TECHNOLOGY EDUCATION IN BRITISH COLUMBIA:
A SURVEY OF HISTORY, PROGRAMS AND PRACTICES

by

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ABSTRACT

Technologically literate citizens can participate intelligently and thoughtfully in the world around them. This research provides a picture of the state of Technology Education in the public schools of British Columbia at the beginning of a new Millennium.

A substantial literature review traces the origins of Technology Education back through Industrial Education, Industrial Arts to Manual Training, championed at the turn of the last century by the philanthropist William Macdonald. Manual Training’s grounding in European Sloyd based Educational Systems provides a backdrop for a review of the published results of several commission reports and surveys. A detailed evaluation of a recent province-wide survey of all Middle, Junior and Senior Secondary schools provides statistics that support arguments that additional TE teachers will be required in the immediate future to replace those retiring. The shops and labs in BC’s public schools studied are a mixture of traditional, general shops and New Technology labs. School departmental program offerings as well as specific subjects being delivered were analyzed and critiqued to provide insight from within the schools. A picture emerges from the findings illustrating the possibility that an industrial focused curriculum is being delivered under the guise of Technology Education, with troubling consequences. Computer based and new technology subjects are gaining popularity but male dominated narrow tool-skill subjects Woodwork, Metalwork and Automotive continue be promoted, even in the face of declining
enrolments. A purposeful curriculum invigoration of some twenty years in is
danger of stalling or reversing.

The transformative nature of research and the investigative process is
illustrated in the final chapter that deals with my own narratives of socialization
and experiences in Industrial, Vocational, and Technology Education. My own life
history illustrates and reflects the historical phases of Technology Education
Evolution.
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CHAPTER ONE: THESIS INTRODUCTION

1.1 Introduction

Technology Education in British Columbia is in a state of transformation. The prescribed change from the established Industrial Education Curriculum to one modeled on Technology Education continues to be moderated by historical, social, and economic engines. While Technology can be considered as old as humanity (Phillips, 1985), the interest in incorporating Technology Education into the framework of public liberal education is a less than two decades old. Chinien, Oaks and Boutin (1995) argue that the interest is largely propelled by major shifts in world economies and the changes that have resulted and impacted on the skill sets required in the workplace. A technologically literate and well-educated workforce is considered a key ingredient for maintaining national competitiveness.

What has often been referred to as Shop or Technical Education has at various times been identified by different terms including; Manual Training, Manual arts, Industrial Arts, Industrial Education, Technical Education, Vocational Training, and Technology Education. These descriptors suggest a chronological progression of a single field or subject. The name changes and shifts in focus may have been driven by political, social and economic engines. Parts of the curriculums can be identified with liberal education or with pragmatic roots have remained despite shifts in focus and direction (Phillips, 1985).
Some educators have argued strongly that people entering a wide range of careers and occupations require a greater understanding on the technological world; they need to be more than wise consumers or uses of technology. They must be able to function effectively in an immerging society that continues to reinvent itself. A technology education approach that illuminates how the embedded social and cultural biases of technology can influence the political, social and economic systems of a society and contribute to making students technologically literate (kemp & Schwaller, 1988, p.1). A technologically literate citizenry is essential in balancing the political and economic structures of rampant consumerism (with its general disregard and neglect of the environment) against the need of citizens to participate intelligently and thoughtfully in the world around them.

1.2 Structure of the Thesis

I open Chapter One with a discussion of the background and intent of my master’s thesis to provide a picture of the state of Technology Education in the public schools of British Columbia. Following this brief introduction, in Chapter Two I undertake a comprehensive literature review, of historical literature and the published results of key commission reports and surveys that trace the evolution of Technical/Technology Education. In Chapter Three, I discuss my methodology that merges survey, historical and narrative approaches. In Chapter Four, I undertake a detailed evaluation of a recent province-wide survey. This evaluation includes all Middle, Junior and Senior Secondary schools data on: Technology
Education teacher retirement demographics, School departmental program offerings and specific technology subjects taught in British Columbia’s Public Schools. In *Chapter Five*, I present my survey findings, as I analyze and critique the insights from the field practitioners, and situate my implications within the historical context of *Chapter Two*. My master’s thesis departs from the structure of the traditional 5-chapter thesis. In *Chapter Six*, I close on a personal note, writing this chapter a journey enacted over four decades, two continents and several Canadian provinces, weaving my life experiences through industrial, vocational and technical education.

### 1.3 Significance of this Study

This undertaking is significant in that it will provide a snapshot of the state of Public School Technology Education at the beginning of the second millennium. The last complete survey of the provinces schools; the *Chant Commission report* was conducted in 1960.

### 1.4 Statement of the Problem

The problem investigated by this research was to survey school Technology Education department heads or coordinators; to document the extent to which industrial education has been transformed into technology education.

Four human-adaptive systems of subject matter embody four major areas of contemporary society: (ITEA, 1985)
• Communication technology involves efficiently using resources to transfer information to extend human potential.
• Construction technology involves efficiently using resources to build structures or constructed works on a site.
• Manufacturing technology involves efficiently using resources to extract and convert raw/recycled materials into industrial and consumer goods at a central plant location.
• Transportation technology involves efficiently using resources to obtain time-and-place utility and to attain and maintain direct physical contact and exchange among individuals and societal units through the movement of materials/goods and people.

A new conceptual framework titled: Technology Education was produced by the British Columbia Ministry of Education in 1992 (BCMOE, 1992). Within this umbrella, four new curriculum areas; Information Technology, Materials and Processes Technology, Power and Energy Technology, and Systems Integration Technology were introduced. With the exception of Information Technology the remaining strands have not materialized and the existing traditional subjects; woodwork, metalwork etc. persist with the addition of the word “technology” as an add-on. e.g. (Automotive) Technology. It is conceivable that these subjects are being approached from a Technology Education perspective; it is also arguable that in some schools Technology Education has been embraced in name only.

In a journal article titled “Where do we go from here” Pullias postulated that there are three positions that can be taken with respect to Technology Education Curriculum Change: (Pullias, 1989, p. 3-4)

• The “revolutionary” position proposes “to discard the old and begin fresh.”
• The "evolutionary," view prefers "to keep part of the old, install part of the new, and 'ease' into full implementation"

• The third position "is to disguise what we have been doing for years and try to make it look like a new curriculum".

If Technology Education has been embraced in name only, the third position, the status quo of Industry aligned, male dominated technical electives will be perpetuated, reinforcing the adage that *Males Build and Females Decorate.*

1.5 *Purpose of this Research*

The purpose of this research is to inform the practice and policy of Technology Education in Canada.

The stabilized or decreasing birthrates following the rapid expansion of European and North American populations following the *Second World War* (1939-1945) is expected to result in shortages of skilled workers in all sectors of the economy (Marshall and Mueller, 2002) Within an ageing professional workforce many technical teachers are approaching retirement. “More than one-third of BC's educators are 50 years of age or older. In the next four to eight years, 13,000 teachers are likely to retire” (BCTF, 2004). An accurate estimate of the number of new teachers that will be required to teach in the technology areas is long overdue; without an adequate supply of qualified technology teachers school districts may have to cancel certain courses or will have the justification to abandon expensive elective subjects.
1.6 Delimitation

The survey was delimited to Technology Education teachers and department heads (Technology Education Coordinators) in the Middle, Junior and Secondary public schools of British Columbia. Private schools and First Nation Band schools were not surveyed at this time. Private schools in the province have historically provided an academic focus; linked to post-secondary and they do not generally include technology education, industrial arts, or industrial education in their curriculum in other than in a craft context. Most First Nations schools operate as private “Band Schools” and organize curriculum around a K-10 or K12 format. Industrial and Technology Education electives are not common, due in large part to the negative impact of the Native Residential School experience which had a usury vocational focus (Battiste & Barman, 1996). Inclusion of data from these sources would skew the results and findings.

1.7 Assumptions

1) It was assumed that the sample used was adequate.

2) It was assumed that the survey instrument was valid and reliable.

1.8 Operational Definitions

Technology

The term Technology is often used in a generic way for all the technologies that humans develop and utilize. The public conception that
technology is a product of modernity and only concerns electronic and digital innovation is confusing. Technology involves the purposeful application of knowledge, experience and resources to create products and processes that meet human needs. The term *Technology* is in one way problematic as it embodies due Western interpretations of *Technique, Technic and Technical*. With *Technique* there is the "internal" skillfulness of an action. In the second and third case the context is of tools used in an external action. Skilful action necessarily uses tools; its skillfulness cannot be dissociated from using these tools (Latour, 1994a, Brey 1997).

According to Webster’s Ninth Collegiate Dictionary (1985, p. 1211) technology is “the totality of the means employed to provide objects necessary for human sustenance and comfort.”

Increasingly the term "(new) technology" is attributed to certain artifacts; digital processors for example, which are products of the skilful use of tools and technique and at the same time are themselves used as tools for some other purpose.

**Industrial Education**

- *(is) an area of education which teaches general principles of technology through workshop experience with materials, tools, and machines. Industrial Education has the following specific aims: (BC. DOE, Division of Curriculum, 1964, p.6)*
• To teach principles of technology and to apply these principles in practical situations.
• To explore and evaluate the interests and aptitudes of students in technology fields.
• To establish a broad base of technological skills which will provide a sound foundation for subsequent development of the individual.
• To develop systematic planning and safe practices in the solution of technological problems

Industrial Arts

• ...is a study of the changes made by man in the forms of materials to increase their values, and of the problems of life related to these changes (Bonser & Mossman, 1923).
• ...those phases of general education which deal with industry - its organization, materials, occupations, processes, and products - and with the problems of life resulting from the industrial and technological nature of society (Wilber, G. 1948, p.2).

Technology Education

• ... an educational program that helps people develop an understanding and competence in designing, producing, and using technology products and systems, and in assessing the appropriateness of technological actions. *International Technology Education Association* (Wright, Israel, & Lauda, 1993)
• Technology Education is a multidisciplinary school subject concerning knowledge in designing, creating, using, maintaining, regulating, and recycling technologies (products, processes and services) (Petrina, 1997).
• A comprehensive, action-based educational program concerned with technical means, their evolution, utilization, and significance; with industry, its

- That phase of general education in which students deal experientially with technology—its evolution, utilization and significance; and with industry—its organization, materials, occupations, processes, and products—and with the benefits and problems resulting from the technological and the industrial nature of society (Maley, 1985).

- That phase of general education that deals with the study of technology—its evolution, utilization and significance—and with the technologies associated with the many diverse elements of construction, manufacturing, communications, power, energy, and their economic, political, social and environmental impacts (Maley, 1991).

Between 1973 and 1991 Donald Maley published a least 3 definitions of *Technology Education*. Although similar they reflect a change in emphasis from the Industrial to the Social.

**Educational Technology**

- ... is a complex, integrated process involving people, procedures, ideas, devices, and organization, for analyzing problems and devising, implementing, evaluating, and managing solutions to those problems involved in all aspects of human learning. In educational technology, the solutions to problems take the form of all the *Learning Resources* that are designed and/or selected and/or utilized to bring about learning, these resources are identified as messages, people, materials, devices, techniques, and setting (AECT, 1977).
Vocational Education

- Instruction designed to enable people to succeed in occupations requiring less than a baccalaureate degree (Evans & Herr, 1978).

- Organized educational programs which are directly related to the preparation of individuals for paid or unpaid employment, or for additional preparation for a career requiring less than a baccalaureate or advanced degree (Calhoun & Finch, 1981).

- (Vocational programs)......offer a sequence of courses that provides individuals with the academic and technical knowledge and skills the individuals need to prepare for further education and for careers (other than careers requiring a baccalaureate, master's or doctoral degree) in current or emerging employment sectors (Perkins, 1998).

- Organized educational programs offering a sequence of courses which are directly related to the preparation of individuals in paid or unpaid employment in current or emerging occupations requiring other than a baccalaureate or advanced degree (Perkins, 1990).
2.1 A Brief History of Technology Education

What is Technology Education? According to the American Association for the Advancement of Science, Technology Education in its broadest definition is the oldest discipline among all of the school subjects (A A A S, 1993; Zargari & MacDonald, 1994). Going back possibly as far as 500,000 years, “hand skills” were very important to the survival of primitive society and contributed to the refinement of civilization (Phillips, 1995). Technological knowledge “arising from, and embedded in, human activity” (Herschbach, 1995).

The anthropological view holds that about 2.4 million years ago the first humans created primitive tools by chipping away the edges of suitable stones. The development of hunting tools: spears, bows and arrows, and simple traps allowed tribal/social groups to expand and grow due to more readily obtainable sources of food and clothing. The growth and productivity that organized hunting brought to early society brought with it divisions of labor, gender and a hierarchy of status. In the simplest terms what developed was a hierarchy based on hunting and providing food that placed the strongest and most agile members at the top and the less capable further down and responsible for providing shelter and security from competing tribes¹. Individuals that had learned the migratory habits and hibernation patterns of birds and animals would have been better

hunters or providers thus attaining special status. Women’s roles apart from child bearing, would have included preparing and cooking meals, making and repairing clothing, and keeping the living spaces clean; roles based essentially on remaining close to the hearth and nursery. This close proximity to the family shelter enabled women in hunter-gathers societies to assume agricultural roles; sowing seeds and tending medicinal and spice gardens. Yet early humans had become more than tool makers and tool users. A problem-solving capacity had emerged along with systems of production and control, divisions of labor based on status and gender that would endure for centuries.

2.2 Early Education and the origins of Manual Training

During what is often termed the Greek period (27 BCE-1453 AD), Aristotle (384-322 BCE) identified three disciplines, the theoretical, the practical and the technical. Although the two principal city-states Athens and Sparta differed considerably, neither included practical arts instruction in their children’s education. In Athens, boys and girls were generally educated at home or in low cost state schools up to the age of 13 or 14. Apprenticeships in wood and metal trades were available for boys and domestic service for girls. In Sparta, healthy boys entered military schools and became soldiers at age 18 or 19. Girls could be educated at home or attend state schools that promoted good physical condition and health.

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2 According to Aristotle, education was central to becoming a fulfilled person. Learning was accomplished by doing, and was complemented by reason and a balanced curriculum delivered by educators with a clear philosophy of life.

3 These attributes were also the ones required for childbearing.
The Romans⁴, are thought of as innovators for developing gravity water and sewer systems for towns and villages, central heating for civic and private buildings, promoting the widespread use of the arch in aqueducts and refining copper and lead.

**Figure 1. Segovia Aqueduct.**

By contrast state education was not concerned with fine arts or training for adult employment. The affluent employed a pedagogue, a specially trained slave to ensure that the boys attended lessons at home with a tutor or at a fee-paying school. To acquire skills, boys who had finished attending school and did not go into military service, entered into family apprenticeships with an uncle or the father teaching the son. Education for girls was limited to home tutorage and domestic training.

During the Medieval or Middle Ages (300-1300 AD), Guilds of skilled artisans across Europe provided elementary level education for children of guild members. Classes were conducted by clergymen and paid for by the guild.
2.3 European Manual Training Roots

Martin Luther was a supporter of public state funded education and included "Manual Arts" as a vital part of liberal education (Phillips, 1985). He promoted the establishment of public schools and in his 1524 open letter, "To the Councilmen of All Cities in Germany", he argued that one of the duties of government was to ensure decency and the good order in society through public education.

Comenius is considered by many as the Father of Modern Education. In relating education to everyday life he developed pansophism, a philosophy that emphasized religious reconciliation, political unity and cooperation in education. He advocated a system of public education: teaching in the vernacular rather than the customary Latin.

"Education is indeed necessary for all, and this is evident if we consider the different degrees of ability. No one doubts that those who are stupid need instruction, that they may shake off their natural dullness. But in reality those who are clever need it far more, since an active mind, if not occupied with useful things, will busy itself with what is useless, curious, and pernicious. Not the children of the rich or of the powerful only, but of all alike, boys and girls, both noble and ignoble, rich and poor, in all cities and towns, villages and hamlets, should be sent to school." (Keatinge, 1967).

5 The quote was located on the Froebel Web: http://members.tripod.com/~FroebelWeb/web7005.html
6 The Great Didactic can be translated to mean The Whole Art of Teaching.
7 The Great Didactic, was written 1628-32 and published 1649. Translated by M.W. Keatinge 1896.)
Comenius' 11 Didactical rules of teaching,\textsuperscript{8} would become foundational as later reformers and educators considered the educational value of bringing practical activities into classrooms. According to Jakubec, (1928) the underpinnings of Sloyd\textsuperscript{9} systems have roots in Comenius:

\textit{he was the first to realize that the object-lesson was the only way in which any impression could be made on the half-developed thinking powers of the child [and] he practically anticipated Pestalozzi, and paved the way for Froebel . . .}

Visualization in all things is the watchword of the Comenian method (Keatinge, 1967 p, 150).

Comenius' Didactical rules of teaching (IBED)

The ways of working must be learned in work: "Schools must be workshops where all are working".

1. There must be a \textit{pattern} (examples) and \textit{rules} (precepts) for the work to be done.
2. The use of tools should be learned rather in work and by pattern than by rules.
3. In the beginning the elementary skills should (be) first trained before more complex task.
4. In the beginning the familiar areas should be considered first.
5. In the beginning the training should be imitation of the pattern and only later may be improvised more freely.
6. The patterns should be as perfect as possible.
7. First trial of imitation should be as strict as possible.

\textsuperscript{8} Didaktik (Didactic) is a term that is more commonly used in Central Europe and Scandinavian countries than in English and French speaking countries. In emphasizing the normative aspects of Didaktik, Kansanen suggests the translation as “the art of teaching”. However an essential aspect to his analysis is the second order term which is described as “a model or methodology of how to envisage the teaching-learning process”. (Kansanen, 1995)

\textsuperscript{9} Sloyd is the English translation of the Scandinavian word sljd, which means craft or manual skill.
8. Teachers must be available and they must correct all errors and give suitable rules and advises.

9. Learning should consist of both synthetic and analytic exercises; the order is rather from synthesis to analysis.

10. Training should continue until skills are truly artistic.

Figure 2. "Engines" Orbis Pictus. 10

Comenius’ most well known book is the Orbis Pictus11, or Pictures of the World. Initially he wrote a Latin language book, Janua (Comenius, 1631) to use in one of his schools but found the classical Latin base too difficult for his

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10 Comenius, pp, 134-235.

11 Orbis Pictus is available to read on-line at: http://www.digibib.tu-bs.de/1007-3289/start.htm
students. He then proceeded to write a book intended for a range of children; to
some with little education, and others wishing to study Latin. He achieved this by
integrating language and pictorial study. The book contained 150 pictures of
everyday life indexed numerically. Each picture has corresponding text described
the event or activity in the local language as well as Latin. This can be illustrated
in the example pages of *Orbis Pictus*\(^{12}\) (pages 134,135. See Figure 2 above) the
illustrations were captioned in both Middle English and Latin. Since a third of the
topics in the book were under the heading of arts and crafts, considering
Comenius' global view of education, one could conclude that this represents an
early type of technology education:

> "Here Comenius gives very detailed and informed descriptions of different
kind of areas of human productivity. These areas include among others: gardens,
husbandry, grinding, bread-baking, hunting, cookery, vintage, spinning of line,
weaving, tailor, carpenter, house building, engines, black-smith, mine, potter,
wells, watches, looking glasses, carriages, writing, paper, schooling and musical
instruments" (Pikkarainen, 1998).

Jean-Jacques Rousseau\(^{13}\) must have read Comenius. 100
years after his passing with much of his work forgotten,
Rousseau advocated to parents that their children should

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\(^{12}\) The illustrated school text book *Orbis Sensualium Pictus* was first published in 1658. This Latin-German
edition was followed by versions in English, French, Italian, Polish, and other languages. *Orbis Pictus*
maintained its popularity into the nineteenth century and was a model for a number of other eighteenth and

\(^{13}\) Jean-Jacques Rousseau was born at Geneva June 28, 1712 and died at Ermenonville, near Paris on July 2, 1778
study and savor nature to understand the world. "He believed that knowledge was derived from nature, that reality was determined by collecting information through the senses and validated by constructing relationships, and that human beings learn gradually and constantly throughout their lives," or "learning by doing" (Jacobsen, 1999 p. 143).

He advocated that a child should be treated as a child and not a small adult. Classrooms should not be prisons to restrain students. Education should be as much as possible, natural and pleasant to permit to encourage the unfolding of inherent curiosities. Rote learning should be replaced by training in the arts of reason, calculation, and perception. Rousseau included lessons about machinery and crafts in his teaching and as a result is considered one of the fathers of technology education.

Friedrich Froebel (Fröbel) (1782-1852) best known as the originator of the kindergarten system pioneered the use of educational "objects" as part of the earliest form of Kindergarten. He believed that the use of objects and hands-on learning were fundamental to the learning process (Lilley, 1967). Froebel encouraged environments that involved practical work and the direct use of materials. According to Froebel, engaging with the world, understanding unfolds (Lilley, 1967). He considered educational play significant as a creative activity in creating awareness of the child's place in the world. Froebel's

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14 Kindergarten is generally translated into English to mean "Children's Garden", a place of play and discovery.
recognition of the importance of industrial\textsuperscript{15} education resulted in later emphasis on Manual Training at the kindergarten and elementary school levels. What today is thought of as Technology Education rather than Vocational or Industrial education, had it's beginning in the late Middle Ages when educational reformers concluded that humans develop the mind through the use of all the senses (Thorbjornsson, 1989, p, 259).

With the concomitant rise of capitalism in both Europe and North America during the 19th century, industrialization and the resulting demographic changes created new pedagogical needs. The last decades of that century saw a period of great population growth and mobility, with tremendous increases in urban populations. The changing life style, separation of work and home and the increasing autonomy of workers offered less opportunity for the traditional elite to exercise control over youth and other disenfranchised groups such as women and piece-workers. Early debates on mass education are marked by an anxiety over declining morals in the towns (Katz, 1976). Children were perceived of as being in danger of idleness and ensuing vice. Proponents of mass education charged that responsibility must be assumed by the state, as the working-class were unable or unfit to educate or train their own children.

The German philosopher and educator Johann Herbart\textsuperscript{16} was one of the first educators to study and apply the psychological processes of learning. He proposed developing curriculum based on the aptitudes, abilities, and interests of

\textsuperscript{15} Europe was becoming industrialized and Fröbel sought to counter some of the negative impacts of industrialization with education.

\textsuperscript{16} 1776-1841
students. Educated at the University of Jena he became interested in the work Pestalozzi while tutoring in Switzerland. Herbert's educational philosophy stated that all mental activity results from interaction of elementary ideas grounded in personal experience, and not from separate individual mental experiences. His early teaching methods incorporated the psychological processes of learning and were adopted at several European teacher training schools including Nass (Clark, 1999). Based on the work at Naas, Herbart's followers designed a five-step teaching method:

- Prepare the pupils to be ready for the new lesson.
- Present the new lesson.
- Associate the new lesson with ideas studied earlier.
- Use examples to illustrate the lesson's major points.
- Test pupils to ensure they had learned the new lesson.

The British Sociologist and Philosopher Herbert Spencer (1820-1903) is remembered mainly as a Social Darwinist17 activist in the later half of the nineteenth century. His work helped theory of evolution gain wide acceptance18 and impacted future educational progressive like John Dewey. Spencer created controversy in England because his educational views challenged the dominant positions of the Latin and Greek languages and literature in education. Radical for the time, his publication "What Knowledge is of Most Worth?" posed the title

17 Named after Charles Darwin the British naturalist noted for his theories of evolution and natural selection. (1809 – 1882)

18 Herbert Spencer coined the phrase "survival of the fittest" which depicted a constant struggle amongst the species. As a result of this continual struggle, the stronger species survived and multiplied while the weaker species perished.
as the question that must be answered before any curriculum can be developed.

He stated that five components need to be present in any curriculum:

- Self preservation.
- Performance of occupations.
- Child-rearing.
- Social and political participation.
- Recreation and leisure.

Spencer proposed that all knowledge could be placed within a modern, nineteenth century, scientific framework, which was viewed as the only way to gain useful knowledge. Learning should be a sensory experience where students interact within their environment over a slow, gradual, and inductive process. Children should be encouraged to explore and discover which would allow them to acquire knowledge naturally (Wiltshire, 1978). Through scientific knowledge, people learned to contribute and live in society. Social Darwinism impacted all aspects of society; social, political, economic, and education. Small homogeneous groups evolved into large complex groups over extended periods. During the British Industrial Revolution, the economy of England changed from mainly agricultural to industrial, people were uprooted from small towns and farmlands as they moved to industrial areas to seek work. This migration eventually led to the emergence of large cities.\footnote{See: The Impact of the Industrial Revolution, Nicholas Fessenden. (1978) Harcourt, Brace, Jovanovich. New York.} Spencer was at odds with educators who promoted a state run common school system since his Social Darwinist ideology promoted a private school system that would compete for the
brightest students. This competition, conflict and struggle would result in the most exemplary schools acquiring the best teachers and students.

2.4 The Russian System of Workshop Instruction

The Russian system of workshop instruction and the Scandinavian Sloyd system, credited with having the greatest influence on North American educational pioneers, started the Manual Training era (Phillips, 1985). The system grew out of a need for a better system of giving shop instruction to technical college students in Russia. Manual and industrial education were conceptualized once an adequate teaching analysis of the tool processes and instruction methods used in the workshops had been developed. This structured method provided an economical and effective alternative to apprenticeships that were emphasizing imitation and conformity. This analysis placed the manipulative and mechanical arts instruction on a sound pedagogical foundation. The mechanic\(^{20}\) arts could be analyzed and the elements placed in a pedagogical order as for example, with mathematics, music, and language (Quale, 1950). When or where the first analysis of manual arts occurred is unclear, but a thorough analysis of Geometric Drawing was made in the Pestalozzi school before 1824. It is not known if Pestalozzi made similar studies of other subjects taught at his school. An analysis of the process of sewing was performed in England during the mid 1800’s to enable the better teaching of girls in Industrial Schools. No adequate analysis of the mechanic arts existed until

\(^{20}\) The term Mechanic Arts is used frequently in articles written prior to 1900. The terminology is interesting in that it uses Mechanic to separate the person from the process – the Mechanical.
1866, when the Russian system of workshop instruction was devised by Victor Della Vos and his associates at the Imperial Technical School in Moscow.\textsuperscript{21} Della Vos reasoned, that since it had been proven that the mastery of the arts, drawing, music, painting "\textit{was attained only when first attempts were subject to a law of gradation}" in the mechanic arts the same conditions existed (Quale, 1950). Until that time, no methods of study or scientific analyses of the mechanic arts had been prepared. It remained to Della Vos to devise a system that would involve the instructor and an analysis of the arts he wished to have taught in his School. The evolved system saw the \textit{Instruction Shops} as separate from \textit{Construction Shops}. The former were for (as the name implies) instruction, with the instructor explaining and demonstrating and the students practicing technique, skill, and accuracy. Students were only allowed to \textit{work} in the construction shops after having successfully completed the required \textit{Instruction Shop} course. The object of this systemic approach was to teach the \textit{fundamentals} of the Mechanic Arts in a short time frame, and in such a way as to provide adequate instruction to a large number of students. The study of practical shop-work led to continued improvement, and given its sequential nature the progress of individual students was measurable. Each course consisted of a graded series of exercises to develop skill and competence without connection to a final use for the artifact.

\textsuperscript{21} In 1830 a special technical school was founded for orphans. It was believed that having technical knowledge would help the graduates through life. Later this institution became the Imperial Technical School. After the 1917 revolution, the University was named after Nikolai Ernestovich Bauman a revolutionary who was killed not far from the main buildings.
The teaching of the course was divided into three consecutive phases:

- In the first, the student was given the names of the tools; their uses and how to use them.
- In the second, the student combined the exercises of the first to make joints in wood and simple forms in metal.
- In the third, the student made the whole or parts of various mechanisms and acquired an extended knowledge of working wood and metals.

General Principles of the Russian System: (Bennett, 1937)

1. Each Mechanic Art had its own Instruction Shop. e.g. joinery, woodturning, blacksmithing etc.
2. Each student in a shop had a workstation and a full set of tools.
3. Courses of models were arranged in order of increasing difficulty.
4. All models were made from drawings of which each student has a copy.
5. The drawings were made by the student in the drawing class. The teacher of drawing and the shop manager agreed on the details of the drawing.
6. No student was allowed to begin a new model until satisfactorily completing the previous one.
7. Accuracy of work was expected to increase with succeeding models.

Each teacher must have more knowledge of his specialty than was necessary to perform the exercises in the course of instruction. He must keep constantly in practice so that his work may “be an example of perfection to the students”. Such dexterity of the teacher increased his authority (Bennett, 1937).
2.5 Sloyd System of Tool Instruction

Uno Cygnaes (1810-1888) was a Finnish pastor, scholar and missionary. He studied the Russian model of tool instruction and added manipulating objects from paper and wood using simple hand tools to create the Sloyd system. The term is taken from the Finnish term for handwork (Hostetter, 1974).

Otto Salomon was the best known of the promoters of Swedish craft education or “Sloyd” as he termed it. His variant of Sloyd was strictly woodwork based and became the dominant program throughout Sweden. It was termed boys’ craft to distinguish it from textiles or girls’ craft. Salomon wrote that the goal of his pedagogic Sloyd was not to train particular workplace skills, but rather to instill an ‘attitude, a willingness and respect for manual work in general. Salomon’s program became internationally known and termed the Naas system. It was exhibited at several world fairs and implemented within schools in England, Scandinavia and Sao Paulo, Brazil. It attracted attention in North America and the UK as “Manual Training” and gave rise to several professional organizations.

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22 Cygnaes founded the first Evangelical Lutheran church on the Pacific West Coast at Sitka, Alaska in 1839.
Solomon. It attracted teachers from many countries and a great number of British teachers attended at their own expense. Several governments sent delegates to study this particular version of craft education (Thorbjornsson, 1989). Manual Training organizers from Canada were later to visit the Naas School when developing the Macdonald Manual Training program.

2.6 The Montessori Method

Dr. Maria Montessori (1870-1952) was a pioneer in early childhood education. She applied a scientific approach and observed that children are "sensitive to certain areas of learning at specific ages". Her work can also be considered foundational to the development of Manual Training.
San Lorenzo district of Rome. Through her observations and work with these children she discovered their amazing, natural ability to learn. Children taught themselves! This simple but profound truth formed the cornerstone of her lifelong pursuit of educational reform. She eventually gave up her university chair and medical practice to found the first Casa dei Bambini, or "Children's House." This early beginning would ultimately be developed into the Montessori Method of education. Her methods of teaching and teacher training were based on scientific observations of the children's "almost effortless ability to absorb knowledge from their surroundings", as well as their "tireless interest in manipulating materials". The equipment, exercise and methods Montessori developed were based on what she observed children to do "naturally," by themselves, unassisted by adults.

In the following extended quotation located in The Montessori Method, she describes her classroom activities with what she termed Manual Training:

...Another work in the School of Educative Art is the manufacture of diminutive bricks, and their baking in the furnace, and the construction of diminutive walls built by the same processes which the masons use in the construction of houses, the bricks being joined by means of mortar handled with a trowel. After the simple construction of the wall, which is very amusing for the children who build it, placing brick on brick, superimposing row on row, the children pass to the construction of real houses, first, resting on the ground, and, then, really constructed with foundations, after a previous excavation of large holes in the ground by means of little hoes and shovels. These little houses have openings

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23 The first Montessori environment was opened on the 6 January 1907 in San Lorenzo, Italy, by Dr. Maria Montessori.
corresponding to windows and doors, and are variously ornamented in their facades by little tiles of bright and multi-colored majolica: the tiles themselves being manufactured by the children.

Thus the children learn to appreciate the objects and constructions which surround them, while a real manual and artistic labour gives them profitable exercise.

Such is the Manual Training which I have adopted in the "Children's Houses"; after two or three lessons the little pupils are already enthusiastic about the construction of vases, and they preserve very carefully their own products, in which they take pride. With their plastic art they then model little objects, eggs or fruits, with which they themselves fill the vases. One of the first undertakings is the simple vase of red clay filled with eggs of white clay; then comes the modeling of the vase with one or more spouts, of the narrow-mouthed vase, of the vase with a handle, of that with two or three handles, of the tripod, of the amphora.

For children of the age of five or six, the work of the potter's wheel begins. But what most delights the children is the work of building a wall with little bricks, and seeing a little house, the fruit of their own hands, rise in the vicinity of the ground in which are growing plants, also cultivated by them. Thus the age of childhood epitomizes the principal primitive labors of humanity, when the human race, changing from the nomadic to the stable condition, demanded of the earth its fruit, built itself shelter, and devised vases to cook the foods yielded by the fertile earth'. (Montessori, 1912, pp.162-166).
2.7 The Pestalozzi Method

Pestalozzi (1746-1827) was a Swiss educator who was pivotal in the promotion of Manual Training. He established a school in Europe where manual work was combined with general education. The "Pestalozzi Method" came to fruition in his school at Yverdon (established in 1805) Pestalozzi took up Rousseau's ideas and explored how they might be developed and implemented. "Instead of dealing with words" he argued, "children should learn through activity and through things". They should be free to "pursue their own interests and draw their own conclusions" (Darling 1994, p.18). He believed that a sound education needed to include both vocational and general education. At his first school in Neuhof the school combined education with work. It would be considered a production facility today since items were manufactured and sold so that children could finance their own learning. In 1809 As a student of Pestalozzi, Francis Neff was invited by the American philanthropist William Maclure to come to Philadelphia to open a Manual Training school.

2.8 French Workshop Instruction

The French School of Arts and Crafts at Châlons-sur-Marne formed an important chapter in the history of European Technical Education. The stated goals were the integration and teaching of both practice and theory: practice interpreted as shop-work on marketable products according to the drawings and specifications of the director of instruction; and theory viewed as a combination of
descriptive geometry, drafting, math, and science. A course in elementary sociology was included, the ideas of social obligations, the meaning of social standards and the relations of man to the community were reinforced (Mead, 1908. p, 382). Students spent most of their time building "real-world" artifacts in the school's shops, and according to the curriculum of 1807, students spent two or three hours per day in classrooms. The students, all male between the ages of 8 to 20 produced a variety of products ranging from basic hardware, files, and furniture to textile machines, scientific instruments, and clocks. From 1808 to 1815 about half of the older students manufactured caissons (Cannon Barrels) consisting of interchangeable parts for Napoleon's artillery -the most advanced form of manufacturing at the time, (Pannabecker, 2002).

2.9 British Arts and Crafts Movement

"We are always in these days endeavoring to separate the two; we want one man (sic) to be always thinking, and another to be always working, as we call one a gentleman (sic), and the other an operative; whereas the workman ought often to be thinking, and the thinker often to be working, and both should be gentlemen (sic), in the best sense". John Ruskin, 1819-1900.

As one of the effects of the Industrial Revolution in England, factory production took beauty and craftsmanship out of many of the items that were now being mass produced across the country. The rapid development of large industrial cities close to resources meant that workers were often living in squalid conditions and working under harsh conditions. John Ruskin a socialist and instructor at Working Men's
College in London, in around 1880 began denouncing factory production and expounding upon the value of individual craftsmanship. He stressed personal creativity and control over the work and gained support by promoting school workshops that promoted non-mechanical labor. Ruskin believed that individual craftsmen produced the most beautiful and unique work. These craftsman, if given the freedom to design, were capable of producing beautiful works of art befitting religious structures: (Ruskin, 1849, Garni, 2003, p.2)

"We are always in these days endeavoring to separate the two; we want one man to be always thinking, and another to be always working, as we call one a gentleman, and the other an operative; whereas the workman ought often to be thinking, and the thinker often to be working, and both should be gentlemen, in the best sense."

William Morris (1834-1896) was the son of a wealthy businessman and enjoyed a comfortable childhood. After studying at Oxford, Morris was articled (apprenticed) to G. E. Street, a Gothic Revival architect. With admiration for the Pre-Raphaelite artists he left the architectural position, determined to become a painter (Salmon, 2002). Morris is reported to have met Ruskin while at Oxford and at his urging perused a career in decorative arts instead of one in theology that he was initially pursuing. An essential element of Morris' philosophy was his belief that the maker of any object should strive for originality in design. This led to the constant search for best quality materials and methods in dyeing, weaving,
tapestry and other media which characterized his business career in the 1870s and 1880s. In March 1882 he testified before a British Royal Commission on Technical Instruction promoting originality and quality in British Manual Training (Harvey & Press, 1991).

The now established Arts and Crafts movement expanded throughout England and gained popular support from poets, craftsmen, and artists. Arts and Crafts crossed the Atlantic to America and Canada and influenced educators like John Dewey, the future architect Frank Lloyd Wright and furniture manufactures Green and Green.

**2.10 Early North American Manual Training**

The first Manual Training school to teach children in the United States opened in Philadelphia in 1809. William Maclure was a successful Scottish born American businessman and a supporter of Pestalozzi’s European schools. He tried unsuccessfully to persuade Pestalozzi to immigrate to America and open an Manual Training school. While visiting France on business he was able to convince Joseph Neef (1770-1854), a teacher at Pestalozzi’s school in Paris to open a school in the US. Neef published a *Sketch of a Plan and Method of Education* in 1808, the first North American instruction manual on Pestalozzian Manual Training (Neff, 1808).

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24 Image of William Maclure, Smithsonian Institution Archives, RU 7177, George P. Merrill Collection.
James Huff Stout promoted and funded Manual Training and domestic science in several states after being impressed with the work of the Technical High School in St. Louis, Missouri. Possibly desiring the improve the well being of the Knapp, Stout & Co lumber workers he supported a Manual Training program that integrated public school curriculums from kindergarten through high school. The Stout Manual Training School\textsuperscript{25} was established in 1891 and would eventually evolve into Teachers College, University of Wisconsin. It offered a two year program to train future Manual Training teachers (Agnew, 1976). By 1901 the Stout Institute was training teachers in Manual Training, Domestic Science, Agriculture, Physical Culture and Art Instruction. Stout eventually entered politics and while a US senator promoted and supported several social, educational and infrastructure innovations.

\textsuperscript{25} This was a Teacher Training or normal School and not a school for children.
Edward Sheldon is credited with founding the Oswego normal school in 1861 in New York City to train teachers (Park, 1936). Sheldon believed that the required fundamentals should be taught through the use of objects: “Object teaching is of particular interest in our discussion because by its very nature, it could but lead to some development like...industrial arts...” (Misner, 2004, p. 4).

Sheldon had his students make things that could be used as instructional aids and useful to them in their future classrooms. In 1886 Oswego became: “...the first teacher training institution in the United States to prepare teachers in the field of Manual Training” (Ibid).

Oswego’s first Manual Training classes were taught by the school’s janitor, it is possible that he was selected because he was the only person with tools for the students to use; not an auspicious beginning for a field that would continually strive for equal status with other school subjects.

A system of agricultural and mechanical colleges was established by the Morrill Act of Congress in 1862. A type of Manual Training was put to use after the American Civil War (1861-1865) in the Northern states for the training of engineers to operate steam engines and machinery. It is unlikely that the instruction featured the object centered methodology of Pestalozzi due to the

26 SUNY Oswego is now one of the leading universities preparing future Technology Education teachers.
27 The adjective normal is derived from the Latin word norma, which signifies a carpenter’s square, a rule, a pattern or model; [teachers’] schools are called normal, because they have connected with them a model school in which pupils apply theory to practice.
28 The United States Civil War was a conflict between the Northern states (the Union) and the Southern states that seceded from the Union and formed the Confederacy.
Industrial and Vocational nature of the training. In the Southern States Manual Training served to keep recently freed slaves employed on farms and plantations as well as to recruit them as industrial workers to boost regional economies (Maxcy, 1981 pp.47-71). Manual Training as described by Maxcy was concerned with the training of the worker in some skill and not as a liberal education enterprise. Industrial Manual Training\(^29\) was used with adults in a training environment. European Manual Training heavily influenced the subject's development in both Canadian and American Educational settings.

**Figure 6. 1876 Centennial Exposition.**

Charles Bennett was the founder of the *Industrial Education Magazine* (1899); the *Manual Arts Press* (1903); as well as the author of several textbooks pertaining to Industrial Arts. Writing in "A History of Manual and Industrial Education, 1870-1917" (1937) Bennett states that during the 1876 *Centennial Exposition* in Philadelphia, European education was showcased. Representatives from both Russia and Scandinavia were approached by the American Educators John O. Runkle, professor of mathematics and president of Massachusetts Institute of Technology and Calvin M. Woodward, dean of the Polytechnic faculty at Washington University in St. Louis.

With European assistance a pilot program was developed. A system modeled after the Russian program with elements of British Arts and Crafts and

\(^{29}\) I use this term to differentiate between Manual Training used as a way of training workers on specific hand and machine skills and the sloyd based systems and Scandinavian Manual Training used in children's education to manipulate objects to improve hand-eye coordination.

The first *Industrial Education Association*\(^30\) (IEA) came into being in the United States 1884. The IEA organiser was Grace Dodge who along with the same group of women who originally administered the Kitchen Garden Association (KGA) recognized that the organization had outgrown its original philanthropic mission... The original objective was:

"To teach poor girls the fundamentals of domestic service based on a popular instructional model of kindergarten education" *(Dodge 1866, pp. 666-668)*

In the context of the growing support of the Manual Training movement among social reformers and leaders in education during this period, Dodge orchestrated the redesign of the KGA, which was subsequently renamed the *Industrial Education Association* in 1884.

The IEA as a philanthropic reform organization offered a wide range of services, becoming in Dodge's words, "*a center of agitation, of information and of*

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\(^{30}\) The IEA evolved into the New York College for the Training of Teachers and in 1891, became Teachers College, New York and eventually Columbia University..
organization." Among other activities, the IEA sponsored classes in the industrial arts for public school children, training classes for teachers in industrial education, public lectures on topics related to the manual and domestic arts, and classes in the domestic arts for adult women. In addition, the IEA functioned as a bureau of information about industrial education. It published and disseminated articles about Manual Training and solicited and organized information on the subject from sources across the country. According to the association's official reports, hundreds of people from all parts of the country came to the offices of the IEA in search of information about training in the manual and domestic arts (Kriegel, 1977). One of the association's main objectives was to stir public interest in industrial education.

Figure 7. Children's IA Exposition, 1886.

In 1886 the IEA sponsored the Children's Industrial Exhibition in New York. "The exhibition received seven thousand visitors" (Kriegel, 1977). Children's work in industrial education from seventy different schools was on display to the public for seven days.

2.11 The Beginnings of British Columbian Public Education

Early British Columbia colonial society was organized to replicate its British origins. By importing the most useful attributes of an imperial society the class distinctions were replicated. People could perform the same duties within
the same social structure as in the mother country with each restricted to their inherited social position. Jean Barman compares the development of early colonial schools to "the transfer to structures approximating English practice with their clear class and religious division between schools." ..."The handful of Englishmen and Scots in charge of the new British colony at Victoria quite naturally continued familiar patterns of behavior, living so far as possible as if in Britain itself" (Barman, 1986, p. 241)

Figure 8. HBC Fort Victoria.

The colonies first schools reinforced the rigid class divisions that existed between the Hudson Bay Company's (HBC) officers and employees (servants) and among the settlers who came to work on the company farms. According to historian Sally Mitchel, "colonial administrators were largely middle-class men; educated at public schools, they found in the Colonies, a degree of power and a standard of living that only aristocrats could enjoy at home." (Mitchel, 1986, p. 286.) Victorian England was the model for the new colony and with British aristocracy remaining in England⁴¹, middle-class men had a higher status in the new colony.

⁴¹ The British aristocratic class had no reason to immigrate to the new world, but their black sheep or prodigal sons may have.
The first school at Fort Victoria (Craigflower) was established for the children of Company officers and was intended to reinforce the system in which these men had prospered. In 1849 Governor Douglas was successful in obtaining the services of the reverend Robert Staines\(^{32}\) and his wife to teach the officers' children and perform the duties of the company's chaplain.

For the children of the company's servants and arriving settlers two common schools were opened in 1852, one for boys and another for girls. Teachers in common schools did not require formal qualifications. One of those selected to teach, Charles Bailey had earlier been employed as a "clerk to a Shipbroker," and had "a fair education" and "having conducted himself with great propriety since his arrival ... and not being particularly useful as a mere laborer," \(^{33}\) was appointed school master at the boy's day school opened by Douglas for the children of the Company's laboring class. The Victorian vision for mass education was the solidification of the existing social status.

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\(^{32}\) Staines was educated at Trinity College, Cambridge.

