michigan State University Press, 1994). The research has also resulted in a formal paper submitted to the journal English Studies in Canada as well as a forthcoming chapter "A History of College Rhetoric in the U.S. and Canada: Different Traditions" in Social Reflections on Writing: To Reach and Realize, to be published in Winnipeg. The research has also been presented at conferences in Vancouver, Cincinnati and Ottawa. Results of this research have also been integrated into my courses, English 304 (Advanced Composition) and English 306 (History or Rhetoric).

BUDGET:

(Air travel expense for research during this period has been paid by support for conference travel, as noted in "Project Collaborators" above.)

Accommodation (Ottawa)	\$ 185.00
Expenses	120.00
Accommodation (Vancouver)	205.00
Expenses	215.00
Travel (Vancouver)	400.00
	<u>\$1125.00</u>

PREPARED BY: Henry A. Hubert, Ph.D.
Department of English and Modern Languages

DATE: September 1, 1994

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: J.D. Beresford: A Candidate for Truth

PROJECT LEADER: Dr. George M. Johnson

The SAC funding received was used for a research trip to England from April 8 - 30, 1993 during which I examined the largest collections of novelist J.D. Beresford's unpublished material. In London, I visited the British Institute of Psycho-analysis because of Beresford's early connections with that movement. Near Arundel, at the home of Jon Wynne-Tyson, publisher and writer, and the son of Beresford's collaborator, Esme Wynne-Tyson, I read and made notes on Beresford's unpublished autobiography "Memories and Reflections," his diaries, letters, typescripts and manuscripts. I then traveled to the National Library of Wales in Aberystwyth where I read Beresford's correspondence with novelist John Cowper Powys.

The results of this research to date are two entries for volumes of the Dictionary of Library Biography, British Short Fiction (ed. John Rogers) and British Novelists 1890-1918 (ed. George M. Johnson), both of which are scheduled to appear in 1995. I am also carrying out my original intent of publishing what will be the only work of criticism on Beresford, for Twayne publishers. That project is well underway and is due in to the publishers in December 1994. It has taken longer than anticipated because of my work editing two volumes of the Dictionary of Literary Biography in the intervening time and because of a heavy teaching load.

This research trip was an essential one, especially since I was able to interview a person who knew Beresford well. The research undertaken has enabled me to produce thoroughly informed entries on Beresford, and will enable me to produce a detailed biography and critical assessment of him for Twayne. Again I thank the committee for their support. If you require any additional information, I would be most willing to supply it.

PREPARED BY: George M. Johnson
Department of English and Modern Languages

DATE: September 1, 1994

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Freedom of Speech--A Liberating Duty [a dissertation for the completion of the degree--Doctor of Philosophy at UBC]

PROJECT LEADER: Dan O'Reilly

ABSTRACT:

The main focus of my work was to complete a dissertation on Freedom of Speech. That was not successful (see **RESULTS** below); nevertheless, I was able to complete two papers. Those papers are:

One paper addresses the meta-theory of rights. In this paper, I use the Square of Opposition of Classical Logic to highlight the logical relations, both deontic and alethic, that constitute a rule system. This model can then be used to assist in the analysis of the relations that constitute rights in general.

The second paper directly addresses the issue of Freedom of Speech. In this paper, I examine a principle of the freedom of speech based upon Alexander Meiklejohn's argument from democracy. I argue that Meiklejohn's is a duty-based theory of free speech, whereas most free speech theories are right-based theories. In the paper, I outline why most theories are right-based, what a right-based theory of free speech is, what a duty-based theory of free-speech is, why Meiklejohn's theory is duty-based, and why, until my paper, his theory has not been identified as duty-based in the literature.

OBJECTIVES:

The primary objective of the project was to write a successful Ph.D. dissertation, and the secondary objective was to achieve some published articles.

RESULTS:

Though I was unable to achieve my primary goal, a successful Ph.D. dissertation, I was able to generate two papers from the thesis material, one of which has so far been accepted for publication.

One paper: "Using the Square of Opposition to Illustrate the Deontic and Alethic Relations Constituting Rights" has just been accepted for publication by *The University of Toronto Journal of Law*.

I have yet to submit the second paper, "Freedom of Speech--A Liberating Duty" to a journal, but hope to do so shortly.

BUDGET:

I received a 4 hour reduction in workload for two terms upon the recommendation of the SAC Committee. (UCC administration approved a 12 hour work load during the Winter and Fall of 1992 rather than my normal 16 hour workload.)

PREPARED BY: Dan O'Reilly

DATE: July 27, 1994

SCHOLARLY ACTIVITY PROJECT REPORT

PROJECT TITLE: Computer Simulation of Medical Instrumentation

PROJECT LEADER: F.A. Rice

PROJECT COLLABORATORS: D. Rouisaard, Systems Director, B.C. Center for Disease Control, Vancouver, B.C.