In 1854 a school was opened at Minnies Plain. Robert Barr was hired to oversee construction and to act as schoolmaster. The colonial government paid him an annual salary of 50 Guineas\textsuperscript{34} and expected him to collect fees from the parents. Although British Columbian colonial schooling in many ways reinforced the social divisions within the new colony that mirrored those in British society, Barr’s school was unique. It was the first to build on the emerging ideals of universal education and offer instruction that could better the common students social standing and employment prospects. The school's curriculum included; reading, writing, composition, grammar, geography, arithmetic and industrial training\textsuperscript{35}.

The humble beginnings of what would eventually develop into manual, industrial and technical education in British Columbia began with a visionary educator Robert Barr, at the Minnies Plain common school on Colonial Vancouver Island.

\textbf{2.12 The Macdonald Movement and Manual Training in British Columbia}

Initial efforts to introduce practical arts and Manual Training classes can be traced back to eighteenth century Europe with the establishment of charity

\textsuperscript{34} A gold piece worth 21 Shillings, or 1 Pound and 1 Shilling.

schools, societies of mechanics and mechanics institutes, lyceums and colleges devoted to agriculture. In BC The Manual Training movement was the precursor to the vocational and career training programs present in the secondary schools today. In Canada and British Columbia, turn of the century Manual Training emphasized the intellectual and social development associated with the practical training of the hand and the eye. Manual Training was process based and involved teaching wood and metal working, with the argument that this teaching improved perception, observation, practical judgment, visual accuracy and manual dexterity. It was argued that it taught students the power of doing things instead of merely thinking, talking, or writing about them. Initially, Manual Training was not intended to teach a specific trade, this was perceived as too narrow and intellectually limiting for a general education. Manual Training would be an enhancement to the traditional curriculum, not a replacement, and would thereby help fully develop the individual. The student would learn to skillfully use tools in drafting, mechanics, wood or metalworking and then would be able to transfer this knowledge to almost any kind of tool or setting.

Migration of new Canadians westward created the need for more schools and teachers as the school population grew more than threefold from 23,615 students in 1901 to 79,243 in 1920.\textsuperscript{36} As the BC population boomed, the school system responded by offering more hands-on courses to familiarize students with the workplace culture of the day. The vocational tradition originated with the Industrial Revolution, with production for market rather than self-sufficiency, and

\textsuperscript{36} Statistics obtained from British Columbia school Enrolment. 1872-1971. Published in: 100 Years, Education in British Columbia. (1976) BC. DOE.
production in *industry* rather than in the *home*. Specific art and craft skills such as drawing, drafting and woodworking, as well as general work habits of neatness, precision and diligence were prized and "had to be taught in school as the home lacked the means to educate for work in the new social order" (Helgadóttir, 1993, p. 4)

Educational leaders in BC faced the task of devising not only curricula but instructional methods for large groups of essentially working class children. Many educators in the early 1900s believed that Manual Training contributed to the general education of youth, rather than providing merely vocational job-entry skills.

**Figure 11. William MacDonald.**

The development of *Manual/ Industrial/ Technical/ Technological*\(^{37}\) education in BC can be traced back to the turn the century. Its main proponent was a private benefactor *Sir William Christopher Macdonald*. William became an integral part of the financial establishment of Montreal and the nation and was named a director of the Bank of Montreal (1831-1917). Born in Glenadale Prince Edward Island he attended school in Charlottetown, and moved to Montreal and amassed a large fortune as a tobacco manufacturer. Macdonald began his career in Boston where he began work as a clerk in a counting house. He began exporting goods to Halifax and in 1852 with

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\(^{37}\) Finding a term that suits a field of study that has origins in Scandinavian folk arts and has over a 200 year period evolved or morphed into Technology Education is virtually impossible.
his brother as partner started an oil and gas sales business in Montreal. This venture grew as they began importing tobacco and led to the establishment of MacDonald Brothers and Co. He was to become a major player in the financial concerns of Montreal and Canada as one of the directors of the Bank of Montreal. Macdonald was knighted in 1898 by Queen Victoria for his philanthropy and generous support of education and health issues. He died unmarried and without heirs, leaving his business to two loyal employees who like himself, had began their careers as clerks. The question of why Macdonald did not peruse a political career may be answered by considering the strong writings and opinions of his father the Very Reverend Dr. Daniel Macdonald in The Laird Of The Glens: (Macdonald, 1881.)


If they expect to thrive in this Dominion of ours, let them be sober and industrious, live within reasonable means, keep clear of debt, and improve their system of farming, without any further loss of time. If the wish of men is for real independence - in the true sense of the term - let them never allow themselves to be carried away by the vain but all too common delusion of aspiring to public offices of emolument and government patronage, for the moment they place themselves and their prospects at the mercy of any government party, ever changing and changeable, that moment they sacrifice their true independence and manhood and enter on a precarious course which may last for a whole lifetime, and in which they will find themselves placed like honest Wilkins Micawber\textsuperscript{38} always "Waiting for something to turn up." Let them also take precious good care, that through their recklessness, some of them do not

\textsuperscript{38} Wilkins Micawber is a character from Charles Dickens' novel David Copperfield, modelled on a person introduced to Dickens by his younger brother.
wake up some fine morning to find themselves the mere serfs of grasping Shylocks, slimy and slippery Uriah Heeps, and unscrupulous wirepullers.

William Macdonald was a major benefactor to the Macdonald Agricultural College in Ste. Anne De Bellevue Quebec.

Figure 12. MacDonald Agricultural College

The college had been successful in improving the lives and well being of rural residents by improving agricultural methods and livestock production techniques. The College's principal and professor of dairying from 1905 through 1910 was James Robertson. He had been appointed the Dominion Commissioner of Agriculture and Dairying in 1886. He was able to persuade Macdonald that schools concentrated too heavily on book work and did not include any training for "doing" (Hurley, 1998, P. 84).

Robertson was quite vocal on the subject:

.....too much of the present system is based on the study of books; and too much time is given to memorizing symbols and names. That is one-sided and renders children more capable of answering questions and explaining methods than of enjoying themselves in doing delightful beneficial work. They are able to answer all sorts of questions; but it is not so conducive to happiness to be able to explain the universe, as to be able to do well one's work in it with unselfishness.

Charles Dickens created Uriah Heep for his novel David Copperfield. Uriah is notable for his cloying humility, obsequiousness, and general insincerity.

Summarized from an entry in The Macmillan Dictionary of Canadian Biography (4th ed.)
The school studies have been devoted too exclusively to the falsely so-called intellectual life. A child is one and indivisible, a being with physical, mental and moral qualities and powers; and surely a school course is deficient which does not provide as fully as is practicable for the development and training of faculties of the body, mind and soul (Robertson, 1899, pp. 21, 22).

Macdonald agreed to sponsor up to Nine Manual Training centers across Canada for Three years for a total cost of $37,680. This amount was to cover; nine sets of equipment, nine teachers salaries and 8 observational trips to England and Sweden. The Macdonald Sloyd School Fund received $40,000 in July 1900 to begin operations. Robertson proposed:

"...giving object-lessons of Manual Training in the city and town schools so as to educate public opinion in favor of better methods of education in places where newspapers were published and to which the country people looked for guidance" (Robertson, 1903, p. 87).

As a respected agriculturalist and bureaucrat Robertson traveled within Canada and abroad on government business. As early as 1899 he spoke publicly to promote Manual Training in elementary schools. In an address before the Ottawa public school board he stated the following:

"...Everybody has heard of Sir William C. Macdonald, of Montreal, and his splendid benefactions to the cause of higher education in Canada. It is reported that his gifts to McGill University exceed two and a half millions of dollars. He is keenly interested in primary education as well as in University training and extension. He now offers to pay for the equipment required for educational Manual Training in one place in every province in

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41 The original account name used at the Bank of Montreal, later to become the Macdonald Manual Training Fund.
the Dominion; and also to meet the expenses of qualified teachers, and of 
maintenance for three years in all those places.

In Ottawa, he offers to equip and maintain for three years as many 
centres as are required to give all the boys (about 1,000) between the 
ages of 9 and 14 in the public schools an opportunity to receive this 
training. It is hoped that after a year or two, an equally valuable course of 
practical instruction suited for girls of the same ages may some how be 
provided; and doubtless, "nature studies" will be given a proper place in 
rural schools. Sir William has authorized me to make a similar offer to the 
school authorities of Brockville, Ont, of Charlottetown and Summerside, 
P.E.I.; of some place in the Province of Quebec; of Truro, N.S.; of 
Fredericton, N.B.; of Winnipeg, Man.; of Calgary, N.W.T.; and of some 
place in British Columbia. (Robertson 1899, pp, 26-27) (Appendix 5)

Mr. Harry Dunnal was appointed inspector of Manual Training for the 
province on September 1st 1903, a position that he held until January 1915, 
when he was appointed art instructor in the provincial teacher training or normal school in Victoria. The Manual Training fund had sponsored 21 programs 
throughout Canada by 1910. Initially 27 trained Manual Training teachers were 
brought from England to start the programs. Local tradesmen were recruited as 
the needs grew and they received teacher training at summer institutes and 
weekend sessions. When the three years came to a close the Vancouver and 
Victoria trustees found the program to be so successful that it was continued and 
became a part of the curriculum. The following excerpts are taken from Mr. 
Dunnal's first annual report as inspector of industrial and Manual Training under 
the dated July 15th. 1908.
In November of 1900, professor Robertson on behalf of Sir William McDonald visited BC to make arrangements with the education department and the school trustees in Victoria and Vancouver for the introduction of Manual Training into the schools, for period of three years, to illustrate the usefulness of some form of hand work being taken in connection with the child's school life (BCPSR, 1907-08, p. b32).

Timothy Dunn writing about Manual Training in Victoria and Vancouver stated that:

"... the teachers wages and the cost of equipment and supplies were born by Macdonald and neither the education department or the cities of Victoria or Vancouver were asked to pay any of the expenses except for providing the rooms in which to carry on this branch of study" (Jones, 1979, Dunae, 1990, pp, 55-57).

The space allocated was often in school basements or separate buildings altogether. Arguably, the dramatic rise in the provinces public school population put a tremendous strain on facilities. Classrooms were neither available nor suitable for Manual Training instruction and as an experimental or demonstration subject it may not have been expected to last beyond the 3-year trial period. In 1903 Robertson visited BC and all of the participating provinces to determine if the individual districts wanted to continue with Manual Training. If they agreed title to the equipment would be given to them as long as they paid the wages of the instructors and program costs for the next year. To meet the need of growing school and provincial populations a set of Manual Training equipment was given
directly to the provincial government and set up at the Victoria normal school so that local teachers could be trained in Manual Training areas. In his 1906 Annual report Harry Dunnell wrote that:

“For two years the entire cost was born respectively by Victoria and Vancouver, and since that time, as you know, sir, the education department has assisted paying the salaries of both the Manual Training and cosmetic science instructors” (BCPSR, 1907-08, p. b32)

The Department of Education as well as the Vancouver and Victoria school boards was convinced that the program should be continued and expanded (Dunnell, 1908).

Figure 13. 1912 Boys Manual Training Class. Victoria Central School.

Manual Training courses; wood and metalwork, were offered for boys in grades elementary 5 to 8. Girls were initially provided with “Educational Hand-work”, the courses were intended to develop dexterity and practical skills in the belief that the head and the hand should work in unison. However, the curriculum had a larger purpose, as education historian Timothy Dunn put it, for the males it sought to promote positive attitudes towards work and wage labour by:

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"popularizing industrial life...by providing youth with a positive conception of manual employment, and by teaching industrial disciplines". "How to work efficiently was a central thrust of Manual Training." (Dunn, 1979, pp 55-57)

The courses that were developed for girls reinforced the traditional female roles of preparing and cooking family meals, dressmaking, home management and economics. In the early 1900's women in BC did not have the vote, were considered property, not persons under common law, and were discouraged from working outside the family home, except as domestic workers. These curriculums helped maintain the status-quo. Domestic Science teachers were included under the Manual Training umbrella. The first official classes were held in Victoria in 1903 and partly under as a result of external pressure:

“at the beginning of this year classes in cooking were opened for the older girls, under the direction of Miss Winifred McKeand,. The equipment of the kitchen for this purpose was provided at the expense of about $400, by the Local Council of Women.” (BC Public School Report, 1902-1903, p. C, 55).

Vancouver followed in 1905 according to Superintendent W.P. Argue:

“A domestic Science centre is now being fitted up and in a short time classes will be organised. This department will under the direction of Miss Elizabeth Berry, a graduate of the Macdonald Training School, Guelph, Ontario.” (BC Public School Report, 1904-1905, p. A, 57).
Once Domestic Science Centres were established, attendance was compulsory throughout the school year. Girls from distant schools attended morning sessions. Subjects included: Needlework, home management, personal hygiene, theoretical and practical Cookery, draughting and dressmaking, house management and laundry-work. A Diploma was awarded by the Department of Education to female elementary students completing the 2-year course during grades seven and eight. This diploma was a prerequisite for girls sitting for high school entrance examinations. 

By 1910, a prescribed course of study for Manual Training had been established. School districts were paying the costs of new facilities and teacher salaries with funds raised through taxation and donations of land and buildings. The 1910 *Federal Royal Commission on Industrial Training and Technical Education* emphasized the value of manual arts, home economics, and technical education for the developing nation (Young, 1992) The provincial government agreed to pay part of cost of Manual Training equipment in public schools. This

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44 This is the spelling used in the manuscripts consulted.

45 *Courses of Study for Public, High, and normal Schools of British Columbia*, 1920, pp. 31-35.
assistance should have resulted in a rise in the number of schools offering Manual Training, but this was not always the case. Two publicly held class based views of Manual Training slowed its introduction; the first held by many working class parents was that Manual Training was training for wage earning labour. Children were in school to receive an education that would allow them to obtain a better position in society and not follow in their parents working class vocations. The second view often held by middle class parents was that Manual Training was training that led directly to employment, and should not be provided at provincial or local expense. Worker training was the responsibility business and industry. Many districts did not implement Manual Training until a change in public opinion or the election of supportive trustees occurred.

The Macdonald Manual Training fund had sponsored 21 programs throughout Canada up until 1910. The Department of education expanded the Manual Training program during the next decade with the encouragement of partial provincial funding to establish Manual Training centers. In 1912 the course was included as a compulsory course for elementary students; and optional for the high school grades. Manual Training grew in popularity across North America following the publication beginning in 1913 of the Speyer Manual Training School Curriculum. This was the first curriculum that said students should have an interest in what they are learning not just to learn about a subject (Luetkemeyer and McPherson 1975). Frederick Bonser promoted expanding Manual Training to industrial arts and including it as a major subject in the elementary schools.

46 Although this sounds impressive in fact schools could and often did provide only the minimum requirement, 2 hours of Manual Training per pupil, per week.
Bonsor considered *industrial arts* both subject matter and method, an end as well as a means. At the time of publication, 1913 he was a professor of education at Western Illinois State normal School in Macomb. Bonsor completed his bachelors and masters degree at Teachers College, Columbia University. Columbia has strong British roots with its original foundation as King's College in the Colony of New York\(^{47}\), created by a royal charter of King George II in 1754.

To understand this apparent overwhelming British-ness at the beginning of the 19th century one must look back almost further 100 years to the early 1800's and the events concerning Britain, Spain, Russia, and United States.

**Figure 15. Oregon Territory Map, 1837.**

The area that was to eventually become British Columbia started to be clarified when Spain abandoned all claims to the West Coast north of the 42nd parallel in 1819 (Treaty of Florida Blanker). Secondly, Russia abandoned similar claims South of the 54'40" parallel in treaties with the United States in 1824 and Britain in 1825. The British- Russian Treaty identified the inland border with Russia as the first range of mountains at the 141st Meridian. In 1818 the British and Americans agreed on a *Convention of Commerce* that left disputed territories west of the mountains open to citizens of both countries for 10 years:

\(^{47}\) Closed throughout the Revolutionary War when New York City was occupied by the British, the College was reorganized, re-chartered and renamed in 1784 as "Columbia College."
"It is agreed, that any Country that may be claimed by either Party on the North West Coast of America, Westward of the Stony Mountains, shall, together with it’s Harbours, Bays, and Creeks, and the Navigation of all Rivers within the same, be free and open, for the term of ten Years from the date of the Signature of the present Convention, to the Vessels, Citizens, and Subjects of the Two Powers. The only Object of The High Contracting Parties, in that respect, being to prevent disputes and differences amongst Themselves" (Convention of Commerce, 1818, Article 3).

The agreement broke down in the 1840s and to avoid the possibility of war the two nations signed the Oregon Treaty. The British-American border was extended west along the 49th parallel to the ocean and through the main channel between the mainland and Vancouver Island. A further Treaty of Washington mediated by the German emperor in 1872 placed the Gulf Islands to the South of Vancouver Island within United States control. The Hudson Bay Company had been actively trading on the West Coast under what was turned “free and open” conditions since 1818. With the signing of the Oregon Treaty the British were forced to vacate their forts and trading posts on the North West coasts south of the 49th parallel and use Fort Victoria on the southern tip of Vancouver Island as the HBC headquarters for the Pacific Northwest. British governmental organization became formalized as a result of a the following:

- In 1849 when Vancouver Island was given over to the Hudson Bay Company on the condition that it establish a colony. In 1858 the colony reverted to the Crown due in part to the companies poor performance at colonisation.
- The gold rush to Frazier Valley led to the creation of the Lower Mainland colony of British Columbia in 1858, it also administered the Queen Charlotte Islands.
• The Stikine territory was organized in 1862 following discovery of gold and was administered by the governor of British Columbia.
• The colonies of British Columbia and Vancouver Island became united in 1866 with the provincial capital being established at Victoria on Vancouver Island.

2.13 Manual Training during World War One

Beginning in 1914 the European conflict that involved all countries in the British Empire and Europe was initially known as the Great War, the war to end all wars had a significant impact on British Columbian Technical Education.

Figure 16. School Garden, Victoria. 1916.

With the outbreak of war the beginning of the end of what many considered a period of idealism (Hurley, 1998, p. 16) in public education was at hand. The public school system responded slowly at first as the popular belief was that the war would be over within a year. J. W. Gibson, an original supporter of James Robertson, coordinated the Department of Educations mandated Patriotism and Production Campaign among school children in support of the war effort. Funds were raised for the Red Cross and organizations such as the Belgian Orphans Relief Fund. According to the

48 The 1914-1918 war referred to as The Great War prior to the advent of the 1939-1945 conflict. Subsequently the 1914-1918 conflict became known as World War One and the 1939-1945 conflict as World War Two.
Curricula of the Public Schools published in 1914, there were no separate Technical Schools to train students for direct employment operating in the province (BCDE, 1914). The school districts in were encouraged to ..."establish and maintain, subject to the approval of the council of public instruction, technical schools for day or evening classes" (SBC, 1914, p. 68). Grants of 75% were available toward the cost of equipment, instruction and supervision providing that suitable accommodations had been made. At the end of hostilities in 1918 the grants were reduced to a maximum of 50% or a maximum of $500, that could only be applied toward equipment.

Figure 17. Art Class in Victoria. Early 1900’s.

Elementary Manual Training expanded during this period due in part to the efforts of John Kyle. Requited in England in 1905 to work as an art instructor and supervisor he was appointed organizer of technical education and Manual Training for the province in 1914. He actively promoted the establishment of Night Schools to fill the need of providing courses for newly arrived Canadians and those wishing to better themselves and/or upgrade their academic and vocational skills.
Manual Training instructors were some of the first to respond and arranged to teach woodwork and metalwork. The Manual Training centers were soon occupied night and day. Kyle was appointed organizer of night schools for Vancouver in addition to his duties as supervisor of art instruction. In his report of 1914 the following is noted:

"There are 38 woodworking centers in the province with 36 instructors and 5,652 students. It is also noted that there were no teacher training classes for instructors." (Most instructors were of British ancestry and possessed prior trade training."

"There were no Technical Option courses in the High Schools, .... this is primarily due to universities not recognizing those courses" (British Columbia. Public School Report.1914, p. MT4)

By the end of the war in 1918 an estimated 57,000 Canadian men had volunteered to fight on the side of Great Britain. With men absent from the work force women had taken up employment in the factories and shipyards of BC to support the war effort. They were expected to relinquish the work upon the men's return.
Victoria high school had a class in aircraft fabrication\(^{49}\) and the Manual Training shops were used to train machinists for armament, shipbuilding and defense production. In all likelihood the courses were taken by women and boys too young to join the army but able to work in factories. In 1917 the Department of Education, in conjunction with the Department of Mines, created Coal Mining Correspondence courses, partly in response to Kyle's concerns after visiting coal miners at Nanaimo.

In 1919 Kyle assisted the University of British Columbia (UBC) in giving War veterans instruction in agriculture, mining, mechanics, steam engineering, and machining. With the encouragement of partial provincial funding, enrollment in Manual Training courses increased significantly over the next decade. Public School Manual Training had competition after WW-1. Adult Industrial and Technical Education in BC was supported with funds provided by the Federal government under the *Technical Education Act of 1919* (Young, 1992, p.16). The Act was aimed at retraining returning soldiers and youth under 14, technical or engineering colleges and Manual Training centers were not able to receive funding. Between 1919 and 1929 BC received $564,516 and used the funding

\(^{49}\) Detailed in the British Columbia. Public School reports for 1914-15 and located in the historic curriculum section of the UBC Education Library.
to finance the costs of teachers, facilities, furnishing, equipment and for the
training of the teachers for technical programs. Night schools, Mining schools,
and apprenticeship training were beneficiaries.

2.14 Industrial Arts Beginnings

At the beginning of the last Century *Manual Training* in British Columbia
was not initially intended as a Vocational subject. The exercises and activities
were designed to build skill and confidence in the student, improve hand-eye
coordination and make connections in the student between real materials,
arithmetic and geometry.

**Figure 20. Chemanus. Manual Training, 1920.**

The Macdonald Manual
Training fund sponsorship
expired after ten years. With the
loss of funding the programs
took on a Vocational focus.
Funding after 1914 was
provided by the Federal Government to promote Vocational Training. The initial
push for federal involvement came from the Dominion Trades and Labour
Council. As early as 1901 they lobbied the Prime Minister to appoint a Royal
Commission to study the needs of *Technical Education* in Canada and develop a
Ministry of Industrial Education. Prof. James Robertson was appointed chairman
of the Commission. The 1913 report recommended financial support for Manual
Training and occupational training of youths and adults, control of programs would remain a provincial concern. Implementation was delayed by World War One hostilities (Johnson, 1968 p. 121). Although recommended by the Royal Commission, the 1919 Technical Education Act did not fund Manual Training.

Although the name Manual Training was retained in BC until the 1920’s the curriculum lost its Liberal or General education focus. BC received $564,516 for the construction of school shops and technical high schools in the 1920s (Fairey, 1967; Hurley, 1998; Sager, 1936; Young, 1992). With this shift student projects moved from skill building activities like making plant label sticks, drafting scales and note-paper holders to Arts and Crafts style projects; tables, cabinets, chairs and jewelry boxes.

Figure 21. Woodwork Projects. 1920.

In contrast to the 1920’s vocational intent of BC’s Manual Training several American educators believed that Manual Training had become Industrial Arts, and the subject contributed a great deal to the general education of youth, more than just providing vocational job entry skills. Charles Richards. Writing in an editorials for Manual Training Magazine, he suggested that the term Industrial Arts be substituted for Manual Training because “we are rapidly leaving behind the purely disciplinary thought of Manual Training and are now we are beginning to see that the scope of this work is
nothing short of the elements of industries fundamental to modern civilization.”
(Charles Richards, 1904 p, 9-23)

Frederick Bonser was a professor of Education at the Teachers College, Columbia University when he was credited with expanding Manual Training concept to industrial arts and promoting its inclusion in the elementary schools of the U.S.

History has not been kind to Lois Coffey Mossman. According to information gleaned by reviewing articles compiled by Patrick Foster\(^5^0\) and a study of Joseph Carela’s (1997) historical research,\(^5^1\) Lois Coffey began teaching at a rural school in Kansas in 1896. She was 19 years old and had earned an elementary teaching certificate. Remarkably for the times she became the principal in 1902 of the Las Vegas NM. High School. In 1903 she accepted a job teaching English in Macomb Illinois, close to where her family was living, she probably met Frederick Gordon Bonser at the Western State normal School in Macomb. He was a professor of education and director of the training school at which she had accepted the position of critic teacher. For the next 26 years she and Bonser were always at the same institution. Coffey had been teaching in public schools for 10 years when she came to the realization that practical (experiential) activities made education come alive for children. In

\(^{50}\) Patrick Foster PhD, University of Missouri-Columbia developed a electronic library of articles from both the Journal of Technology Education and the Journal of Industrial Teacher Education to provide an authoritative History of Technology/industrial Education in the U.S. http://soe.csusb.edu/jscarcella/Article/History/index.html

\(^{51}\) At the time of writing Dr. Carcela was an Education Faculty member at the San Bernardino Campus of the California State University.
1908 she gained the attention of State Department of Education when aided by colleagues she set up the first general shop, in which students rotated through experiences in shop-work, drawing, and home economics. When learning about clothing, students designed and made shirts and when studying shelter they planned and drew houses. She emphasized the importance of aligning the school's practical work with traditional curriculums by having students design their own projects not make copies of models. Coffey repeatedly emphasized that the integration of school subjects could be achieved by practical classroom activities. Her extensive curriculum for industrial arts for the 7th and 8th grades was published in December 1909\textsuperscript{52}, accompanied by an editorial by Bonser. The article is credited with leading to the integration of Manual Training, drawing, and home economics into Industrial Arts. By 1913 Coffey had moved to New York, married Niles Roy Mossman and completed a bachelors degree. The 1909 article impressed James Russell the dean of Teachers College at Columbia University in New York. Bonser was offered the Directorship of the college's teacher training school as well as the department head position of the newly created Industrial Education department. Coffey-Mossman completed a Doctorate at Columbia with Bonser as one of her advisors. During her distinguished 33 year career as an Associate Professor at Columbia she taught and was published in press and educational journals. In 1923 she co-authored with Bonser Industrial Arts for Elementary Schools and in 1924 collaborated and developed one of the classic definitions for industrial arts in the United States:

“The industrial arts are those occupations by which changes are made in the forms of materials to increase their value for human usage. As a subject for educative purposes, industrial arts is the study of the changes made by man (sic) in the forms of materials to increase their values, and of the problems of life related to these changes” (Bonser & Mossman, 1931 p. 5)

Industrial arts as promoted by Bonsor and Mossman in the 1920’s was a social study with obvious links to society and larger issues of the day:

“By considering the changes in the well-being of man resulting from each invention, it will become increasingly apparent how fully man's progress in civilization and wealth has been parallel with his development of new tools and machines” (Bonser & Mossman, 1931 p. 453)

Bonsor & Mossman found the existing paradigm of Manual Training problematic and listed the three main components of Manual Training to which they objected:

“Investigation of the courses proposed and taught in our schools leads one to note these prominent inadequacies in Manual Training:

- Want of relationship of the work to life. The sequence of the models was in terms of tool processes.
- Failure to provide for the individuality of the child. Each must conform to the system.
- Lack of motivation. The work was all prescribed in a fixed course. Placing the emphasis upon the product as the objective, rather than upon the growth of the child (Bonser & Mossman, 1931 p. 479).

Additionally they also promoted industriousness, the study and practice of all activity that surrounds the industrial as the focus of study within the Industrial umbrella: ... "a means to a higher end" an "approach to higher forms of industrial studies" (Zuga, 1994, p. 17).
Industrial Arts was to be a study of people and their interaction with the emerging technical or mechanical society. The subject was not intended to be a study of rail or road transport, building and resource materials, or engineering and project management. IA's subdivisions were food, clothing and shelter. Food for one example could be used as a vehicle to study agriculture, rural science, farm buildings, farm economics and marketing and distribution: "Their focus on industrial remained the general idea of 'industriousness' rather than 'pertaining to the economic enterprise of industry'" (Zuga, 1994, p. 82-84).

Gordon Bonser and James Russell are remembered for their contributions to the founding of industrial arts and by extension Technology Education. Regrettably Lois Coffey Mossman has all but been forgotten.

2.15 The U.S. Smith-Hughes Act of 1917-18 and the Canadian Federal Technical Education Act of 1919

The close relationship between Canada and the United States in several areas including trade, education and economics was becoming apparent in the early 1900's. British Columbia was exporting large amounts coal and lumber to California and Canadian educators were looking to American pioneers in Progressivism. Canadian economic policy aimed at rebuilding industry and society following World War One mirrored US initiatives. Following the adoption of the Smith-Hughes Act of 1917-18 in the U.S, the Canadian Federal Technical Education Act of 1919 would provide $10 Million over 10 years for technical education in Canadian secondary schools (Johnson, 1968 p. 121). The targeted
funds could not be used for elementary or college programs. The seeds for Industrial and Vocational education in BC were sown at the expense of elementary Manual Training.

In the US, Industrial and vocational training were assured a place in the curriculums. The Smith-Hughes Act was designed to promote *Technical* and *Vocational* education by providing Federal grants to match State expenditures. It spelled out the American Federal Government’s intent that vocational teachers should have workplace or vocational experience in their teaching areas. Funds for vocational education could only be spent on salaries of teachers with vocational experience, not on salaries of academic teachers. Students attending Vocational schools could easily become marginalized as the act required that students taught one class by a teacher paid from Federal vocational funds could receive *no more* than fifty per cent academic instruction. This became known as the 50-25-25 rule: 50 per cent time in shop work; 25 per cent in closely related subjects, and 25 per cent in academic course work. Although the intent of this restriction may have been to ensure that the funding would be used for the benefit of vocational students, the result was to separate industrial, vocational, and technical education programs from the mainstream curriculums. The 50-25-25 arrangement was a feature of many technical and vocational schools in Canada, the U.S. and The U.K. until the mid 1960’s. This stability may have

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53 As a student for 3 years during the 1960’s in comprehensive school in London England I experienced firsthand a curriculum that exposed the student to half a day of shop based instruction in woodwork, metalwork, bricklaying, painting and decorating and mechanics. The remaining time was spent on applied math and science, literature, history, geography and PE. As a grade 12 student in Ontario I experienced a similar situation with half of the day spent in either a Minor or Major technical subject with the balance of the day spent in applied academic classes.
fostered the growth of industrial arts and technical education but at the expense of creating a second class of both teachers and students.

2.16 Putman and Weir's Survey of the School System

In 1925 Putman and Weir's *Survey of the School System* was published. Commissioned the previous year by the provincial government it has become known as the most searching and comprehensive educational survey ever undertaken in Canada up to that time. The Commisioneers, Dr. J. Harold Putman, Senior Inspector of Schools, Ottawa; and Dr. George M. Weir, professor of education at the University of British Columbia, who would later become a Minister of Education, strongly endorsed "Progressivism". One of the aims of Progressive education is to make schools more effective agencies of a democratic society. There are differences of both style and emphasis among progressive educators but they share the conviction that democratic responsibility means active citizen participation in social, political and economic decisions that will affect their lives. *Respect for diversity* and the development of critical, socially engaged intelligence, enables individuals to understand and participate effectively in the affairs of their community and country. Child-centered and social reconstruction approaches are seen as being necessarily related to each other.

The survey recommended that more time be spent on health, physical education, home economics, Manual Training, fine arts, Canadian history and music. Several of their recommendations were incorporated into the school syllabus in the late 1920s. The commission recommended the 6-3-3 grade
pattern, 1 through 6 as elementary, 7, 8 and 9 as middle years or junior high and 10, 11 and 12 as senior secondary.

According to John Kyle\textsuperscript{54}, the Putman-Weir Commission recommendation of the 6-3-3 Grade pattern and encouragement to build junior vocational schools may have been made in part after considering the initial success of a pre-vocational school instituted by the Vancouver school trustees in 1916.

\ldots \textit{"There were 142 students enrolled, 78 boys and 63 girls. The academic work was grouped around handwork. The boys made their own workbenches, drafting tables, drawing boards, tee squares, tables, and a roll-top desk for the teacher\textsuperscript{65}. The students also made windows and doors for a planned new center which they proposed to build; which did not materialize. Assuming that the activity that Kyle described was only one part of the schools curriculum then both boys and girls would have proceeded to work on the senior Manual Training activities. Furniture pieces, Models 47 through 50 (see Appendix 2) would have challenged the boys. Kyle does not identify the types of activities available to the girls but in all likelihood they would have worked in cardboard and raffia. The pen-and-ink-tray, stamp box, stationery case, pencil box and portfolio case detailed in Educational Handwork (Kinner, 1910, pp, 120-129) were likely activities.}

Under Kyle's direction Industrial Arts subjects including drafting, electricity, metalwork, and woodwork were introduced (British Columbia, 1914)

\textsuperscript{54} Personal letter. J. Kyle to Mrs. Robson

\textsuperscript{55} No mention is made of what activities the girls pursued.
The late 1930s saw the revision and publication of new curriculum documents detailing courses of study for Industrial Arts. By 1936 after 22 years there were 193 Manual Training centers with 80 instructors and enrollment and 14,317 students. Technical Courses were implemented in the High Schools and a school of Decorative and Applied Art was established as well as correspondence courses. The name Manual Training was retained to describe the facilities that often remained separate from the main school building. The curriculum delivered in the 1930's was Industrial and One problem remained; "From causes largely historical the Practical Arts have often operated largely in relative isolation, and where this has been true the teaching of them has been inconsistent with modern educational theory" (BC MOE, 1937, p. 8).

2.17 Vancouver Technical High School

Started in 1916 under the leadership of J. George Lister the Vancouver Technical High School originated in the Manual Training room in the basement of the former King Edward High School.
The school later moved to more spacious quarters in the Vancouver Labour Temple. It was a boy's school and was reputed for its "no nonsense" approach to learning. The current Vancouver Technical High School opened its doors in 1929 to an ambivalent community. Building the school with funding provided by the Dominion government under the 1919 Technical Education Act meant that the school was obligated to deliver technical and vocational programs.

Prior to construction; In 1927, when the City of Vancouver polled east end residents, who were predominantly working class, on plans to construct a technical high school, votes were split. The proposal received a mere 53 votes over the necessary 60% for approval (Barman, 1988, p. 42). While generally supporting Manual Training, organized labour was cautious about sanctioning vocationalism with fears of threats to the control of training that unions had recently achieved. Child labour, (originating in Seventeenth century Europe and brought to BC's mines and fish packing

56 The act expired in 1929 due to the depression.
plants\textsuperscript{57}), emphasizing production rather than training, began to undermine the position of adults in the new factory system. Artisans, in order to protect themselves against the abuses of child labour, formed craft unions to regulate apprenticeship training. The aim of the craft unions was not only to re-establish apprenticeship as a means of entry into the skilled trades, but to preserve the craft tradition as well. To do this the craft unions set out to define and enforce qualifications and training necessary for journeymen status (Foster, 1970). Many tradesmen rejected school-only based learning, arguing that trade or craft education needed to have workplace component to allow social and cultural learning within a workplace context to develop. Others argued that IA sided with management by focusing on tool skills and ignoring cultural issues regarding technology (Dunn, 1978, pp. 156-180). A Manual Training teacher and "father" (sic) of technical education in BC, the new Vancouver Technical's principal J. G. Lister held that Vancouver Technical provided skills that most east-end\textsuperscript{58} families could not afford to provide for their children. Trying to find middle ground, Lister offered a curriculum that combined academic, commercial, domestic and industrial courses with vocational intentions. With Western Canada's most expansive, state-of-the-art facilities, Van Tech was a model for the new comprehensive high school with day and night school classes covering almost every subject. The training of military specialists and returning veterans would eventually validate the school's construction.

\textsuperscript{57} The use of children under the age of 12 was not common-place but occurred with Chinese, Japanese, and First Nations piece workers involved in fishing and mining.

\textsuperscript{58} A working class and low-income area of Vancouver.
2.18 Progressive Education

What was to become known as the progressive education movement was most active in between the 1890's and the 1930's. Educators from many disciplines critical of teacher and curriculum-centered approaches promoted what can be described today as student-centered education. The new programs also included developing social skills, critical thinking and encouraging democratic participation to transform a society of greed, individualism, waste and corruption to one based on compassion, humanism and equality (Rippa 1997). Influenced by the writings and lectures of John Dewey, progressivism challenged traditional ideals concerning the foundations upon which students' education was based. Dewey's thought and writing was inspired by political and educational theorists such as Vittoriano da Feltre, Campanella, Comenius, Pestalozzi, Rousseau, and Bronson Alcott, and by the social theories of people like George Herbert Mead, Auguste CoMaNonal Traininge and Thorstein Veblen (Schugurensky & Aguirre, 2002). The shift in Dewey's later writings to experimental research has been attributed to his investigations of Darwinism. Although Dewey is the most recognized leader of progressive education, other important educators contributed to progressive education in North America. Among them were Jane Addams, Theodore Bramald, George Counts, Marietta Johnson, William H. Kilpatrick, Margaret Naumburg, Francis W. Parker, Harold Rugg, and Ella Flagg Young (Schugurensky, 2003).

According to Alan Child, The Aims and Philosophy of Education in British Columbia (Appendix 8) is one of the most detailed, inclusive summaries of
progressivism ever written, the author, H. B. King, an associate of George Weir, "did more than any other individual to establish the principles and practices of progressive education in British Columbia schools." (Child 1974, pp, 313-316). Between 1935 and 1937 King was technical advisor to Education Minister Weir and he coordinated extensive curriculum revisions for elementary, junior and senior high schools. His philosophy was clearly enunciated in the guidelines he prepared for curriculum revision committees. "It is the function of the school, through carefully selected experiences, to stimulate, modify, and direct the growth of each pupil physically, mentally, morally, and socially, so that the continual enrichment of the individual's life and an improved society may result," he wrote (Wytenbroek, 2003)

2.19 Curriculum Revision 1927

A newly-devised Programme of Studies for Junior High Schools, reflecting Putman and Weir progressive viewpoints, was published in 1927. The recommended consolidation of British Columbia's several hundred school districts into less than 100 would have to wait until 1934 when George Weir would become Minister of Education. Putman and Weir recommended the building of junior vocational schools to serve those students that would not require post secondary prerequisites and the introduction of Industrial arts; drafting, electricity, metalwork, and woodwork. The 6-3-3 grade re-alignment was implemented through the 1930s and newly created junior high schools began to appear in the larger
centers. The first junior high school was opened in Penticton in 1926; a second in Kitsilano, was opened in Vancouver in 1927.

As students at Kitsilano junior high, we were given many educational opportunities, vocational and academic. Our school had the latest equipment, and courses were taught by the best qualified teachers in the province. Pupils at Kitsilano were encouraged to participate in various programmes, which meant that boys could take home economics and girls could take "shop." This kind of gender equality in education was very unusual at the time. Major King made schooling meaningful in a new way for many of us. (Wytenbroek, 2003).

Figure 25. King Edward Metalwork.

During the 1920s Industrial Arts was required for all boys, and home economics, book keeping and typing in for girls. IA expanded Manual Training from woodworking, metalworking and drafting to include electricity, home mechanics, metalworking and printing. A vocational focus was evolving at the expense of the idealistic intent of Manual Training (Hurley, 1998). The Unit shop, or a workshop for a single type of material or activity; metalworking, electricity etc, proliferated and increased by 77% during the 1920s. While practice at the junior and high school levels became increasingly technical, the intent was primarily cultural (Foster, 1995; Lakes, 1988; Lewis, 1995; Petrina and Volk, 1995a, 1995b; Zupa, 1996).

"It is the function of the school, through carefully selected experiences, to

59 This was not a new school. Rather the existing Kitsilano High school was split in Junior and Senior Divisions.
stimulate, modify, and direct the growth of each pupil physically, mentally, morally, and socially, so that the continual enrichment of the individual's life and an improved society may result," (Child, 1974, p. 57)

**Figure 26. Sheet Metal projects.**

The tool culture of the shops and the privileging of tradesmen; "puts undue emphasis upon technique instead of culture. It subordinates growth to discipline. It makes the instruction more important than the child. It makes a part appear larger than the whole" (Putnam and Weir, 1923, p. 338). A more cultural training of IA teachers was recommended and they encouraged professionally trained teachers in academic subjects to take technical courses towards Manual Training certification.

### 2.20 Industrial Arts during the Great Depression

By 1930 in BC, there were 139 IA workshops, 96 instructors and 14,983 students enrolled (Leduc, 1958, p. 69). This included 8,475 students in 101 elementary school shops and 6,508 in 39 junior and high school shops. IA enrolments reflected the overall increase of school enrolments in BC. As the populations of the metropolitan areas grew children had greater opportunity to stay in school and complete more education. About 66.7% of fifteen-year old

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60 Future IA teachers were to be encouraged to take liberal studies courses.
boys and girls were enrolled in 1921, and by 1931 82.5% were attending school (Barman, 1988; Dunn, 1978). Funds for IA were severely reduced through the 1930s and larger workshops were constructed to accommodate more students. Gee (1978, p. 18) writes that in 1934, a conservative Minister of Education vowed to "cut out the frills." "Cut out all Manual Training, domestic science, music, art, etc" he insisted, "and get down to teaching the basics only." Gee was writing about J. Hinchcliffe, Minister of Education from 1928 to 1933. What was to become known as the Great Depression gripped North America for most of the 1930's and was part of a global economic slump that followed the stock market crash of 1929.

**Figure 27. Hoover Dam.**

The US economy and citizenry were bolstered by President Franklin Roosevelt's *New Deal* program. The Works Progress Administration (WPA), put 8,500,000 jobless to work, mostly on projects that required manual labor. With Uncle Sam meeting the payroll, countless bridges, highways and parks were constructed or repaired.

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By comparison, less grandiose projects were undertaken in Canada with many men employed in building bridges\textsuperscript{62}, roads and railway projects. The markets for BC fish, lumber and fruit were considerably smaller but weren't as badly impacted as the other provinces. Between 1930 and 1933 the per-capita wage dropped almost 50% to $314\textsuperscript{63}. Canadian public education and schools were impacted and little money was available for new programs or curriculum changes. Shop teachers were not likely to be responsive to top down interventions when they were being laid-off or having their wages cut, in some cases by 40%. Many Manual Training shops were closed to save money, often at the insistence of citizens exercising pressing pressure on elected trustees (In Cumberland, on Vancouver Island Manual Training survived, but Home Economics and Manual Training were cancelled in Courtenay after a plebiscite was held. With the publisher of the local newspaper opposed to anything but academics, and a mayor wanting the parents to pay for the classes if they were retained, the outcome was predictable. Loosely affiliated with the Vancouver School Board, the \textit{Apprentice Council of Vancouver} was created in 1930. Boys with at least grade 8 completion could be apprenticed to a tradesman and receive on the job training while earning a reduced wage. With the passing of the \textit{British Columbia Apprenticeship Act}. In 1936 the model was

\textsuperscript{62} The Lions Gate project was popular during the depression period, once objections over the access road through the heart of Stanley Park were overcome.

\textsuperscript{63} Table 8.4, Per Capita Income by Province. Morton Desmond; \textit{A Short History Of Canada}. 1996.
expanded province wide in. 1936 the province's first vocational centre was opened by the Department of Education in Nanaimo with funds provided by the *Dominion-Provincial Youth Training Agreement*. In 1936 there were six Dominion-provincial agreements in operating providing targeted training programs for youth on a 50-50 cost sharing basis.

"These projects are open to unemployed young men and women between the ages of 18 and 30 with the selection made by the province without discrimination or favor in relation to their social origin, religious views or political affiliations" (Labour Gazette, July 1936, p. 743 and August 1936, p. 858). (Young, 1992).

These Federal-Provincial programs were diverse and forward looking for the period. A summary of identified programs includes:

- Forest conservation work, to provide a practical course in forestry
- Technical and Safety Training in Mining to be given in the technical schools.
- Rural training, providing practical courses in subjects related to agriculture for young men.
- Industrial apprenticeship and learner-ship To help train young men or women in skilled or semi-skilled employment by paying the cost of their instruction either in special classes in technical schools or in periods of instruction in the shop or factory.
- Women's Specialized Training. Schools for training household workers
- Urban Technical Occupational Training. To provide courses of practical training in the technical schools and elsewhere to help young people fit themselves for employment opportunities in the area.
Between 1932 and 1937 BC school primary enrolment dropped by 3,155 students while secondary enrolment increased by 5,685 students. The secondary increase may have been due to shortages of employment opportunities brought on by the depression and allowing students to remain in school longer. While the primary drop may have resulted in less students in Manual Training classes the secondary increase of almost 15% must have put considerable strain on a system struggling for funding. While the provinces Manual Training and IA teachers were struggling with larger classes and level or reduced resources, curriculum developers and academics remained occupied revising and publishing new curriculum documents detailing specific courses of study for Industrial Arts. The transformation from Manual Training to manual arts to industrial arts is indicative of the general education reform that was taking place over the same period, (Phillips, 1985).

**Figure 29. Production Line, 1940.**

IA was culturally defined in BC as "a study of the changes man [sic] makes in materials to increase their value to meet needs, of the appropriate usage of products made, and the social advantages and problems resulting from the making of these changes and products" (BC MOE, 1937, p. 5). The primary goal of IA in BC was undeniably cultural: "To give the pupil some appreciation of the complex industrial society of the modern world" (BC MOE, 1937, p. 27). The message did not always get to the classrooms and shops as differences between the mandated /intended curriculums and the delivered curriculums and related
activities occurring in the school shops continued. Most Industrial Arts instructors were former tradesmen who emphasized tool skills in the workshops over the cultural and Liberal intent of IA. Several contributing factors compounded this problem. As Goodson notes, (Goodson, 1988) the curriculum in use will come from or be moderated by the collective life experiences of the teacher. Without serious intervention in the form of in-service training or professional development change will not occur. The teachers were teaching within an area in which they were experienced, the exclusively male students in the classes were enjoying making things in a non-academic environment and parents were content that their sons were learning to do something useful that may enable them to earn a living and support themselves.

2.21 Industrial Arts during the Second World War

The Second World War, 1939-1945 brought an end to the Great Depression. Canada as a Commonwealth Nation supplied not only troops as part of the allied forces but also military equipment with tanks, ships and aircraft as and food to Great Britain.

Figure 30. WW-2 Shipbuilding.

According to the Public School Reports for Industrial Education for 1943 to 1944 the effect of the War on the Lower Mainland schools was dramatic. Upwards of 36,942 people would be trained in BC under the War Emergency Training
Program within a five year period (Young, 1992, p. 29). This program provided considerable interruption to the secondary programs. Vancouver technical school was noted as being the most impacted by the war effort; temporary barracks were installed on the school grounds to accommodate army tradesmen taking classes. The entire lower floor of the girls building was used exclusively for training Royal Canadian Air force (RCAF) tradesmen. The Provinces schools faced staff shortages with many teachers fighting abroad, and up to 50% of the instructors in elementary shops were only partially trained. These instructors were expected to continue attending weekend and summer courses to obtain credentials. A course in design was prepared by John Kyle and made available by correspondence to IE teachers. Successful completion would allow credit toward an IE teaching credential. Metalwork programs were hardest hit by material shortages. Ingenious teachers used recycled automotive parts and scrap metal not required by the war effort for project work. 152 elementary, junior and senior high shops were in operation staffed by 122 instructors, teaching 13,992 students. As a teacher could only be in one shop at a time, this suggests that either Manual Training teachers were working part time in multiple locations or that classes were being given by other teachers. Juvenile delinquency was a noted concern in Vancouver. In the senior shops making of a home tool kit was promoted as a means of giving the students an interesting project that would hopefully lead to mechanical activity at home. As it was projected to be a short war, there was an expectation that normal classes would resume in the near future. In Vancouver over 700 boys were reported as being registered in high
school technical program for 1943. The 2 year program included: Sheet metal, printing, woodwork, machine shop practice, automotive engineering, electricity, mining, and diesel engineering.

**Figure 31. Sir James Douglas School Cadet Corps, 1942.**

Beginning in 1941 mandatory cadet instruction involving "infantry squad and platoon drill without arms" was introduced in all superior, junior high and high schools. In 1945 at the conclusion of hostilities, participation became optional.

**2.22 The Cameron Report**

Dr. Maxwell A. Cameron was appointed as a one-man commission of inquiry on education administration by the Minister of Education, Dr. George W. Weir in November of 1944. Like appointees before him he was affiliated with the UBC Education Faculty and a supporter of the political party of the day. The end of hostilities in Europe and Asia was a year away and a report concerning educational finance would attract little public attention. Cameron recommended a new formula for school finance based on property tax assessment and the reorganization of the province into large, regionally defined administrative units. The commissioner proposed several criteria for establishing the new units, which would be known as *School Districts.*
• The units were to embrace a school age population large enough to support Grades 1 to 12
• The units should be large enough to employ at least 60 teachers, and ideally 100 teachers
• The units should disregard municipal government boundaries and should include, if necessary, extra-municipal and unpopulated areas
• Each unit should be "comprehensible to local people" and should constitute "a community or economic entity."

In contrast, King's 1935 Report on School Finance in British Columbia had recommended disbanding small school boards and centralizing control of educational administration and finance, Cameron possibly anticipating the political mood of the day advocated instead for strong local authorities, controlled by elected school trustees and managed by provincially appointed district superintendents. Cameron's recommendations were enacted\(^\text{64}\) the following year and 74 large school districts were created; amalgamating almost all of the rural, municipal and city school districts in the province.

Acceptance of Industrial Arts in becoming part of the North American school system was illustrated in the creation of the American Industrial Arts Association (AIAA). The earlier association, the Industrial Education Association (IEA) created in 1884 and evolving into the New York teachers College had lost its original IE focus. Dr. William Warner incorporated the AIAA prior to World War II but did not hold its first conference and become active until 1947. This organization was well supported by Canadian technology educators as Canadian

\(^{64}\) Public Schools Act Amendment Act of 1946 [10 Geo. 6, c.64].
technical education became more closely aligned with its American counterpart. The theme of the first conference was; “A Curriculum to Reflect Technology”. Technical education in Canada was becoming more American than British.

2.23 Industrial Arts in the 1950’s

A period of readjustment and recuperation ensued following the end of hostilities. Not unlike the period following the First World War, an economic slowdown or depression followed. Manufacturing geared to war production ceased and returning soldiers swelled unemployment rolls. Public secondary education during the 1950s appears to be almost humdrum. The school population increases following the return of soldiers and the resulting increase in the birth rate (baby boom) was yet to impact secondary technical programs. With a new funding formula and reorganized system of school administration, a period of growth and stability ensued. Public secondary schools where attempting to provide a meaningful and challenging education to all students (ECBC, 1971) (Young, 1992). Academic studies and vocationalism were coexisting. The university entrance program led to university or professional studies and the general program to employment in industrial and clerical occupations. Continuing an established practice, the Federal government provided funding for Vocational programs. According to educational historian, Darius Young (Young, 1992, p. 32), citing an unpublished CVT Federal Expenditures report, British Columbia received over $2,000,000 in cost sharing grants between 1945 and 1957 under the Vocational Schools assistance Act. Education was

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65 Hostilities officially ended on May 8 in Europe and on September 15 in Japan.
acknowledged as a provincial responsibility. Providing such large amounts of funding at a time of extreme cold war\(^{66}\) anxiety and cultural conservatism\(^{67}\) slanted the playing field to the point that progressive education would disappear.

**Figure 32. Bud Lake School.**

Educational Technology's early developments occurred during WW-II, when film and slide presentations were used in the training of large numbers of soldiers. What had began as an emphasis on audio-visual communications and media became later focused on the systematic development of teaching and learning procedures that could used in the schools. Scientific management based on cognitive, psychology and perception psychology would impact on almost every area of public education. Radio was utilised for regular school broadcasts of elementary science, social studies, music and drama from the early 1940's to the late 1950's (Lambert, 1963).

**2.24 Sputnik and the Wake-up Call**

The 1960s saw major curriculum revisions in industrial education in both the United States and Canada. The impetus was political and in direct response to Soviet advances in rocketry that culminated in the successful rocket

\(^{66}\) A *cold war* is defined as a war with no direct fighting between the countries involved. The Cold War arose not from one isolated event, but from the different ideologies and interests between the Soviet Union and the West.

\(^{67}\) Cultural conservatism is the belief that there is a necessary, unbreakable, and causal relationship between Western, Judeo-Christian values and the success of Western societies: If the former is not maintained, the latter will be lost.
deployment of the world's first artificial satellite "Sputnik" or *fellow traveler* on October 4, 1957.

**Figure 33. Sputnik: First Artificial Satellite.**

The 180-pound spacecraft transmitted an A.M. shortwave radio signal down to Earth. With the launch of Sputnik the *Cold War* escalated and tensions between the US and the USSR grew. Americans and the Russians regarded each other as enemies. They both built massive armies, navies, and air forces and were prepared to engage in global war at a moment's notice. American military manuals regarded the Russians as "The Threat," and Soviet government promoted the training of non-military citizens on the use of small arms to repel an invasion from "The Imperialists."

The satellite launch brought about new political, military, technological, and scientific developments. While the Sputnik launch was a single event, it initiated the start of the space age and the international space race. In a 1957 Presidential Address, "Science in National Security" Eisenhower stated that "one of our greatest and most glaring deficiencies is the failure of us in this country to give high enough priority to scientific education and to the place of science in our national life." The shortage of workers in highly skilled fields was "the most critical problem of all." *(Eisenhower, 1957, p. 1)*
The following year saw the passage of the National Defense Education Act (NDEA) that dedicated nearly a billion dollars for education in the name of national defense. Additionally more than 20 projects that were funded through federal, state, local, or foundation sources that provided rich efforts toward curriculum revision. Politicians in Canada and the United States interpreted the initial Soviet success as an indication of their own weaker educational systems. The perceived poor quality of public education presented a major threat to western survival in the cold war. Instruction lacked substance and intellectual rigor (Spring, 1976). Greater emphasis on the teaching of science and mathematics was needed and many felt that a major curriculum reform in all subjects, including industrial arts was long overdue.

2.25 The Chant Commission

In British Columbia in 1958, a Royal Commission was appointed. Chaired by Dr. Chant, the Dean of Arts and Sciences at UBC the inquiry examined the programs of study and pupil achievement (ECBC, 1970). The commission made over 100 recommendations and most implemented. School organization was altered from the 6-3-3 grade structure instituted following recommendations of the Putman-Weir survey of 40 years earlier. A 7-3-2 plan was instituted and intellectual development was identified as a primary aim of schools. The existing "university entrance" program remained generally untouched by the commissioners, but they recommended the "general program" for youngsters directly entering the workplace be more vocationally focused. An occupational stream was established at the junior high level recognizing that many students leaving school
at the end of grade 10 were ill-prepared for the workplace. Having Grade 7 returned to the Elementary system was unpopular with many IE teachers. Writing in the BCIEA news letter in 1963, R. J. Cuthbertson commented that the impact of the move would be the teaching of grade 7 material in Grade 8 and so up the system, ultimately resulting in a loss of senior content at the Grade 12 level (BC Shop Teachers Journal, 1963, pp. 3-6).

Following up on Chants recommendations the BC MOE developed new curricular materials and started building additional schools to accommodate a fast-growing population. The provincial government raised residential property taxes with the imposition of education levies to cover the expenditures.

2.26 Technology Educations Beginnings

With a robust economy based on resource extraction and commercial fishing with little connection to the emerging high tech economy, B.C. curriculum innovation and change in industrial arts had little support. In contrast within the US, academics in education and educators in the schools were feeling the urgency of a political climate that saw educational reform as a key to national security and economic prosperity. Curriculum revision projects were funded through federal, state, and local initiatives; the Industrial Arts Curriculum Project (IACP) at Ohio State University, the American Industry Project at Stout State Institute in Wisconsin and the Maryland Plan at the University of Maryland were influential in shaping early technology education. Virginia Polytechnic Institute and Virginia State College were at the forefront of curriculum innovation in the late 1970s. With funding from a Federal grant covering a three-year period
(1978-1981) the Industrial Arts Education Department undertook a two-pronged investigation; to develop *national standards* for programs in Industrial Arts Education and a database of *programs, providers, and research*. Conclusions showed that secondary school I.A. programs had not changed appreciably in United States, since the 1960s. Woodwork, metalwork and drafting were the most common courses taught over the 30 year period.

Salient to the origins of *Technology Education* was the publication of *Technology and Industrial arts: (A Derivation of Subject Matter From Technology With Implications for Industrial Arts Programs.)*, Olson’s 1957 Ph.D. Thesis completed at Ohio State (Dugger & Yung, 1995). Olson saw the emerging technologies; electronics, rocketry, and automation as providing a challenging way to engage students innate and creative abilities. His views were expanded when he published, *Industrial arts and Technology in 1963* (Olson, 1963). Building on the ideas of the time that viewed Industrial arts/educations roots as a social/cultural activity, the model divided the content of all technology into the human activities of *Production, Communication, and Transportation*. Technology education was seen as a necessary part of the *liberal* education of all citizens. *Without a citizenry educated about technology, a modern society could be neither free nor democratic* (DeVore, 1976). Olson’s influence on the field is evident in the degree to which technology has been adopted as a content base (Kirkwood, Foster, Bartow (1994)).
2.28 Macdonald Report on Higher Education in British Columbia

The Macdonald Report on Higher Education in British Columbia and a Plan for the Future was written by Dr. John B. Macdonald, the president of The University of British Columbia and published 1962. The report recommended that Victoria College be allowed to become an independent degree-granting institution and that a four-year degree-granting college be established in the western Lower Fraser Valley. Victoria College, an affiliate of UBC became The University of Victoria, (UVIC) and work to establish Simon Fraser University (SFU) was begun. As in other parts of Canada the blueprint for a system of community colleges throughout the province was developed. The early years of North Island College are worthy of mention. The college started in 1975, and was an unconventional, but innovative, operation. Although the college had offices in Courtenay and Campbell River, it had no classrooms. Instead, a converted truck, as a bookmobile, served its students. North Island College, which later outfitted an ex-whale hunting ship as a "mobile instructional unit," billed itself as "the only non campus based community college in Canada." (Dunae, 2001, pp. 55-57). The assorted mixture of technical, vocational and fine art institutions would be brought under one umbrella within the next decade.

2.29 British Columbia Community College Growth

The beginning of the demise of both vocational and general technical education within the public schools can in part be attributed to the competition provided by the provinces technical colleges. The colleges needed a student
body and programs to deliver. During the next decade, vocational and adult programs from public education, industry training and distance education were raided. As an example; Vancouver City College, was established in 1965 by bringing together the Vancouver Vocational Institute (1949), the Vancouver School of Applied and Decorative Arts (1925), the Vancouver School Board’s Night School Program (1909) and the King Edward Senior Matriculation and Continuing Education Centre (1962). The resultant Vancouver City College was eventually to become Vancouver Community College. VVI ceased to exist as a stand-alone provider of the classroom component of apprenticeship training. The autonomous Vancouver School of Applied and Decorative Arts re-organized and opened as the Emily Carr Institute of Art and Design located at Granville Island. Both the VSB and KESM gave up control of their night school courses. Vancouver Island's first community college Malaspina, located in Nanaimo opened in former military facilities in 1969. In 1971 it absorbed the Nanaimo branch of British Columbia Vocational School that was established in 1936. Economies of scale and the avoidance of program duplication were important considerations, but the loss of adult and night school general interest courses in bookkeeping, electronics, woodwork and metalwork classes effectively removed adult students from many schools. Isolating the learners from main stream education would eventually result in the closure or reduction of, general interest and public academic night school classes.

At the end of the 1960's students entering senior secondary schools in grade 11 would be streamed into either; academic, vocational or technical
programs. Upon graduation those streamed into academics could apply for university admission, the vocationally streamed could seek direct employment as they had been further channeled into vocational commerce, vocational industrial, vocational service, vocational agriculture or vocational fine arts, (printing) or seek trade apprenticeships.

**Figure 34. BCIT, 1965.**

The newly opened British Columbia Institute of Technology (BCIT) was available for those in the Technical program. Located in Burnaby and opened in 1964 (Johnson, 1964, pp. 269-270) the Institute was further up the hill and above the British Columbia Vocational Institute (BCVI) that it would eventually absorb. BCVI was one of the federally funded providers of the trade school component of industry apprenticeships.

**2.30 BC Industrial Education Teacher Preparation, 1960-1980**

B.C. Industrial Education teacher preparation was put on a solid footing during this period. Initially, Industrial Education teachers could obtain a teaching certificate by supplementing trade and industry qualifications and experience with pedagogical studies carried out at summer schools held originally at the provincial normal schools and later at the provincial teachers college and UBC Faculty of Education.

**Figure 35. 1949-1950 IA Teacher Preparation Class.**
This flexible approach permitted the province to address pressing technical teacher shortages following World War II by getting trade qualified teachers into the shops and credentialing them on a continuous basis. By the 1960s this method was proving impractical considering the number of teachers required staff the newly constructed schools.

In 1967 a new facility was opened by UBC adjacent to the main BCIT campus in Burnaby. The new building was designed with extensive input from Industrial Education faculty to be the most up-to date facility possible. However, according to Ron Seal, Chairman of the Division of Industrial Education (INED) at UBC from 1958-1979, "there were some misgivings" about the inclusion of his subject area in UBC's Faculty of Education (Petrina & Dalley. 2002, p. 15). While early in the planning stages for a new facility a UBC campus location had been proposed in the area of the former agricultural farm. institutional politics of the day prevailed with the selection of the Burnaby site. The problem as Seal saw it, was an issue of status. Teachers of industrial education were "second class citizens within the teaching profession" (Seal, 1973, p. 202), (Petrina & Dalley. 2002, p. 15). This situation was mirrored in the relatively low status of the subject in the schools.

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68 Photographs taken in 1967 of the buildings construction and equipment installation were shown to me in 1996 by Bill Logan, the former UBC program head, emeritus professor..

69 The BCIA had similar concerns: see the letter from Sofco to Smith, dated Oct 27. 1980. in App 12.

70 The farm land and buildings were vacant as UBC had opened 2 experimental farms, one on Vancouver Island and the other in the Fraser Valley. The site is now part of parking lot B.
The Industrial Education Teacher Training Centre allowed future IE teachers to obtain all of their training within one facility. Shops and labs for woodwork, metalwork, foundry, automotive, material science, drafting, design, electricity, electronics and plastics were in place. A video equipped teaching classroom allowed student teachers to practice lesson demonstrations and later to review their efforts. A lesson planning and resources section was established to distribute new curriculum materials, existing project plans and blueprints to school districts for further distribution to teachers and the schools. Teachers in the field were encouraged to send in successful lesson plans and project details. The program instructors were for the most part experienced industrial education teachers that had been instructing in school programs and recruited specifically for the new institution. With the new facility, Industrial Education (INED) expanded from a small division graduating 15 new teachers per year in the early 1960s to 75 students per year by the early 1970s. By the late 1970's the division had nine full-time UBC faculty members at the Burnaby site and was offering a 5 year IE Bachelors program. Trades qualified candidates could be complete faster and teach on a provisional teaching certificate. Summer upgrading courses allowed existing teachers to obtain degrees or additional expertise.

2.31 1960’s Industrial Education Curriculum

The 1964 Junior Secondary Industrial Education Curriculum Guide was published by the BC, Department of Education in 1964 and distributed to the schools as a soft cover text for 3-Ring binders. (Authors own Copy)
tried to address them within the classroom and shop. The guide notes indicate that the 1964 guide includes materials published in *Industrial Arts 1962* and *Industrial Education 1963*. From the dates of the previous guide titles it is apparent that a name change occurred between 1962 and 1963, *Industrial Arts* has now become *Industrial Education*. The Term Technology appears for the first time with a new definition of Industrial Education. "*Industrial education is an area of education which teaches general principles of technology through workshop experiences with materials, tools, and machines*".  

**Industrial Education, (1964) had the following specific aims.**

- To teach principles of technology and to apply these principles in practical situations.
- To explore and evaluate the interests and aptitudes of students in technology fields.
- To establish a broad-base of technological skills which will provide a sound foundation for subsequent development of the individual.
- To develop habits of systematic planning and safe practice in the solution of technological problems.

**The list of prescribed textbooks for Industrial Education Included:**

- *Understanding Electricity and Electronics*, McGraw-Hill.
The *Principles of Technology* identified in the aims of the program were not defined in the document. The approved text books would remain in use in some schools for the next thirty years.\textsuperscript{72}

### 2.32 Re/Defining Industrial Arts as Technology Education

The 1970s were an implementation period for the curriculum developed in the 1960s. In spite of the social upheavals resulting from the conclusion of the Vietnam War, the women's liberation movement and the beginnings of an environmental social consciousness surrounding deforestation and destruction of fish habitat; industrial education curriculums remained grounded in materials and process. Scientific and Technical advances that placed humans on the moon and at the bottom of the world's oceans seem to have generated little interest in the curriculums of technical education. A new curriculum definition of Industrial Arts/Education came from the *Jackson's Mill* think-tank comprised of teachers, industry leaders, district superintendents/supervisors and teacher education program coordinators organized by the Virginia Department of Education and Virginia State College. The eventual outcome was a preliminary definition of what constituted Industrial Arts.\textsuperscript{73}

> "comprehensive educational programs concerned with technology, its evolution, utilization, and significance; with industry, its organization, personnel, systems, techniques, resources, and products and their socio-cultural impact"  

\textsuperscript{72} I routinely used these texts in my own secondary teaching as late as 2001.

\textsuperscript{73} The definition of the term "industrial arts" evolved further with the publication of *Jackson's Mill Industrial Arts Curriculum Theory* in 1981.
Many of the debates and issues encountered within Industrial/Technical/Vocational within Canada and BC stem from differing philosophical groundings and internal disagreements that mirror those in the United States; is the field general or vocational?. The original American Industrial Arts Association (AIAA) under the initial direction of William E. Warner evolved into the AIEA and eventually the ITEA and have always been non-vocational, believing that MT, IA, IE and TE are a social study and part of liberal education. On the other hand there are well supported professional groups that share a different philosophy. NAITTE, the National Association of Industrial and Technical Teacher Educators and AVA-TED, the Technology Education Division of the American Vocational Association placed vocational intent ahead of liberalism.

In British Columbia IA and the subsequent IE above the grade 8 level were overwhelmingly vocational. With heavy Federal subsidization for facilities, equipment and instructor training over several decades the die had been set.

2.33 1977 Industrial Education Curriculum Guide

The 1977 edition of the B.C. Industrial Education Curriculum Guide that would direct technical education through to the 1990s was in essence a re-issue and updating of the 1960s and '70s publications. The 6 content areas were reduced to 5 with the removal of Graphic Arts from the curriculum.

I.E. Program goals were identified as follows: (Page 14).

- To develop interest in the technical fields and applied sciences as an integral part of students general education.
• To develop a foundation of skills and knowledge related to materials and technical procedures.
• To develop a high degree of safety consciousness.
• To develop confidence, high standards of performance, and a sense of pride in achievement.
• To develop creative potential both vocationally and avocationally.
• To achieve a degree of competency that will assist the students to obtain further education, training, or employment.
• To develop an insight into the workings of an industrial world.

Industrial Education in 1977 was defiantly about the industrial; working with materials and machinery in a setting replicating the work place. The cover made a bold statement; a wood-grain background with Industrial Education carved across the top, the word Industrial was 4 times the height of Education. 94 wood screws in a rectangular shape surround stylized graphics of 2 technical drawings; daVinci's Man74 as well as 2 roses and a butterfly. 5 scenes of industrial society are dominant and feature blueprint creation, metal machining, forestry, automotive, building construction and Automotive Mechanics.

Figure 36. 1977 IE Curriculum Guide.

74 Vitruvius, the architect, says in his work on architecture that the measurements of the human body are distributed by Nature as follows that is that 4 fingers make 1 palm, and 4 palms make 1 foot, 6 palms make Leonardo's drawing was originally an illustration for a book on the works of Vitruvius. The translated text accompanying the drawing states: 1 cubit; 4 cubits make a man's height. 4 cubits make one pace and 24 palms make a man; and these measures he used in his buildings. If you open your legs so much as to decrease your height 1/14 and spread and raise your arms till your middle fingers touch the level of the top of your head you must know that the centre of the outspread limbs will be in the navel and the space between the legs will be an equilateral triangle. (The Notebooks of Leonardo DaVinci, no date)
The guide reversed the intent defined for IA in the 1920s. IE's first two goals were now vocational: "To develop interests in technical fields and applied sciences" and "To develop a foundation of skills and knowledge related to materials and technical procedures." The long-time primary goal of IE was made ambiguous and placed last: "To develop an insight into the workings of the industrial world" (BC MOE, 1977, p. 14).

Five of the 171 pages are dedicated to an emerging course, Technology. The preamble identifies the course as a new approach to the previous Industrial Power and Industrial Science courses. The intent was "not to train students in specialized areas but to expose them to problem solving" (p. 167).

The General Objectives for the course indicate that the authors were aware of research in new approaches in technical education:

- To develop an understanding of technology and an awareness of its effects upon other areas of knowledge.
- To nurture the students curiosity and creative thinking abilities related to design and industrial technology.
- To encourage the students to explore the development of industrial technology.
- To develop safety consciousness and promote work habits essential to an industrial situation.
- To encourage the students to understand the process of searching for explanations of natural and man-made phenomena.

This section of the guide departs from the previous section's style in that apart from listing learning outcomes; it is descriptive as opposed to prescriptive.

"Teachers are expected to develop their own particular courses bearing in mind that the learning outcomes must be followed" (p. 167). The course was not enthusiastically embraced. It did find a place as a correspondence course and was offered until the early 1990's. This course permitted Distance Education students to earn either a science or an applied skills credit. The paper based course materials were not original, they were assembled by taking sections and units from existing courses; electricity, mechanics, science and drafting.

2.34 The UBC-BCIT Joint T.E. Teacher Preparation Program

Up until 1987 both professional and technical studies were consolidated and completed within the UBC Industrial Education (INED) building in Burnaby. Beginning with the fall of 1987 the INED program changed dramatically. A loss of provincial Department of Education funding for the INED program necessitated structural changes in the way the program was delivered. A fuller picture of the events surrounding the changes can be gained from a review of correspondence between UBC-INED staff, the BCIEA and provincial politicians, see Appendix 12.

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75 As a distance education school teacher/marker I was provided with all texts and answer keys for the Technology course.

76 The tension, frustration and animosity existing between the BC government, The university and the Division of Industrial Education can be identified in the selected correspondence provided in App. 12.
Professional and technical studies would be completed in two separate institutions (Petrina, Dalley, 2002, p. 136.). Students now complete one year of professional studies at UBC and up to two years of technical studies at the British Columbia Institute of Technology, (BCIT). This transition to institutions of industrial technology is consistent with changes in technology teacher education in Canada and the USA (Petrina & Dalley, 2002, Volk, 1993, 1997). The programs were renamed as the Technology Studies Education (TSED) program at UBC and the Technology Teacher Education (TTED) program at BCIT. The programs operate, symbiotically within their own institutional cultures.

2.35. Legacy for Learners, The 1988 Royal Commission on Education Report

Also referred to as the Sullivan report, Legacy for Learners became the roadmap used to direct the course of education for the next two decades. Published in 1988, the Royal Commission on Education report, Legacy for Learners examined the current condition of education and what changes would be required in the future. The province was emerging from several years of poor economic performance magnified by a heavy economic dependence on resource extraction and commercial fishing. Recommendations included; a greater emphasis on educational relevance and greater choice, access and flexibility for students. A key finding was that “the curriculum is startlingly inadequate at the senior secondary level for learners not planning to attend a post-secondary

77 The former IDEN building was transferred from UBC to BCIT and now houses the BCIT department of Manufacturing Engineering which now provides the TTED program.
institution."

what was requested by most of the secondary students, even those headed to college or university was a greater variety, choice and relevance in course selection." Following publication of the report the next decade would see increased funding for post secondary and a complete examination or overhaul of most subjects in the secondary system. The motivation was provided for the development of applied academics and technology education curriculums (Royal Commission, 1988, Summary p. 31, Report p. 99).

2.36 The 1987 BCIEA Name Change to BCTA

In 1987 the British Columbia Industrial Education Association (BCIEA) changed its name to the British Columbia Technology Education Association (BCTEA). This action followed the name change of the American Industrial Arts Association to The International Technology Education Association (IATA). The 1988 Sullivan Royal Commission Report argued that cultural and economic change demands educational change. The Practical Arts, defined as "Physical Education, Technology Education, Business Education, and Home Economics." must be elevated to an equal status as humanities and sciences. IE should be changing from the "use of tools, materials and technological processes to providing opportunities for students to employ different technological applications and to engage in activities allowing them to create, design and construct" (BC MOE, 1989, pp. 15-16; Royal Commission, 1988, pp. 29-30). The Royal Commission had re-stated conceptual changes already underway in IE in BC. "Industrial/Technology Education requires a new curriculum... we support an educational agenda of change" (BCTEA, 1989b, p. 2, Petrina, Dalley, 2002).
2.37 The 1990 Science for all Americans project

The American Association for the Advancement of Science (AAAS) addressing "What should a science-literate adult know and be able to do in science, mathematics, and technology?" took a leadership role in "...setting out for the nation the knowledge, skills, and habits of mind that all citizens need to live interesting, responsible, and productive lives in a culture shaped by science and technology:

"Science for All Americans is based on the belief that the science-literate person is one who is aware that science, mathematics, and technology are interdependent human enterprises with strengths and limitations; understands key concepts and principles of science; is familiar with the natural world and recognizes both its diversity and unity; and uses scientific knowledge and scientific ways of thinking for individual and social purposes" (AAAS Project 2061, 1989, introduction).

2.38 The 1990 Perkins Act

In the United States the 1998 Perkins Act was rewritten and reissued in 1990 to move away from an industrial model which tailored training to one narrowly defined job slot. The revised act emphasized two related approaches:

- Integrating vocational and academic education so that students gain strong basic and advanced academic skills
- Providing students with strong experience in and understanding of all aspects of the industry they are preparing to enter, including planning, management, finance, technical and production skills, underlying principles of technology, labor, community, and health, safety, and environmental issues (American Vocational Association, 1998).
2.39 The 1993 BCIT Technology Education Needs Survey

The Technology Education Needs Survey (Appendix 10) was conducted in the spring of 1993 as part of an internal review of the British Columbia Institute of Technology Industrial Education Teacher Education program. BCIT at the time of the survey in partnership with The University of British Columbia's Faculty of Education offered a joint program that educated future Industrial and Technology Education Teachers. The survey was coordinated and reported on in October 1994 by the program head and senior instructor, Peter Trant (Trant, 1984). According to in an internally published summary of the study; all District superintendents and Technology/Industrial Education Teachers in the province were surveyed. Superintendents were identified through the 1993/94 MOE School book \(^{78}\) and teachers were identified through the British Columbia Technology Education Association (BCTEA) complete \(^{79}\) list of Teachers. It was reported that 76% for District Superintendents and 54% for Teachers responded to the questionnaire.

The major findings were that:

- Technology Education is general in nature, assisting students to understand and develop capability in a broad range of technology.
- Technology Education broadens the scope of technical study to use tools of contemporary technologies.

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\(^{78}\) At the time the Ministry of Education published a listing of all schools in the province as well as contact information for school officials and district personal. The publication was titled the School Book.

\(^{79}\) The British Columbia Technology Education Association is a Local Specialist Association of the British Columbia Teachers Federation (BCTF), the teachers professional association or union. Membership in the LSA is optional and requires a fee payment.
• Technology Education does not lead directly to a career.
• Technology Teachers are required to teach generalist technology courses.
• Technology Education Teachers teach a range of technical and academic subjects.
• The need for teachers to have a Trade Qualification is decreasing.
• 42% of new teachers with Trades Qualifications or extensive experience, (Accelerated 1 year Program) felt that their preparation was inadequate.
• 22% of the less trades experienced (Regular 2 Year program) felt that their preparation was inadequate.
• There is a great deal of uncertainty about the connection between Secondary School courses and Post Secondary opportunities.
• 50% of District Superintendents believe that Secondary School Technology Education leads to Community College Programs, 25% of the Teachers thought so.

Written comments expressed several concerns:

• About the need for High Schools to link with Post Secondary Institutions and partner with industry.
• There are no clear pathways to technical careers. Well defined Diploma Programs with clear prerequisites would assist in solving this problem.
• The existing Technology Education teaching force is an aging population. 40% of respondents have been teaching over 20 years, while only 6% have been teaching less than 4 years.
• Teachers have great interest in a wide range of in-service content areas; and prefer it to be delivered through in-service continuing education at workshops with time and funding provided by their school district.
The survey results became the catalyst for program revision and re-design for the BCIT component of the joint UBC/BCIT program.

2.40 The 1993 National Census on Technology Education in Canada

Chinien, Oaks & Boutin reported on their 1994 study, "A national census on technology education in Canada." The study surveyed all 12 provincial and territorial coordinators of industrial arts/technology education. The coordinators were responsible for the governance and policy formulation for industrial arts/technology education programs and were a valid source of information. According to the authors they were in close contact with stakeholders and would be able to make accurate reports on leadership issues. "Current beliefs that technological literacy is empowering and that a technologically literate workforce will enhance our ability to compete in world trades have generated a national momentum for replacing the traditional industrial arts programs with technology education" (Chinien, C. A., Oaks, M. M., & Boutin, F. 1995, p. 14).

The study investigated and reported on 10 areas and concerns to generate useful information regarding the degree of change from industrial arts to technology education in all Canadian jurisdictions

1. The degree of importance of technology education.
2. The availability of resources to facilitate the implementation of technology education.

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3. Enabling legislation to advance the implementation of technology education.
4. Types of curriculum models being used for implementing technology education.
5. The degree to which content organizers are being used in developing technology education programs.
6. Responsibility for implementing technology education programs;
7. Progress made in curriculum development.
8. Teachers' responses toward change in technology education;
9. Teacher retraining initiatives.
10. Leadership.

Results indicated that:

- The majority of the provinces and territories have already changed the name of industrial arts programs and have incorporated the word technology into their new program title.
- None of the provinces and territories has adopted curriculum models developed in the United States. The provinces and territories have developed their own curriculum models based on consultation with stakeholders and by adapting other models.
- A continuing transition from traditional industrial arts to new technology based program concepts, from simple name change to program re-design.
- A lack of provincial funding for curriculum development efforts in TE program implementation: facility planning, equipment, teacher training, and research.
- A lack of interest of local school districts in funding technology education programs.
- Limited community support and limited partnership between school and business/industry.
- The Industrial Arts/Technology Education Association were the major change agents responsible for the shift from IA to TE.
• A lack of adequate teacher training will impact on TE adoption.
• Committed teachers were major change agents in the transition to technology education.
• Teacher education programs should keep up with the changes in the field and address professional development needs through post-baccalaureate initiatives.

2.41 Technology Education Curriculum Development

Technology Education **Instructional Resource Packages** or IRP's[^81] were developed for grades K-7 and 8-10 in 1995 and 11-12 in 1997 [BC MOE, 1995a, 1995b, 1997a] and included in the provincial curriculum. Implementation at the elementary level was hampered by limited in-service training and support for existing teachers and limited training for new teachers leaving universities.[^82] Complete implementation of the T.E. IRP was unrealistic and unopened shrink-wrapped packages sat on the shelves of many elementary schools.[^83] Without guidance some teachers interpreted technology education as keyboarding or computer literacy and chose not to move into untested waters. In the case of shop based industrial education electives subjects: woodwork, metalwork, drafting, automotive and electronics the last curriculum overhaul resulted in the issue of the 1977 prescriptive **Industrial Education Curriculum Guide**.[^84] A technology education approach to curriculum design and instruction should have

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[^81]: This approach to curriculum planning is descriptive rather than prescriptive in that Teachers develop and teach subject matter utilizing a range of approved text-based, electronic and interactive resources. Well-defined **Expected Learning Outcomes** (ELO) guide lesson planning, delivery and evaluation.

[^82]: Inclusion of the curriculum materials in the syllabuses of faculties of education often lagged behind issuance to the schools.

[^83]: Personal observations made during practicum supervision visits to student teachers and active teaching assignments lead me to this conclusion.

[^84]: The 1977 IE guide focused exclusively on developing tool skills and production process.
reinvigorated stagnating curriculum's that had seen a continual drop in enrollment for at least 2 decades. By 1987, total IE enrolments dropped to one-third of their height in the mid to late 1970s while total school enrolments declined only 11% (Petrina, Dalley, 2003, p. 17)

Following publication of a secondary draft technology education curriculum document in 1995, IRP development was entrusted to a core group of practicing teachers under the umbrella of the British Columbia Technology Education Association (BCTEA) Choosing to ignore the identified curriculum organizers; Technical Communications, Production, Control, Energy & Power, and Self and Society (BC MOE, 1992, p. 23) that were intended to replace discrete technical subjects, the developers chose instead to redevelop and repackage the existing curriculums of separate technical and shop courses. Re-titled courses; Technology Education Electronics, Technology Education Automotive have the appearance or sound of something new and appropriate for the second millennium but they are very much the industrial courses from the 1977 curriculum guide.

2.42 The Re-Visioning of Technology Education Initiative

The most recent attempts to reform TE were aimed at the senior secondary years and was initiated by BCIT and the Centre for Curriculum, Transfer and Technology and resulted in the publication of “A Vision Paper for Technology Education in British Columbia” in 1998 (Rosenthal, Falk, & Williams, 1998). The paper describes what the authors term the “...rapidly changing contemporary economy” and the implications of these changing economic, social and technological conditions relevant to technology education.
change in employment patterns, in the structure of work and in the knowledge and skills most valued in the "new" economy were addressed in terms of their relationship to TE:

- The decline in popularity of traditional industrial technology education
- The skills shortages and skills mismatch arguments
- The needs of secondary school population who are "at risk"
- The increase in private post-secondary education and the possible implications for technology education

The Vision Paper for TE followed five years of curriculum reform and the publication of several visionary papers including A New Tool for Learning (BC MOE, 1995a, 1995b, 1997a; Halladay, 1996). The Vision Paper for TE was an attempt to deal with the politics of reform in TE by negotiating the tension between an increasing majority of IE and the minority of TE advocates as well as between BC MOE's support of TE and the BCTEA and BCIT's support of IE. The Vision Paper for TE legitimized IE practice within BCIT teacher preparation programs as well as in the schools, and advocated reform with no reform, change Technology Education by reviving Industrial Education (Petrina & Dalley, 2003).

2.43 The Demise of Technology Education as a Discrete Subject

In 2002 technology education lost its position as required subject in the public schools in British Columbia85. An applied skills subject must be taken at the grade 7 or 8 level. Although the most common grouping is a rotation through

85 As far as I could determine, no public announcement was made. The requirement to include Technology Education as a subject or curriculum disappeared from re-issued documents and all TE IRP materials for non skill-based subjects was removed from MOE web-sites and on-line resources.
introductory woodwork, metalwork, computers and home economics/foods other combinations exist. Understanding and explaining how a reversal in curriculum policy could occur is a difficult undertaking. It is conceivable that apart from limited success in the middle and junior secondary schools, T.E. development and implementation at the secondary level was constrained from the very beginning. This restraint included a lack of vision among many practicing technical teachers and their professional association the British Columbia Technology Education Association (BCTEA). Limited provincial funding for curriculum implementation and teacher professional development as well as and support at some district levels may have contributed to the implementation reversal. Using the new name Technology Education in place of industrial education or woodwork, construction, metalwork, automotive to identify the programs in the school shops and labs may have given a crisp new image to shop based courses and at the same time sanctioned the delivery of essentially the same industrial education curriculums.

86 Many of my fellow teachers have difficulty defining Technology Education. A large number feel that Technology is industrial process and practice.
CHAPTER THREE: METHODOLOGY

3.1 Introduction

Three methodological approaches were utilized to provide for a comprehensive investigation. Historical research methodology guides Chapter two, the literature review. Survey methodology is employed to ground the discussion and interpretation of the survey data. Narrative research methodology guides

3.2 Historical Research Methodology

The historical literature review is foundational to this thesis. It provides the background and context for the analysis and interpretation of the UBC Survey of Programs and Practices conducted in 1998. Historical research adheres to traditional notions of source validity. The problem of internal validity of evidence was generally not problematic within this research. Forgery was not suspected in any of the source documents I surveyed. I established external validity in most cases by superimposing and comparing single records against other related sources. I read the primary documents critically and used in an appropriate context.

My selection of primary sources was guided by the research questions underpinning this thesis. I compared published results and recommendations of commissioned reports and surveys: Putman Weir, Cameron, and Chant with curricular and structural changes within the field. When relevant, I introduced biographical evidence related to William MacDonald, James Robertson, John
Kyle, and Harry Dunnell and other key figures. In an endeavor to argue how a well-intentioned and valid curricular innovation was halted, I brought in historical evidence to establish developmental links between Manual Training, Vocational Training, Industrial Arts, Industrial Education, and Technology Education.

3.3 Narrative Methodology

The use of the narrative has become well established within social disciplines like education and sociology (Mishler, 1986; Polkinghorne, 1988). Personal narrative is often hermeneutical, context dependent involving multiple plots (Polkinghorne, 1988). The hermeneutical circle expressed as narrative provides a way of looking to research for iterative and deepened meaning, where every understanding has the potential to lead to a better understanding (Kvale, 1996). A successful narrative draws the reader into the story via the hermeneutic circle (Polkinghorne, 1988). Narration as technique contains layered views and multiple plots. This multiplicity is possible since narrative contains an awareness of the centrality of social time and place, allowing the reader to move beyond the individual experience of history.

3.4 Survey Methodology

Survey research is an established branch of social scientific research with procedures and methods refined and developed by psychologists, sociologists, political scientists, economists, and statisticians. The rigor of survey research gives the method credibility. The method appeals to researchers interested in sampling the characteristics of whole populations.
Turning to the present survey, The Survey was conducted in the spring of 1998 by Stephen Petrina and Stephen Dalley; Department of Curriculum Studies, UBC faculty of Education. The investigation encompassed all of the public middle and secondary schools in the province, (See Figures 37, 38 & 39) and follows the Technology Education Needs Survey undertaken by Peter Trant of the British Columbia Institute of Technology (BCIT) in 1994 (Trant, 1994).

A sample of the province's technology education teachers was used for generating characteristics for the whole population. For surveying school practices (courses, facilities and programs) in BC we created a questionnaire in the winter of 1997-1998. The survey was mailed to the Technology Education coordinators of all post-elementary schools (N=301) including; middle (grades 6-8), junior high (grades 8-10), secondary (grades 8-12) and senior secondary (grades 11-12) schools in BC. Representatives from 179 schools returned responses (60% return rate). The survey sampled twelve items that ranged from program and course descriptions to gender. Qualitative responses were also elicited from the coordinators to clarify the descriptive survey statistics and to address various issues such as gender. The questionnaire (Appendix 6) contained both interval and categorical components designed to elicit quantitative and qualitative responses.

Whether the participant responses were truthful in accurately presenting the schools programs and facilities is a serious concern; a common concern shared by many researchers and the subject of serious academic inquiry. The relationship between an individuals beliefs or attitudes and resulting behavior on
the part of the respondent is considered pivotal in assessing survey validity. The Technology Education coordinators surveyed were at the forefront of practice and it was assumed that their responses would be both accurate and valid.

3.4.1 Attitude-Behavior Relationships

My literature survey found that two main models inform the relationship between survey responses and Attitude-Behavior and Intention: Ajzen and Fishbein's *Theory of Reasoned Belief*, proposed in 1967, and Fazio's *Attitude-to-Behavior Process Model*, published in 1980. Although the two models are similar, the main premises of the models differ.

With the former, Ajzen and Fishbein's *Theory of Reasoned Action*’s main premise posits that a person's intention is the main predictor and influencer of attitude; i.e. If a person intends to do something they will probably do it. Conversely if they have no intention then they will more likely not do it (Ajzen & Fishbein, 1980).

The Reasoned Action theory suggests two main influencers of intention;

- The *Attitude toward the behavior* suggests that people "think about their decisions and the possible outcomes before making a decision" (Ajzen & Fishbein, 1980).

- The *Subjective Norms* come from "The person's belief that specific individuals or groups think he should or should not perform the behavior and his motivation to comply with the specific referents" (Ajzen & Fishbein, 1980).

The decision maker is influenced by the importance of peers or what others will think of her/his action and if the right thing is being done.
We argue that people consider the implications of their actions before they decide to engage or not to engage in a given behavior. For this reason we refer to our approach as a "theory of reasoned action...We make the assumption that most actions of social relevance are under volitional control and, consistent with this assumption, our theory views a person's intention to perform (or not to perform) a behavior as the immediate determinant of action (Ajzen & Fishbein, 1980).

The Attitude-to-Behavior Process Model proposed by Fazio & Powell argues that: "attitudes can guide a person's behavior even when the person does not actively reflect and deliberate about the attitude" (Fazio & Powell, 1989). In this model the main gauge of attitude is how the event or decision is viewed by the subject:

- The attitude is related to memory and prior experience with similar situations.
- The decision making process can be long and thought out or short and routine. Additionally if the attitude is not derived directly from memory then external cues will help form the attitude to make the decision.

"Overall the stronger the relationship between memory and perception of the object the stronger the attitude will be towards the resulting decision" (Fazio & Powell, 1989, 1891).