CLIENTS/AUDIENCE: Clinical laboratory educators in didactic and clinical settings

ABSTRACT:

A computer program was developed which simulates the operation of an automated blood cell counter. The program code randomly generates both normal and abnormal patient results. The results generated are; hemoglobin, hematocrit, erythrocyte number, MCV, MCH, MCHC, RDW, leukocyte count, leukocyte differential and platelet number. These results are randomly generated so as to fit a specific patient condition and are not selected from a set of stored results. As well, the program produces appropriated leukocyte, erythrocyte and platelet histograms to match the generated data. The program then selects and displays a matching color photomicrograph selected from a collection of 12,000 images stored on a laser disk. The display of this data is identical to that seen on a real particle counter.

The student is then required to identify the results displayed, just as in the real world.

BACKGROUND AND METHODOLOGY:

Health education is faced not only with the problems of information overload and biohazard, but also with problems of patient availability, technologic change and shrinking budgets.

Technology is constantly changing, expensive to purchase and expensive to operate. As well, there is more than one instrument capable of performing any given test or procedure. Each student must be provided the opportunity to use each of these expensive instruments as often as possible in order to ensure they become proficient, not only at running these instruments, but also at interpreting the results generated. With the program developed all the major instrument types can be simulated. It doesn't matter how many times the students run the simulation there is no consumption of reagents, no wear and tear on the instrument, and no exposure to hazardous patient specimens. Students use the simulation to apply newly learned knowledge in a cost effective ,safe, and physically non-threatening environment.

The correct diagnosis and treatment of patients today is, to a large extent, dependent upon the production and correct interpretation of accurate laboratory data. If this data, or interpretation of the data, is incorrect then, the diagnosis and or treatment of the patient must also be incorrect. Students can become competent in data interpretation only through experience. Simulated patient data generated by this program allows the student to become a competent, effective, decision maker without having to interact directly with the patient. Computer generated simulations ensures that patients are not placed at risk by the student and the student is not exposed to potentially dangerous patient specimens.

The original program was used by students in the Clinical Laboratory Sciences program at UCC and was demonstrated at several national and international meetings of laboratory educators. Two deficiencies were identified. When the student was incorrect in their interpretation of the data there was no mechanism to allow them the opportunity to learn from their mistake. The program now contains an extensive library of information on the following disease states; iron deficiency, thalassemia minor, thalassemia major, sideroblastic anemia, megaloblastic anemia, reticulocytosis, and liver disease. The student can now compare the patient results generated by the program to the patterns which would occur in the above disease states.

Although Macintosh based systems are common in the educational community the majority of clinical laboratories use IBM systems. To allow this program to be used during the clinical year, it had to be written in a language which could be used on both systems. "Plus", published by ObjectPlus corporation, Cambridge MA, allows this cross platform portability.

The effectiveness of this program is in part due to the fact that it is able to select and display appropriate color images stored on a laser disk. Plus does not have the inherent ability to link to external devices such as laser disks and CD-ROM's. An extensive set of subroutines were written by D. Rouisaard to allow this to occur from within the Plus environment.

RESULTS:

The presentation of papers and workshops to:

- American Medical Laboratory Educators National Conference - Denver (February 1992)
- Bringing Student Success into the Classroom Workshop - Kamloops (April 1992)
- BCSMT Interior Academy Spring Seminar (April 1992)
- Innovations in Education Conference - Kamloops (May 1992)
- Canadian Medical Laboratory Educators National Congress - Calgary (June 1992)
- BCSMT Provincial Congress - Terrace (September 1992)
- Canadian Society of Laboratory Technologists National Congress - Halifax (June 1993)
- BC Society of Medical Technologists Provincial Congress - Kelowna (September 1993)
- Kootenay Academy of BCSMT Spring Seminar - Cranbrook (April 1994)
- Canadian Society of Laboratory Technologists National Congress - Vancouver (June 1994)
- Interior Academy of BCSMT Fall Seminar - Kamloops (September 1994)
- B.C. Health Association Annual Conference - Vancouver (November 1994)

Copyright has been obtained by UCC on this program and is now the property of UCC. It is currently in use at clinical sites in Canada and the USA.

The subroutines developed during this project to allow Plus programs to directly drive external devices can be used in other programs developed for instructional purposes in other areas such as nursing or natural resource sciences.

Students using this program appreciate the opportunity to learn at their own rate and at times convenient to their schedule. Although hard data is not yet available, preliminary indications are, that students in their clinical training and who have used this program, are much better prepared to function in a real hematology laboratory.

Two papers have been published:

- "Computer Simulations in Initial and Continuing Medical Laboratory Education" Canadian Journal of Medical Technology, 1994; 56: 113-116.
- "A Computer Program to Aid in Learning Differentials and Morphologies" Medical Laboratory Observer, 1994; 26(6): 55-58.

ObjectPlus Corporation, publisher of the computer language "Plus" is currently completing a rewrite of the language. As a result of my extensive use of this language and suggestions made to the company on improvements, I have been asked to act as an alpha tester of the new release. This is to occur during the fall of 1994.

PREPARED BY: F.A. Rice

DATE: July 21, 1994

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