Most significantly, both models identify attitude as the main predictor of behavior:

- Intention is the major part of attitude formation in the Theory of Reasoned Action, with people rationally thinking about all their actions and the possible outcomes.
- In the Attitude-to-Behavior Process Model the persons attitude is subordinate to the situation and events that are surrounding the decision. The surrounding situations and events will result in attitude formation.
Applying research to this survey, the *Theory of Reasoned Action* and the *Attitude-to-Behavior Process Model*, collectively argues that the individual will respond in a manner that correlates to their belief system: He is concerned and cares about students, teaching and believes that participating in this survey is worthwhile.

### 3.4.2 Data Collection

A mail survey approach was used for data collection. The mailing included a letter of introduction/explanation, the survey instrument and a postage paid return envelope (See Appendix 6) The survey was addressed to the schools Technology Education teacher or department head (Technology Coordinator); it was anticipated that the survey would be completed by the intended party and not the computer studies, educational technologist, or school administrator.

### 3.4.3 Request for Participation and Mailing Procedure

The survey package contained a letter of introduction designed to solicit participation, the survey form, and a postage paid return envelope (See Appendix 6) The initial mailing occurred in early March 1998. Responses were requested before April 24 1998.

### 3.4.4 Non-Response Follow-up to Request to Participate

In early May a second mailing was distributed to non-responsive sites. Data entry and survey evaluation began with the conclusion of the public school year in June of 1998.
3.4.5 Overview of the Survey Instrument Questions

Questions 1 & 2. School Locations
These two questions asked the participants to identify their school and district, to allow the investigators to geographically locate the research site within the province and district, permitting evaluation on a regional basis.

Question 3. Teacher Attrition and Demographics
This section sought to determine the following:

- The total number of full and part time Technology Education teachers in each school.
- The total number of Women Technology Education teachers in each school.
- The total number of Technology Education teachers retiring from each school within the next Two years.
- The total number of Technology Education teachers retiring from each school within the next Five years.
- The total number of new Technology Education teachers expected to be hired for the 1999-2000 school year.
- The total number of new Technology Education teachers expected to be hired for the 2000-2001 school year.

Question 4. School Program Categorizations
Participants were asked to categorise their schools programs as either:

- Industrial Education.
- Technology Education.
- A combination of both Industrial and Technology Education.
- Career Preparation.

Question 5. Lab and Shop Categorizations
Participants were asked to categorise their schools Labs and Shops as either:

- Unit or Subject Specific (Woodwork, Automotive, Metal etc)
- General.
- Combination of both General and Unit Specific.
- Modular.
Question 6. Lab and Shop Equipment Categorizations

- Participants were asked to categorize their Lab and Shop Equipment as either:
  - Traditional (Old Technology)
  - "New" Technology.
  - Combination of both "Old" and "New".

Question 7. Course Titles

- Participants were presented with a list of 33 subjects recognized by the BC-MOE and asked to check off any that were offered.
- Space was provided for additional titles offered.

Question 8. New Unit Titles

- Participants were presented with a list of 19 Unit titles and asked to check any that they intend to offer in the near future.
- Space was provided for additional titles to be offered.

Question 9. Locally Developed Courses

- Participants were asked to list Locally Developed Courses offered.

Question 10. Career Preparation Courses

- Participants were asked to list Technology Education Career Preparation Courses offered.

Question 11. Courses for Young Women

- Participants were asked to list Technology Education Courses offered only for Young Women. In the

Question 12. Feedback

- Participants were asked to identify concerns and to provide useful feedback concerning Technology Teacher Education in British Columbia.
CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

4.1 Introduction

Overall the response to the survey questionnaire was generally positive with a total of 179 responses received by the cutoff date of June 15, representing an accumulative 60% return rate.

4.2 Specific Schools

Question 1

Identifying individual schools made it possible to identify and classify differences in responses between the 4 classifications of schools:

- Middle schools with a typical grade structure of 6, 7 & 8 or 7, 8 & 9.
- Junior High with a typical grade structure of 8, 9 & 10.
- Senior High with a typical grade structure of 11 & 12.
- Combined Junior and Senior High with a typical grade structure of 8, 9, 10, 11 & 12.

There is considerable variety of grade structures within the various models and between districts. For Instance:

- Vancouver has grades 1-7 as Elementary and 8-12 as Secondary.
- West Vancouver has grades 1-6 as Elementary, 7-9 as Middle and 10-12 as Secondary.
- North Delta has Grades 1-7 as Elementary, 8-10 as Junior Secondary and 11-12 as Senior Secondary.
- The Comox Valley has grades 1-6 as Elementary, 7-9 as Middle school and 10 to 12 as Secondary.
The differences might be explained in part by districts having the autonomy to determine their own individual structure. The deciding factors can include philosophical, historical and economic considerations. Short-term peaks and valleys in enrolment and grade numbers can be remedied by moving grades between school models. Arguments can be made for school expansion based on inadequate capacity that may have been generated by moving grades from one model to another.

Vancouver, for instance is one of the largest and longest established districts and has historically not embraced the middle school philosophy or structure. This may be due in part to an established infrastructure, established school communities and stable support services. Within the larger and older high schools it can be argued that two separate schools exist. In the technical areas there are Junior shops for grades 8 and 9 students and senior shops for grades 10, 11, and 12 students. The same situation exists in other subject areas such as Science, English and Math. With teachers assigned to teaching specific grades in his argued that students at a particular grade level are receiving the appropriate pedagogy.
4.3 School Districts

Question 2

District responses were grouped into three regional classifications: The Lower Mainland, Vancouver Island and the Remaining Mainland schools (See Figures 37, 38 & 39) This three-part grouping was selected to match the BC Ministry of Education area breakdowns. In so doing, this grouping strategy allows for comparison between ministry reported data and trends for specific regions where findings of the survey can be more easily undertaken. Comparisons between Provincial regions will be helpful in determining if initial trends in Technology Education proliferation in the Lower Mainland were replicated in other parts of the province.

Figure 37. Lower Mainland Districts

| 33 Chilliwack  | 34 Abbotsford  | 35 Langley  |
| 36 Surrey  | 37 Delta  | 38 Richmond  |
| 39 Vancouver  | 40 New Westminster  | 41 Burnaby  |
| 42 Maple Ridge- Pitt Meadows  | 43 Coquitlam  | 44 North Vancouver  |
| 45 West Vancouver  | 46 Sunshine Coast  | 47 Powell River  |
### Figure 38. Vancouver Island Districts

<table>
<thead>
<tr>
<th>61 Greater Victoria</th>
<th>62 Sooke</th>
<th>63 Saanich</th>
</tr>
</thead>
<tbody>
<tr>
<td>64 Gulf Islands</td>
<td>68 Nanaimo- Ladysmith</td>
<td>69 Qualicum</td>
</tr>
<tr>
<td>70 Alberni</td>
<td>71 Comox Valley</td>
<td>72 Campbell River</td>
</tr>
<tr>
<td>79 Cowichan Valley</td>
<td>84 Vancouver Isl. West</td>
<td>85 Vancouver Isl. North</td>
</tr>
</tbody>
</table>

### Figure 39. Remaining Mainland Districts

<table>
<thead>
<tr>
<th>5 Southeast Kootenay</th>
<th>6 Rocky Mountain</th>
<th>8 Kootenay Lake</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Arrow Lake</td>
<td>19 Revelstoke</td>
<td>20 Kootenay-Columbia</td>
</tr>
<tr>
<td>22 Vernon</td>
<td>23 Central Okanagan</td>
<td>27 Cariboo-Chilcotin</td>
</tr>
<tr>
<td>28 Quesnel</td>
<td>48 Howe Sound</td>
<td>49 Central Coast</td>
</tr>
<tr>
<td>50 Haida Gwaii- Queen</td>
<td>51 Boundary</td>
<td>52 Prince Rupert</td>
</tr>
<tr>
<td>Charlotte</td>
<td>53 Okanagan-</td>
<td>57 Prince George</td>
</tr>
<tr>
<td>Similkameen</td>
<td>54 Balkley Valley</td>
<td></td>
</tr>
<tr>
<td>58 Nicolla- Similkameen</td>
<td>59 Peace River South</td>
<td>60 Peace River North</td>
</tr>
<tr>
<td>73 Kamloops-Thompson</td>
<td>74 Gold Trail</td>
<td>75 Mission</td>
</tr>
<tr>
<td>78 Fraser-Cascade</td>
<td>81 Fort Nelson</td>
<td>82 Coast Mountains</td>
</tr>
<tr>
<td>83 North Okanagan-</td>
<td>87 Stikine</td>
<td>91 Nachako Lakes</td>
</tr>
<tr>
<td>Shuswap</td>
<td></td>
<td></td>
</tr>
<tr>
<td>92 Nisga’a</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.4 Teacher Attrition and Demographics.

Question 3

3a. Participants were asked to provide the total number of Technology Teachers at the school site.

The total number of both full-time and part-time teachers included in the survey is 560 (see Table 1.) The number is somewhat fluid as teachers from other departments that teach one or more technology course might not be included: e.g. a home economics teacher may teach an interior design course utilizing a CADD lab, a drama teacher may be teaching set construction in a woodwork shop and an art teacher may be teaching lost wax casting or Jewelry design in a metal shop. Conversely, Technology teachers might be found teaching Math or PE.

Table 1. Number of Teachers in the Sample

<table>
<thead>
<tr>
<th>Full-time Technology Education teachers in the sample.</th>
<th>Part-time Technology Education teachers in the sample.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>446</td>
<td>114</td>
<td>560</td>
</tr>
</tbody>
</table>

3b. Participants were asked to provide the total number of total number of Women Technology Teachers at the school site.
Survey responses indicate that 43 women or 4.3% of the total technology teachers in the sample are women (Table 2).

**Table 2. Number of Women Technology Teachers in the Sample**

<table>
<thead>
<tr>
<th></th>
<th>Full-time Women Technology Education teachers in the sample.</th>
<th>Part-time Women Technology Education teachers in the sample.</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>26</td>
<td>17</td>
<td>43</td>
<td>4.3%</td>
</tr>
</tbody>
</table>

This finding is consistent with BC Ministry of Education (BC MOE) figures of the percentage of female technology teachers (Table 3).\(^{87}\) Like the percentage reported in the survey, the Ministry's percentage is inflated in that **part-time** teachers, or teachers responsible for only one course in technology, are included.

**Table 3. Average Percentage of Women BC Technology Teachers**

<table>
<thead>
<tr>
<th>Source</th>
<th>Women</th>
<th>Men</th>
<th>Total</th>
<th>Average %</th>
</tr>
</thead>
<tbody>
<tr>
<td>UBC Survey</td>
<td>27</td>
<td>603</td>
<td>630</td>
<td>3.2%</td>
</tr>
<tr>
<td>BCTEA Estimate</td>
<td>19</td>
<td>1,041</td>
<td>1,060</td>
<td>9.6%</td>
</tr>
<tr>
<td>BC Ministry</td>
<td>36</td>
<td>774</td>
<td>810</td>
<td>4.5%</td>
</tr>
<tr>
<td>Average %</td>
<td>3.2%</td>
<td>96.8%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

This finding is consistent with those of the *International Technology Education Association* where representation is about 97.5% men. Historically,\(^{87}\) The Ministry reported in 1995 that 4.5% of 810 technology teachers were women (BC MOE, 1995c, p. 41).
women have been strongly represented in home economics and business (commercial) education, which dealt with technologies of the home and office, while men were strongly represented in industrial education, technologies of industrial workplaces.

3c. Participants were asked to provide the total number of total number of Technology Teachers retiring this year.

• Responses indicated that 100 or 18% of the total technology teachers at the school were to retire between 1998 and 1999.

3d. Participants were asked to provide the total number of total number of Technology Teachers retiring within 5 years.

An additional 157 Technology teachers were expected to retire within 5 years for a total of 257 (Figure 40) It is reasonable to infer that many of these retirements can be expected to occur among long service teachers with trade backgrounds currently teaching in career preparation programs. As the teachers have been in the profession for a lengthy period it is expected that they have advanced through the ranks to senior positions including; department heads and senior teaching assignments. Based on the data compiled upwards revisions may need to be made for the number of new teachers that will be required to teach in the technology areas.
The greatest number of expected retirements, 61% of the total Technology Teachers is expected to occur within 5 years on Vancouver Island. Anecdotal sources, (discussions with fellow teachers and administrators) point to a higher average teacher age on Vancouver Island, due in part to career moves to the island later in the individual teachers careers. A move away from the stress of living in the Lower Mainland and harsher climate of the interior are often given as contributing factors for these types of career moves.

3e. Participants were asked to provide the total number of total number of Technology Teaching positions to be filled this year.

- The anticipated number of full and part-time positions to be filled in the 1999-2000 years was reported a 185 (Figure41). As suggested above, the number has some elasticity as full time Technology Education teachers may be teaching another subject outside of technology and part-timer teachers may be teaching as little as one block.
3f. Participants were asked to provide the total number of Technology Teaching positions to be filled next year.

- The reported number of full and part-time positions to be filled in the 2000-2001 period was reported a 168 (Figure 41). This number should also be considered speculative for the reasons outlined previously and because any projected enrolment figures used to justify FTE equivalents would likely have been of a preliminary nature.
4.5 School Program Categorizations

Question 4

Participants were asked to categorize their schools programs as either: Industrial Education, Technology Education, A combination of both Industrial and Technology Education or Career Preparation.

By design; definitions of Industrial, Technology Education and Career programs were excluded from survey questionnaire to avoid foreshadowing and possibly biasing the instrument. The following operational definitions from chapter 1, are provided as a helpful guide towards interpreting the data.

Industrial Education:

An area of education which teaches general principles of technology through workshop experience with materials, tools, and machines. Industrial Education has the following specific aims:

- To teach principles of technology and to apply these principles in practical situations.
- To explore and evaluate the interests and aptitudes of students in technology fields.
- To establish a broad base of technological skills which will provide a sound foundation for subsequent development of the individual.
- To develop systematic planning and safe practices in the solution of technological problems. BC. DOE, Division of Curriculum. (1964, p. 6.).

Technology Education:

- That phase of general education in which students deal experientially with technology–its evolution, utilization and significance; and with industry–its organization, materials, occupations, processes, and products–and with the
benefits and problems resulting from the technological and the industrial nature of society (Maley, 1987).

• Technology Education is a multidisciplinary school subject concerning knowledge in designing, creating, using, maintaining, regulating, and recycling technologies - products, processes and services (Petrina, 1997).

Combined Industrial Education and Technology Education:

• An amalgam or combination of selected portions of both approaches to experiential technical education that results in a curriculum that best utilizes available facilities and resources (Author).

Career Preparation:

• Career Preparation programs are locally developed educational programs that prepare students for entry into the workplace or for further education and training in a specific career pathway. School districts have developed a variety of Career Preparation programs to meet the needs of their students and community, (Author).

The goals of Career Preparation include:

• Providing opportunities for enhanced career development activities.
• Providing students with entry-level skills for specific employment opportunities.
• Improving transition between secondary school and the workplace.
• Enhancing transition between the secondary and post-secondary education systems, (BC. MOE. 2002).

Responses.

62% of the respondents identified their overall programs as combinations of industrial and technology education (Figure 43) and 49% refer to their programs as career preparation. As in other response areas, respondents could have noted, for example, that their programs were both industrial or technology
education and career preparation, thus accounting for a total percentage over 100. Regional differences are minimal, given the data and number of responses. Across the province Career preparation programs vary considerably in content and included subject areas. On one extreme a Career prep program includes a selection of courses, both technical and core area that lead to focused study in senior years in a single trade or employment area. Building Construction, Automotive, Welding, and Drafting are typical offerings. On the other extreme, some districts consider all senior students to be in Career Preparation programs based on the argument that since all students after leaving school will at some point be independent wage earners, and have careers. The amount of funding coming into districts that consider all of their programs Career Preparation is enormous.

62% of the respondents described their programs as combinations of Career Prep and another area may be an indication of dual expectations, retaining existing courses without making substantial changes while introducing new courses and units. Alternately this percentage may reflect a true integration of the old and new and the result is a conglomerate. The number of respondents referring to their programs as Technology Education (25%) is nearly equivalent to the number calling their programs industrial education (20%). One cannot generalize that a unit shop equipped with traditional tools and machines determines that a program will be industrial as opposed to Technology Education. With both categories; school district and administrative policy,
available budget and individual teachers training and philosophy will shape the program of study.

Figure 43. T.E. Program Emphases in BC by Percentage of Schools.

4.6 Lab and Shop Categorizations

Question 5

Participants were asked to categorize their schools labs and shops as either: Unit Specific, General, Modular or a Combination of both General and Unit Specific.

Unit Specific Shops

60% of the shops are Unit Specific or single use facilities. (Figure 44) This percentage is higher than in many provinces and the majority of American schools. The Putman Weir Report (1923) recommended building single use shops in which Vocationally aligned courses could be taught. The large Vancouver high schools; Vancouver Technical, Britannia, David Thompson, Gladstone, Killarney, Etc were constructed post Putman Weir and included large well-equipped single subject vocational shops. The rapid population growth of the province and the need for locally trained trades people were underlying factors in
facility and program design. Adult education and night school classes made extensive use of vocational shops in public schools in the first half of the century.

**General Shops**

General shops are also known as construction shops, and on Vancouver Island occur at 10% or twice the number for the “Other” Mainland. On the lower Mainland General shops account for less than 4% of the total.

The Middle school philosophy is in part driving new construction on Vancouver Island and the standardized plans used by district architects have typically included a General shop for delivering woodwork, Metalwork and Electronics within one space. The low number (<1%) of general shops in the Lower Mainland may be in part due to newly constructed or renovated schools including Modular Shops and Labs in their designs.

**Modular Shops**

The highest concentration of Modular shops (5%) is in the Lower mainland. While Vancouver Island reported 2% the balance of the Mainland had no measurable response. The proximity of the Lower Mainland districts to the initial centers of Technology Education innovation; BCIT and UBC is a likely contributor to this finding. The Burnaby District, in close proximity to BCIT is acknowledged as the first in BC. to embrace and promote *Technology Education* curriculum reform beginning in 1995. The Modular configuration is the preferred model within US Technology Education programs.
Combination of both General and Unit Specific

Lower Mainland schools with a combination of shops occur at almost twice the percentage reported for the balance of the mainland, 48% vs. 26% and Vancouver Island reported 35%. This abnormally may have historical roots. Settlement patterns favored the lower mainland and have resulted in Lower Mainland secondary schools predating most of the Island and remaining Mainland schools.

Figure 44. Technology Facilities in BC by Percentage of Schools, 1988.

Figure 5. Technology Facilities in BC by Percentage of Schools, 1998

4.7 Lab and Shop Equipment Categorizations

Participants were asked to categorize the schools lab and shop equipment as: Traditional (old technology), “New” Technology or a combination of both “Old” and “New.”
Question 6 Lab and Shop Equipment Categorizations

Participants were asked to categorize their Lab and Shop Equipment as either:

- Traditional (Old Technology)
- “New” Technology.
- Combination of both “Old” and “New”.

Traditional Shop Equipment

Overall, 25% of respondents categorize their equipment as traditional.

These shops tend to utilize the type of equipment found in the manufacturing, service and construction industries (Figure 44)

Figure 45. Traditional Shop Equipment.

Drafting

Drafting boards and tables with parallel rules or articulating arms.

Electronics

Analogue and Digital meters, Soldering stations, oscilloscopes, Circuit board printing and chemical processing tanks.

Automotive

Hoists, Brake lathes, Valve grinders, Power washers and engine diagnostic machines.

Metalwork

Lathes, Milling machines, Drill presses, Surface grinders, Oxy-acetylene cutting, Gas and electric welding, forges and foundries.

Wood and Construction

Table-saws, Radial arm saws, Thickness planers, Jointers, Lathes, Mortising machines, scroll saws, and Band saws.

This equipment type is more common in the unit-specific shops. The majority of the shops in the lower mainland are located in schools constructed
during the height of the *Industrial Arts* movement, 1930-1950 or during the 1960's when *Industrial Education* took on a more obvious Vocational character following recommendations of the *Chant* Commission.

**"New" Technology Shop Equipment**

"New" technology shop equipment was reported in use in 9% of the Lower Mainland schools and 5% of the Island sites with the remainder of the province reporting less than 1% (Figure 47). This outcome matches the order for *Modular Shops* reported earlier. "New" Technology shop equipment and space may be specialized and is not limited to computer-based technology.

**Figure 46. Technology Education Lab or Shop Equipment**

- Wind tunnels.
- Load-cell, Digital, Beam and Tension scales.
- Mac and PC workstations.
- Scroll saws, Band saws, Disk and Belt sanders, Table saws.
- Plastic benders and Vacuum tables.
- CO2 and gravity vehicle tracks.
- Compressed air rocket launching platforms.

Although "New" equipment was reported mostly in Middle and Junior Schools with Technology Education labs and shops, the equipment is also to be found in traditional and modular programs.
Combination of traditional and “New” Equipment

70% described their school equipment as combinations of traditional and new technologies (Figure 47). This is not surprising given that, if regularly maintained good equipment can last any number of years. The Metal shops at two Vancouver schools are prime examples: David Thompson and Vancouver Technical were both constructed post Putman-Weir, during the 1930's and contain most of the original Lathes, Milling Machines and Drill presses; all in good working order. The slow introduction of “new equipment into traditional shop spaces reflects budget policies, with many teachers and administrators operating within extreme constraints.

Although districts have made significant investments in computer equipment within schools, this has not always translated into Technology Education lab equipment. With caps and limits on spending it can be argued that the investments made in computer equipment have constrained Technology
Educations growth. Traditional equipment might be supplemented or replaced with "New" only as tired equipment needs replacement or becomes inadequate.

**Figure 48. School Equipment Combinations.**

School equipment combinations of Old and New typically include the following in various combinations: (Author)

<table>
<thead>
<tr>
<th><strong>Technology Subject Area</strong></th>
<th><strong>“Old” or Traditional Technology</strong></th>
<th><strong>“New” Technology</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Drafting:</strong></td>
<td>Drafting boards and tables with parallel rules or drafting heads.</td>
<td>Computer hardware and design drafting software to supplement board drafting.</td>
</tr>
<tr>
<td><strong>Electronics:</strong></td>
<td>Analogue and Digital meters, Soldering stations, oscilloscopes, Circuit board screen printing frames and chemical processing tanks.</td>
<td>Circuit design and simulation software, bread-boarding, as well as circuit board production hardware and software to produce pc boards.</td>
</tr>
<tr>
<td><strong>Automotive:</strong></td>
<td>Hoists, Brake lathes, Valve grinders, Power washers and engine diagnostic machines.</td>
<td>On-line interactive and stand-alone digital equipment and/or software for system diagnosis, service procedures and parts manuals.</td>
</tr>
<tr>
<td><strong>Metalwork:</strong></td>
<td>Lathes, Milling machines, Drill presses, Surface grinders, Oxy-acetylene cutting, Gas and electric welding, forges and foundries.</td>
<td>Computer or CNC controlled lathes, milling machines and digital measuring equipment and CNC controlled plasma cutters.</td>
</tr>
<tr>
<td><strong>Woodwork and Construction:</strong></td>
<td>Table-saws, Radial arm saws, Thickness planers, Jointers, Lathes, Mortising machines, scroll saws, and Band saws.</td>
<td>Computer controlled Overhead Router and Cut-off or Panel Saws. PC hardware and software for design and layout.</td>
</tr>
</tbody>
</table>
4.8 Course Titles

Question 7

Participants were presented with a list of 33 subjects titles recognized by the BC-MOE and asked to check off titles that were offered.

Despite curriculum reform in the shops and labs of British Columbia’s public schools being actively promoted for at least two decades, date indicates that the top five curricula in terms of popularity continue to be: woodworking, (2) construction, (3) board and CAD drafting, (4) automotive, and (5) metalworking (Figure 49). This order of popularity is consistent across the province, and this particular finding does not differ greatly from the findings of similar surveys conducted in other provinces and in the United States. Even though it is conceivable that these five subjects are now being approached from a Technology Education perspective; It is equally arguable that Technology Education has been embraced in name only in some schools.
This survey question generated 38 course titles, 34 listed on the survey instrument and 4 written in by respondents in the open-ended sections (Appendix 6). When similar course titles are grouped with related titles; e.g. Woodwork with both Construction and Wood Art, Power Mechanics with Automotive etc, the picture changes. As can be noted in Figure 50: Drafting, including Architectural, Mechanical and Computer Aided is the most popular. Woodwork/Construction is second. Metalwork, including Welding and Art Metal moves to third from fifth and the Automotive grouping remains in forth position. The Science and General Technology group or “New” Technology grouping; Technology Education, Science & Technology, Environmental Technology, Biotechnology, Design Technology, General Technology and Applied Technology are in the fifth position. A new grouping that suits the title Visual Technologies encompassing
Graphics, Video & Media, Photography and Digital Animation is the sixth most popular grouping. These titles contain overlapping content and activities.

**Figure 50. Grouped Popular Technology Subjects**

![Graph showing grouped popular technology subjects across different regions: Vancouver Island, Other Mainland, Lower Mainland.](image)

When the Junior and Middle school subjects are separated from the composite data a different picture emerges, consistent across the regions Wood and Metalwork are in first and third positions respectively (Fig 51).

While interpreting this study, one should be cognizant that the roots of these courses can be traced back through *Industrial Education (IE)*, *Industrial Arts (IA)* to *Manual Training*. Manual Training's foundational subjects were Wood and Metalwork. Manual Training was introduced into the public schools of Canada and British Columbia at the turn of the last century as a Sloyd based training program to balance hand-eye coordination and tool use with academic studies (*Hostetter, 1974*). To enable the manipulation of real objects and materials, a series of progressive or sequential exercises and activities using
wood and metalworking was employed. The Idealist, pestalozzian nature of the program by 1915 had become a craft based replication of industrial practices.

The implications of this shift are significant, many practitioners in the field are concerned that Technology Education at the secondary level now has a mainly vocational focus. Senior Technology Education subject areas (Wood, Metal, Automotive, and Electronics) present an excellent way of enhancing and contextualizing liberal education for all students (Hurley 1999). With curriculum, facilities planning, and budgets being driven by a directly to-work, apprenticeship or articulation to community college model there is little opportunity for non-vocationally directed students to take electives that permit the manipulation of real materials and objects. In other words; while a student might want to take a woodwork or metalwork class for the experience of working with materials in a creative way in order to fulfill the applied skills graduation requirement, S/he may not have the opportunity to do so, in several districts courses are over subscribed and students in career prep streams receive priority placement. Confounding this situation is the tendency of counseling staff to encourage young women away from the technology areas and post secondary pre-requisite courses in favor of soft skill elective areas.
The impact of Technology Education is evident in the second most popular group of subjects. The popularity of “New” technologies including Technology Education, Science & Technology, Environmental Technology, Biotechnology, Design Technology, General Technology and Applied Technology with the grade 7 to 9 structure is encouraging and may well be influenced by the requirement to include some aspect of Technology Education in the K to 8 Grades. The finding is surprising considering that without start-up funding for Technology Education classes several districts have used existing applied skills electives including woodwork, electricity, computer applications and keyboarding to meet the requirement without curriculum re-organization.

*Design Drafting;* Architectural, Mechanical and Computer Aided and the *Visual Technologies;* Graphics, Video & Media, Photography and Digital Animation are in forth and sixth position. Again this group contains many unexpected course titles. Automotive courses at these grade levels are mainly
composed of Small Engines and Power Mechanics and again the roots are historical. *General Mechanics* was introduced as an Industrial Arts course during the 1920’s as a practical course initially to aid families with the repair and maintenance of machinery coming into general use on the farms of rural BC.

Given that many new Technology teachers find their initial teaching assignment in the junior high or middle school grades then it is reasonable to conclude that their pro Technology Education teacher training at BCIT and UBC may be influencing the development of new subjects at those grade levels.

### 4.9 New Unit Titles

**Question 8**

Participants were presented with a list of Nineteen Unit titles and asked to indicate any that they intend to offer in the near future. Space was provided for additional titles to be offered.

The selection of intended new unit titles within existing separate subject courses or programs indicates a willingness to include content that moves beyond traditional technical subject boundaries of woodwork, Metalwork and Automotive (Fig 52)
Other units identified included: Bio-Technology, Energy, Home Maintenance, Hydraulics & Pneumatics, Materials Science, Plastics, Science & Technology, Transportation, Electronics and Computer Networking. With the proceeding occurring at > 1% interpretation or explanation is difficult but the interest in a broad range of the areas is encouraging.
4.10 Locally Developed Courses

Question 9

Participants were asked to identify any Locally Developed Courses that they currently offer. Space was provided to identify up to 12 titles on the questionnaire.

Courses with groundings in Automotive, Woodwork and Metalwork identified in Fig (53) were the most popular. This finding is not surprising as the same trend is evident in General Course Tiles, Item 7 and Technology Career Preparation Courses, item 10. Interestingly the need to address a social or creative need as well as the ability to deliver non-traditional courses in existing facilities may be identified in the three most popular locally developed course titles; Car Care, Wood Carving and Art Metal.
Car Care

A Car Care course differs from its Traditional Automotive counterpart in several ways:

- A traditional Automotive course is typically taught in a shop replicating the workplace and containing most of the equipment and tools found in industry. Although the knowledge and experiences gained by the students can be useful in using and maintaining vehicles in their adult years the curriculum focus is primarily Vocational and has typically appealed to male students with automotive career aspirations. A strong link exists between the learning outcomes of the senior programs and the knowledge and skills-sets required of future automotive apprentices. Students gain knowledge, experience and
competency in 2 and 4 cycle combustion theory, engine disassembly and repair, steering, breaking and electrical systems, tool and equipment use as well as basic bodywork. Regrettfully some out-of-touch councilors and administrators place students weak in academics, and/or behaviorally challenged in applied skills electives without support, effectively creating what many teachers term a "dumping ground", lowering the quality of instruction and limiting the programs content as instruction must proceed at a pace that does not leave students behind.

- A Car Care course may be delivered in a “working” shop or a Tech Lab. With a curriculum focus of vehicle systems operation and maintenance the need for full facilities is diminished (A generalist or even humanist approach to the interaction between the vehicles parts/systems and the owner/operator provides and opportunity to deliver curriculum to a wider audience.) Since the curriculum connects classroom knowledge and experience to future adult life responsibilities (owning, operating and maintaining a vehicle). It can appeal and be useful to a broad range of students and is not limited to those with vocational career choices. In a Car Care course students were exposed to a combination of classroom and practical experiences. Engine, fuel, electrical, steering, suspension and braking systems are studied and students gain experience and competency in identifying common failures like worn or flat tires, dead batteries, etc. Hands on activities can include: Checking fluid levels, oil changes, air filter changes, changing and rotating tires, cleaning
interior and exterior finishes. Young women are more likely to enroll in non-
vocational Car Care than traditional Automotive classes due in part to
reduced Math and Tool phobias as well as the useful nature of the curriculum.

**Wood Carving**

A Wood Carving course differs from general Woodwork courses in several ways:

- **Woodwork classes are for the most part taught in specialized shops with a variety of hand tools and machinery available.** Middle or Junior school shops generally contain smaller scale and less industrial machinery while they promote a curriculum focused on correct and safe hand and power tool use. Senior secondary shops contain most of the equipment and tools found in the construction industry. Again, curriculum focus in Construction and Cabinet Making classes is primarily Vocational, and appeals mainly to male students with building construction career aspirations. A strong link exists between the learning outcomes of the senior programs and the knowledge and skills-sets required of future Carpentry apprentices.

- **Wood Carving classes fall into two main classifications, decorative and creative.** Decorative carving includes both chip and relief methods and links historical, social, and fine art traditions to the creative process. Early Manual Training utilized *Relief Carving* to develop hand-eye coordination. The main distinction of is in process, creating an artifact by removing material from a solid piece of wood. The links to social, historical, anthropological and fine art
traditions are strong. Away from the Provinces Lower Mainland, the enrolments of students with First Nations ancestry are higher and programs often feature a cultural theme, going as far as inviting guest carvers to supplement the instruction.

Art Metal

An Art Metal course differs from its general Metalwork counterpart in several significant ways:

- As in automotive and woodwork, metalwork is commonly taught in specialized shops with specialized hand tools and machinery. Both Junior and Senior classes promote laying-out, cutting, manipulating and joining various types of metals. This includes; bench work, welding, forging, foundry, and machining. Junior shops generally contain smaller and less industrial versions of machinery. Senior secondary shops contain most of the equipment and tools found in Industrial Welding, Fabrication or Machine shops. Like Woodcarving, curriculum focus in senior Metalwork classes is primarily Vocational, and appeals mainly to male students with career interest in metal related occupations. A strong link exists between the learning outcomes of the senior programs and the knowledge and skills-sets required of future welding, millwright and machinist apprentices.

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88 The metal component of a junior technology or applied skill course if often taught in a combined shop that might include woodwork and drafting.
• In Art Metal classes the operative word is Art. When taught in traditional shop facilities the instruction and learning outcomes for personal safety, hand tools, foundry, forge, welding and lathe work remain the same as for a general metal class. With identical methods of manipulating, cutting, and joining materials, an Art Metal approach develops a creative component within the student. The established projects; coal shovels, coat hooks and cannon barrels are often replaced with two and three-dimensional sculpture, wrought iron table lamps and cast sculptures. The industrial nature of many shops makes the inclusion of highly detailed work; jewelry, copper or silver smithy difficult. Lost wax casting and jewelry work is popular but often a part of a Fine Arts program and taught by an art teacher. Art Metal courses appeal to wide range of students in part because of the non-vocational nature of art metal courses and the links to art in general and the creative process.

The development of Car Care, Wood Carving and Art Metal courses by technical departments to meet local needs can be seen as a positive sign that a move away from Vocationalism is occurring. It is also arguable that the need to maintain enrolment in declining elective subjects is being addressed. The development of the remaining Locally Developed elective subjects; Graphic Communications, Film and Animation, Engineering Design, Applied Technology, Transportation, and Power & Energy courses may be in response to the changing needs of the workplace. As the province moves away from a reliance
on resource extraction, lumber and commercial fishing the need for expertise in emerging occupations will have to be addressed. If this is the case then the underlying focus is still Vocational.

4.11 Career Preparation Courses

Question 10

Participants were asked to list any Technology Education Career Preparation Courses offered.

Fifty different Career Preparation course titles were identified by the respondents (Fig. 54) When grouped by Career Related Area the most popular are Construction, Automotive and Metalwork.

Figure 54. Career Preparation Course Areas.

This finding is not surprising given the unit specific nature of the majority of the facilities and the Industrial/vocational nature of many programs. The industry backgrounds of many senior technical teachers may be having a bearing on the curriculum development of career preparation courses.
Construction related courses included:


Automotive related courses included:

- Automotive Mechanics, Auto body, Automotive Technician.

Metalwork related courses included:

- Metal fabrication, Welding, Engineering, Machinist, Aviation and Millwright.

Drafting related courses included.

- Drafting and Computer Aided Design Drafting (CADD).

New subject areas included:


New technology areas included:


Computer-related courses included:


Although the 4 most popular curricular areas continue to be Woodwork, Metalwork, Automotive and Drafting, over 50 individual and different courses were identified. The offerings included courses in wood/metal fine arts, new technology and computer related areas. Taken as a group these new offerings are equal to the number of automotive career preparation courses in the province.
and may represent the beginning of a move to align career preparation programs with the evolving workplace.

4.12 Courses for Young Women

Question 11

Participants were asked to list any Technology Education Courses offered only for Young Women.

Comparative evaluation is difficult with less than one percent of the sites offering Technology related courses exclusively for young women. Overall the respondents identified courses titles mainly in automotive, woodwork and construction areas.

Figure 55. Subject orientations, courses for young women

<table>
<thead>
<tr>
<th>Automotive related</th>
<th>Woodwork related</th>
<th>Other courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Car Maintenance</td>
<td>• Women in Construction</td>
<td>• Technology</td>
</tr>
<tr>
<td>• Automotive</td>
<td>• Woodwork</td>
<td>• Jewelry</td>
</tr>
<tr>
<td>• Automotive 11</td>
<td>• Women in Trades and Technology</td>
<td>• Mentorship,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Womens Studies</td>
</tr>
<tr>
<td>• Mechanics.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Technology Education courses for young women can be viewed as interventionist in that they provide an opportunity for young women to gain exposure to vocational and career areas that have been traditionally male
dominated. Vocational and Career course enrolment hesitation centered around tool and math phobias can be overcome when young women take an initial single gendered course.

4.13 Written Comments

Question 12

Participants were asked to identify any concerns and provide feedback concerning Technology Teacher Education in British Columbia.

An Excel spreadsheet was designed to record and tabulate the responses that had been categorized, a macro approach to textural analysis was employed to identify significant words and phrases and classify into 14 separate Areas of Concern. (Figure 56) Full responses are provided in Appendix 1.

66% of the Junior/middle school respondents and 62% of the secondary responders identified concerns and provided feedback directly related to the preparation and credentialing of Technology Education Teachers in the province. Additionally a range of specific and general concerns on an assortment of items from the quality and types of programs in their schools, to funding issues for new and existing programs emerged.

89 All written comments were transcribed to text and the MS word software feature "Find" was utilized to locate specific words and phrases. The total was tabulated and converted to a percentage of the total number of responses received.

90 The total includes several identified topics: Teacher Training, BCIT Teacher Prep. UBC Teacher Prep, Practicum Experience, and Professional Development.
### Categorization by Areas of Concern

<table>
<thead>
<tr>
<th>Categorization by Areas of Concern</th>
<th>Middle &amp; Junior High</th>
<th>Senior Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle School Program</td>
<td>39%</td>
<td>0%</td>
</tr>
<tr>
<td>Technology Education Focus</td>
<td>36%</td>
<td>50%</td>
</tr>
<tr>
<td>Teacher Training</td>
<td>36%</td>
<td>24%</td>
</tr>
<tr>
<td>Shops and Facilities</td>
<td>27%</td>
<td>16%</td>
</tr>
<tr>
<td>Traditional Focus</td>
<td>18%</td>
<td>20%</td>
</tr>
<tr>
<td>BCIT Teacher Preparation</td>
<td>16%</td>
<td>6%</td>
</tr>
<tr>
<td>Funding Problems</td>
<td>16%</td>
<td>19%</td>
</tr>
<tr>
<td>Curriculum Development</td>
<td>16%</td>
<td>12%</td>
</tr>
<tr>
<td>Junior High Program</td>
<td>13%</td>
<td>3%</td>
</tr>
<tr>
<td>Industrial Education Focus</td>
<td>12%</td>
<td>16%</td>
</tr>
<tr>
<td>UBC Teacher Preparation</td>
<td>9%</td>
<td>7%</td>
</tr>
<tr>
<td>Professional Development</td>
<td>6%</td>
<td>20%</td>
</tr>
<tr>
<td>Teacher Retirement and Teacher Shortages</td>
<td>6%</td>
<td>5%</td>
</tr>
<tr>
<td>Practicum Experience</td>
<td>3%</td>
<td>5%</td>
</tr>
</tbody>
</table>

#### 4.13.1 Middle School Program Concerns.

44%\(^91\) of the narrative responses can be identified as being from either Middle or Junior schools.\(^92\) Identifying a program's prominent focus from the teacher comments is difficult as not every respondent commented on similar concerns. However, within this Middle/Junior grouping it was possible to identify 36% as having Technology Education program concerns, while 12% can be identified as having Industrial Education, and 18% have Traditional Program.

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\(^91\) 39% Middle school and 13% Junior High.

\(^92\) This identification was possible as the responders provided the name of their school and the district on the survey form.
concerns. This suggest that as a group the Junior and Middle schools teachers have been offering some type of Technology Education/industrial/traditional program. This is reasonable considering the British Columbia Ministry of Education (BC-MOE) requirement to provide Technology Education as a mandatory subject area for Kindergarten to Grade 8.\textsuperscript{93} The MOE curriculum branch distributed a K-8 Instructional Resource Package (IRP) developed to replace previous rigid Curriculum Guides. The rational for this approach is that it allows educators a choice in selecting educational resources, topics and instructional methods within a framework of Prescribed Learning Outcomes (PLO's) for \textit{Self and Society, Production, Communications, Control -Energy & Power}. Curriculum can be developed that suits local conditions of available resources, facilities and needs.

4.13.2 Senior Secondary Program Concerns

Secondary participation accounts for 46\% of the responses. Some elasticity may exist as some sites have differing grade structures including K-10, Alternate 8,9,10 ect. Additionally some teachers may be teaching at more that one site or in more than one program. Within this Secondary grouping 50\% reported having Technology Education program concerns while 16\% identified \textit{Industrial Education}, and 20\% \textit{Traditional Program} concerns. This breakdown suggests that as a group of secondary teachers 86\% have concerns about the programs that they are delivering. As with the Junior/Middle school responders

\textsuperscript{93} This requirement was lifted beginning with the 2002-2003 school year.
these program concerns are related to school program finance, teacher preparation, professional development and facility concerns.

4.13.3 Technology Education Focus

Written comments in this category included 36% of the Middle/Junior and 50% of the secondary responders and identified concerns overlapping with other topics. Implementing a technology education course or program where none has existed before has impacts on budgeting, curriculum development, teacher professional development and shop and facility adaptation.

4.13.4 Teacher Training, BCIT Teacher Preparation, UBC Teacher Preparation and the Practicum Experience

As a group of topics these concerns were expressed more often by Middle/Junior than Secondary teachers; 64% verses 43% of each groups responses. In each group at least two streams of thought are present; one represents the responders dissatisfaction with her/his own training or preparation. “The BCIT portion of our education needs to focus on practical unit building and not so much on academic courses that have proved to be a little practical use to me. Courses like material science for example, take up a lot of time that could be better employed in shops developing units and skills.” “As a recent grad, my concern is with a good, basic preparation for teachers. Things

94 Although no hard data is available, anecdotal sources report that new teachers without industry experience or Trades qualifications generally are hired into junior or middle school positions. The greater number of concerns from the Junior/Middle school group may be attributed to more new and dissatisfied teachers working at those sites.

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as rudimentary as grinding chisels and welding need to be mastered before the
design and problem-solving stuff is introduced."

"No graphic arts or printing production courses offered at UBC. I had to go to the U.S. to get trained."

And the other view that the preparation programs can be improved;

"Teacher training for middle school tech-ed positions should be different than the focus for high school teachers, grades 9 to 12. Middle schools do not get into doing brake jobs on cars or building tables and grandfather clocks."

"prospective teachers have to have some ideas of how to fit new tech curriculum into old shops and facilities."

"All teachers need courses for proficiency in desktop publishing and spreadsheets. Also, the options of training on Marks- entry programs of any kind and/or test construction using large databases."

"Elementary teachers need to be familiar with technology that applies to their curriculum areas."

"Practicum should be longer; what about the intern program like UVIC for the general program."

"I am concerned about the length of the extended practicum. Many staff members feel that 13 weeks is too long."

"Many student teachers in the past have lacked basic practical skills. This is not a fault of their own. It seems the time allocated to practical hands-on training has been reduced."

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95 The University of Victoria, (UVIC) model for elementary and middle school teachers sees students enrolled in the faculty of education from their first year onwards. Students graduate in 4 years having had multiple intern/practicum experiences. Technology Education is not included in the UVIC offerings.
"With a changing emphasis, we need individuals who:

A. have a combine training in industry, tradesmen and new technology
B. Are female.
C. Have the ability to bring the artistic creative design prospective to technology education courses.
D. Are computer literate."

In the preparation of Technology Education Teachers the separation of skills training and pedagogical development may account for some of the expressed views and can be attributed to the structure of the training program. BCIT provides the skills based training and UBC the curriculum development, pedagogy and major student teaching experiences.

4.13.5 Shops and Facilities

Concerns focused on shops and facilities were often connected to other issues and include; shortfalls in funding..."Lack of funding for new or replacement equipment", the desire to move beyond an industrial focus. "Shops need upgrades for cleaner/quieter environments", The need for teachers to be flexible..."I think prospective teachers have to have some ideas of how to fit new tech curriculum into old shops and facilities" Teacher preparation....we seem to be lacking graduating students that have hard skills.

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96 One view held by Technology Education advocates is that TE should replace IE.
97 With long serving teachers retiring; those new to the field can be expected to have a Technology Education pedagogy and could well be teaching in traditional types of shops.
98 Compared to the last decade, the UBC/BCIT preparation program is seeing fewer trades background candidates entering technology teaching. New teachers with industry experiences frequently entered teaching with embodied hard skills.
and the desire to retain existing courses..."I feel that a general technology shop is fine but not at the expense of the traditional shops." .... "the traditional shops and courses are still needed". These comments reflect the view that many in the field express, they do not dispute the real need to provide Technology Education in the public schools but feel that this should not occur at the expense of shop courses with either a liberal arts or vocational purpose.

Shop and Facility concerns were expressed by 27% of the Middle/Junior responders and 16% of the Secondary group. This range of views may be explained in that many of the Lower Mainland Junior schools were constructed during the 1960's following on the heels of the Chant Commission recommendations (discussed in detail in Chapter 2, section, .25) The commission recommended moving from the 6-3-3 grade model to a 7-3-2 structure and constructing shops for developing Industrial Education courses for the grades -8, 9 and 10. Many students were leaving school to enter the workplace and the commission felt that they were ill prepared.

4.13.6 Funding Concerns

Funding concerns were expressed by 19% of the secondary and 16% of the junior and middle responders.

Teachers located in schools that offer Technology Education within existing facilities reported (a lack of)... "Adequate funding for facility renovations to traditional shop areas wishing to convert to a tech Ed approach." And.... no implementation funds targeted for industrial education or technology education.
The need to replace outdated machinery is growing, ... "How, financially do we upgrade equipment". The lack of funds for purchasing new TE equipment; wind tunnels, rocket launchers and computers is a concern; ... "Funding for new equipment is low or nonexistent". "Lack of financial support to provide technological resources especially in the situation we are in with no course fees. Big concern".

4.13.7 Curriculum Development Concerns

The move to open-ended or descriptive curriculum materials in the form of Integrated Resource Packages (IRP)'s is troubling to 16% of the middle/junior and 12% of the secondary responders. The previous guide; published in 1977 had been prescriptive in nature and provided a set of objectives, learning outcomes as well as required and optional content. Evaluation was based on ability of the student to demonstrate mastery of technical knowledge and required practical skills. In comparison the IRP approach encouraged a formative and continuous evaluation approach.

For some teachers the shift to a curriculum that moves away from or transcends the status-quo with its established links to apprenticeship and employment in trade occupations is difficult to come to terms with. and implement. ... "The curriculum is too theory focused students learn best by hands-on approach to technology learning. The emphasis should be on practical

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99 First published in 1977 the guide became the primary curriculum document covering the 6 IE areas and was available from the MOE curriculum branch until 1992.
projects which include the fundamentals of technology. Project should proceed the information so students began to ask why things don't work and in doing so are more receptive to new learning.”

Beginning in 1995 pre-service teachers enrolled in the BCIT portion of their training received an introduction to curriculum development, unit/lesson planning and instructional strategies modeled on a technology education framework. Responses from recent graduates indicate that attention may not have been paid to the problem of delivering TE in traditional IE unit shops. ..."I think prospective teachers have to have some ideas of how to fit new tech curriculum into old shops and facilities". The need for a structured approach may have been overlooked, .."The new curriculum isn't prescriptive enough and prevents the establishment of standards".

Concern is evident surrounding ongoing curriculum support, ...“Since the new IR P has been released the ministry seems to have abandoned it to the field”, ..."a lack of provincial and university support for new technology curriculum". In-service concerns include,"... “teachers will not move away from traditional industrial education instruction models unless they are educated to understand the dynamics of the new curriculum”.

Technology education in the middle schools does not have the obvious vocational and career curriculum pressures found in secondary schools. One respondent commented that .."Much about middle school Tech-Ed curriculum comes from individual teacher interests and locally developed units". Middle and junior schools act as feeders for the districts secondary schools. Collapsing of
woodwork and metal programs in the middle grades can impact on the secondary schools electives in that without exposure to the subjects, students are less likely to request technical electives in the senior grades.

4.13.8 Industrial Education Focus

As reported earlier in Chapter 4, section 4; a primarily IE program focus was identified in 28% of the schools that were not located in the Lower Mainland or on Vancouver Island. The Mainland/Island program focus rate was 12%. Communities away from the Lower Mainland may not have embraced a TE curriculum for economic or political reasons (Petrina & Dalley, 2001). Vocational and career preparation programs are strong in communities dependant upon resource extraction, fishing or logging...” We cannot ignore the role that industrial education has played; the real world is a broad spectrum”.... “Unlike the Lower Mainland, where tabletop technology will suffice, rural schools are totally different. IE teachers in smaller and isolated communities are defensive of their program. ....”Extensive knowledge and skills are a must. Teachers must approach the technology courses being taught to relate directly to the local environment small town rural BC is very unforgiving, it must be taught suit them or they will not except technology courses”. Low student interest and enrolment numbers is a problem away from the major cities...”In small schools is very difficult to acquire the enrollment to run other than traditional industrial education”. In some districts reduced interest in IE is causing some schools to close down or combine programs.... “At (name withheld) Secondary industrial
education teachers must work in a combined metal and wood shop with small classes”. This situation has its own set of problems, without dedicated space one or the other of the programs will suffer. Oil and grease contamination of work benches, hand tools and wood stock can make woodwork classes difficult. Wood dust and shavings must be kept out of engine lathes, foundry and welding areas. Existing IE teachers may not see any benefit in re-aligning their programs…”Teachers will not move away from traditional industrial education instruction models unless they are educated to understand the dynamics of the new curriculum”.

4.13.9 Professional Development

Apart from workshops given at the annual BCTEA Technology Educators Specialist Association respondents report that little has been provided on a province wide basis to promote or assist in the introduction of technology education. Teachers located in the interior or far north feel strongly about their individual situations. “…Technology education teachers in the field have experienced little in the way of professional development activity aimed at promoting or assisting in the introduction of TE in the schools. New technology involves more than updating and re-configuring equipment. New teachers will need to be competent in the old technologies, which, while de-emphasized, are

100 IE and TE teachers can join the BCCTEA or British Columbia Technology Education Association. This is the only organization available that is recognized by both the BC College of Teachers and the teachers professional association or union. All teachers in BC can join what is termed their Local Specialist Association (LSA) for their subject area. The organizational structure is regulated with elections held annually.
not disappearing and in the new technologies which are rapidly evolving and will require continuous professional development in order to keep skills current.”

Views were expressed that post secondary institutions should be taking a leading role in providing professional development...”It would be great if the technology education center at BCIT would offer pro D. workshops to help teachers stay current areas such as plastics, CAD, animation etc.” An undercurrent of frustration is evident...”I was trained to teach Tech 10 years ago I'm still waiting for guidance and support.”

4.13.10 Teacher Retirement and Teacher Shortages

As reported in section 3 the data indicates that within 5 years up to 25% of the reported 1,060 technology teachers\textsuperscript{101} will retire. The feedback responses offer insight into individual teachers concerns, “There is a great shortage of technology education teachers in the province”.... “I am very concerned about the retirement rate of tradesmen and IE teachers other next few years. It will be almost impossible to replace them if students are not encouraged to go into trades and technology”. Specialist TE teachers may be in short supply...”Clearly there is a great shortage of qualified technology teachers understanding contemporary processes in automotive, drafting, and machining”. Concerns surrounding the availability of teachers prepared to teach in new areas...”Scarcity of bona fide instructors well grounded in this area in tune with IRP directions”. Teachers-on-call or substitute availability is a concern...”We

\textsuperscript{101} This figure of 1,060 is an estimate provided by the BCTA based on local specialist association membership. The Ministry figure is lower at 810 teachers. Both estimates are general in that they contain teachers teaching less than a full load.
cannot get enough substitute teachers to allow for release time for illness or prod”. Leadership in the area of re-positioning long service IE teachers is sought... "Need a clear picture provincially of what technology education is, and where it is headed. This district sees many old industrial education teachers 5 to 10 years from retirement, and wondering where they fit in the scheme of things.”
CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Explaining or reconciling the apparent failure of what has been described as "the perfect reform" is far from an easy task (Petrina & Dalley, 2001). Technology Education, together with other school subjects, have histories and politics (Goodson, 1988, pp. 160-183). Some subjects have socio-historical constructs reaching into antiquity while for others, their emergence was due to the efforts of particular interest groups that actively contrive school subjects. These interest groups also have politics and histories and can exercise power to influence which curriculum reforms succeed and which ones fail.

Unlike the earlier centralized and separate curriculums of manual and industrial training that reinforced the cultural and class-based practices of their day, Technology Education is a global enterprise that can cut across cultural, political and economic lines. Technical-like school subjects have been described as "practical" and like art and home economics have a history of struggling for identity, power, and status within the schools. The mix of subjects included in a school's offerings is often a result of what various influence groups value. Identifying and understanding the values embodied in technology may provide insight into one of the driving forces new curriculum development, curriculum change or the resistance to it. Advances in science, technology and industry

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102 Post secondary institutions, business interests, and subject specialist associations can exert pressure as lobby groups.
have affected almost every aspect of human life in the industrialized world. Practical based curriculums in schools should have reflected these radical changes. Looking to the past is not just an exercise in history, it provides way of understanding people and societies and helps us understand change and how the society we live in came to be.

The era up until the stock market crash of 1929 was one of great optimism. Electricity powered the cities, towns, and a variety of new household appliances. Radio brought world news, music and drama into the home. The telephone originally promoted for business use was finding favor in the home. Trains and trucks transported goods to distant markets and people could travel in the cities on electric streetcars and in the country on trains, buses or their own automobile. Those that could afford it could use air travel. We can be more comfortable with new trends if we understand how they developed and how they impact on human behaviors. Since history provides an immediate background to our own life and age, it is highly desirable to learn about forces that arose in the past and continue to affect the modern world (Hexter, 1971, Holt, 1990).

103 Concepts that we now consider new or modern often have earlier parallels. As on example, although one might assume Global-ism is a relatively new concept; it is not new at all. During the Middle Ages a "transnational" economy existed in Europe. That was up until 1343 when the English king Edward III was either unable or unwilling to pay debts that built up as a result of equipping his armies and fighting wars. The Florentine bank that financed him collapsed. The fall-out was the eventual establishment of separate national economies, the beginning of radical changes within European finance and countries maintain independent economies for the next 600 years. The current move toward globalization does not necessarily mean that we are going back to a medieval style of economy, with it's centralized monetary system controlled by a select few individuals. The adoption of a universal currency and standardized trading practices on the surface appears logical when viewed from a bureaucratic or corporate perspective. A cultural or social lens will show that universality is blind to the historic, geographic, cultural and social identities that are central to the creation of discrete nations and countries.
Understanding the role or importance of Technology Education in adolescent schooling is made easier with an understanding of the roots of human technocratic enterprise. For instance, there are similarities between the ideals of Technology Education (As defined by Maley in the 1980's) and Sloyd based Arts and Crafts enterprises in Western Europe and Scandinavia.

European Sloyd based Manual Training sought to impart some useful skill or practical knowledge, an understanding or appreciation of the process and the resultant outcomes without direct connection to a trade or vocation. The rise in parallel popularity of Manual Training in Europe and the Arts and Crafts movement were not only rooted in the successful use of simple technologies but in shared knowledge within families, peer groups and communities. The emergence of the Arts and Crafts movement in Britain was a reaction to Victorian ornamentation, and embellishment made possible by technical advances in manufacturing and mass production; and a resistance to mechanization that de-skilled the work place and lowered both wages and standards of living.

5.2 What Is/Was Technology Education in B.C.?

The untidy fit of technical, vocational, manipulative and ‘high-tech’ subjects under the umbrella of Technology Education in the British Columbian public schools has its own history and trajectory. Ontario, Quebec, and the Maritime Provinces had trade and industrial schools established as early as 1800

104 I use the term schooling as appose to education purposefully, to indicate the period when adolescents are required to attend “School” and receive a mandated curriculum.

105 Pottery, leatherwork, forging, foundry and furniture making.
but slow population growth and a lack of a manufacturing or a substantial industrial base slowed such development in BC.

The present curriculum amalgam is generally though of as having its beginnings with the Manual Training initiatives funded by tobacco philanthropist William MacDonald during the early 1900s. William MacDonald’s family had early roots in Canada, coming to the Isle of St. John (later Prince Edward Island) and settling there in 1772. He has received much of the credit for taking Manual Training initiative across Canada. Without his substantial financial contribution, similar programs in almost every province in Canada would not have come into being. Philanthropy was the major driving force for many other North American Manual Training and industrial arts programs. Health, exercise and nutrition initiatives were actively supported. While orphanages and church missions in B.C. may have also included some informal activities in developing hand skills for their charges; one can only offer an educated guess as to possible activities. Sewing and domestic service could have transpired for young girls with agriculture or animal husbandry for young boys. James Robertson was a second generation Scott who was able to convince MacDonald that he should sponsor a major Manual Training program. Robertson originally saw Manual Training as a way of improving the practical education of rural youth and that Manual Training in urban schools was the first step to improving the rural schools that tended to

106 He was not related to Canada’s first Prime minister, John. A. MacDonald. In fact William had the spelling of his name legally changed in the early 1900’s from MacDonald to Macdonald possibly to avoid confusion.

107 See APPENDIX 4. The MacDonald Heritage, last stanza.
"over-school" their charges (Hurley, 1988, p. 86). After seeing the larger world view presented through texts and other materials enlightened and educated youth may not have wanted to return to the family farm, thus placing its viability in question.

The MacDonald brand of Manual Training was closely modeled on the English Sloyd system. Male students worked in wood and produced "models" of increasing complexity. The series of 50 models detailing Manual Training activities (Appendix 3) ranged from the pointer, #1 to a small table #50. This graduated series of exercises allowed students to move from simple to complex activities, building tool skills and drawing abilities.

**Figure 57. Manual Training Bench work 1912**

It could take the students as long as four years to complete all 50 models. In the early part of the century, the majority of students did not proceed beyond grade eight and consequently would not been exposed to the most complex and interesting activities. High School Manual Training occurred in grades 9 and 10. The classes were taught in separate buildings or school basements, that evolved into specialised *Manual Training Centers*. Scandinavian trained British Manual Training specialists were recruited to come to BC to staff the three Manual Training
centers setup under the MacDonald plan. There were a limited number of experienced teachers available within Canada and hiring in the United States was avoided due to a history of tension between Britain Empire and the US going back to the war of independence (Began in 1775). An Englishman, Harry Dunnell administered the first decade Manual Training and in 1913 John Kyle was appointed Director of Technical Education. Kyle was a Scottish born journeyman jeweler and watchmaker as well as an accredited artist and teacher with head teacher and supervisory experience. He originally came to BC as the supervisor of drawing and to teach fine arts in the Vancouver schools (Hurley, 1988, p. 128). As director, John Kyle continued to import specialised British arts and crafts instructors, Canadian Manual Training with its strong links to British Manual Training and social structure effectively replicated British working class knowledge in British Columbia. In the early private schools, a different story must have unfolded, as the schools sought to employ chiefly British teachers with classical degrees or religious training. Within this construct, Manual Training was not included in the private schools beyond basic craft activities; they were essentially text-book based and did not value or see a need to include subjects outside of the established classics.

5.3 Keeping British Columbia British

The British-ness evident in the curriculum at the beginning of the 19th century can be ascribed initially to the dominance of both culture and economy.

108 John Kyle was responsible for commercial education, domestic science, Manual Training, and night school, aka "the workingman's university"
by the Hudson Bay Company\textsuperscript{109} and later by the British colonisation that continued British cultural and class distinctions\textsuperscript{110}. The first school on Vancouver Island to include a practical subject, \textit{Industrial Training} \textsuperscript{111} was opened in 1854 near Victoria at Minies Plain.\textsuperscript{112} The "public" fee paying school was operated for the children of colonists and lower status HBC servants. It shared commonalities with the school at Westminster in the Mainland colony that served mainly the children of the Royal Engineers. The settler's children could also attend these schools but maintaining consistent attendance was problematic until the advent of free compulsory schooling that begun in 1873 according to the \textit{Public School Act} of 1872 (Statutes of British Columbia. 1872, p. 1). From 1880 onwards rapid population growth ensued that was fueled by successive gold rushes and a booming coal, lumber and a canned and dried fish exporting economy.

The need to quickly provide schools and curriculum was met by establishing schools following the British model; with texts and teachers obtained from Ontario and Britain. Although closer and more easily assessable, American educational materials were not considered. Britain and by extension, the new colonies, had been at war with the US in recent memory: continual disputes over American expansion into the Oregon territory, the \textit{War of 1812} in the east, and

\footnotesize{
\begin{itemize}
\item \textsuperscript{109} The HBC was chartered on May 2nd 1670 by the English king Charles II as the "The Company of Adventurers", The Charter granted the Company the rights to "sole trade and commerce" within the entrance of Hudson Strait. Chartering of companies by the English Crown was an established method of trade and territorial expansion.
\item \textsuperscript{110} A good history of the BHC's influence on Canada can be found in Peter Newman. \textit{Company of Adventures}. (1986). Penguin Books, Toronto.
\item \textsuperscript{111} Apparently no records are available to establish exactly what was taught. It is likely that the school followed the Ontario curriculum with decorative handwork, single line book-keeping and commercial practice being the norm.
\item \textsuperscript{112} The school was located near the site of present day Central Junior High/Middle School and was used as primary school from 1853 to 1870 and Victoria High School from 1876 to 1882
\end{itemize}
}\normalsize
the local but limited 1859 Pig War\textsuperscript{113} on the San Juan Islands caused the British settlers to distrust Americans. British educational practice would be the norm, and if not available then eastern Canadian methodology would prevail over American. The new common schools replicated or reinforced Victorian British working class childhood.

In contrast to the schooling of the settlers children, the children of the newly made captains of business and industry received a different kind of education. The six private schools established in BC up until 1932\textsuperscript{114} followed the British boarding school model and delivered essentially a British grammar school curriculum to the children of the new fee-paying aristocracy (Barman, 1996). Learning to “play the game” and fit the expectations of upper class society was as important as achieving high academic results. The boys were being groomed to be future captains of business, industry and politics. The elite wanted their children educated separately from the riff-raff, and ordinary folk often had misgivings about the local public school Curriculum or teacher (Conrad, Finkel, & Jaenen, 1993, pp. 504-505).

\textsuperscript{113} Confusion over which ocean channel separated the US and the Crown’s Colonies resulted in an armed stand-off after an American settler shot and killed a HBC pig that was foraging on one of the disputed Islands.

\textsuperscript{114} St. Ann’s Academy 1858, Crofton House School 1898, Queen’s Academy 1904, St., St. Margaret’s School, Victoria 1908, St. Michaels University School, Victoria 1906, Shawnigan Lake School 1916, George’s School, Vancouver 1931.
Since it was commonly believed that a women's place was in the home and being too smart or having too much education could impair her chances for an advantageous marriage, the education of girls included meeting the social expectations of deportment, manners and companionship. These private, exclusive institutions did not include arts and crafts or Manual Training subjects in their curriculums for educational reasons. Embroidery was taught since it was considered a refined activity unlike dressmaking or the work of the seamstress.

5.4 First Nations and Manual Training

The British government was obligated by the Royal Charter of 1763 to protect the well being of aboriginal people living within British Colonies in America. When the separate British Colonies and territories came into the Canadian Confederation the Canadian Federal Government
assumed that responsibility under the *British North America act*, (BNA) and passed several “Indian Acts” to regulate aboriginal land reservations, education and health care. ¹¹⁵ (*Fisher, 1977*).

Since the aboriginal children would return to their families after school, early attempts at schooling on reserves were not always successful at conversion or indoctrination into the dominant culture. As a solution, the government adopted a more powerful model. *Indian Residential, and Industrial Boarding schools* set up for the province’s Aboriginal or First Nations children, described at the time as Native Indians.¹¹⁶ The schools were based on operational models developed in the United States and contracted to religious or charitable groups to operate schools established by the federal government.

There were and are, two principal and contrasting views or philosophies that illuminate the reasons for the establishment of Indian Residential Schools in Canada and the United States:

"*The common schools are the stomachs of the country in which all people that come to us are assimilated within a generation. When a lion eats an ox, the lion does not become an ox but the ox becomes a lion, *"

-Henry Ward Beeche, 1813-1887 (*The Red Man, 1890*).

"*If the Great Spirit had desired me to be a white man he would have made me so in the first place. He put in your heart certain wishes and plans; in


¹¹⁶ The term “Indian” has been used generally to describe the indigenous peoples on the American continent. The origins seem to be with Christopher Columbus, who upon seeing these people is reported to have mistakenly believed that he had Discovered the Indian subcontinent, rather than the American continent while on a circumnavigation of the world in 1492.
"my heart he put other and different desires. Each man is good in the sight of the Great Spirit. It is not necessary, that eagles should be crows."
-Sitting Bull, Teton Sioux 1831-1890 (The Red Man, 1890).

**Figure 60. Carpentry at Labret.**

In British Columbia the first Indian Residential (IR) school opened in 1863, St. Mary's located in Mission. It was notably the last IR school to close in 1984. The official reasons for establishing the schools were to educate, train and acculturate Aboriginal youth so that they could be successful in the larger society. The Federal government's theories about industrial education were generally translated to as basic vocational training. In most cases, the schools used extreme discipline and espoused religious dogma, served spartan meals and used the children's labor in school workshops. Products produced in the IR workshops included: Clothing, shoes, furniture (Figure 60) and blacksmithing items that were subsequently sold with the money going to the schools operators (Miller, 1996).
At the Alert Bay Residential School on Cormorant Island the situation differed in that students could make projects for their own use. During the 1930's principal Anfield instructed the senior boys in woodwork and during their final year they constructed a fishing boat to take with them when they left. By reinforcing traditional seafaring activity he was promoting self-sufficiency for the isolated island communities.

BC was 20 years behind Ontario in closing residential schools, preferring to leave the responsibility for first Nations education with the Federal government. The original St. Michael's school building still stands impressively at the north end of Cormorant Island is a grim reminder of a painful time. It is difficult to walk the hallways without feeling the presence of so many children with broken dreams and spirits. The building now houses First Nations carvers, community space and extension programs delivered by North Island College. With the residential school closing, a day school opened within the shadows of the original building. For 30 years, Island students spent their school days in a collection of hastily assembled and deteriorating ATCO portables connected together by covered outside walkways. In 1995 a new school was completed for the 'Namgis Education Authority. The T'Lisalagi'Lakw school is a modern facility that can accommodate up to 150 students; it operates as a private school with Federal financial support.

117 The selected location was out in the open with no protection from winter storms or summer rain.
In 2001 I was invited by the school to develop and pilot the woodwork and technology component of a Co-op education program \(^{118}\) directed to at-risk youth.

**Figure 62. T'Lasalagi'Lakw School. Alert Bay. BC**

As I knew the history of the community, it was important for me to develop curriculum and activities that would celebrate North West Coastal First Nations \(^{119}\) culture. To expedite Federal funding approval, the new school had been designated as an elementary school and as such was built without a science lab, art room, foods lab or woodshop. To create lab and shop space 16 teen-age students \(^{120}\) worked to relocate one of the better old school portables to the new school grounds. With my guidance, the Grade 10 co-op students designed and constructed workbenches, storage units and tool racks for the shop. After some initial skill building activities that allowed the students to develop safe and efficient ways of working with tools and machinery, a resident carver come on-board. Gary Peterson assisted in giving instructions and supervised the students in traditional carving skills. Apart from the expected projects: stools, cutting boards and clocks; traditional bentwood boxes, blanket

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\(^{118}\) The students participated in a combination of academic and applied schooling as well as related employment and work experience within the community.

\(^{119}\) Among the First Nations of the North West Coast there are 13 different language families, making up 13 ‘nations’

\(^{120}\) There were 12 boys and 4 girls in the group. The principal described the group as “at-risk and re-captured street youth”.

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boxes and carved masks emerged. Every one of these items found an immediate
use and became highly valued by the creators. The space was a bee-hive of
activity with younger students coming in before and after regular classes to make
trinket boxes and observe carving. I assisted school staff and community
members in the evenings and on weekends as they acquired skills and produced
a variety of shelves and cabinets. One ambitious female student, along with
other items, made a tall pine bookcase for her grandparents; she had to wait for
two weeks to deliver it as they lived independently on isolated island. The gift
was a success and the student informed me that her grandfather had asked her if
she would make his coffin when he passed on. I still feel humbled by the
experience.

5.5 Utility over Idealism

With Canada's involvement in World War I, public school Manual Training
lost any sense of the idealism identified with the pedagogies associated with
Fröbel or Pestalozzi. As discussed in chapter 2, the male students took
compulsory daily marching and drill practice and the girls collected warm clothing
and assembled parcels for the troops overseas. In the evenings, school workshops
were used by adult and evening classes to train workers for ammunition and ship
production. Generous federal grants for technical instruction, materials and
equipment ensured that newly established senior vocational programs would
continue, following the end of hostilities.

In the subsequent economic downturn that lasted until 1920 the economy
of B.C. rebounded with the high export sales of lumber and coal to the United
States. The growing BC population required more skilled workers. The number of available skilled trades workers had been reduced by the earlier war and subsequent flu pandemic. Only a limited number were available via immigration, and the Provincial government utilized federal funding provided in the 1919 Technical Education act to establish the Vancouver technical high school. The largest and best equipped school in the province would provide technical education to high school students, adults and trade apprentices and returning war veterans.

In the United States industrial arts as proposed by Bonsor and Mossman, was not intended at the elementary school level to be a vocational subject. With progressivism making a strong impact on American public education, Industrial Arts was viewed as an updating of Sloyd-Based Manual Training. In B.C. since the majority of students were leaving the public system at the end of grade 9 or 10, the Manual Training curriculum was now given to vocational education. The name change to Industrial Arts made little difference to the taught curriculum above the grade 9 level. Gender-based vocational Manual Training was delivered to all students above Grade 8 and increased 77% between 1920 and 1930. Recommendations made by Putnam and Weir in their 1923 survey of the school system served to create a school system based on the 6-3-3 model, (Grades 1-6 elementary, 7-9 Middle or Junior High and 10-12 Senior High). The newly created junior or middle schools delivered a vocational technical curriculum for

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those students not continuing to high school; this policy continued up until the 1960s.

Between 1932 in 1937 Elementary enrollment dropped by almost 4000 students while Secondary enrollment increased by almost 6000 students. As the province was in the grips of the Great Depression, little money was available for new schools or programs. The beginning of renewed hostilities with World War II in 1939 effectively ended the Depression in BC and saw the delivery of Federal government funding under the war emergency training program. School workshops were provided with additional tools and machinery to train future trades-people needed for the war effort. After the war, the facilities were used to retrain veterans in the trades required to build houses and infrastructure to meet the resulting baby boom.

The 1950s were educationally uneventful; a stable funding formula would insure classroom space for the growing elementary population. Everything would change in 1957 when the Soviet union became the first nation to put an artificial satellite, Sputnik in orbit around the earth. The reaction in the United States was to blame the school system for not preparing the scientists and technologists needed for such an undertaking. Canadian educators felt some empathy for their southern neighbors. Although not connected to the reaction of the United States, a Royal Commission was appointed in 1958 and chaired by Dr. Chant, the Dean of Arts and Sciences at UBC to examine the programs of study and pupil achievement in BC public schools (Chant, 1960). The far-reaching

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122 A generalization as not all of the United States is south of Canada.
recommendations of the Chant Commission would guide educational policy and curriculum development for the next two decades. The implementation would further divide student populations into either college/university bound or vocational streams. In this vein, continuing in a similar direction, the government of B.C. commissioned the president of UBC, Dr. MacDonald to report on higher education in the province to develop a plan for future growth. The report was published in 1962 recommending the establishment of two new universities and a network of community colleges to provide local and technical education.

The 1960s and 70s were an implementation period for technical education. Newly constructed schools featured up-to-date workshops to deliver the industrial education curriculum spelled out in the 1962,1963 and 1964 guides (B.C.D.O.E, 1964). When responding to the call to embrace technology, the guides stated that: "Industrial education is an area of education which teaches general principles of technology through workshop experiences with materials, tools, and machines".

In the mid 60's work was began on a new UBC technical teacher training center in Burnaby that would feature up to date shops and labs as and a curriculum resource center to develop and distribute lesson plans and shop drawings. In hindsight, if the facility had been located on the UBC campus, easy access to education faculty and other student teachers might have ensured newly trained technical teachers equal status with others in the profession. Instead industrial education teachers would continue to be created from the die of their forebears, under the shadow of differentiated status.
5.6 The Radical 1960's

During the 1960's, monumental changes occurred at almost every level of society. Unrestrained nuclear weapons proliferation on the part of the US and USSR created a public fear of global annihilation. An unpopular/unjust war was waged in Southeast Asia while black South Africans were constrained by an apartheid government. Poor governmental regulation and industrial practice was creating water and air pollution, deforestation and climate change. For women who felt restrained by domestication, government and male domination, the Women's Liberation Movement put expression to their anger. A reactionary grass roots protest movement developed in response to a range of issues, with support and participation from all levels of society. Popular music, literature, television and theater reflected the passions and beliefs of a generation that understood that the world could be devastated by a pushbutton nuclear war. Protest marches and demonstrations provided a new avenue of expression that often resulted in violence as police and demonstrators clashed.

Yet in spite of these extreme social upheavals, Industrial Education remained silent and rooted in tool and machine practice and the lockstep\(^\text{123}\) project tradition well into the late 1970's. This situation reflected a remarkable indifference to almost everything surrounding the IE. Teacher, exemplifying a disconnection from the everyday world. Alternatively, woodwork classes would have been an ideal location to discuss deforestation and ecology. Automotive

\(^{123}\) In Manual Training students could progress from one model or exercise to the next on an individual basis. In industrial education shops students typically made the same project and proceeded at a pace that would not leave anyone behind.
classes could have responded to these contextual shifts with curriculum that opens opportunities to discuss discrimination, worker rights, within industrial manufacturing settings. Electronics classes could have provided a forum to discuss process automation and impact on the workforce. Although these were issues that troubled youth, discussions and dialogue did not come from those in the field but instead from English, Math, and Art teachers.

The issuance of new curriculum guide in 1977 combined all of the separate subject guides of the previous decade into one volume that featured a standardized layout for lesson planning, learning outcomes, and evaluation. The entrenched IE courses: Drafting, Electricity/Electronics, Mechanics, Metalworking and Woodworking/Construction, were defined in merely technical terms, ignoring any cultural content of practices within these industries. Notably photography, graphics and printing were excluded from the guide. In fact, they were removed from the IE area altogether and later re-appeared as part of the fine arts curriculum. In schools where the art teachers had expertise photography survived. At Vancouver Technical for instance both photography and printing were retained as part of IE, and now form the backbone of a successful graphics program.

The prescriptive guide reversed the ends of both progressivism and Industrial Arts that were defined as far back as the 1920s. Industrial Education had become officially vocational, with the original goal of IE: "To develop an insight into the workings of the industrial world" placed at the end of the list

\textsuperscript{124} BC MOE, 1977, p. 14
and ready to fall off. The one new proposed area, Technology, could not be developed without the support of administrators wishing to include it in the curriculum or teachers willing to teach the subject; it was relegated to the future. After two decades of upheaval and unrest, the role of labour in industry or any discussion of the environmental degradation and pollution resulting from poor industrial practice were taboo subjects. Schools with their developing fixation on university bound students served to marginalize the toil of the worker. The shop appear to have been teachers were complacent on this issue and placed working class knowledge of industrial process, machine, and tool skills ahead of technological and social awareness.

Industrial education entered the 1980s with a tarnished image and a reputation as a curriculum area for low achieving, problematic male students. With competition from fine arts, drama, applied science and physical education electives, IE enrollment and programs were stagnating. By 1987, total IE enrolments had dropped to one-third of their height in the mid to late 1970s while total school enrolments had declined only 11%. In 1987 the school system in BC underwent a comprehensive Royal Commission review. The Royal Commission argued that cultural and economic changes underway demanded educational changes. One recommendation was to level the status issue in the schools by restructuring the curriculum into four strands: Humanities, Sciences, Fine Arts and Practical Arts. The Practical Arts were defined as "Physical Education, Technology Education, Business Education, and Home Economics." By

\[125\] Sweat-Hogs, Grease-Monkeys, Wood-Butchers and Knuckle-Draggers were common terms that could be heard in the hallways and staffrooms.
Restructuring graduation requirements the fine and practical arts areas would be elevated to an equal status as humanities and sciences. The Commission's designs on IE saw this subject changing from the "use of tools, materials and technological processes to providing opportunities for students to employ different technological applications and to engage in activities allowing them to create, design and construct" 126.

Under this new directive, a number of new schools were constructed in the early to mid 1990s that included progressive facility designs for TE. A new Technology Education conceptual framework was published by the BC-MOE in 1992 and it spelled out a shift from the reliance upon tool process of unit shops and materials127 to the why, how and what of technology. Several innovative teachers128 responded to the wake-up call with a vision based on experimental, forward-looking practices. Working from this conceptual framework and under a partnership agreement, the BCTEA representatives wrote and BC MOE published a new TE curriculum for grades K-7 and 8-10 in 1995 and grades 11-12 in 1997.129

The curriculum organizers for TE were:

- Self and Society
- Communications
- Control, Power and Energy
- Production.

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127 Metalworking, woodworking etc
128 Chris Bastone (1990), Judy Doll (1994), David Fraser and Craig Riechel,
129 BC MOE, 1995a, 1995b, 1997a
The BC MOE had originally planned to use individual practicing teachers, also members of the BCTEA to develop additional grade 11 and 12 Instructional Resource Packages (IRP's) in Biotechnology, Construction Technology, Design and Communication Technology, Production and Manufacturing Technology, Systems Technology, and Transportation Technology. Changing political and philosophical attitudes however, would halt the process and radically change its direction.

5.7 The 1998 Provincial Survey of Technology Education Practice

5.7.1 Introduction

Having discussed the historical backdrop of Industrial Education in BC, I turn to the survey conducted in the fifteenth year of TE reform. As reported in chapter 4, the top five courses remain: construction and woodworking, drafting and CAD, automotive mechanics, metalworking and power mechanics/auto mechanics. On one hand it is arguable that practices within the top five courses have been reformed to deliver a technology education approach. On the other hand, it is equally arguable that in many schools, IE has been reformed in name only.

5.7.2 Competition and Technology Education Electives

As with other parts of Canada and the United States, A handful of industrially grounded courses have been the most popular ones for the last 70

130 BC MOE, 1997a.
years. This is consistent across the provinces and although enrollment has decreased consistently since the 1980s, they are nonetheless important course offerings. The declining enrollment as previously discussed is substantially attributed to a loss of focus within the industrial education curriculum. Additional factors confound this situation. Competition is strong from Art, Drama and Music; courses that many students consider “fun” electives. With Physical Education now established as an applied skill, PE subjects; outdoor education, snowboarding and hiking electives are also attractive to students. Moreover, the industrial appearance and odors of the technical sections of schools often deter students from selecting these electives. Declining budgets and lack of maintenance and administrative priority tend to keep the facilities appearing rundown. While new carpeting, freshly painted lockers and background music are often found surrounding core or academic subject classrooms this by contrast, is not the case with IE and TE areas.

5.7.3 Technology Course Offerings

Recent survey indicators in the United States indicate a rise in the popularity of general technology (Sanders, 2001). With less than one-third of the schools offering the subject, this is not the case and BC. What is often offered, but not reported on in this survey are Science and Technology electives. Students taking this course receive science credits to fulfill graduation requirements, this approach has regretfully been used to permit less successful students obtain the credit by reducing the rigor and content of the course. Science and technology courses have also been described within the BC
teaching community as "Science for Dummies". Electronics courses although offered more in Vancouver Island schools than the rest of the province, are showing a decline. This is ironic considering the amount of consumer electronics encountered in everyday life. The curriculum reliance upon basic electronics theory with a heavy math component and a progression into digital and bread-boarded projects serves to make the courses less appealing to general students. The tendency of delivering a curriculum with a science foundation that links directly to postsecondary study also makes it difficult for a teacher to include everyday electronics like telephone, cable TV systems, or car audio alarm systems in their lessons. Such inclusion would serve to increase enrollment. A number of schools have reported planning to offer courses and units that are typically associated with TE, like science and technology, computer aided design (CAD) or video and media, but the number of schools offering these types of courses is substantially lower than those offering the two most popular courses, wood and metalwork.

5.7.4 Facilities and Programs

Given the mix of old and new school buildings around the province it is not surprising that 61% of school coordinators identified their overall programs as combinations of IE and TE. Although it's possible to offer Technology Education program in Industrial Education facility, the reverse is not true. Career preparation programs are popular. 49% of respondents referring to their programs as career preparation, with large numbers reporting their programs as combinations of both industrial or technology education and career preparation.
With 61% of the coordinators describing their programs as combinations of both IE and TE, this suggest that either they want it both ways, or the junior programs are TE, and the senior IE and career Prep. Ultimately they may want to retain IE practices without making any changes, while introducing new courses and units. Teachers that grew up during the industrial education era may well have retained a romantic view of the period. The 27% of respondents that identified their programs as Technology Education may be just doing that; identifying the program in name only as Technology Education; and not reforming the curriculum. By comparison a 2001 survey of U.S. schools found that 58% identified their programs as TE (Sanders, 2001).

5.7.5 Facilities and Technology Education

Overall, lower mainland schools, outside lower mainland and island school shops are very similar. With some exceptions, the equipment and facilities available determine the activities and the nature of the program. Woodworking machines in a wood shop is a good indicator that a woodworking courses would be offered. With a TE focus, skill-based emphasis would decrease in the design-and-problem solving component, increase. Over half of the BC schools are provided with unit shops. Substantial federal funding for vocational skills training from the 1920s through the 1960s made large amounts of capital available for school districts to go to improve shop facilities. About 30% of the total coordinators noted that their facilities were combinations of unit specific and general shops. Some facilities were designed and built that way while others evolved or morphed into that position. As an example over a 30 year time span
the original metalwork shop at P.S. Ogden in 100 Mile House changed into a combination metalwork and automotive facility. Hoists, brake lathes and tire changers were installed resulting in a combined facility. A small number of respondents identified their facilities as general, the most suitable for TE, and most of those that did, taught in a middle school. Less than 1% are teaching in modular facilities.

5.7.6 Equipment and Technology Education

It is reasonable to expect that a teacher utilizing a unit specific wood shop with traditional equipment would be delivering essentially an IE program. In fact, 60% of respondents identified their shops as unit specific with 70% describing their school equipment as combinations of old and new technologies. With 58% reporting their programs as IE, the status quo is maintained in over half of the provinces schools. Another 25% described their equipment as traditional, and the balance was using new technologies. New technology equipment does not necessarily translate into technology education. For instance, in a drafting lab, a CAD station can be used to replicate traditional mechanical and architectural drafting practices. In the metal shop a, CNC lathe or milling machine can be used in an industrial fashion, while in the electronics lab, a computer and software can be utilized to produce circuit boards by the hundreds. Computer technology can be used as a time saver with questionable learning outcomes.

If maintenance is done regularly, equipment can last any number of years. Generally, table saws and welders will outlive electronic equipment. It is extremely difficult if not impossible to equip and outfit a Tech lab without a capital
budget. Department heads and administrators are hesitant to recommend converting traditional shops for technology education when they are unsure of future interest or enrollment. School districts have often made significant budget commitments to computer technology at the expense of textbooks elective programs. While these investments are claimed to be unjustified through the argument that computer terminals benefit all students, this may not in all cases the true. Computer labs are frequently used to teach basic keyboarding. While keyboarding can of course be taught on a manual or electric typewriter, the computer lab provides the advantage of self instruction. A teacher librarian can run the class while the software can manage the students, with most computer networked for web access, this seems like an incredible waste of technology resources. Humanities teachers often make use of Internet enabled labs for student research projects while the library books stay on the shelves. On a balanced but sarcastic note, in my experience students do however hand in easy to read, spell and grammar-checked essays and research papers. In the constant, in the battle to have up-to-date labs with the latest hardware and software, significant resources are committed to computer equipment that serve to marginalize requests for Tech Ed improvements.

Several of the larger 8-12 schools in the Lower Mainland contain a mix of traditional equipment in unit specific shops as well as specialized labs with “new” equipment. School sites with a limited number of shops often have a combination of equipment within a common space.
Recently constructed, post 1990 Middle Schools with grades 6 to 8 typically have one facility designated as a "Construction" shop. In this space traditional equipment has been installed for stock break-out with smaller equipment provided for student use. Where the facility is complimented with an adjoining *Tech-ed Lab* or *Clean-Room* a *Technology Education* curriculum can be easily delivered. Without ready access to class/clean room a craft based or traditional type of wood or metal program is more likely to be found. This is not to say that teachers are not capable of designing and delivering a TE curriculum within limited facilities but that the existing curriculum, especially if it is popular and successful will tend to remain in place.

5.7.7 Teacher Attrition and Technology Education

With an aging technical teacher population and many set in their ways, TE reform is constrained. According to BCIT data\(^{131}\) many practicing teachers may have 30 years of experience. While another 35% had between 11-20 years of experience, while it can be argued that these experienced teachers resistant to change, might see little incentive to reform their practices. This view is reflected in the comments section, where one respondent noted: ""few industrial ed teachers seem capable of conceptualizing the new technology ideas to move shop courses into the 21\(^{st}\) century. Many shop teachers are nearing retirement and don't care" (Appendix 1). Some new teachers are reluctant to embrace TE reform. It may not be reasonable to ask a new teacher with limited experience to undertake the reorganization of an IE program. Large numbers practicing

\(^{131}\) (Trant, 1994).
teachers were expected to leave the schools in the 5 years following the survey. This is the case in other subjects, as well as business and industry as post ww-2 "baby boomer" children approach retirement. Programs coordinators reported that about 250, or 25% of the total technology teachers, were to retire between 1998 and 2003. Without updated statistics it is difficult as to whether the full number left the schools, or if those teachers were replaced. However, in the face of declining enrolment, a number of schools have combined teaching assignments, eliminating the need to hire replacement staff. Science teachers are teaching electronics, and home economics teachers are teaching CAD based drafting and design courses. To make up a full time position, assignments are often advertised as a combination of PE, Math and Tech-Ed. It is ironic that at any one instance there might be as many as 50 non-qualified individuals teaching in the provinces shops on letters of permission, while senior elective positions that require trade qualifications; automotive, welding etc. remain unfilled. It is the administrators prerogative to assign a teacher to an area that the supervisor is satisfied that s/he can teach; an increasing number of teachers without formal training or credentials in Technology Education are teaching in the shops. This is for a large part due to conceptions that junior level technology education is a physically safer subject to teach than any of the machine based senior electives. As Junior TE is often taught in a classroom or lab with limited power machinery, teachers without documented technical ability are finding themselves with a block or two of TE.
5.7.8 Women in Technology Teaching, Girls in TE Classes

At the end of the twentieth century, when the understanding and use of technology is tightly tied to democratic participation, ecological sensitivity, and economic justice for all, it is vitally important that women be called on as technology teachers for the next generation of young girls and boys. Compared to other subject areas the four percent of women teaching TE/IE in BC is extremely low. This percentage is lower than other provinces, and may be a reflection of the historical male proliferation within the construction and industrial trades in BC. It is arguable that IE and TE are not very attractive teaching areas for young women. The pay is the same whether one is teaching TE or PE. As well, the choices may lay more within the status of the subject and the culture of the schools. When compared to the USA, female technology teachers in BC are under-represented. Women in the International Technology Education Association (ITEA) represent 68.9% of elementary, 14.5% of middle and junior high, 11.9% of secondary, and 8.5% of post-secondary profiles (Braundy, O'Riley, Petrina, Paxton and Dalley, 2000; Schaefer, 2000). Female enrolments in technology courses in some of the other Canadian provinces and other countries also differ from those in BC. For example, data collected in Ontario for the 1998-1999 school year confirm that the overall percentage of girls in senior technology courses (19%) is higher than that of BC (7.9%). While in individual courses, such as construction technology, the enrolment of girls in Ontario is 15%, in BC this percentage is 8.4% (Ontario Ministry of Education, 1999). Sanders found that in the US, girls account for 17.7% of enrolments in high
school technology courses (Sanders, 2001, p. 43). In England and Wales, the enrolment of girls in A and O (secondary) level technology courses was 21.5% in 1992 (Harding, 1998, p. 26). TE has been, and will remain, for the time being an elective above grade 8 in BC, but some technology teachers have overused this as an excuse for low enrolments of girls (McLaren & Gaskell, 1995) (Petrina & Dalley, 2001).

The almost total male domination of technical and shop senior electives in the public system is part of a larger picture. Gender and technology course enrollment has its own historical trajectory. Early turn of the century elementary education included drawing and hand-work classes where boys and girls typically drew shapes and cut them out to color-in or stitch with raffia or wool. Above grade eight and beginning in the 1900s and 1910s, young women were streamed into Domestic Science (home economics) while the young men were streamed into Manual Training. This practice was naturalized over then next few decades, and by the 1950s, there were few who questioned the practices on sexist grounds.

Since the 1960s, some borders have been crossed, but for the most part, educators have been slow in overcoming the early historical precedents. By the mid 1970s, about 6.5% of the total enrollments in industrial education were young women, and about the same percentage of young men enrolled in home economics. Beginning in the 1977-1978 school year, schools were mandated to include either a home economics or industrial education course for all grade 8 students. This mandate ought to have changed practices, but most schools
simply continued to stream boys into industrial education and girls into home economics. This was a convenient situation; most Home Economics teachers were women and most Wood and Metal teachers, men. Teacher preparation unknowingly reinforced the stereo-type as the Industrial education instructors were all men and the Home Economics instructors were all women. The subject of how to develop and teach curriculum that could be used for mixed gendered classes was probably newer addressed.

Through the 1980s, enrollment of young women gradually increased, and since the mid 1990s, the percentage of young women enrolling in the grade 8 technology courses has been about 42%. This increase has been largely due to the “applied skills” requirement introduced in 1995-1996 for grades 7-10. Students are required to take one or more of the applied skills courses. This interpretation may be seen as a milestone in gender relations in BC education history, but practices in some districts have nevertheless remained unchanged. Some districts have made a literal interpretation of policy and the result is that a vast majority of the boys elect technology subjects and girls elect home economics or business/computer subjects.

In the senior secondary courses, the percentage of young women enrolled continues to be extremely low but it is better than it was during the 1970s and 1980s. In 1988-1989 according to individual school program data submitted to the Ministry of Education, the percentage of young women enrolled in grades 11 and 12 technology courses was about 7%. During 1996-1997, in construction 11 and 12 courses for example, the enrollment of young women was 11% and 6.5%
respectively. Enrollments of young women in drafting and CAD courses were higher (19% in grade 11 and 16% in grade 12), but are still quite a distance from an equitable situation. Beginning in the 1997-1998 school year, the BC Ministry of Education mandated that all students have a course in fine arts and applied skills each year in grades 11 and 12. Administrators and teachers have been creative in developing ways to fulfill the applied skills and fine arts requirement in the upper grades, including courses that unify both requirements.

Technology education continues to be an elective above grade 8, but an elective with both fair and unfair competition: Fine Art, music, business, home economics, and information technology are subjects that build a liberal education. Regretfully Administrators often sanction courses that undermine technology and other electives including: Snowboarding & skiing, outdoor adventure and leadership. While in theory there are no longer the structural access problems that once prevented young women from enrolling in technology courses, yet in many schools there lingers a residue of gendered administration and counseling, and an often celebrated masculine culture in the workshops.\textsuperscript{132}

\section*{5.8 Gender in the Lab and Shop}

Having taught in junior, senior high and middle schools, I have seen firsthand, the differences in female enrollment and engagement in Technology Education classes. In my middle school teaching assignments, TE was a requirement at the Grade 7 level. Young boys and girls were eager to cut and

\textsuperscript{132} For more detail on cultural transmission see: Alan Beals. Culture in Progress. (1967). Holt, Rinehart, Winston. Toronto. (pp, 146-159.)
shape both wood and metal into containers, candlesticks and wooden gumball machines. With a little persuasion they would prepare sketches, design notes and shop drawing for the activity. I actively promoted the Grade 8 courses during the Grade 7 term. At the Grade 8 level in design technology, wood technology and metal technology, I had approximately 20% female participation. There were enough girls in the class to exert pressure to counter the male students conditioned behaviors. At the grade 9 level the situation was different. Typically, there would be four or five girls in the class of 30. The boys if not closely monitored would monopolize the machines or other resources, and as a group generally be disrespectful to girls. Constant monitoring of the behaviors was required.

My junior High teaching experiences were substantially different. In Grade 8, all students would cycle through woodwork, metalwork, electronics, drafting, computers, textiles and foods. My Grade 8 woodwork and electronics classes generally had an equal number of boys and girls. By using a design and problem solving approach, skill differences were minimized, students were productively occupied, and behavior issues were minimal. Woodwork at the Grade 9 level was an elective and about 30 percent of the students were female. In the Grade 9 power mechanics class things were radically different. Young girls did not select this elective. Without girls in the class the behavior of the boys tended to be aggressive and at times, even disrespectful; not only to me, the teacher, but to each other. At the Grade 10 level, admission to the woodwork class required completion of the Grade 9 course. The average female enrollment was 35 to 40
percent. Since the girls had taken two years of woodwork, their design, drafting, hand tool and machine skills were well developed. The individual furniture projects that the girls designed and made were of equal or better quality and complexity than the boys efforts.

My senior secondary teaching experience has included woodwork and small engines/power mechanics. In the grade 10 woodwork classes, the students had moved up from the middle school. I could expect 3 to 4 girls in the class of 24. The subject was an elective which did require the student to have taken any previous woodwork classes. Some students in the class had taken three years of woodwork and some had not taken any beyond the grade 7 or 8 -6 week rotation. The technology department policy was to consider this an introductory woodwork course with a simple project and minimal design and problem solving. The students would make a 12 inch square box with a hinged lid. Students had a choice of three corner joints. Because of a wide range of abilities; boredom and resultant poor student behavior was often a problem. The girls reconciled their struggles in a social way. As a group they selected a design, choice of wood, and corner joints. After watching the daily lesson and demonstration they would break the planned activity down into small steps and work cooperatively to complete the activity. At the end of the course all four or five girls had produced a high-quality useful project and received a good mark (even if the boxes were similar). By contrast, most of the boys on the other hand could not, or would not cooperate. The boys with experience made good quality projects and the boys with little experience took home less successful efforts. This type of situation has
a long history, the problem was not as the BC Shop Teachers Association (BCSTA) phrased the "female problem" in 1976:

There is the increasing problem of the number of girls taking shop courses. The girls are very welcome in the shops, but they will often lack the practical experience of power tools that a male student will have received. The instructor will often be forced to teach a class which is at several different levels of ability. It can reach the point where the instructor has to do a large amount of individual teaching to compensate for these widely varying levels of attainment (BCSTA, 1976, p. 3)

I see the problem lying within the teacher, the program structure, and the outdated practices of Industrial Education.

During the school accreditation process conducted during one of my teaching assignments, the external evaluation of the technology area identified burned-out tubes in hallway lightning fixtures, worn painted floors and broken locker doors. The accreditation team was assured by the administration that in the near future the floor would receive carpeting. The lockers would get repaired and painted and the light fixtures replaced. Four years have past without any improvement. Both male and female students have told me that they avoid that shop wing because of the slippery floor, strong smell of grease, and cutting oils. If our schools are not factories then they should not look or smell like them!

5.9 Under Representation in Technology Education

The under-representation of girls and women as students and teachers is matched by an under-representation of the visible minority groups. First Nations schools were not included in this survey, but based or my teaching experience in
FN schools, the majority of these schools employ non-aboriginal technology teachers. This would not necessarily be an issue if First Nations technology teachers were sufficiently represented in other BC public schools. The problem of under-representation is particularly difficult to resolve, for the most part due to the negative connotations of industrial workshop activity within the former native residential schools. As discussed earlier, the last “Indian Residential" school in BC only closed 20 years ago. As this period is extremely recent, the current grouping of FN students in FN schools have parents who in all likelihood were schooled in the residential school system. Because of my personal experience teaching in a First Nation school, I have come to appreciate the mistrust of any activity outside of traditional carving and box making. Even though the UBC faculty of education has input into the curriculum of the Native Indian Teacher Education Program (NITEP) at UBC, no bridges or links seem to have been established for First Nations education students to participate in mainstream Technology Education initiatives.

5.10 Conclusion

The vast demographic changes in the lower mainland of BC have not been matched by demographic changes in the technology teaching profession. Some school districts in BC have enrolments where between one-third to two-thirds of the students speak English as a second language at home and yet less
than 1% of our technology teachers are ESL.\textsuperscript{133} Although Asians make up a majority of these ESL students, data indicates that UBC graduated only four Asian technology teachers in the past fourteen years.\textsuperscript{134} Asians typically do not seek careers in the skilled trades. The current route to technology teaching through the BCIT/UBC joint program requires exposure or experience in a technology area is a prerequisite to admission. This is a difficult route for many and is almost equivalent to climbing a small mountain for some.

The comments and concerns expressed by the survey respondents do not paint a positive picture of TE in the province. Teachers that have been invigorated and excited by technology education are reporting frustration as they work to implement TE, in less than ideal facilities, with minimal funding and little peer support. Teachers and career preparation of vocational programs expressed concerns about declining enrollment, shrinking budgets and problems finding replacement teachers. A disconnection seems to exist between teachers, educational academics, curriculum developers and administrators. This disconnection is probably indicative of the separation that I feel exists between nature, science and technology.

The beliefs, values, and philosophies of the various educational stakeholders encompass a wide range of societal, political and technical ideals. Competition within public education is fueled by academic, economic, and political engines. The narrative comments section of the survey suggests a common theme. Without implementation funding, teacher in-service training,

\textsuperscript{133} BC MOE, 2001.
\textsuperscript{134} CUST, TSED enrolment data.
technical support, and a viable long-term vision; technology education as a replacement for industrial education will not succeed.
6.1 Watching and Waiting

It’s one of those spectacular Island mornings; bright sun in a cloudless sky, birds singing and the air just crisp enough to chill the skin. I’m leaning on the boardwalk railing at the Comox harbor staring down and through the crystal clear water in a vain attempt to find the words to write about the sadness, frustration and anger that envelopes me as I contemplate the demise of what was once a robust and important component of general education in British Columbia.

Just below the surface a school of perhaps two-year-old Salmon are swimming. As I watch maybe a thousand swim leisurely beneath an iridescent sheen of oil; not a major oil spill but perhaps the result of a couple of ounces of mixed gas leaking from an outboard motor fuel tank. This section of the harbor is full of small boats bobbing in the breeze, almost forgotten by their owners until it’s time to pay the monthly moorage bill. Some tug at their moorings wanting a scrap of sail and to be free on the ocean, while others are complacent, content to rest and wait for barefooted children to scamper on their decks and take them on adventures.

This seems like such a waste, useful products of science and technology sitting idle, unused and possibly polluting a fragile environment.
As I contemplate those tiny Salmon I'm reminded that they are the direct descendants of the Salmon that the kw'umuxws people have harvested with fish weirs and nets in this location for thousands of years. These Salmon swim in the same water that Juan Perez\textsuperscript{135} and James Cook\textsuperscript{136} traveled on voyages of discovery, trade and colonization a close 300 years ago. The wind that tugs at the lines of those little boats contains the same molecules of oxygen that enlivened both plants and animals in the distant Jurassic period.

My own introduction to boating was as a young boy rowing a rented boat among concrete dinosaurs in an artificial muddy lake (Fig. 7) that was once the showpiece of the great Crystal Palace exhibition in South London.

I am sure my boating experience was a direct result of a good reading of \textit{Swallows and Amazons},\textsuperscript{137} one of Arthur Ransome's books; and vivid dreams about Wild Cat island, the setting for the stories. A family vacation away from the London smuck\textsuperscript{138} found me

\textsuperscript{135} In 1774 Juan Perez commanded a fleet sent by the Spanish viceroy to investigate Russian advances down the northern coast.

\textsuperscript{136} In 1778, Captain James Cook sailed his ship \textit{Resolution} into Nootka Sound.

\textsuperscript{137} 'Swallows And Amazons' is the serialized story of six young children on holiday in the English Lake District during the peaceful summer of 1929. Based on the novel by Arthur Ransome.

\textsuperscript{138} I use Smuck, and invented word to descried a combination of Smog and Muck.
steering an under-powered rental boat around a sleepy Devon harbor; and after a day of climbing the rigging, running the decks and rescuing Peggy and Nancy\textsuperscript{139} from pirates on the Golden Hind,\textsuperscript{140} I knew I'd be a sailor.

Living in South London permitted only limited adventures on the water. A day picking sea-glass and rusty iron nails from the muddy banks of the Thames just below Tower Bridge or a short walk along to traitors gate; the water entrance to the Tower of London connected me at once to the Romans, the Tudors, the Stewarts and the Industrial Revolution.\textsuperscript{141}

\textbf{6.2 A Small Epiphany}

I think that I've always been connected to both the good and bad sides of technology. My great Aunt Mary's husband Will was an engine driver for the British railways. She told me that he lost his leg after his engine was shot-up by a German fighter in World War II. I thought about him in black and of white documentary images of fighter planes strafing trains, as I traveled on a school journey to Dundee on the Royal Scot; one of the last express steam trains running between England and Scotland in 1963. For quite a distance, the route north paralleled the road\textsuperscript{142} built by the Romans to transport their soldiers and materials north to construct Hadrian's great wall.\textsuperscript{143}

\begin{footnotes}
\item[139] They are 2 of Ransoms characters.
\item[140] A replica of the ship that Francis Drake used in 1577-1580 to circumnavigate the world. Now located in Brixham harbor, Devon.
\item[141] The term Industrial Revolution refers to the developments that transformed Great Britain, between 1750 and 1830, from rural agriculture to a town-centered society engaged increasingly in factory manufacture
\item[142] The British Railway tracks are 4’8.5” apart. The same width as the wheels on roman wagons.
\item[143] The Wall was built by order of the Emperor Hadrian beginning in AD 122. For 6 years soldiers and legionaries worked to construct 80 miles of walls and forts to keep the Scots north of the border.
\end{footnotes}
As the train crossed Baker and Fowlers great iron Firth-of-Forth bridge on a cold wet March day my head was stretched out of the window to gulp in great breaths of steam and coal smoke. Railway engine smoke was rich and almost sweet. The steam often condensed on your face. The elation was short-lived when I found out that 80 years prior 75 passengers and crew on a similar train perished when an earlier badly designed bridge had collapsed in a wind storm. The replacement had to be designed and constructed to reassure the traveling public that the bridge was indeed safe. Although the bridge seems massive and imposing; structurally it is quite light being constructed mainly of hollow iron cylinders and tubes riveted together into a series of inter-locking triangles, the public was reassured by the design. While on this adventure in Scotland I was out for a day of mischief and picture taking with a friend and a Brownie box camera in neighboring Perthshire. We came to a single railway line that we followed for what seemed like miles to a small station and platform. I recall that the stationmaster wore a smart blue uniform with silver buttons and a chain for his pocket watch. He was smoking his pipe sitting on an ancient luggage cart just outside the waiting room as I approached.
He was silent for some time after I asked when the next train was due to arrive, I wanted to take a picture of the 0-3-0\textsuperscript{144} engine\textsuperscript{145} that I'd seen on a postcard. \textit{They don't stop here anymore laddie.} After a long pause he told me that passenger service had been abandoned and only express and goods\textsuperscript{146} trains used these rails now. \textit{Busses and motor-cars laddie, busses and motor-cars} was his only reply why I asked him \textit{why}. 

I suppose I'd seen my first instance of one technology replacing another, not because one was necessarily better than the other but because political, business or social forces became involved in the equation. Diesel-Electric locomotives are arguably cleaner than the Smokey coal burning steam engines. Transport economic theory\textsuperscript{147} supports that railways are a more efficient way of transporting large volumes of both people and freight over longer distances. Busses, trucks and cars may offer convenience in terms of personalized transportation but at a price that may not be immediately obvious, a cost to both the environment and human health: Owning a particular model or vintage of automobile has as much to do with prestige and status as it does practicality.

\textsuperscript{144} Steam engines were classified by the arrangement of wheels on one side of and engine. In the case illustrated: (0) the number of wheels before the drive wheels-(3) the number of drive wheels-(0) the number of wheels after the drive wheels.

\textsuperscript{145} This picture is not the same engine. It's one that Ford used at their Essex car factory up to the 1970's

\textsuperscript{146} Goods is a British term for freight.

\textsuperscript{147} This implies that society would be better off if the price of driving an incremental mile were incorporated both external costs (congestion, road and parking facility costs, accident risks, pollution, etc.) and some costs that are actually variable but are charged as fixed costs.
The hidden costs of low occupancy automobile transportation include; increased atmospheric pollution, wear and tear on the roads and increased consumption and depletion of petroleum-based fuels. Many of these costs remain hidden as they are spread across wide populations.

6.3 Nostalgia, Providence and Schooling

Separating the "me" from technology may not be possible. I grew up within the glow\textsuperscript{148} of empire and in the footprint (or at least the shadow) of an industrial revolution that had led the world. James Watt is immortalized in many books on the British Industrial Revolution as the inventor of the steam engine. It is true that his company did make and sell almost five hundred reciprocating steam engines before his patent expired in 1800. He did not however invent the steam engine.

Figure 67. Newcomen Engine.

The early origins are unclear but the first reliable and useful steam engine was built by the engineer Thomas Newcomen in 1705. The engine pumped water from tin mines and used a vertical piston to lift a column of water by atmospheric pressure.\textsuperscript{149}

My early education was in a Victorian era primary school named after Sir Joseph Paxton, architect to Queen Victoria for the Crystal Palace exhibition.

\textsuperscript{148} It was a fading glow, but I could not see that at the time.

\textsuperscript{149} As the steam in the cylinder was cooled by a spray of water it condensed; creating a vacuum in the cylinder, causing the piston it to rise, thus lifting the water.
Joseph Paxton started his working life as gardener's assistant. Through industriousness, he became the head gardener for the Duke of Devonshire and designed greenhouses for the Duke at Chatsworth.

**Figure 68 Crystal Palace, Early Sketches.**

These early drawings formed the basis for his winning design of the Great Exhibition building, which used glass covered prefabricated cast iron trusses and frames to produce a cost efficient harmonious building (Frampton and Futagawa, 1983, p. 11).

**Figure 69. Crystal Palace Perspective.**

The structure was taken apart and set up permanently at Sydenham, in South London in 1854, unfortunately a fire started within the wooden interior and consumed the building in 1936, it was not re-built.

Paxton was immortalized in that school as his name was carved in the stone over the entrance and his picture graced a wall. Charles Dickens could
have used the place as a model for a novel if he'd seen it. Monitors\(^{150}\) and prefects\(^{151}\) maintained order, the compulsory morning assembly started with God save Queen, proceeded to the singing of Hymns and concluded with a Bible reading. The readings were matched to the seasons and usually contained a salient message; *Give and thou shall receive, turn the other cheek and be kind to others*. Thinking back to the curriculum, my most prolific and probably inaccurate recollections are of time spent learning multiplication tables and making maps of the empire.

I saw my first images of Canada in that stark gymnasium on 16mm black and white NFB documentary films;\(^{152}\) Eskimos\(^{153}\) constructing Igloo’s, the Bluenose hard-over in gale, Sudbury INCO workers smelting nickel and lofty Great Lakes elevators pouring grain into waiting ships. Little did I know that I would eventually meet one of those film makers; Ken Campbell Sr, crew on a schooner, work for INCO as a mine electrician and as a stevedore at the Port Arthur elevators tying up ocean going freighters.

I don’t think I had a choice as to whether or not I would embrace technology. I had made a mess of the 11-plus exam after being off sick for 2 weeks prior to the test day.\(^{154}\) Following this disastrous turn of events my parents advocated for me to attend one of the new comprehensive schools. These

\(^{150}\) In a throwback to Monitorial schools, monitors assisted in teaching and in class discipline, They were rewarded by a points system.

\(^{151}\) The prefects maintained order in the hallways and on school grounds.

\(^{152}\) National Film Board of Canada.

\(^{153}\) Inuit is of course the proper nomenclature but Eskimo was the popular term in the 1950’s.

\(^{154}\) The 11-plus would eventually be abandoned due to its unreliability but at the time all eleven-year-old children in England had to write the test on the same day.
institutions accepted all students. The earlier system had the grammar, or academic schools taking the highest scoring students with the balance proceeding to the mainly vocational secondary modern schools.

**Figure 69. Tulse Hill School.**

I spent the next four years at Tulse Hill Boy’s School, one of England’s newly constructed schools that featured Bauhaus style utility. The Bauhaus movement began in post WW-1 Germany when Walter Gropius formed a new art school by combining of the Weimar Art Academy, and the Weimar Arts and Crafts School. The schools founding principles promoted a move towards the better integration of art, design and technology for mutual benefit. They set out to create a “consulting art center for industry and the trades” (Bayer, H., Gropius, I., Gropius, W. 1976, p.12). The English Comprehensive (sic) schools fulfilled Walter Gropius’s ideals about an architecture which should be simple, practical, universal and imaginative (Saint, 1987, p. ix.) Radically different school architecture was intended as an instrument of social change. The new schools reflected a different political and educational picture of society, one rooted in a public view that future war and sacrifice were unacceptable. Virtually every family in Britain had a son, daughter, mother or father killed or maimed as a result of the 1939-1945 war.

A rapidly expanding generation of students required large institutional buildings with spaces to match new social and academic aspirations. Saint
(1987) is emphatic in his view that the building of new schools was an integral component of the post-war package of social reforms.

"Innovative and progressive educational thinking, modern design and experimental architecture informed the new school environment (Saint, ibid).

Tulse hill was typical of the new schools and accommodated almost 2000 male students. The curriculum was a lot like the North American vocational models with part of the day spent on academics and the remainder in a combination of technical and trade areas. The school had several large shops that were staffed by teachers with extensive trades and materials backgrounds.

By the 1990's the population bulge resulted in the need for less of these large school units and Tulse Hill school closed. In my opinion it closed in part because the school continued to follow the grammar school model of using a house system and school uniform. This move was an attempt to create a sense of unity and belonging and it enjoyed success for some time; regrettfully it was a painful link to the Victorian school model of control and class rigidity, and it fell out of fashion.

In spite of the curriculum intent toward vocationalism I did receive a fairly liberal education. There were lunchtime and after school clubs covering everything from classical music appreciation to American film. I realize now that those four years were foundational in charting my thinking away from the accepted views of the British colonial empire and the patriarchal class system.

In Britain the new schools were needed for the same reason as in BC, to meet the need for additional school seats to accommodate the large numbers of
children born as result of increased prosperity and stability following WW-II. The British and Canadian systems differed in two principle ways; Firstly, Canada hadn't been subjected to a war on her own soil, even though 1.1 million Canadians were uniformed between 1939 and 1945 and 39,000 died. The physical devastation of war was always at a distance. Secondly; the BC curriculum had been impacted by American progressivism and innovators such as John Dewey and the new schools were being staffed by fresh teachers with new ideas. The British Comprehensives in spite of new language and curriculum replicated the existing empirical paradigm.

6.4 Winds of Change

To borrow a line from a Neil Young song; all my changes were there.\textsuperscript{155} When I was working in one of Tulse Hills workshops I could contextualize Technology, process, science and history. While manipulating Iron, Wood or Brick I was in touch with many generations that had done so before me.

Figure 70. Roman Key Arch.

\begin{figure}
\centering
\includegraphics[width=0.3\textwidth]{roman_key_arch.png}
\caption{Roman Key Arch.}
\end{figure}

I could have been one of the Roman stone masons or one of the slaves that built roads, the arched bridges and canals to cement an empire, even a Cornish Tin miner or the Lead smelter who created the pipes and conduits used to supply public fountains and baths. I developed a sense of nature and improved my math skills laying out, measuring and working with wood. The act of measuring, cutting

\textsuperscript{155} "Helpless", Neil Young. 1971.
and shaping wood has always been a special one for me; for while doing so I could be an Elizabethan shipwright or an Egyptian carpenter.

Wood is technologically significant, thought by some of as a second cousin to steel due to its lower tensile strength, it gained popularity as it is relatively easy to work and (was) abundantly available. Humans used wood rafts to cross rivers and oceans, build shelters and housing, erect fences to contain livestock and to construct weapons to wage war. What I perceived as nature in 1964 was in fact a representation. The city parks and public spaces had been crafted and arranged to present an orderly balanced view of nature. Tall stately trees were planted to provide a backdrop, smaller species filled the spaces with hedges and shrubs used to form borders to walkways laid out to afford present views for visitors. Stately homes and palaces used geometric and Gaelic shapes to organize flower beds, fountains and topiary to present nature in an organized and civilized way.
Figure 71. HMS Victory

It saddens me to recall reading that more than 2,500 individual mature oak trees were cut down to construct just a single warship in Lord Nelsons time\(^\text{156}\). Many of the nature reserves and parks in Europe exist because they were at one time forests reserved for Royal or military use.\(^\text{157}\) Today the smell, texture and resilience of cut wood immediately takes me to the living forest with her damp mosses, shafts of sunlight and a myriad of living creatures. I owe a debt for the opportunities of connecting with some of natures materials under the guidance of skilled artisans who unknowingly embodied ecology, the conservation of materials, \textit{as well as} balance, form and function. These thoughts are never far from my consciousness.

Both Pestalozzi\(^\text{158}\) and Froebel\(^\text{159}\) were teaching and writing in a time when nature was for want of a better word, natural; uncorrupted by

\(^{156}\) "...the industry most dependent on wood and most critical to sixteenth-century commercial expansion and national supremacy was shipbuilding. Mature oak of 80 to 120 years was required for the hull of ships, firs were used in the masts, and pitches and tars for sealing. Famous oak reserves in England included the royal forests of Dean, New, Alice Holt, acreages eventually set aside after the Restoration of 1660 exclusively for naval timber" (Merchant, 1989, p. 65). Lacking the technology to steam-bend ship ribs the shipwrights had to resort to cutting curved ribs from curved tree trunks and branches. This was an incredibly wasteful practice. "In England, concerns for shipbuilding lumber during the reign of Queen Elizabeth (1558-1603) resulted in a law preventing the cutting of oaks larger than a foot in diameter in areas near the coast, where the navy could easily harvest and transport them. Despite timber conservation for naval use, lumbering continued unabated during the reign of Elizabeth, due to the granting of extensive cutting rights" (Merchant, 1989, p. 66). Merchant, C. (1989). \textit{The death of nature: Women, ecology and the scientific revolution}. San Francisco: Harper.

\(^{157}\) The giant trees in Vancouver’s Stanley Park were originally reserved for use as Spars and Masts for the British Navy. In 1886 Vancouver’s first City Council petitioned the Federal Government to lease the 400 hectares (1,000 acres) for park and recreation purposes. Stanley Park is named for Lord Stanley, the Governor General of Canada in 1888 when the park was officially opened.

\(^{158}\) Johann Heinrich Pestalozzi (1746 - 1827). Within the ‘Pestalozzi Method’, children learn through activity and through things.

\(^{159}\) Froebel (1782 – 1852) displayed a love of nature and with a strong Christian faith. He sought to encourage, unity in all things, living or not..
industrialization and not yet ordered by fashion or infrastructure. For Pestalozzi the manipulation of real concrete objects occurred within a context. His early experiences with farming, nature and teaching underprivileged children would have provided his grounding. Froebel is generally thought of as an idealist, I feel that he was also a realist and felt that the acquisition of knowledge must be balanced by the opportunity and empowerment to use it. Empowered use can only occur within a fixed time, place and the location; be it a city, workshop or forest floor it will unavoidably create a context and influence the artisan, the process and the resulting artifact.

6.5 To Begin Near the End

A myriad of circumstance, passion and disorderly events have contributed to the writing of this epilogue to what has turned out to be several years of study, reflection and anguish that lead me to this place, time and circumstance. This is not the destination I had in mind when I decided that I wanted to be a shop teacher. I had worked hard to obtain qualifications in two trade areas and many of the trappings of a middle class urban family life.

I was living in Southwestern Ontario and recovering from a serious auto accident, it was in the spring of 1987 and I was tired of the pressures of project management, the physical stresses of working in the building trades and the overwhelming industrial that surrounded me. A light turned on in my subconscious, not an epiphany but a dawning realization. Teaching woodwork or electrical to trade apprentices or even high school students could provide a viable alternative to my present circumstance.
6.6 Coming to Canada

My parents decided in 1965 to leave England for a new life in Canada. Their original choice was Australia but after the immigration department lost all of the paperwork the year before, they took it as some sort of omen. I can understand their reasons for wanting to leave the country. England was changing, it was not the same England that they had grown up in, fought for and been prepared to die for. As Britain relinquished control of her colonies to local governments new faces and languages appeared on the home landscape, exciting to some and disconcerting to others. Rapid population growth was eating up green space, congesting the roads and increasing competition in the workplace. The opportunity for their children to enjoy the life that they envisioned for them was disappearing; a new start in the new land was a gamble with taking.

The ocean voyage to Canada gave me time to think. I discovered why governments chartered aging ocean liners to transport naive British immigrants to Canada in the month of November: to save money. The ships really didn't have many posh or full-fare paying passengers at that time of the year, for only the desperate or uninformed would travel for five days on a rolling ocean in disgustingly foul weather. The Cunard Shipping Line, owner of the Corinthia had to have made money on those winter passages for one principle reason; almost no one ate any of the food, they were too sick.

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160 Both of my parents had put their lives at risk during WW2, my father as a sailor and my mother as a radio and telephone operator on an air-force bomber base.

161 Originally POSH was an acronym for Port Outbound Starboard Homebound developed by I believe by the P & O shipping line to assign passengers cabins on their trips to India so that they would always sleep on the side of the ship closest to England. (Port is left, Starboard is right)
Mariners that made the crossing under sail did so in harmony with the ocean currents and trade winds, not in direct opposition to them as we were. A square-rigged sailing ship needed the wind to be blowing from behind (astern) for the best propulsion. The prevailing winds in the winter blow in a circular pattern; Westerly to America from Southern Europe across the South Atlantic, Northward up the American coast to Canada and then Westerly back across the North Atlantic to Europe. I knew nothing of this at the time, only that I had never been so sick in my life; so sick in fact that I spent the majority of the time lying in my bunk wishing to be anywhere but here. The Corinthia crashed on through that November gale taking me away from almost everything that ever I'd known, loved, or cared about.

Twenty-five years earlier my father would probably been happy to be in this Gale. In his 18th year he volunteered for the Royal Navy\(^{162}\), So here he was, an electrical technician, pulling convoy duty on a British Navy mine sweeper\(^{163}\). German submarines or U-boats could not operate effectively in such disgusting weather and the convoy would be safe from attack for at least one more night. I learned this fact one night at work in 1976, as I drank tea with Heinz the shift mechanic. Heinz did not like to talk about it, but he had lied about his age and joined the Kriegsmarine's U-Boat service at the tail end of WW-2. The sub was captured after being depth-charged off the coast of Newfoundland and he spent

\(^{162}\) He told me that the Air force was more prestigious but being short in stature he would have been made the Tail-End-Charlie (Tail Gunner), and they didn’t live to complete many missions.

\(^{163}\) The boat was a converted wooden fishing trawler wrapped with coils of wire and the fish hold packed full of batteries. In theory when sweeping for magnetic mines the electrical field would detonate them at a safe distance from their ship.
the rest of the war in a POW work camp in Northern Ontario. I wondered how a neat row of headstones with German Iron Cross designs had come to be located at the back of cemetery on Oliver Road in Port Arthur, now I had a good idea. After the war Heinz was sent back to Germany, immigrated to Canada and got a job as a diesel mechanic at INCO.

I wasn’t 18 yet and I didn’t have a choice as to whether I could stay in England or not. I listened to British songs on a new transistor radio that I had purchased that summer for seven Pounds\textsuperscript{164}. No BBC for me, radio Caroline and London came in at night almost as far as Newfoundland, to hear their fading signal I had to go up to a covered deck that was tarped to keep the salt spray out. As the Beatles\textsuperscript{165} and the Rolling Stones faded out sounds from a Boston station, Bob Dylan, the Doors and Joan Baez replaced them. I suppose I was angry at my parents for pulling me away; I’d finished school and started work as an apprentice electrician. I had my own tools, a job, a girlfriend and no real reason to leave England. The money for the radio was earned at a summer job at a holiday camp. Not a camp for spoiled kids with affluent parents, but a place near the English channel where whole working class families came for a weeks stay in rented grotty little travel trailers or chalets to escape the drudgery of boring jobs and grungy cities\textsuperscript{166}.

That summer I had learned how to cook burgers, wash dishes and make tea for 20 in 2-gallon teapots. I first heard Radio Caroline on that transistor radio

\textsuperscript{164} Seven Pounds was a weeks wages for me at that time.

\textsuperscript{165} Both the Beatles and Rolling Stones were popular musical groups in the 1960’s

\textsuperscript{166} The Camp idea originated with British railways eager to find ways of increasing ridership. The camps promotional hype didn’t mention the stony beach, cold wind or beach-tar deposited by passing oil tankers
and it became my friend on the Atlantic, The BBC had the state monopoly on broadcasting and consumers were supposed to purchase a license to listen to a radio or watch TV. I chose to listen without a license. The BBC Monopoly was being challenged by Pirate radio stations. The British territorial waters extended for 3 miles and several innovative entrepreneurs chartered ships, equipped them with transmitting towers, turn-tables, records and began broadcasting just outside the limit and the law. I become a convert to commercial pirate radio.

6.7 Stranger in a New Land

So this is where I'd finished up after crossing an ocean, traveling up the St. Lawrence to Toronto and riding a train across half a continent. Saint John, New Brunswick is where my father had chosen to live and work. His first job in Canada was as an electrical engineer for a subsidiary of KC Irving. At the time the Irving family reputedly owned the local pulp and paper mill, newspaper, radio and TV station as well as an oil company.

I have a good idea of what it was like to be like to be a student in a 1940s vocational school. I'm pretty sure that time had stood still for Saint John, N.B. Vocational, the teachers as I recall were all close to retirement and probably had spent most of their teaching career at that one institution. The School was situated across the reversing Falls Bridge and outside the city of Saint John, in an area called Lancaster. Saint John had a Colligate High School and typical for the period, the vocational school was considered a second choice institution. Buses delivered the students that were deemed to require a vocational

167 Short form for the British Broadcasting Corporation.
education. The contrast between the Comprehensive schools of south London in the 1960's and the Vocational schools of one Atlantic province were outstanding: One whole wing of the second floor in the Saint John vocational school was dedicated to electronics. The date could have been 1940 or 1945 and except for the absence of uniformed sailors and airmen, you would probably think it still was. For the brief time that I was a student at the school it listed several vocational subjects: building construction, welding, machine shop, automotive, electronics as well as bookkeeping and hair dressing.

I think the choice was made for me because the school offered electronics and my parents were told that I would need a grade 12 education to do anything worthwhile in Canada. When one thought of electronics in the mid '60s images of color televisions, transistor radios, cassette recorders and stereo sound systems came to mind. This however was not a vision shared by the electronics department at the Saint John vocational high school. During the 1940's the school had received an influx of cash under various emergency war measures programs to train youth for military service, being a sea-faring province it was natural to train future mariners. I now recognize that in 1966 that school was suffering from severe case of curriculum stagnation. They were either unwilling or unable to move ahead and keep abreast of changes in industry and society.

There was a classroom designed and set-up to teach Morse code. The students sat at long tables wearing headphones and attempting to decode and write down the dictation that the instructor was sending out with his code key; da-da-dit-dit, dit-dit-da-da, and so on. He varied the pitch and volume of the signal
and introduced the sound of wind and pounding engines to give the realism to
being a radio operator on a ship at sea. We had to memorize the code and be
able to transmit it at 20 words-per-minute to pass the course. The school had an
operating marine radio station and a radar room to fill out the experience. I'm not
ungrateful for the experience; and this would have been useful had a war still
been going on or even jobs for radio operators on merchant ships. There wasn't
a war on and there weren't any jobs.

I know from that experience what it was like to be a student at Vancouver
Technical in the 1940’s. The school would have been a lot like this school was in
1965, students were segregated by gender, there was a girls section for their
vocational and core subjects. Automotive students took apart and re-assembled
Jeep engines under the gaze of a stopwatch and radio students practiced
drawing the circuit of a 3-Tube Super-Heterodyne AM receiver from memory. I
learned more about electronics that year by reading the Simpson-Sears and
Heath-Kit catalogs\textsuperscript{168} than I did in that school.

That summer I did however learn to sail. Jim Browne was 17 and had a
plywood sailboat that he built mostly by himself in his father's basement. They
were an old family and Jim grew up in New Brunswick beside the Kenebacasis
river in a house built by his grandfather. We felt like explorers as we sailed and
poked our way among the local river, backwaters and tributaries, stopping to eat
baked beans and drink tea when the need arose.

\textsuperscript{168} The Sears catalogue had the latest in consumer electronics and Heath-Kit allowed you to purchase color
TV's and stereos to assemble yourself.
Jims older brother lived with his wife and kids in a house on the nearby Saint John river and they owned an old 2-masted wooden schooner. They did most of the maintenance work themselves. One weekend I helped them pour the lead for a new keel, they had made a wooden mould and set up a scrap wood fire under and old cast-iron bathtub. Once the lead was molten a valve was opened and the liquid lead flowed down a pipe and into the mould. I was surprised by two things, first that the lead did not catch the wood mould on fire and secondly that such a primitive looking furnace set-up would work so wonderfully well. Those people had an innate sense of how to organize and do that kind of work that could only have come from experience that must have been generations old. I sailed with the Browne’s from Saint John to Digby in Nova Scotia couple of times. Once we’d lost sight of the rusty Russian trawlers and Irving tankers it

Figure 72. Bluenose.

was easy to imagine that you were on the deck of the Bluenose with the rigging so tight that it sang and you could disappear into the lyrics of a Stan Rogers song as you turned to face the wind. It seemed to take the breath right out of your mouth.

Take me back to my western boat,
Let me fish off Cape St. Mary’s.
Where the hog-down sail,
And the Fog horns wail.
With my friends the Brownes and the Clearys.
Let me fish off Cape St. Mary's
Let me feel my dory lift
To the broad Atlantic combers,
Where the tide rip swirls.
And the wild ducks whirl,
And old Neptune calls the numbers.\textsuperscript{169}

That summer on the water gave me a good idea what it must have been like to row an English longboat around Nootka Sound, Vancouver Island\textsuperscript{170} in 1776 at the pleasure of one of the officer's wives, traveling on His Majesties ship Discovery.\textsuperscript{171}

Williamenna (Elmy) was sitting statue-like on the bow seat of the canoe that summer day in 1966 as I paddled her along the shore of the Kenebacasis river going up towards the Gondola Point Ferry\textsuperscript{172}. She was the teen-age daughter of the Dutch Trade Ambassador to the Maritime provinces. I don't recall exactly why I was paddling that canoe or why she was in it, only that she was Jim Browne's neighbor and she appeared so regal and proper that summer day, and I felt so much her underling.

\textsuperscript{169} Written by Otto P. Kelland, Quality Music, Inc., PROC. Recorded by Stan Rogers in 1982

\textsuperscript{170} Captain James Cook, and his crew sailed his ship Resolution for the first time into Nootka Sound on March 30th 1778. Upon seeing Cook's ship, Nootka Chief Maquinna told his people "to go out and try to understand what these people wanted and what they are after."

\textsuperscript{171} HMS Discovery was Captain Cook's ship that visited Nootka sound on several occasions between 1777 and 1778.

\textsuperscript{172} The ferry would later be used in the film, Children of a lesser God.
6.8 Moving West

When the tide turned and work ran out for my farther at Irving we moved to the middle of Canada.

Port Arthur was bitterly cold and that first winter the ice in the harbor was over 6 feet thick and it extended 4 or 5 miles out into lake superior.

Hammarskjöld High was modeled on the United Nations. Named after the UN's first Secretary General the school outwardly modeled exclusivity and democracy. It was much like the schools built in BC during the 1960's as it featured large well equipped shops and industry experienced teachers. The shops at Hammarskjöld were separated from the academic wing by the Gymnasium and Cafeteria. Additional student alienation was created by timetabling, technical students enjoyed a different lunch period and were instructed in core subjects separate from their University bound counterparts. This institutional segregation led to isolation and tension. Predictably the student council and most of the clubs were not the turf of the tech guys. Apart from the regular offerings of woodwork, automotive, electricity and electronics the school featured a unique program: Television.

Bob Angel was a TV broadcasting and cable engineer. He'd taken a teacher certification course at Queens University and wanted to teach TV production and engineering at Hammarskjöld. He arranged for the CBC and several suppliers to donate equipment to the school. The school board built an addition for studio space. Over a two year period with his students help he got a 3 camera studio up and running. When I left that school they were producing
programs for the local cable channel as well as the new Ontario educational channel, TVO.

I'd finally met someone that cared and could make a difference. If I had to identify a model teacher, it would be him. He had the determination that the early men and women that came to *Prince Arthur's Landing* (the original name for Port Arthur) must have had. I had worked on the construction of the replica HBC Fort William on the Kaministaqua River in 1974, at the time I thought that was hard work and yet we had cranes, tractors and power tools. Those early settlers, the Northwest Company\textsuperscript{173} traders and the Nishnawbe Aski\textsuperscript{174} must have endured continual hardship as January temperatures can be as low as minus 40 Celsius and exposed skin freezes in minuets. In the short summer the infamous black flies and mosquitoes will continually bite at any exposed skin.

**Figure 73. The Sleeping Giant.**

Local legend tells that the people and harbor of Thunder Bay are protected by the *Sleeping Giant*, located on a peninsula. The rock formation resembles the shape of a Giant lying on its back (Fig. 12) The Great Spirit Nanabijou laid down and turned from flesh to stone when the secret location of a silver mine on the other side of the peninsula was disclosed.

There was a huge stone fireplace at one end of the main dining room in the Nanabijou lodge. My parent's friends, Sue and Luther had purchased the

\textsuperscript{173}The Hudson Bay and Northwest Company's were bitter rivals operating within the same territory.

\textsuperscript{174}Nishnawbe Aski is the name preferred by those included in the treaty 9 area.
lodge and we visited them quite often as it was just over the Canadian border in Minnesota. Nanabijou was originally a hunting and fishing lodge built in the 1920's to cater to an affluent clientele, the great depression put an end to its viability and it lingered waiting for a caring owner. I really wanted a summer job there but Luther, Sue's husband told me he couldn't hire me. When I pushed the matter, he told me that if I was working in the States I'd have to register for the draft. The war in Vietnam was something that may have dominated the evening news but not many of my thoughts. That changed very quickly.

One time when we visited the place it was closed. Sue told my mum that her best friends eldest son was dead. Six weeks of basic training, one week's leave, four weeks in 'Nam and then dead. Now the war was real. How was it that television could reduce such a thing as a WAR into a mundane entertainment event? Just like millions of others I watched the six o'clock news; saw the gun-ships strafing rice paddies, listened to the rising casualty figures, witnessed Buddhist monks incinerating themselves, and yet; it didn't seem real. A lot of the music we heard protested an unjust war and the topic was passionately debated with friends, yet it took the death of someone that I didn't know very well to shock me into reality.

A few years of living and working put the memories of Luther's son someplace out of immediate memory, that was until I was called into Pat's office. Pat Wesley was my boss and the head of the AVA department at Lakehead University, I was hired to train as an AVA technician as the university had

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175 The department maintained a fleet of film, overhead and slide projectors that were moved around the campus as the need arose. They established a TV studio to produce distance education videos.

176 Located in Thunder Bay, formally Port Arthur.
established a TV studio to produce distance education videos. Pat introduced me to two a couple of students from the university drama club that wanted to stage a musical using a street theatre cast. To get permission to use the University's theatre they needed a staff member to operate the lighting and sound equipment.

I found out that the production would be *Hair*. The plot was centered on the lives and events of several American teen-ages as one of them received his draft notice and prepared to go to Vietnam, to be replaced by his best friend at the last moment. Hair was described as a *Tribal Love-Rock Musical* and was playing on Broadway at the time. The local production played to twenty packed houses, I didn't disclose my reasons for accepting the challenge and continued to act as their voluntary director for a year.

### 6.9 Technology Nature and Place

Technology, water and travel have been re-occurring themes in my journey, not by any conscience choice or decision but by providence. An ocean had to be crossed for me to get to Canada and while traveling and moving across the continent, my stopping places have all been close to water: *Saint John* New Brunswick, on the Atlantic Ocean; *Thunder Bay*, on Lake Superior; *Windsor* Ontario, between lakes Erie and Huron; *Comox* British Columbia, on the Georgia Straight, Pacific Ocean.

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177 Audio-Visual-Aids Technicians are now called Educational technologist

178 After finishing school and working for a summer in the local radio station. My main responsibility was to help crew the universities educational TV studio.
Living near Saint John and experiencing the differences between the English and New Brunswick secondary schooling frustrated me, at the time I did not realize why the school's curriculum had the focus that it did. On the Atlantic coast, I was able to frolic in an abundance of relatively unspoiled nature that was unavailable to me in England.

One cannot live in a place for twelve years without it having some effect on you. Thunder Bay city was created with the forced amalgamation of two rival cities Port Arthur and Fort William in 1970. The joining brought two somewhat different communities together and at the time was contested, the cities had duplicate local government, hydro, telephone, police, ambulance, fire and medical services. On an administrative level amalgamation made sense; but each community contained a different cultural and ethnic mix with identity and sense of place embodied in the cities names, that uniqueness would eventually disappear.

I could feel the undercurrent of difference as I delivered Photographic orders to small corner stores and pharmacies in a tired old Vauxhall Viva. Prismatic Photo Labs hired me after the university downsized the AVA department, I ran the black and White darkroom in the morning and picked up and delivered finished work to stores in the PM. The drug stores were pretty much alike but the small family run stores all seemed to smell different; pepperoni, sauerkraut and maybe spices. The owners accents and behaviors disclosed different geographic origins. My origins were different as well, but invisible to them.
Cathie and I moved out of our rented ground floor apartment after a few months onto a forested 160 acres. It was 16 miles from town and a mile from the highway and any services. The lots were originally given out to returning WW-1 veterans. They had to improve the property by installing fencing for livestock, building a small cabin and a barn in order to keep the title. The land was agriculturally poor and too much work for the original owner, the title to the land was forfeited.

Living in a small cabin in sub-zero January was challenging without grid electricity, running water or a flush toilet. We had a lot in common with those that had settled the area earlier. The lot behind ours had a small cabin and a family of elderly Finish speakers would use our access to get to theirs. I found out later that during the WW-1 some Finns had hidden out there, their home country was not on the same side and they would have been interned for the balance of the war, if caught. Ironically, during the next few years we would provide shelter to a Spanish National and several American Vietnam draft dodgers that seemed to find us. Working as an electrician in a nearby hard rock mine generated the cash needed to restore the cabin and install both electricity and running water.

This INCO mine was unique for its time in that it was located underneath a recreational lake and designed to have a minimal impact on the environment. Officially a nickel mine, platinum and chromium content in the ore made the investment in innovative technology worthwhile. The mill buildings were sealed to contain dust and almost all of the mine waste was ground-up and used to re-fill previously mined out areas. The possibility or a cave-in or flooding was never far
from my thoughts. I recall thinking that it could have been me after a rock scalar that I had gotten to know quite well died in a roof collapse, I had walked by that same spot three times a shift for over a year. I gave my notice.

Concepts of conservation and economy probably developed in me while I was involved in house building.\textsuperscript{179} The amount of usable waste generated in the construction industry was beginning to bother me.\textsuperscript{180} There was no incentive to use materials efficiently or re-cycle, I took a lot of stuff home to use in projects and used small scraps as fuel in a wood stove.

Music, photography, and stage lighting continued to occupy my free time. Nights and weekends were often spent setting up PA\textsuperscript{181} systems or running a lighting board for a visiting band or act. Knowing that I did sound or lighting set-up for Jackson Browne, Deep Purple, Savoy Brown, and Ike & Tina Turner is still a little humbling.

The ice, snow and cold was defeating us. The realization had crystallized that we were spending a disproportionate amount of our time, energy and resources just to stay warm and keep our vehicles in a condition to operate in cold weather. The maintenance of a particular or standard of living in a cold climate was not only dependant on the relationship of income to expenses, but highly dependant on a huge variable, the natural environment. This variability may not have been much of an issue in a pre-industrial economy, cutting an

\textsuperscript{179} I joined the Carpenters union as a apprentice after the mine experience and for the several years had a range of experiences including; barn to home conversations, tract house building, office interiors and log building repairs.

\textsuperscript{180} Truck filled with short -ends of lumber and off-cuts of plywood were being burned at landfills when they could be recycled and customers were being invoiced for materials coming onto a jobsite.

\textsuperscript{181} PA is the short form for Public Address and in this context was for stage sound.
extra supply of firewood and planting additional grain for the draft horses would have been adequate preparation for an extended winter. However in 1970's northern Ontario an extended or colder winter meant paying more for electricity, fuel oil or propane. The overlay of an exchange economic system now necessitated additional paid employment to offset the increased costs.

The weather got progressively warmer as we traveled south from Thunder Bay toward Windsor with a car, loaded pick-up, two kids, a dog, a cat and a back seat full of house plants. We crossed the bridge over the St. Lawrence Seaway at the Sault and on into Michigan. We would drive south for a few hundred miles to Detroit and cross back into Canada. The Canadian highway around the top of lake superior had been just two lanes, but on the American side, it blossomed into four lanes with a spacious median in the centre.\footnote{These Northern Interstates all seem to meet the Canadian border in this fashion, a throwback to the nervous cold war days when the fear of soviet attack on American cities dictated substantial evacuation infrastructure.}

Apart from the need to escape the harshness of the north it was paramount that our children grew up knowing their extended family, but for the ten years that we lived in Windsor Ontario, Catherine's birthplace, I cannot say that I really enjoyed the experience. The opportunity for consistent or regular employment that we received was at a price. I was to discover that things that I had come to value, open spaces, fresh air, clean water and the ability to connect with local history and culture were restricted or unavailable.\footnote{The air was often fouled by industrial pollution, the drinking water was heavily chlorinated and the history was often concealed by asphalt.} I did manage to connect with history and culture in an unconventional way, by repairing and
restoring heritage properties. Modern technologies of lightweight materials, polymers and acrylcs was linking with earlier technologies of bricks and mortar in seamless and invisible ways to ensure structural integrity.

I was beginning to teach and I was enjoying it, teaching small things at first, bird house building at cub scouts and platform house framing to new employees at jobsites. I was working from instinct and experience when I developed and instructed a basic skills course for entry level employees in metal manufacturing.

6.10 To Begin Near the End –Why I Wanted to be a Teacher

My parents had made the move to Vancouver Island in the mid 1970’s and now my father had retired at the end of a continent crossing career in electrical engineering. We moved our family permanently to BC in 1998 and started on a new chapter. Several sojourns west in the 1970’s and 80’s had started a smoldering fire, like a fire in a peat bog –impossible to extinguish.

It was fantastic to be near the Pacific Ocean and with the help of parents, friends and our children we constructed a substantial home. House building work was plentiful and a welcome relief from the stressful project management positions that I had left behind in Windsor.

6.11 They Even Brought Their Own Coal
I can empathize with those trying to get to Vancouver Island before Canada was Canada. The journey was a horrendous undertaking. Before the CPR was completed and could begin depositing immigrants across the prairie there were only two ways to travel; by a 3 or 4 month passage around the tip of South America and northward up the coast\(^{184}\), or by a 3 or 4 week crossing to North America by ship from Europe and then a railroad trip across the entire American continent to San Francisco. Another ship would then transport the travelers up from Frisco past the Oregon territory to the British Mainland and Island Colonies. Sailing ships supplying the Hudson Bay posts and forts brought coal and house building bricks in their holds\(^{185}\). They could at least build a chimney and make tea. The incentive to make the trip would have to have been enormous. In many cases gold, or the pursuit of it was the motivation. The history of BC is closely linked to gold, either the wealth that the Fraser and Caribou discoveries brought or the money generated by supplying or taxing those traveling through the area to the Alaska, Klondike or Yukon gold rushes. A number of the 1860’s male settlers came from Australia after missing the 1850’s gold rush there. Difficult to document are the cases where the reasons for leaving Britain were sufficiently strong enough to justify the hardship. Apart from events like Irish potato famines and utter desperation; financial ruin, extreme debt were likely candidates as one could be imprisoned for owing large debts. BC provided

\(^{184}\) The Panama canal was not completed until 1914.

\(^{185}\) After coal was discovered on Vancouver Island in the 1870’s the practice stopped.
fertile ground for the growth of personal empires and fortunes, this was the case for James Dunsmuir; the future Nanaimo coal baron who was almost knighted by Queen Victoria. 186

There were a couple of things that were beginning to annoy me and together they brought me to teaching; One, my growing dissatisfaction with the quality of the public education that my children were receiving. Two, declining knowledge, lack of expertise and lack of pride in work that my co-workers were exhibiting. These were problems that I felt could be avoided or at least reduced if addressed as part of public education.

It wasn’t until my own children were in school that I knew that something was wrong. We helped our children with their homework, not directly with the work itself (it was their homework) but with motivation, helping identify topics for essays, being the subjects of surveys etc. I’m not sure exactly when, but I was becoming aware we had to do more and more as their general knowledge, writing, spelling and math skills were developing slowly.

When they got to Junior High all of our children took and enjoyed shop electives; woodwork, metalwork and small engines. As they took the classes, I was looking for signs of developed knowledge about the processes and materials that they were experiencing. They were bringing home pencil boxes, note holders, bird houses, grappling hooks and crowbars; but had difficulty identifying different wood species, measuring accurately or even locating the oil filler on the

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186 He left the Orkney Islands off the coast of Scotland to find and mine coal as a contract employee for the Hudson Bay Company. His wife and family came out and he promised to build her a castle. And the rest for him, as they say is history, he became one of the riches men in Canada in his time.
gas lawn mower. I felt that they were gaining useful knowledge by helping me in the summers and on weekends with various private building commissions, as well as maintaining and repairing the family vehicles. Knowledge was being acquired within a real context.

I had become aware from my own experience that youth wanting to enter the building and construction trades were in many cases lacking important basic foundational abilities. By the mid 1980's it was apparent to me that the math skills new apprentices were bring to their future careers were not sufficient. I initially blamed the schools and the teachers for this situation and to resolve the short-term problems became involved in an initiative to develop and publish a math work-book for new apprentices.

6.12 Getting Serious

Daily life for most people includes some type of paid employment. Since the birth of the Industrial Revolution and its subsequent impact on mass production and automation, the ability of the worker to control of the quality and volume of the work has been in the hands of others (Franklin, 1990) With the exception of areas of extreme specialization, the worker is often considered only a resource, one part of the production or manufacturing process. The efforts of the worker are not any more significant than the materials or production process.

In my own circle of co-workers and acquaintances, personal tragedy has been a constant reminder to remain vigilant:

187 To eventually become a journeyed carpenter one of the foundational things an apprentice has to be able to do is measure accurately and perform basic math functions, these items are foundational to any building or manufacturing area.
A 16 year old was killed on the first day on the job as a welding trainee; a massive steel plate fell on him from a storage rack.

A foreman was killed as he walked into the tail rotor of a helicopter being used to lift an air conditioning unit into place.

A mobile crane operator was electrocuted when his crane came close to a high voltage power line. The crane did not contact the power-line; the electricity jumped the gap to the crane boom, killing him instantly.

In my opinion adequate education, training and proper supervision may have gone a long way in preventing these tragic events.

I can accept that technology must often be utilized to increase production and profitability, but this must not occur at the expense of human health and safety or degradation of the environment. There are often Faustian Bargains to be made as one accepts both the Blessings and Curses of Technology (Postman, 1995, p. 41). Acceptable risk, worker death and injury are not compromises that can be made to balance the use of technology as a labor or cost saving practice. In We Almost Lost Detroit, John Fuller explains how poor quality control, falsified welding X-rays, incomplete records and a beer can in the cooling loop almost resulted in a nuclear power plant melt-down in 1965 Detroit. (Fuller, 1984) I am sure there have been many other near tragedies that have gone unreported.

The transformation in my thinking towards technical, technology and public education occurred as I became aware of overlaps and conflicts within the practices and histories of technology, science, education and industry. I was exploring these areas while studying for an undergraduate degree at UBC in the
mid 1990's. I realized that there are political, social and economic factors that affect what is in any curriculum. My original intention, to obtain qualifications that would allow me to instruct skills based shop courses to youth has expanded to a larger purpose. I believe that skills based curriculums can be useful and have validity but with technology impacting almost every human endeavor and all aspects of the environment they cannot be the *only ends* of technical or technology education.

**6.13 Waiting and Watching**

It has been two weeks since I saw that school of tiny salmon. I was looking for the words to write that would conclude several years of research study and observation; I may have found them.

The coastal forest is reclaiming the overgrown spur-lines; rusting donkey engines and arterial haul ways that once reverberated with the sounds of barking caterpillar diesels and the shrill blasts of steam in whistles. The drafty bunk houses and hard-living loggers have given way to highly efficient harvesting machines and helicopter logging.

Unlike their eastern Atlantic cousins that return annually to the place of their birth to procreate and then return to the open ocean to swim and forage, the Pacific Salmon live virtually their entire lives traveling the West Coast waters. After several years and at their appointed time they return to the exact place of birth to procreate and die. They don't eat once they have started their journey in fresh water. Their flesh is consumed and converted to energy as they fight currents and geography on an unstoppable mission.
It's fairly easy I suppose to think of Atlantic Salmon in same way that we conceptualize the life cycle of plants and other animals; birth, a period of nurturing and growth, extended annual productive procreation followed by death. On another side of the country bears and eagles feed on the decaying carcasses of Pacific Salmon once their eggs have been laid and fertilized, their mission fulfilled.

I thought I understood a simple argument. Sticky silt generated by insensitive logging and mining practices will clog the gravel beds of the ancient streams that the new salmon fry must live in before going to sea; as less return to the Pacific, fewer will return to reproduce. Environmental Consciousness? on the surface yes; but there is a larger story to unfold.

Return to those bears gorging themselves on the Salmon that have returned to spawn and die. The Bears and Eagles cannot eat all of the dead and dying Salmon in the streams and tributaries. Bears have be seen taking salmon away from the streams and into the underbrush. One might conclude; a meal for later in a cool spot away from annoying cubs and biting flies.

The bears don't eat all of the fish they carry away, some are dropped and forgotten while others are taken a couple of hundred feet into the forest. If they are not hungry and bears don't hoard food, then why this behavior? The Salmon do not have a choice and must fight the elements to return, procreate and die. The bear's behavior is purposeful and part of that cycle, as is the forest. New trees or saplings require nitrogen to grow. The decaying Salmon carcasses provide the fertilizer for the forest, and the new tree growth along the banks traps
the silt and holds it out of the gravel. Silt free gravel holds the maturing eggs and
the clean fresh water nurtures the Salmon fry.

The forest, water, salmon and bear are one.
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APPENDICES

APPENDIX 1. Respondents Written Comments

Middle School and Junior High Comments.

- Sections 4, 5, 8, 9, 10, 11. Do not apply. We go up to grade 10 and have only a small component in the IE shop for grades 8 to 10.
- We need more technology teachers in order to keep up programs from folding. As it is, we can't even find qualified TOE's. We need to provide opportunities for kids to work with hand tools to build skills and self-esteem. Computer related technology is great but traditional technology is alive and well and greatly under funded by comparison.
- We cannot get enough substitute teachers to allow for release time for illness or pro-d.
- Shops need upgrade for cleaner/quieter environments.
  I would like to see some student teachers in the Victoria area.
- As changes come forward with IRP's I see a potential for the entire costs being placed on schools. The purchase of the new technologies is often beyond the level we are able to pay. Additionally, there needs to be extra money infused into the system to pay for the technological support we need to keep equipment running.
- Concerns are:
  Adequate funding for equipment.
  Adequate funding for facility renovations to traditional shop areas wishing to convert to a tech Ed approach.
- Scarcity of bona fide instructors well grounded in this area in tune with IRP directions.
- Communication between actual work sites and school programs re; expectations called one another; knowledge of realities, etc.
• We have changed the focus and for many teachers that meant stop doing and using machines etc in a creative way, that may sound old school but the basics in any area are a must. Pick any area, IE. Wood, all students should know how to use the saws, jointer, drill press, etc. What is then done with the skills may be applied by the teacher i.e.: tech Ed, Vs vocation, Vs industrial ed. Etc. every student should be required to know how basic machinery operates, they should know its safety and then and only then should we be doing R &D (research and development). Sound old school ?. There is no equality in education. There are no standards, and many of our students are being short changed. Our programs are full every year at (School Identification withheld).

• We have a grand total of 0.2 fte for our tech coordinator at this time and I do not know if we will receive any tech time next year, it seems very unlikely. Our district does not have a tech coordinator. We cannot progress without in-service and this also seems unlikely to happen.

Funds for: in-service for teachers, parents and community.
Support technology and equipment upgrades.
Increase in the number of individuals available at district/school level for technical support and troubleshooting.

• Funding for new equipment is low or nonexistent

• As a recent grand, 1991, my concern is with a good, basic preparation for teachers. Things as rudimentary as grinding chisels and welding need to be mastered before the design and problem solving stuff is introduced. After student teacher has mastered basic procedures some kind of prep for ordering parts, maintaining machines, building tool boards, etc needs to be implemented. There is a major difference between technology and shop courses. The more rural communities run many successful shop courses whereas technology often doesn't fly. Course work at BCIT and UBC should reflect this difference between the lower mainland and everybody else. I do not feel that teaching shop for women or having representation of females in shop classes is as big an issue as some would like asked to think. If women
are treated with respect as equals they will add to the teaching program. More often not if the shop teacher has a personality that is respectful and enabling for all students, young women will take the courses. Currently at numbers are about 80 percent boys / 20 percent girls in metal and mechanics. Unfortunately I think this is mostly because of interest and a dislike for getting dirty. Perhaps the biggest problem is how to promote respect and equality for all. Finally I believe there is a absolute need for some kind of shop facility at UBC so student teachers can demonstrate lessons, practice basic skills, and receive meaningful, mandatory safety program. I feel these teachers need to have either received or developed their own comprehensive safety program that is approved by either their instructor or WCB. Unfortunately nothing prepares you for that first-year. However, if teachers have got the solid grounding in basic skills, know how to repair and maintain a shop, are enabling in the way they treat others and absolutely concerned for safety of their students and all other stuff (Drag cars, high mileage vehicles, design, animation etc) will develop on its own.

P.S. I would also suggest the more aggressive screening of applicants for ability and for course completion before entry into BCIT or UBC.

- It has been very difficult at times to find qualified and competent teachers to fill vacancies that emerge.
- If you would like to come see me and checkout the shops and ask questions please call to make an appointment (000-0000), This form is too general, #7&8 topics are too broad
- Industrial education teachers appear to be having difficulty coming to a consensus as to what should be taught. -in other words whether the old courses should be abandoned in favor of the new. I find this discouraging.
- This is a small, 130 students, rural school, K-10. Only about 40 students make use of our small shop and enrollment is decreasing in the area 120 for next year. I don't see much change in TE since we have small numbers and budgets.
As an ex-IE teacher I am very concerned about the retirement rate of tradesmen and IE teachers other next few years. It will be almost impossible to replace them if students are not encouraged to go into trades and technology. Something must be done to avoid this problem.

As a small school we do not have $ to upgrade our shop with much-needed technology, certainly we can progress with technology through other activities, but a shop is not needed for this.

- Few industrial-ed teachers seem capable of conceptualizing the new technology ideas to move shop courses into the 21st century. Many shop teachers are nearing retirement and don't care.

- They should be able to teach both the new and old technology as well as a core subject at the middle school level. Since it is not very often teacher will be hired at the middle school level to just teach technology. Teachers we hired the past couple of years are able to teach in the core subject areas as well as two or three blocks of technology.

- We need to have student teachers placed in a school for teaching. The levels of classroom management skills are not appropriate for today's students in Junior and high programs. Practicum should be longer what about the intern program like UVIC for the general program.

- As a middle school grades 7 to 9 we offer grades eight and nine exploratory units one-third of the year in IE, Tech Ed, and computers. The grade nine students have the opportunity to choose from listed courses.

- It would be great if the technology education center at BCIT would offer pro D workshops to help teachers stay current areas such as plastics CAD animation, etc. one day or a few evenings rather than long courses as most tech teachers I know already have considerable demands on that time.

- How, financially do we upgrade equipment.

- I think prospective teachers have to have some ideas of how to fit new tech curriculum into old shops and facilities.

- We are small, 85 students from K to 10 rural school, somewhat isolated. How facilities are limited: we have only a traditional woodworking shop, small, and
a computer lab with three Mac classics and 6 P.C. generation Macs. We have just recently gone online, email, etc. Unless there is a substantial increase in district funding, which is highly unlikely that we will even be able to higher specialty staff beyond the information and traditional woodwork that we currently offer or to develop further.

- Due to lack of funds our school does not offer a proper technology course.
- May be political winds of change working out technology education favor in the next few years.
- My comments are relating to technology education in the middle school grades 6, 7, and 8.
  1- This survey was not really applicable to the middle school program.
  2- There is a new IR P. for this age group, particularly grades 6 & 7. The IRP appears to have a greater focus on the elementary classroom where grades 6 & 7 are still part of the elementary school setting, as most of the province is.
  How many schools have shop and computer areas. The main machines in the shop area are the band saw, drill press, disk and belt sander and spindle center. We have the space, Workbench’s and equipment to offer a bit different program than in elementary school.
  3- Much about middle school tech Ed curriculum comes from individual teacher interests and locally developed units.
  4- Teacher training for middle school tech it positions could be different than the focus for high school teachers, grades 9 to 12. Middle schools do not get into doing break jobs on cars or building tables and grandfather clocks.
  5- I would like to see a tech-Ed teacher training program directed to middle school only. If the person wanted to teach higher grades then they would have to upgrade their courses. There are many classroom teachers presently in school districts who have the interest and aptitude to teach tech Ed but they require the BCIT training program.
  6- The new tech programs in the middle schools are much more than just how to use band saws and drill presses safely. It could be that the old standards and projects are being touted to middle school students. I think
your survey is a step in the right direction is now is the time to develop new thinking about what is tech Ed and how it should be taught, otherwise, all that is going to happen will be a watered down version of the junior area shop program being taught to students in grades 6,7,8.

- Train more for middle school.
- Teachers need to be trained in both areas of new technologies and traditional wood shop courses.
- The BCIT portion of our education needs to focus on practical unit building and not so much on academic courses that have proved to be a little practical use to me. Courses like material science for example, take up a lot of time that could be better employed in shops developing units and skills. The actual content of material science was out of date and of questionable use. At any rate, the information could be researched and developed on an individual basis as needed. This is one example of the many problems I feel exist at BCIT. I think an overhaul of the program would greatly benefit future tech Ed teachers in BC.
- We are in need of more teachers with Tech Ed training. There is a need.

Senior High Comments.

- Insufficient new teachers to meet demand for positions.
  Untrained unqualified teachers beginning to fill positions in technology. loss of facilities if teachers cannot be found to teach programs. Allowances must be made for TQ, journeyman, to encourage them to enter teaching. Course requirements that take more than one full year are too financially training.
- 1. Why are there no women teaching in technology studies.
  2. How does one attract young women in shop courses.
  3. VSB continually cutting budget for Tech studies.
  4. No department head, no report or communication between teachers, Tech studies and the VSB.
  5. Old equipment, no provision for replacing or upgrading equipment.
• The transition from old technology to new technology involves more than updating and re-configuring equipment. New teachers will need to be competent in the old technologies, which, while de-emphasized, are not disappearing and in the new technologies which are rapidly the evolving and will require continuous professional development in order to keep skills current. New teachers must also be entrepreneurs and marketers or able to make connections with employers and industry leaders as well as recruit students into courses which are still being perceived as not relevant to female or academically oriented students.

• It would seem that it is becoming increasingly difficult to deliver the level of skill development needed within today's budget cutbacks. In a time when trades and technology should be pushed within our society we are hesitant to make a change in a junior and senior high schools.

• Can no longer charge course fees.

• All teachers need courses for proficiency in desktop publishing and spreadsheets. Also the options of training on Marx entry programs of any kind and/or test construction using large databases. Elementary teachers need to be familiar with technology that applies to their curriculum areas.

• Not enough incentive to attract trades experienced present. Trades and technology.

• Lack of financial support to provide technological resources especially in the situation we are in with no course fees. Big concern.

• Too much emphasis upon Tech toys. More emphasis on course material to be relevant to industry needs.

• As having the IRP make offering the course to all students mandatory.

• Need a clear picture provincially of what technology education is, and where it is headed. This district sees many old industrial education teachers 5 to 10 years from retirement, and wondering where they fit in the scheme of things.

• I am concerned about the length of the extended practicum. Many staff members feel that 13 weeks is too long. We feel that the winter practicum should be shortened and a fall practicum incorporated into the schedule.
More practical hands-on training is needed. Many student teachers in the past have lacked basic practical skills. This is not a fault of their own. It seems the time allocated to practical hands-on training has been reduced. There needs to be some better compensation for teachers who sponsor UBC students, for example, UBC tuition waivers are not recognized for BCIT.

Technical courses.

- There is a large gap between the training that young teachers received and their ability to use training without the proper technology in schools. Technological equipment is very expensive and schools cannot afford to acquire and maintain even the basic equipment required for technology oriented courses.

- Teachers don't receive adequate compensation for courses they have taken for upgrading. Many teachers have also taught themselves and are current with no compensation at all. A four-year degree should be able to give credit for level 5. Technology is changing at a rapid rate what teachers learn today, course content, is totally changed in five to ten years in high-tech courses. The traditional courses are very valuable and should not be abandoned.

- I am involved in hiring or at least attempting to hire quite a number of industrial education / technology education teachers over the past six years. I am concerned with the difficulty I have in finding candidates with the strong interpersonal skills I'm looking for. Most seem to be competent in working in a shop environment, however, they frequently don't have a student centered focus. Also, they tend to have an incredible concern about safety. Which is a good thing, unfortunately they sometimes turn it into an obsession. I'm looking for candidates who work well with kids, parents and colleagues. People who are flexible and understanding.

- Clarifying technology vs. home economics.

- Not enough student teachers entering this profession. Hiring is been extremely difficult the past few years.

- We are kind all of out of touch as we graduated five years ago and program and have not had any contact with the program. Even though we have
offered to sponsor student teacher numerous times. As for core programs in Richmond there is a constant struggle in implementing Tech ed. as the old Guard continues to support traditional industrial education and the funding is not supported by the board. Also computers are big as we have a high Asian population who don't like to get their hands dirty.

- Develop a broad base of skills. Must be able to use CAD, AutoCAD 12 or better. Knowledgeable of career prep programs. Any apprenticeship or tq is helpful. Business and marketing skills would be useful. Technology training, materials physics math would be a help. The second teaching area is often necessary. Reality therapy training is in asset.

- Shortage of trained Tech Ed teachers.

- Any teacher entering the system who will teach in a computer lab must have training in network configuration and administration to survive. Districts do not fund enough technical support personnel and thus, teachers must maintain their own resources.

- I feel the traditional shops and courses are still needed we seem to be lacking graduating students that have hard skills. The workforce will always need trades people and the schools need to channel students in these directions. I feel that a general technology shop is fine but not at the expense of the traditional shops. We need to upgrade some of the dated equipment with new technology but not forfeit the traditional shops.

- 1. Inadequate resources and funding, support network.
- 2. Applied skills designation is too liberal and too diluted. Takes away from Tech Ed enrollment.
- 3. Tech Ed or component should be mandatory in every grade K. to 12. New teachers should be prepared to work under the above restrictions.

- Overlapping with other areas. Loss of traditional skills. Some forms of academic student Robin than non-academic.

- We need more people were trades presents with a varied background experiences.
There is a heavy demand in the northern region to what is conceded old technology. Woodwork, construction, drafting, metal, and mechanics are still very popular and relevant. In small schools is very difficult to acquire the enrollment to run other than traditional industrial education. Teachers are willing but the demand for traditional is very high.

With a changing emphasis, we need individuals who:
A. have a combine training in industry, tradesmen and new technology
B. Are female.
C. Have the ability to bring the artistic creative design prospective to technology education courses.
D. Are computer literate.

Focus on the development of interpersonal skills. Teamwork, leading independents, problem solving, critical thinking, personal responsibility.

Increasing graduation requirements plus provincially mandated courses like CAPP, have decimated elective courses. The students to qualify tend to most trades what technologies they cannot afford to participate in technology education elective in this secondary years. Prospective technology education teachers should be well prepared to teach math, science, drama, PE, or in English in order to fill a potential Tech Ed assignment. It is very difficult to justify the capital expense required to convert at traditional shops to technology education when the interest is not there. We have a very successful CAD Program which robs students from other elective areas. Is it fair to adversely affect the CAD program in order to pilot your electives.

Concerns. Industrial education teachers are traditional in focus. Industrial education area is under utilized. woodwork 1/2 time, metalwork 1/2 time. Teachers are reluctant to implement the junior high technology curriculum as they think government may change it because implementation is so very local very possibly due to lack of resources. Lack of provincial and universities support for new technology curriculum. Since the new IR P. has been released the ministry seems to have abandoned it to the field. I think the new IR P. for technology education has great potential.
• We seem to not been approaching enough candidates as positions are to fill and we never have substitutes who have Tech training.

• New students need practice in making lesson plans and using them. Basic equipment maintenance should be emphasized.

• Animation, graphic arts, video production, and photography courses are not taught by our technology staff.

• If Tech Ed implementation is not funded by the ministry it will not evolve according to plan. Unless unit shops are replaced with Tech Ed specific facilities we will continue to focus on materials specific courses. I was trained to teach Tech 10 years ago I'm still waiting for guidance and support. New teachers should be aware of these problems and not be graduating without skills. Woodworking electronics etc.

• There seems to be considerable reluctance to move away from the traditional shop courses in favor of a more technological program based on problem solving. The problem seems to be with older teachers not wanting or receiving support to change.

• Much greater emphasis needs to be placed on lesson planning / unit planning during professional training. Dismal results with two grands recently.

  -Much greater training needed in classroom management skills and knowledge.

  -more emphasis needs to be placed on the routine of the classroom. Attendants, record-keeping, reporting to parents are what is important.

  -critical piece of a good lesson / teaching experience needs to be taught, reviewed and form the base of your evaluation and supervision of your students.

  -many of the aforementioned skills are deficient in three recent grads of your program. Improvement is needed. -principal.

• 1. Increase, (double, triple) the number of applicants. BCIT UBC joint committee.

  2. Select highest quality of candidates possible.

  3. Increase in number of females.
4. Eliminate the accelerated program.
5. Want new teachers to BC schools to have B. Ed degree.

- 1. Multi-skills and technology education teachers with a variety of expertise and experience (CAD, WW, Metal, Mech.) are extremely rare.
2. Technology education program in any given school is driven by the expertise and interest of the teachers involved, not the curriculum nor the program. While this is positive in terms of flexibility is not in terms of continuity or consistency.
3. Because of the point above, I don't believe that questions 4 through 11 will provide truly meaningful data and tabs on technology education issues are subject matter and recruitment. (what is and what will be vs what we would like to see.

- I feel that the need of all teachers to be skilled in computer technology is a must. Computers and a use in instruction is essential today. Students living universities today have to be as highly developed in computer technology as possible.

- 1. We need teachers who have a sound grasping technology-design, production., manufacturing, testing and marketing.
2. Would be teachers who understand the deposit market place and are able to teach students these skills including reading for information and communicating and years.
3. Whitney teachers who are willing to learn with the students and to challenge students to think about how technology already affects them and how much more than one effective in the future.

- 1. Quality of graduates. -many teachers graduating are well prepared, but others did not possess the qualities necessary to maintain a high professional standard.
2. Not enough graduates. How can a school choose a qualified applicant when only one candidate applies or In many cases nobody applies.
3. Not have graduates to maintain the substitute list in many districts. Therefore, when a teacher is absent, the program is not taught.
4. Students teachers should only be sent to schools with strong technology programs.

- Has any method of evaluating the success of new technology courses been examined.? Is the direction of technology education affecting or turning away clientele.? Could the teacher education (program) possibly prepare the students better in classroom management. Physical plant, maintenance, supplies, administration, records, reports, dealing with students, methods, discipline etc.

- Require appropriate funding /maintenance.

- At *************** secondary industrial education teachers must work in a combined metal and wood shop. With small classes. Teachers must be competent in both metal and wood and have some mechanics background. Most small shops are probably similar, and is probably best that industrial education teachers not specialized to much, as they must be able to handle both wood, metal, and mechanics. Incidentally our shop teacher this year is a woman from the U of A and has done very well. -principal.

- Training - hardware, software, maintenance, usage etc. Implementation issues -pro D. and integrating technology across the curriculum.

We often have the local software but lack the skills to trouble shoot.

- Recent grads seem to lack practical skills and training.

- Lack of graduates.

- Long practicum is good. Make sure students still have all the technology skills, at least the basics to safety run the various shops and equipment besides being computer literate.

- Need to be able to meld the many applications programs, working with other teachers.

- Retraining and in-service for teachers to work on the new philosophy for technology education. The need to read it, redesigned the old shops. Broad-based training is essential, you cannot just do with our metal anymore. Old modules of the new IR P. must be included in the training for all.
• There is a great shortage of technology education teachers in the province. I will need 1.25 FTE next year, and I'm concerned they may not be available.

• Is it still important to teach all technology? The Cost of setting up new technology!!.

• It home economics in graphics are considered to be technology education than, in question three we have 2 more teachers full-time, both women, and one part-time one woman teachers graphics.

• Concerns. Availability of qualified teachers coming through teacher training. The high cost of the program and equipment and resources. Retraining, educating of current staff raised in the traditional industrial education programs.

• We need teachers to know and understand technology, they most also have an open mind about implementing technology into all other programs. Also an understanding of multimedia and to move away from the total lab concept where every student must have a computer.

• Technology education "Burnaby" style failed miserable here and the UK. It does not have much support in this province. I hope that the trend in BC is towards tested models of technology education. If it's not working somewhere else, why do it here? If we are training students to solve problems, wonderful! Then first we must give them the skills to be able to solve problems.

• The curriculum is too theory focused students learn best by hands-on approach to technology learning. The emphasis should be on practical projects which include the fundamentals of technology. Project should proceed the information so students began to ask why things don't work and in doing so are more receptive to new learning.

• After seeing the IR P. Must use a saturated approach with technology. More technical course may have an effect on student choice. I have found if students wish to make a project, enjoy the satisfaction on its results and not be subjected to more technical stuff. Taking pride in workmanship is still here!. A blend of traditional and new technological skills is a must. What
about career prep construction! Using small tabletop machines in a room with computers just won't cut it.

- We are working in between the old shop model and new technology. Which way to do.? We have a school designed six years ago under the three shop ideal. That's what we have is the best way. Conflicting ideas.

- It is imperative that both new teachers and practicing teachers be often training and in-service on how best to address the objectives of the new ministry IR P.. Teachers will not move away from traditional industrial education instruction models unless they are educated to understand the dynamics of the new curriculum. Pressure must also be brought to bear on funding agencies to support re-tooling and re-configuration of existing facilities to meet the demise of the IR P. while still maintaining a straw and hands-on approach to instruction. Students are strongly motivated by doing and a strictly theoretical approach to technology education will not be successful.

- The recognition that in small schools in rural areas there is a real need for flexibility in meeting student and community needs.

- I think that the faculty have done a good job in the implementing new courses into the program of BCIT that reflect the new curriculum for technology education in BC. We must make certain though that the teachers graduating from the program still develop the skills and understanding needed to teach students how to work with industrial materials. Paper engineering, spaghetti bridge design, and pop bottle rockets are fine but are not used as the entire basis for a study and technology. The ability to produce quality artifacts using wood metal and plastics is as important as the process of designing the product.

- Money to keep up with equipment.

- Not enough new teachers being trained to fill the jobs or expand programs in the schools.
• Finding away to train teachers to combine old and new technology. Irrelevant course offerings. Developing liaison with the employers in the field as a part of offering course work to teachers that is meaningful and relevant.

• Clearly there is a great shortage of qualified technology teachers understanding contemporary processes in automotive, drafting, and machining.

• Versatile proficient in a variety of areas flexible to accommodate a wide variety of interests in a class. Good classroom management skills very knowledgeable regarding safety. Use of computer technology and CADD animation and design. Motivating marginal students. Developing projects of high interest relevant to the students. How to access community resources human and material.

• It is in very important that technology education teachers of the future are well versed in the utilization of recent technology. At the same time they cannot lose sight of the traditional trades.

• Electronics teachers are defined course at BCIT not doing the job. Computer stuff is good. Why spend so much time on metalwork its dead across Canada. Spend more time on technology related issues and designing technology activities. Also how you run a tech lab with groups of kids doing five different things. Leading how to work with difficult people, staff and students. Classroom behavior and leading disorders.

• For having the greatest difficulty filling of automotive metal fabrication position. We need a big push in this province to train teachers in all the skill areas.

• Courses in technology education should be mandatory. They should at least know the basics of both PCs and Macintosh computers. Maybe even a basic knowledge of repairing computers. What to do if a disk is stocking the machine or how install a program.

• New technology IRP. is somewhat out of ??? for northern communities current shop structure and lack of funding. Realistically we implement what
we can into existing programs and the rest is not addressed unless funding is provided.

- Increased demands IRP. for science requirements. No implementation funds targeted for industrial education or technology education. Poor candidate selection opportunities for remote areas.

- General's background required for vast array of technology education courses means beginners have few highly developed areas of expertise.

- You'll need excellent communication skills. Complete knowledge of IR P. is essential.

- New teachers often arrive with strong biases toward making all courses jewelry. It takes two to three years for us to get students back into a metal shop afterward. Most serious students don't want to enroll in art-metal or jewelry so they stay away from all shop courses. New teachers need to know that they have to listen to colleagues, parents, and students so that they can adapt to local needs. New teachers need to be taught that traditional shop is still a great merit, and general shops are a retrogressive step. Train them in the basic theories and skills needed to operate the tools and machines in all shops.

- Area of growth. Shortage of qualified people who enjoy technology and enjoy young adults. The patients, are understanding analog with educating. These are desperate times.

- There is currently not enough support for technology teachers. Computer teachers are expected to keep the computers labs working as well as teach full-time. The level of technology is not sufficient to meet the IRP in information technology. The additional teacher professional training does little to promote technologically literate teachers and there is little training once hired. In general there is not enough funding from the government level. If it is a priority for the government to produce students that use technology efficiently, it needs to support it accordingly.
- Metal fabrication future existence. There appears to be very little evidence of anyone coming from UBC that is willing to teach machine shop welding fabrication programs. It is very demanding course to organize and teach. All the various equipment that students must know before they can get involved in interesting projects. The irony on it all is that there is such a demand for the metal trades in industry.

- My concerns regarding technology education on the whole there does not seem to be any support or direction from the province. My department has no contacts provincially nor does it regularly receive any information about changes in my subject area. The only thing I've seen from the province is the IR P. For technology education most recently industrial design which seems to be hastily prepared with little import from the teachers or on the job. I'm also concerned with a lack of direction from a professional association they do not regularly contact me noted a contact my district of feel that this organization should at the very least seek my import or concerns regarding issues. I'm a firm supporter of the new basic approach to technology education. But also support the traditional industrial component shops, especially at the sine level West youths are looking for specific trade related skills. I'm a teacher of automotive technology in there is very little educational support for my program, my support comes mostly from local industry. Many people are abandoning facilities such as mine for the new approach. This is being done for many reasons and is usually a sound or rational decision but when I need support, ie, money and new curriculum materials there is little to be found. Thank you for asking my opinion. We here in the schools are not often asked for it. I believe that the powers that be in Victoria don't like hearing the truth. That is, more money into the schools for the students benefit, less money for the administration of the schools. Please feel free to contact me at ***********.

- A few student teachers have told me about their trades background and voice concerns about teaching technology only, with some school districts moving away from traditional shops. Some have poor computing skills in some
student teachers who do not have a trades background are intimidated when problems of dealing with equipment or troubleshooting real not simulated problems. Some are scared stiff to stand in front of class of students. We've had some go-getters who jump in without hesitation, others stand back and wait until they feel confident and knowledgeable and students sense a lack of experience right away.

- Most all of the student teachers we've had all want teach only woodwork or drafting. Students with a wider variety of teaching interests and backgrounds would be good.

- IR P. does not relevant to what we do. Most teachers in district including junior secondary feel the same way. It is so general and almost seems meaningless. No money or resources to develop new courses, hard enough to get full sets of class books. Provincial technology money does not find its way to the class room. If it was not for frequent donations from local business community it will be hard to run many of our programs.

- We need young guys who are willing to teach new technology education. We also need the guys who have industry time in trades. We need to set up a technology teaches safety course. As it stands any teacher can teach technology: phone me if you need clarification.

- We are in the process of redefining shop programs and expanding elective areas as we lead into a major expansion of a school. We see our future shifting toward the technical and the shop courses and are the process of forging partnerships with local industry to help us do this.

- No graphic arts or printing production courses offered at UBC. I had to go to the U.S. to get trained.

- I Think there is still a demand and a need for traditional courses in wood, metals, drafting and mechanics. New teachers require adequate preparation in the skill level required for senior courses.

- The administration has decided to close the mechanic shop. It is almost impossible to run a program. Cutback in technology education program and money the school develops and supports enough technology education
course work to have one and a half technology education people. The reason they do not because they feel that technology education teachers are hard to find.

- We find that they're not enough new teaches to fill positions. Must get more graduates. Electronic and auto teachers are hard to find. New teachers have too much technology training and not enough in traditional courses. Most shops in British Columbia are still equipment based and not new technology based. Money as a problem, there is not so we give them technology problems, design in manufacturing using older equipment. We have changed app programs to allow design in everything but still keeping hands-on projects. Student scenario don't want paper and pencil desktop projects they want to work and build. Industrial for state should be part of teacher training at BCIT just for our own protection.

- Lack of funding and facilities for more traditional shop courses! Poor perception of technology education by public, other teachers, administration, and the ministry of education. Reduced graduation requirements means less kids are taking electives.

- New teaches need to be prepared for the reality that industrial education still firmly ingrained in British Columbia. The new technology approach is great for K-7, but we should keep in mind that are schools would design around the unit shop or combination unit and general shop approach. At curriculum can stay relevant to the degree we keep the up-to-date and expand course offerings to reflect new technologies and local needs in each community. The new curriculum isn't prescriptive enough and prevents the establishment of standards. Colleagues of more and more interested in articulation without programs, (Kwantlen College for Ex.) with emphasis on skill development. Students can save time and tuition at college planning specific areas signed off, then there is more value in credibility to the high school experience, and more bang for the education dollar. We don't need a huge paradigm shift, we just need to stay current and a ministry of education needs to provide
leadership, and perhaps more articulation between teacher education and industry.

- This school is a leader in Media Production. We have trouble finding teachers qualified in media production and animation.
- Curriculum is extremely broad and therefore it is difficult to be knowledgeable in all areas.
- How is it that existing schools can get access to all the new teachers coming out of the program.
- There should be more courses and time allowed to learn computer systems and computer software. There should be methods courses with teaching of computer courses followed by a thorough practicum.
- They're not enough teachers being trained. The one-year accelerated program should be encouraged as not enough trades people are entering profession. There's a distinct lack of qualified teachers on call, in this area. Invariably at nonqualified teacher on call is sent to cover classes, department head.
- Class sizes. Thirty is too large. We should have class sizes of a maximum 24.
- One, lack of trained teachers. Two, reduced capital funding. Three, professional development on new IRP.
- Concern for future of accelerated program. Content of courses are they relevant to what teachers really need. What choices for students in regular program to specialize in second year. Schools. I feel that a general technology shop is fine but not at the expense of the traditional shops that are cheaper to run. Combining shops. Should not be done.
- Give technology education teachers need to have more than a single teaching area, technology being one. The ability skills and knowledge to teach multi-grade and multilevel courses is essential.
- We hired an individual last year to teach in the technology department. Overall there were very few qualified applicants I see a need in this area.
• Many of us with strong programs the very concerned that the willow below mainland schools will dictate the development of the new curriculum. For more rural areas a mix of new and technologies best suits the needs and that students. Below mainland has a bent on throwing out all that works and bringing in high-technology at all costs. This is crazy. What does a farmer or logger need from high-technology and robotics. We must maintain a mix. Other curriculum changes we have seen far too much material is expected to be covered. It cannot be done. It must be more realistic in skill.

• 1, funding. 2, number of new teachers. 3, support and education of school counselors and administrative officers.

• It is most disappointing that BCIT received three million dollars to establish a future direction. An initiative should be undertaken to establish articulation with post-secondary training institutions rather than bringing college programs into the secondary schools. Our strength is dependent on the usefulness of our programs.

• I have a concern with generalists with no specific trade skills replacing the retiring teacher and ending program because he or she is the only person available. Why is UBC the only institute offering technology education? I would say that five years is probably more reasonable for 50 percent of technology teachers to go. Two in my district left because of health reasons. These happen at inopportune times. No teacher, no course, missed opportunities. I've found that courses designed with need technology curriculum exclusively makes them away many students with motivational and other lending problems. I believe strongly in many of the key components in the new curriculum and struggle to implement them. Who is implementing K through 7? We cannot ignore the role that industrial education has played the real world is a broad spectrum.

• Downsizing of technology shops appears to be the rule in Vancouver. Shops being taken out for less expensive courses. Metal shops being taken out for drama studios this has occurred in four or five schools. The reason given supposedly that technology courses require less equipment and less space.
The number of technology teachers have fallen 50 percent at least in the last 20 years.

- I am finding that had I not had extensive industry experience, 28 years, prior to teaching I would not have survived my first year. This is my second year since I left UBC. I have found several other new teaches in the same situation. The administration of most schools I've heard about do not differentiate between new or rookie teachers. Either you can do the job or you can't. Minimal experience in a traditional shop whatever that means can be disastrous in a rural community school. Unlike the Lower Mainland, where tabletop technology will suffice, rural schools are totally different. Extensive knowledge and skills are a must. Teachers must approach the technology courses being taught to relate directly to the local environment small town rural BC is very unforgiving, it must be taught suit them or they will not except technology courses. I know, I tried many ways until I found away to make it work. With great success I might add.

- Provincial funding is required for upgrading old equipment. Marketing about programs needs the support of the province. Not enough support all of teachers on call for industrial education teachers. Unqualified teachers on call looking after classes when we are absent. Pressure program needs more provincial support and career preparation from industry.

- As always budget concerns prevent us from offering up-to-date technology to as students. Computers are out of date. Price of programs is high. Example 3-D studio Max. In Richmond demographics have changed and large Asian population does not value woodwork, metalwork, applied technology, ect. CADD labs are full since it is computer-based.

- Students are becoming aware that university degree is not enough secure a good job. Technology studies should be in the forefront and develop courses that will encourage academic students and appeal to the parents. Students need the skills you have to offer, they need to be sold.

Introduction.

As early as 1907 financial Incentives in the form of grants were available to school districts that would introduce Manual Training into the Public Schools. The Comox, Courtenay and Cumberland districts resisted the introduction until 1929. At that time the district implemented a very limited Manual Training program and the reasons for slow adoption were rooted in the social, economic, and political structure of the communities. To illuminate these issues a local history will be presented to provide a context and framework from which to consider the slow adoption of a Manual Training and Industrial Arts curriculum.

The Comox Valley.

In 1862 in Victoria James Douglas was presented with difficult situation. The city was bursting at its seams with disillusioned gold seekers and adventures. The settlement of the Comox Valley was a direct result of this predicament. The survey conducted in 1860 by commander R.C. Maine of the British Royal Navy had identified an area 60 miles north of Nanaimo as:

"Possibly the most promising spot for agricultural settlement that he had seen on the Island." (1)

The HBC had established a trading fort in the area and at least two missionary groups were hard at work bringing the gospel to the perceived savages.

More than 60 settlers were enticed to take passage on the gun boat Grappler to take up land and settle the Comox Valley. This settlement plan was extremely advantageous to the Hudson Bay Company as they would be the only provider of provisions to the settlement and the only outlet for any produce or industry. The Island and Mainland colony would both be strengthened by an increased British population. The fact that these settlers were all men with little

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farming experience does not seem to have been considered. Regretfully, the names of original settlers was not retained. A diary kept by one of the men Mr. Drabble provides an extensive list of residents and seems to indicate the majority of the settlers were of British ancestry.

A deposit of coal had been discovered in the area by a group of miners that were originally looking for gold, this was in 1853; 9 years before colonial settlement in the Comox Valley. This trip was followed by an examination by the explorer Dr. Brown. He stated:

"I am fortunate enough to be able to report the existence of one of the finest seems of coal to be discovered, at least as far as the out-crop. It is a criterion, on the Pacific Coast. The seam is about five feet thick at the outcrop about a hundred feet is exposed." (2)

This Coal would have provided a local source of fuel for the newly arrived settlers, commercial exploitation would have to wait until the Dunsmuirs mining operations at Nanaimo and Wellington became difficult and the expansion and development of the Cumberland minds became viable. The first coal mining companies ran small-scale operations: (3)

- The Baynes Sound Coal Mining Company exploited deposits on the Tsolum River. It was incorporated 1870. They built three miles of narrow gauge wooden railway and extracted 1500 tons of coal. They failed, according to Hughes, as the market was not favorable.
- The perseverance coal Company followed, but they did not get as far as production.
- Finally there was the Union Coal Company which was the direct precursor of the Cumberland coal industry. They cleared the right-of-way to the ocean at Roystown, (now Royston).

All these ventures seemed to have failed, as they did not have access to capital or the know-how to operate a mine. The Union Coal Company sold-out to agents of the Dunsmuirs and by 1883 Dunsmuirs were in control of all of the coal claims in the area. The industry was just beginning to get on its feet.
According to Mrs. Emilly McIntyre who came to the new settlement as a child with her father, Mr. Alfred Walker (4)

*There was no road so they reached Roystown by the SS Amelia. They were landed on the beach by a scow; the Walker family rode into union over a trail running like tunnel through the giant firs. At Cumberland there were a few shacks near the coal pit. They had no furniture or bedding. The husband wife and four children slept on the floor for weak before the cabin was furnished. Water came from a swamp and many of the miners went down with a form of malaria.*

Comox would have been the ideal shipping point for Cumberland coal as the settlement was six miles closer to Cumberland than the eventual shipping point of Union Bay. The Dunsmuir selected Union Bay as the deep-water port after rejecting Roystown as being to shallow. Comox peninsular was the best choice but they were unable to purchase land from William Robb who had taken the best land on the Comox peninsula (5)

The outcome was that Port Agusta, later named Comox, remained the shipping point for the Comox Valley settlers instead of becoming a very large industrial center.

From 1883 on Cumberland developed as a mining town and supported saw mills, blacksmiths, foundries, general merchants, and lodging-houses. Comox and North Comox, (later Courtenay) now had a close market for farm produce, livestock, and general merchandise.

**The Schools.**

The public school reports indicate a public school was built in 1873 in Comox, local historians place the date as 1871 for the opening of the new school. The school was constructed of lumber sent from Saywards Mill at Cowichan. This was the first *official* public school north of Nanaimo. Prior to this date the children of the settlers traveled over fields, woodland trails, tidal flats and swaps to join informal classes at the home of a Teacher Samuel Fulton Crawford who possessed a first-class teaching certificate from Nova Scotia.
Several narratives indicate that Crawford's house was a log building located in an area known as Little River. I have visited the site and there are the remains of a small log building there. Mr. Crawford was hired as the area's first teacher once the school was built. Considering that most of the original settlers were male and possibly older men there would not have been many children in the area. In order to keep the public school attendance above the 15 students required to keep a school open Mr. Crawford is reported to have traveled to Victoria on several occasions to adopt boys from an orphanage, they performed household duties for him and attended school.

The first school was not located in an area that was accessible to the majority of the population. Some children would have had to walk several miles to school, parents of the Comox Bay children became impatient and purchased land from George McDonald on Anderton Road and in 1884 gained approval from Victoria to construct another school. This original school structure is now part of the Leeward Restaurant and has a Historical Society plaque out front.

In 1885 the boundaries of Comox North and Comox South were clearly defined in the public school reports. Boundaries were adjusted again in 1885 and 86 to create the Courtney school district. (Courtenay was emerging as the major growth area.) In Courtney two additional schools were constructed one on a gift of land from the Harmston family and it was built at Portuguese Creek corner. It was registered in Victoria as Puntledge school but called Sandwick school by the settlers, a school has remained in use on the site for the last 110 years. The second school was built on One Acre and One town a lot donated by Joseph McPhee. The one room school was 28 by 36 and Cost $ 1,200:00. It was reported to have had tall windows and two grass playgrounds; one for the girls and one for the boys. The original school building was closed in 1896 the lumber recycled into a barn and the remaining schools absorbed the student population. Between 1895 in 1901 three distinct school districts existed with fluctuating student populations.
According to Leila Carroll (6) in 1896 there were 38 pupils attending in Courtenay, the emphasis was on Language and Grammar. Mr. Reid introduced drama and “The Black Prince” from “Ivanhoe” was produced. Little is known of the curriculum that was instructed. The Comox Valley School District 71 does maintain an archive that contains student records and administrative reports. This archive was unavailable to this researcher. Mrs. Dorothy Stubbs, who was a teacher and is the widow of William Stubbs, one of the first school principals in Courtenay, states that by 1918 Courtenay had a Four room school, even if it was Two rooms and a crude annex. She has a letter written by a local, but unknown student in 1908 that expressed some puzzlement (7)

"Now we have a new teacher who is teaching us a lot extra. More than ever before like music, bookkeeping, Canadian history, anatomy, physics, hygiene and other things I can't even remember the names of."

In 1921 the Two story Courtenay Central school was finished. It was an Eight room school and was built by Robert Moncrief Construction of North Vancouver. The Moncriefs’ must have liked the area as they moved to Cumberland and became one of the prominent families.

High school classes were conducted in Courtenay from 1915 on. Space was rented in the basement of the Presbyterian church for one hundred dollars a year. Miss Danard was hired as the principal and teacher for one hundred dollars per month. She taught entrance class and the first two years of high school. She left after one-year officially due to ill health. In 1916 the school was moved to the former Building Supply property owned by trustee MacFee. The community continued to grow and in 1927 a new high school was constructed.

It would seem that Courtenay was growing as the main trading partner to Cumberland, with a daily rail connection to Nanaimo and Victoria Courtenay was gaining in importance over Comox. Comox had the only deep-water commercial wharf and was the embarkation point for steam ships bound for Vancouver and Victoria, both destinations required overnight passage.

Night schools, Technical subjects, Manual Training and Domestic Science were slow to become established in the Comox Valley schools of Courtenay, Comox, and Cumberland. In spite of the educational and pedagogical benefits of the subjects; economic, social, political, and personal reasons seem to have impeded their establishment until the 1930’s.

The development of industrial education in BC can be traced back to the turn the century. Its main proponent was a private benefactor Sir. William McDonald. Spurred on by the success of the McDonald agricultural movement in eastern Canada, McDonald set up a Manual Training fund, which sponsored 21 programs throughout Canada by the year 1903. The McDonald Sloyd fund paid the cost of equipment, materials, and instructors for Three years. When the three years came to a close the government of BC found the program to be so successful that was continued and became a part of the curriculum. The authorities were convinced that the program should be expanded and during the next decade set about to achieve that goal.

On September 1st 1903, Mr. Harry Dunnal was appointed inspector of Manual Training for the province, which position he held until January, 1915, when he was appointed art instructor in the provincial normal school in Victoria. The following excerpt is taken from Mr. Dunnal’s first annual report as Inspector of Industrial and Manual Training dated July the 15th 1908 (8).

In November of 1900, Professor Robertson on behalf of Sir William Macdonald, visited British Columbia to make arrangements with the education department and the school trustees in Victoria and Vancouver for the introduction of Manual Training into the schools, for period of three years, to illustrate the usefulness of some form of hand work being taken in connection with the child’s school life. Except for providing on rooms in which to carry on this branch of study, neither the education department of the cities of Victoria orb Vancouver were asked to pay any of the expense. This was born entirely by Sir William McDonald. In the spring of 1903 professor Robertson again visited the province to see what progress had been made, and also to see what prospects there were on the work.
being continued on condition that they work for one year at their own expense, equipment of the various schools was given to them free of any expense. In Victoria school trustees decided to carry on the work and in Vancouver the school trustees at a public meeting held in the City Hall unanimously decided to carry on and extend the work. For two years the entire cost of working the schools was more respectively by Victoria and Vancouver, and since that time, as you know, sir, the education department has assisted paying the salaries of both the Manual Training and cosmetic science instructors.

In 1910 a prescribed course of study for Manual Training was established by the British Columbia Department of Education. In 1912 the course was included as a compulsory course for those students entering both high school grades 9-12 and elementary students. School districts were empowered in 1910 to establish and maintain, subject to the approval of the Council of Public Instruction, technical and night schools. The council could grant funds toward equipment, instruction of supervision. The entire Cost of providing suitable accommodation had to be borne by the districts.

In 1906 John Kyle came to Vancouver to be supervisor of Drawing and Art instruction in the high schools. He noted the advisability of having night schools and the Manual Training instructors were the first to respond. The Manual Training centers were soon occupied night and day. Subsequently he was appointed organizer of night schools for Vancouver in addition to his duties as supervisor of art instruction. In April 1914 Kyle was appointed provincial organizer of technical education and Manual Training. In his report of 1914 the following is noted: (11)

There are 38 woodworking centers in the province with 36 instructors and 5,652 students. It is also noted that there were no teacher training classes for instructors." (Most instructors were of British ancestry and possessed prior trade training.) 'There were no Technical Option courses in the High Schools, he states that this is primarily due universities not recognizing those courses.

With the encouragement of partial provincial funding enrollment in Manual Training courses increased significantly over the next decade.
During the late 1920s the Putman-Weir Commission recommended the 6-3-3 Grade pattern and encourage the building of junior vocational schools. This recommendation may have been influenced in part after considering the initial success of a pre-vocational school instituted by the Vancouver school trustees in 1916 according to John Kyle (12) There were 142 students enrolled, 78 boys and 63 girls. The academic work was grouped around handwork. The boys made their own workbenches, drafting tables, drawing boards, tee squares tables, and a roll-top desk for the teacher. They also made windows and doors for new center which they proposed to build but which unfortunately did not materialize. (No mention is made all of what activities the girls pursued.)

During the 1920's Industrial Arts subjects including drafting, electricity, metalwork, and woodwork were introduced. The late 1930s saw the revision and publication of new curriculum documents detailing courses of study for industrial arts. By 1936 after 22 years there were 193 Manual Training centers with 80 instructors and enrollment and 14,317 students. Technical Courses were implemented in the High Schools and a school of Decorative and Applied Art was established as well as correspondents courses.

Public Schools,Night Schools and Manual Training in Cumberland.

The first school to open in Cumberland was located in a two room Miners Cottage located at Dunsmuir and first streets. It opened in 1889 and the first teacher at the school was Mr. Gillchrist, he taught up to 40 students in a class. The building was also used for church services, in 1902 space was rented above a commercial building and elementary and three high school grades was conducted there. Students from Courtenay and Comox attended the Cumberland school. In 1912 a Four room school was constructed for high school students. It was not until 1928 when the Twelve room school was completed that Manual Training, Science, Home Economics and Art were added to the curriculum. The new school housed both elementary and high school students.

Approximately 60 percent of the residents in Cumberland were either Chinese or Japanese. These children attended public schools during the
daytime, in the evenings and on the weekends they attended classes conducted by their communities and in their native languages. In spite of English not being their mother tongue the majority of the Asian children were excellent students and achieved first-class honors.

School trustees in Cumberland offered night school classes from 1904 onwards. They were at best moderately supported. *The Cumberland News* articles from 1904 to 1930 indicate a pattern of low support (See Attachments.) The subjects offered were mainly English Literature and Composition, High School Mathematics, First-Aid and Mining Certification. Considering the diverse ethnicity of this community one might assume that some of the curriculum was inappropriate. One must consider that one function of night school classes at the time may have been to socialize new immigrants into Canadian society.

The nature of this British class based mining community may have been such that different societal groups were not encouraged to interact. According to Johnstone (9) The Company had a non-fraternization code, Miners and fireman were not to socialize with management or Orientals, this applied to the children as well. The most successful night school classes attended offered mine safety and first-class mining certificate programs. These types of courses could empower the wage ending class to become upwardly mobile. Ben Johnstone in his book "Coal Dust In My Blood" (10) details his personal educational Path that enabled him to rise from underground mining to a senior or management position.

Manual Training and Industrial Education would have had strong opposition in a mining community for several reasons:

- To the British working class Manual Training was seen as purely vocational. It would not allow the students to transcend wage earning employment, and may have been a way of holding them back.
- The Chinese and Japanese communities valued academic achievement in their children. They may have considered Manual Training, Art, and Home Economics as superfluous. In their native language schools they taught Art, Calligraphy, and deportment in an ethnic social context.
• To the mine management, the middle-class and the school trustees, (comprised of prominent citizens and professionals) Manual Training was seen as superfluous and unnecessary. University admission required academic studies and Manual Training would compete within the curriculum.

• Classroom teachers may have felt that their teaching day was full and were unwilling to learn new skills or approaches.

• In a single industry community any new initiative requires the promotion and support on the major industry in order to be successful. It does not seem that the Dunsmuir's or the Union Coal Co. were particularly interested in public education. They were interested in efficient coal production and children and families was something that had to be accommodated and tolerated in the larger picture.

• To politicians and administrators technical education was perceived as an expensive curriculum. The trustees were responsible for raising funds and operating the schools in an efficient manner. Vocationalism was considered better taught in an apprenticeship environment.

Cumberland is a unique community in several respects. During the time investigated the community was divided along class and racial lines. Chinese miners worked almost exclusively in the No. 6 and No. 8 lines. The residential community, Chinatown was in close proximity to the mine shaft. The community was self-contained, interaction with the dominant society was minimal. Japanese, Polish and Italian communities flourished in the same way. The British community was extremely patriotic to both Canada and the Empire, British holidays such as Empire day and May-Day celebrated.

The Community experienced tremendous grief with hundreds of men and boys being killed in the mines. It has been argued that many of the accidents were predictable and avoidable. Bloody strikes and lockouts were the norm in Cumberland.
Conclusions.

The Comox district resisted the introduction of Manual Training until 1929. At that time the district implemented a limited Manual Training program, utilizing one teacher, a second generation Englishman, Mr. Tilby for all three schools. The reasons for slow adoption were rooted in the social, economic, and British class based structure of the area.

The research materials available in the local archives and the BC school reports present for the most part show only one side or view of community life. The local newspapers, the Cumberland Islander and the Comox Argus, present a white middle-class British view. Notably absent is any accurate and detailed picture of Chinese, Japanese or Canadian First-Nations peoples.

End Notes.

(1) The British Navy were reported to have used the area for gunnery practice and recreational activities.


(3) Capitol was always hard to acquire. James Dunsmuir had to take on partners for a short time to open the Nanaimo mines, his investors were British Naval officers. See. Reksten, T.E.(1991) The Dunsmuir Saga. PP. 27-29


(5) Robb was reported to have been offered up to $ 80,000 for his land. He thought it would be worth more as the main source of town lots for Comox.

(6) See: Carol, L. Wild Roses and Rail Fences. Page 133-134.


Bibliography.


Colorado.


Appendix 3. Manual Training Activities

The following 50 worksheets were produced by the O.N. & Co of London England

<table>
<thead>
<tr>
<th>No. 1: POINTER.</th>
<th>WOOD: Birch. NEW TOOL: Knifo.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No. 1 (a).</strong></td>
<td>Get a piece of wood rather larger than required and cut one side level with the knife.</td>
</tr>
<tr>
<td></td>
<td>On level face draw two parallel lines, with rather more than 1/4 in. between them.</td>
</tr>
<tr>
<td></td>
<td>Cut down to lines, keeping sides square to first surface. In same way prepare the fourth side.</td>
</tr>
<tr>
<td></td>
<td>Cut the ends square and draw the diagonals. Rule tapered lines, cut down to them, being careful to keep sides of Model perfectly straight.</td>
</tr>
<tr>
<td></td>
<td>Make octagons on ends.</td>
</tr>
<tr>
<td></td>
<td>Make the object eight-sided by cutting away the edges. Round it and shape the point.</td>
</tr>
<tr>
<td></td>
<td>Cut off length rather longer than required. Finish with sand-paper.</td>
</tr>
</tbody>
</table>

**No. 1 (b).** Follow same directions as in No. 1 (a), but before sand-papering, measure out the oblique faces, and in cutting them keep the sides well balanced and quite flat.

**N.B.** (1) Cut always from you in the early Models, letting the knife slide obliquely down the wood and pressing the side of it against the wood for guidance. (2) The wood for models made entirely with the knife must be straight-grained, and split, not sawn out. (3) In cutting off the length of the Model, be careful to grasp it by the thick end, even if short, to prevent the knife slipping.

<table>
<thead>
<tr>
<th>No. 2: PARCEL PIN.</th>
<th>WOOD: Birch. NEW TOOL: Knifo.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No. 2.</strong></td>
<td>Prepare wood to same shape as No. 1 (1st Stage), 3 in longer than required.</td>
</tr>
<tr>
<td></td>
<td>Cut one end perfectly square.</td>
</tr>
<tr>
<td></td>
<td>Bevel the sides and the squared end; if not successful, cut end square and bevel again.</td>
</tr>
<tr>
<td></td>
<td>Measure and cut off length, square and bevel the other end.</td>
</tr>
<tr>
<td></td>
<td>Cut V-shaped notch across the middle of one side. Finish with sand-paper.</td>
</tr>
</tbody>
</table>

**Note.** Wrap sand-paper firmly round a flat piece of wood, and rub obliquely from you to keep bevel flat and edges sharp. For curved objects the sand-paper should be used with the hand only.
No. 3.—ROUND FLOWER STICK.
WOOD—Deal. NEW TOOL—Knife.
Prepare wood to same shape as No. 1, First Stage.
Cut it octagonal, and then round, by taking off the edges.
Set off the point and shape it.
Measure off full length and cut the top.
Finish with sand-paper.

No. 4.—LETTER OPENER.
WOOD—Birch or Pear Wood. NEW TOOL—Knife.
Get a piece of wood about 3 c. longer than required.
Cut one face flat, and on it draw outline as in Fig. 1.
Cut down to the outline, keeping sides square.
Measure out the thickness, and cut down the fourth side.
Bevel and round the same.
Shape the point, and measure off full length.
Draw top curve as in Fig. 2, and shape it as in the Model.
Finish with sand-paper.
No. 5.—SQUARE FLOWER STICK.

WOOD—Gum. NEW TOOLS—Jig, Try-plane, and Square.

Saw out a piece of wood.
Plane one face and edge at right angles, and try it with square.
Measure out the width with ruler and pencil.
Plane down to the lines and square again.
Plane the bevels.
Measure out and shape the pyramid at top with knife.
Set out and cut the notches, starting from the top.
Measure out the full length, saw off, then shape the point.
Finish with sand-paper.

NOTE.—(a) Sawing—Carefully set blade straight, if frame saw. In starting, draw saw once or twice gently towards you, guided by the thumb of the other hand. Move the saw horizontally, with a long, light, and even motion. (b) Planing—Take care to keep the plane horizontal, to prevent the wood tapering.

No. 6.—PENCIL HOLDER.

WOOD—Gum-graded Deal. NEW TOOLS—Drill and File.

Split up a piece about 3 cm. longer than the Model, and prepare it as in No. 1, First Stage, to 1.5 cm. in diameter.
Smooth the top end and draw diagonals.
Fix the piece in bench.
Hold the brace vertical, and bore hole with shell bit 2 cm. deep.
If not successful, cut off and bore again.
Proceed as in Stages 2 and 3 of No. 1.
Shape the top, and cut off the right length.
Use the file, if needed, and finish with sand-paper.

NOTE.—Before using the shell bit, it is advisable to mark the place where the hole is to be bored with a pricker, to prevent shell bit slipping from the centre. When beginning to bore, take care not to press on the brace, or the hole may not be cleanly cut.
No. 7.—LABEL.
WOOD—Close-Grained Deal. NEW TOOLS—Marking Gauge, Compasses.

Saw out a piece of wood rather more than twice the length required.
Plane up face and edge at right angles (i.e., squaring).
Gauge the thickness and plane to line.
Square a line across the wood about ½c. from the end; find its
centre and describe a semicircle.
Fix in bench and bore hole.
Gauge and plane to exact thickness.
Measure off right length and square line.
Saw off carefully close to the line with tenon saw.
Trim up both ends with knife and file.
Set out and cut the notches clean and square.
Finish with sand paper.

NOTE.—(1) In gauging notice that the head is always held
close to the edge of the wood, and let the sharp point touch the
wood lightly and obliquely, in order to obtain a straight and even
line. (2) In sawing out from the rough block always use the broad
frame saw, or the English hand saw. (3) In filing, fix the piece of
wood in the bench, grasp the file firmly, and move it obliquely;
across the grain.

No. 8.—PACKTHREAD WINDER.
WOOD—Birch. NEW TOOLS—Centre Bit and Bow Saw.

Saw out a piece of wood about 1½c. by 7c.
Square one face and edge.
Copy the diagram in the centre of the wood.
Bore out curves at the ends.
Gauge and plane to exact thickness.
Saw out the shape with fret saw, and trim up the whole with
knife and file.
Finish with sand paper.

N.B.—(1) Let the motion of the saw be light and easy, and
take care to keep it horizontal and parallel with long side of
bench. (2) In boring, if the centre bit be held vertically, it
will first mark out a circle, and then produce a corkscrew
shaving.
No. 9.—RULER.
WOOD—Deal. NEW TOOLS—Smoothing and Jack Plane.

Saw out a piece of wood about 4c. longer than model.
Square one face and edge with jack and trying planes.
Gauge for width and thickness and plane to lines.
Draw diagonals and describe circles on the ends.
Plane to octagonal shape with trying plane.
Continue shaping with smoothing plane.
Measure and cut off length with tenon saw and trim the ends with knife.
Finish with file and sand-paper.

Half the size of the Model

No. 10.—PEN REST.
WOOD—Birch or Mahogany.

Saw out a piece of wood about double the length of the model.
Square up one side and face, gauge and plane to the exact width and thickness.
Copy the drawing.
Saw out the notches with tenon saw, and use knife and file for finishing them.
Saw off length, and copy drawing at each end.
Shape the top with the smoothing plane.
Make the ends smooth and square with knife.
Finish with file and sand paper.
No. 11. - PAPER KNIFE.

WOOD - Birch or Faux Wood. NEW TOOL - Scraper.

Saw out a suitable piece of wood.
Square one face and edge with trying plane.
Gauge and plane down to exact thickness.
Copy the drawing and follow outline with bow saw.
Trim down to line with the knife.
Draw a line along the middle of the front edge to mark the position of the sharp part of the blade and cut down to it with knife.
Shape other parts with knife as in the Model.
Finish with file, scraper, and sand-paper.

No. 12. - BENCH HOOK.

WOOD - Birch or Beech. NEW TOOL - Chisel.

Saw out a suitable piece of wood.
Square one face and edge, gauge and plane to the exact width and thickness.
Copy drawing.
Saw off the length, and smooth the ends by perpendicular chiselling; if necessary, and file.
Saw down for the hooks with dovetail saw, and for the long sawing use the broad frame saw.
Smooth the surface with smoothing-plane, chisel, knife and file.
Round the outer corners with chisel, file, scraper, and sand-paper.

Alternative Model - RAZOR STROP.

WOOD - Birch or Beech.

Saw out suitable piece rather longer than required.
Square to proper width and thickness.
Measure out handle rather longer than required.
Gauge thickness of blade.
Use tenon saw for cross-cut, and broad frame saw for long sawing.
Finish surface with smoothing-plane, knife, and chisel.
Set out length and describe semicircle.
Bore hole from both sides.
Saw off at both ends, and finish with perpendicular chiselling; file, scraper, and sand-paper.
No. 13.—SMALL BOWL.
WOOD—Birch or Pear Wood. NEW TOOLS—Gouge and Spoon Iron.

Saw out a piece of wood.
Square up one face and edge.
Gauge thickness and plane to line.
Copy drawings on both sides.
Saw out the ellipse with bow saw.
Chisel down the line round the edge and complete with the file.
Draw line on the top two millimetres from the edge before gouging.
Balance the model well before proceeding.
Hollow out with mallet, gouge, and spoon iron.
Finish interior with sand paper.
Draw lines on the outside, one millimetre from the top edge.
Use chisel for bevelling.
Model with the knife.
Finish off with file, scraper, and sandpaper.

No. 14.—HAMMER HANDLE.
WOOD—Ash or Birch NEW TOOL—Spokeshave.

Saw out a suitable piece of wood.
Square up one face and edge.
Copy the plan on the face.
Saw out the shape with the bow saw and smooth the sides (right angle to face) with spokeshave.
Copy the elevation on the side and continue as before.
Draw the ellipses at the ends and take care that they lie in the same direction.
Chamfer the edges with the knife and continue shaping with the spokeshave.
Finish off with file, scraper, and sandpaper.

N.B.—Keep the model well balanced through all its stages.
No. 15—PEN TRAY.

WOOD—Birch or Spruce. NEW TOOLS—Hone.

Saw out a piece of wood.
Square up one face and edge.
Gauge the right width, and plane to line.
Draw the plan.
Hollow out with gouge and spoon iron.
Finish the hollow part with scraper and sand-paper.
Gauge and plane thickness.
Saw off the length.
Draw a line on the bottom one centimetre from the edge, and the plan on the sides.
Chisel and file the ends.
Draw the curves on the ends and plane the sides to shape.
Finish with smoothing plane, file, scraper, and sand-paper.

Alternative Model—SPOON.

WOOD—Birch or Spruce. NEW TOOL—Perpendicular Gouge.

Saw out a suitable piece a little thicker than required.
Square up one face and edge.
Gauge the width a centimetre more than the model and plane down.
Draw the elevation, and saw out top curve with bow saw.
Level the surface with chisel and file.
Draw the plan, bore the hole, and saw out with bow saw.
Trim up the edges with chisel, perpendicular gouge, and file.
Draw on top surface two millimetres from the edge a line round the bowl, and hollow out with gouge and spoon iron, finish it with file and sand-paper.
Saw out the bottom curve, and shape with the knife.
Finish with file, scraper, and sand-paper.

FORK.

Same Wood as Spoon.

Proceed as in spoon as far as hollowing out the bowl.
Saw out the underneath shape and the prongs.
Finish with knife, chisel, file, and sand-paper.

No. 16—KNIFE BOARD.

WOOD—Fir or Pine.

Saw out a piece of wood.
Square up one face and edge.
Set out and plane exact width.
Copy the drawing.
Bore the hole.
Saw out the curve with bow saw and the end with the broad saw.
Trim up the curves at top and bottom with the chisel.
Plane the end with the smoothing plane.
Smooth edges with the file.
Gauge and plane thickness.
Finish the broad surfaces with the smoothing plane, and scraper.
No. 17.—FLOWER POT STAND.

WOOD—Pine.

Saw out a piece of wood long enough for both parts of the cross.
Square it up to exact width and thickness.
Set out the length for each piece, and cut off with tenon saw.
Copy the drawing on both sides of each piece.
Cut out the shape with knife.
Fix the pieces together in the bench vise, and smooth them with file.
Set out and cut the notches for the joint—clean and tightly fitting—with the knife.
Cut the curves with the knife, and finish with file and sandpaper.

No. 18.—HALF-METRE and HALF-YARD MEASURE.

WOOD—Birch, or American White Wood.

Saw out a suitable piece of wood.
Square it up to 2.5 cm. by 1.5 cm.
Set out full length for handle.
Gauge on both sides for plan of blade, and saw out with broad frame saw the narrow strips on each side.
Plane the surface with smoothing plane, and finish the part close to the handle with spokeshave, knife, and file.
Draw plan of handle.
Saw out the curved sides, and trim to outer line with knife and file.
Draw elevation of handle, and cut the chamfers.
Saw off the top end of handle, and finish it off with knife and file.
Draw elevation on the blade, and plane down to the lines.
Set out the length and saw off.
Draw the curve at tapered end, and cut it out with the knife.
Finish the model with file, scraper, and sandpaper.
No. 19.—Scoop.

Saw out a suitable piece of wood.
Square up one face and edge.
Sketch plan and bore holes on either side of handle.
Saw out the plan with the bread-frame saw and bore saw, keeping the sides at right angles to the face.
Trim these sides with plane, chisel, perpendicular, gouges, and file.
Draw the elevation.
Saw out the top curve.
Trim up the surface with plane, chisel, and file, and on the top surface re-draw the plan.
On the end draw the elevation for hollowing out, and scoop out with gouge, spoon iron, file, scraper, and sand-paper.
Saw out the bottom curve, and shape outside of scoop with the axe and smoothing plane.
Cut out the handle with the knife, and finish with file, scraper, and sand-paper.

No. 20.—Clothes Rack.

Saw out a suitable piece.
Square up one face and edge, gauge and plane to exact width.
Copy drawing and bore holes.
Saw out curves at ends and finish them with chisel and file.
Plane to full thickness.
Set out the bevels, cut them at ends with the knife, and finish them with file; plane them along the sides.
Plane up a piece sufficient in length for the three pegs to the right size and thickness.
Cut off each peg 2 cm. centimeters.
Mark off 1 cm. from the bottom end, draw diagonals, and make circles rather larger than the holes on the ends.
Cut the pegs to tightly fit the holes, and test when fitted, to see if at right angles to surface.
Set out exact length of pegs, and on both sides of each draw the shape of the hook.
Fix pegs together in the bench, cut notch with tenon saw, and chisel the oblique parts.
Make the top curves with chisel and finish shaping with knife, file, and sand-paper.
Fix the pegs with thin glue and test them carefully before the glue sets.
Saw and plane off bottom projections of pegs.
Finish with file, scraper, and sand-paper.
No. 21.—FLOWER POT STAND.

WOOD—Deal. NEW TOOL—None.

Saw out a suitable piece of wood.
Square up face and edge. Set out ½ m. more than the required length. Plane the ends at right angles.
Gauge and plane thickness.
Gauge and saw out lath; again square up, gauge and saw out another. Continue till required number is obtained.
Fixing the laths in pairs, plane down the remaining side of each lath to the exact width.
Plane up piece of wood long enough for both feet.
Set out the length of each foot, saw them out, and square the ends with smoothing plane.
Draw the shape of the foot on both sides.
Saw them down with tenon saw, and finish with chisel, knife, file, and sand-paper.
Nail the two outer laths half down, and test if they are at right angles to feet; if so, drive the nails home, and do the same to the other two laths.
Punch the nails, and smooth the surface with smoothing plane and the ends with file.
Finish with sand-paper where needed.

No. 22.—FOOTSTOOL.

WOOD—Deal. NEW TOOL—None.

Saw out a piece long enough for both feet.
Plane it up to the right width, and ½ m. more than the required thickness.
Set out and saw off the piece for each foot and nail them together.
Plane the ends at right angles (swinging off the top corners first, to keep the ends from splitting).
Copy the drawing on both sides.
Saw out the curves with the bow saw, and trim them with perpendicular gouge and knife.
Cut top corners with chisel, and finish with file and sand paper.
Separate the feet and bore the holes.
Smooth up the sides with smoothing plane to the exact thickness.
Plane up laths, nail them on, use punch, and finish as in No. 21.
Half the size of the Model.
No. 23.—SOAP BOX.
WOOD—White Wood or Beech. NEW TOOLS—None.
Saw out the material for the different parts, and plane the pieces up to the right dimensions. Set out the length of the back, saw off and shoot the bottom end. Copy the drawing, saw out the shape, trim it up with knife and file, and bore the hole. Measure and saw off the length of the three sides for the box and shoot them. Shape the front face and nail the pieces together. Set out the size of the bottom, bore the hole in the center, and cut the grooves with gouge, then fix it on. Shape the front of the shelf as in the drawing, saw off the length, and shoot the ends. Draw the shape of the support, saw it out, and shoot it across the grain. Finish the edges with chisel, knife, and file. Fix the shelf and support on to the back with glue and screws. Trim up the model with smoothing plane, file, scraper, and sandpaper.

No. 24.—BOOK CARRIER.
WOOD—Deal and Birch. NEW TOOLS—Router (Old Worsted Tooth), and Shooting Board.
Saw out a suitable piece long enough for both boards. Square face and edge, mark out full width, and plane to line. Set out the length of each board, and the grooves for the keys. Cut them out with knife, tenon saw, chisel, and router. Take a piece 10 cm. longer than needed, and plane it up for keys to fit the grooves. Glue each key at the thick end, and knock them firmly in. When the glue is set, saw off the projecting parts of keys. Smooth up the face, and plane to the exact width and thickness. Set out length of boards, and saw them off. Nail them together, and shoot the ends with shooting-board. Set out the notches for the strap, and cut them out with saw, chisel, knife, and file. Square up a piece of birch, gauge and plane it to exact thickness, and copy the elevation on both sides. Saw out the curves with saw, saw, and trim down to line with chisel, perpendicular gouge, knife, and file. Round the top side of handle with smoothing plane, and use knife to shape the under part. Set out and bore the holes, and finish it with file and sandpaper. Mark out and fix handle to the board with screws. Finish with sandpaper.
No. 25. - TOWEL ROLLER & RESTS.

WOOD - Birch. NEW TOOL - Draw Knob.

Saw out a suitable piece for roller and plane to the right width and thickness.

Saw off one end at right angles, and finish it (the ends) with plane and file (plane from corner to corner.)

Saw off the right length, and do the same at the other end.

Draw diagonals, make circles, and bore holes for pegs.

Place the piece round in the same way as the Ruler, No. 0.

Work the pegs up similarly, and fix them with glue.

Cut the pegs to the right length and trim them off.

Finish with file, scraper, and sand-paper.

RESTS.

Prepare a piece to the required thickness.

Copy the drawing on both sides.

Saw out the shape, bore the holes, and trim the edges with chisel, perpendicular gauge, knife, and file.

Saw out opening for the peg, and trim with chisel and file.

Draw the tapering on the top and plane down.

Test with bevel.

Finish the ends, and bore the holes for screws.

Finish with file, scraper, and sand-paper.

No. 26. - SAW.

WOOD - Birch or Beech. NEW TOOL - Draw Knob.

Saw out a suitable piece.

Square up face and edge.

Set out the width, 1 cm. more than required, chop and plane to line.

Draw the elevation on both sides.

First saw down between the handle and the blade with the tenon saw, and then cut out the whole top curve with bow saw.

Trim the same face with plane, chisel, and file, and on it draw the plane.

Bore the holes on each side of handle.

Saw out the blade with the bow saw and the handle with broad-frame saw.

Trim to line with chisel and file.

Draw a narrow rim round the edge of the blade, and scoop out the bowl with gouge, spoon-iron, and finish with scraper and sand-paper.

Draw the underneath curve and saw out: shape it with draw, knife, spoonshave, and knife. but perpendicular chiselling should be used round the top of the handle.

Finish off with file, scraper, and sand-paper.
Saw off the pieces for the lid.
Square face and edge.
Make the joints with coring and grooving planes and glue them.
When the glue is set smooth up and surface and finish the construction.
Saw out the shape.
Smooth the edge with the spokeshave.
Gauge and plane the thickness.
Plane up the cleats and fix them on with screws.
Set out the tapering and plane it.
Make the handle of birch in the same way as the Hook Carrier and screw it on.
Finish with file, scraper, and sand-paper.

Saw out a suitable piece.
Square up face and edge.
Gauge and plane to the right width.
Copy the elevation.
Saw out the concave curve, and plane it with compass plane at right angles to the sides.
Saw out the convex curve, and plane it up in like manner with smoothing plane.
Saw off the ends and square up with chisel and file.
Set out and bore the hole with centre and shell bits.
Draw the tapered lines, and plane down to them.
Make the top curve with spokeshave, and use knife for shaping the ends.
Fix the hook and plug up the hole; see that the grain in the plug runs in proper direction.
Finish the Model with file, scraper, and sand-paper.
No. 29.—RULER.

Saw out a suitable piece.
Plane up face and edge.
Gauge and plane to right width.
Gauge thickness and saw down.
Fix it with wooden pegs to another piece, and plane down to the lines.
Set out and rule lines for the bevels, and plane them.
Measure and saw off length with the tenon saw.
Finish the ends with file and sand-paper.
Measure out and bore the hole (half from each side.)
Finish with scraper and sand-paper.

No. 30.—BOOT JACK.

Saw out a suitable piece.
Square face and edge, gauge and plane to thickness.
Copy the drawing, and saw out the shape, except at the broad end.
Smooth up the edges to right angles with spokeshave, chisel, and knife.
Mark out the groove for the support, and cut it out with tenon saw, chisel, and knife.
Plane up a close-grained piece of deal five centimetres longer, and two centimetres wider than required, and fit the piece into the groove with cutting gauge, chisel, and knife.
Saw out the piece at the broad end of the boot jack, and trim it up at right angles with chisel, perpendicular gauge, and knife, then finish it by drawing the curve, and cut it out with spokeshave, knife, and file.
Fix in the foot with glue.
When the glue has set, saw off the projecting ends at right angles to the top surface, and trim them with smoothing planes.
Measure out the greatest depth of foot and the thinnest end of the face, draw the line for tapering, and saw down to it.
Finish the surfaces with plane, shape all the edges with spokeshave, knife, file, and scraper.
Finish with sand-paper.
No. 31.—BOOK STAND.
WOOD—Deal or Mahogany. NEW TOOLS—Marker and Cutting Gauge.

Saw out a piece long enough for the bottom, and another piece, 8 centimetres longer than required, for the ends. Plane them up to right width and thickness. Shoot all the ends to be jointed. Set out carefully the dovetails on both sides with the cutting gauge two millimetres more than the thickness of the wood. Mark out the pins on the ends of the bottom with compasses, square, and bevel, and cut them out with dovetail saw, chisel, mallet, and knife. Set out the sockets from the pins by aid of the marker, and cut them out as before. Fit pins into the sockets; if the joints are not good, saw them off and start again. When the dovetailing is satisfactory, nail the two ends together. Copy the drawing on both sides, and cut out the shape with bow saw. Trim up the edges with spokeshave, knife, and file. Draw the holes in the ends, and bore with centre bit; finish them with chisel, knife, and file. Fix the joints at right angles with glue. When dry, trim up the object with smoothing plane, scraper, and sand-paper.

No. 32.—SHUTTLE.
WOOD—Birch. NEW TOOLS—None.

Saw out a suitable piece. Square up face and edge. Draw plan, and saw out the shape with bow saw. Trim down to line at right angles with chisel and spokeshave. Hollow out the bowl with gouge (or spoon iron), and smooth with sand-paper. Gauge and plane to thickness. Draw elevation and saw out with bow saw. Trim down to line with spokeshave, make the axle with knife, and fit it in with bradawl and chisel. Shape the top and bottom of the model with spokeshave and knife. Finish with file, scraper, and sand-paper.
No. 33—KNIFE BOX.
WOOD—Deal or American White Wood. NEW TOOLS—None.

Saw out a suitable piece for the sides, and plane it to the right width and thickness.
Set out the right lengths, saw off and square the ends with the shooting-board.
Dovetail the ends together, as in No. 31.
Set out the groove for the handle, and cut it out with knife and chisel.
Glue the sides.
Plane up a piece to the right thickness for the handle.
Copy the drawing, and saw out the shape.
Trim up the curves, and square the ends with shooting-board.
Cut out the hole for the handle with centre bit, chisel, and knife.
Trim up the sides of the box, at right angles with chisel and plane.
Fix the partition in its place.
Plane up the bottom to the right width, length, and thickness.
Shape the edges with smoothing plane and file.
Fix the bottom with nails, and sink the heads.
Finish with file, scraper, and sand-paper.

No. 34—AXE HANDLE.
WOOD—Gum or Ash. NEW TOOLS—None.

Saw out a suitable piece.
Square up face and edge.
Gauge and plane to the right thickness.
Copy the drawing and saw off the length.
Draw the shape on either end.
Saw out the long curves.
Shape the model with smoothing plane, drawing knife, spoke-shave, and file.
Finish with scraper and sand-paper.
No 36—ROLLING PIN.

WOOD—Beech.뉴 TOOLS—None.

(a) Saw out a suitable piece and square it up to the same width and thickness.

Saw off and square the ends with the plane.

Set out the length of the knob, and saw for the groove to a depth of eight millimetres all round.

Make it cylindrical with plane, as in No. 9.

Cut out the shape of the knob with knife and chisel.

Finish with file, scraper, and sand-paper.

(b) Saw out a suitable piece and square it up to the same width and thickness as the model in its thickest part.

Set out and cut off the length.

Prepare for the knob as before.

Draw diagonals and circles at each end and plane off to the circles, starting from the centre and working towards the ends.

When the shaping with the plane is finished, cut out the knob with knife and chisel.

Finish with file, scraper, and sandpaper.
No. 37.—SET SQUARE.

Saw out a suitable piece of wood.
Square up face and edge.
Gauge and plane to thickness.
Set out and plane the bevel and shoot the rind.
Measure out the length and width of the model.
Mark out centimetre divisions.
Place the piece flat on the bench, saw out the oblique side with tenon saw, and plane it up square to sides.
Set out and bore the hole.
Finish with sand-paper.

No. 38.—PEN BOX.

Prepare the pieces for the box.
Make the dovetailed parts as in No. 33.
Before gluing the pieces together, cut out the groove for the lid with cutting gauge, knife, and chisel.
Plane up the lid and fit it in the groove.
Smooth up the bottom edges of the box and glue the bottom on.
Trim up with plane, scraper, and sand-paper.
No. 39.—STOOL.

Saw out the different pieces, square up faces and edges, and make plane joints for the seat and feet.

Plane the pieces for the feet to the right width and thickness.

Nail them together, saw off and plane the top ends square.

Set out the inclination of the feet with cutting gauge and Level, and plane it off.

Copy the drawing, bore the hole, saw out the shape, and trim the edges of the feet.

Plane the top to the right dimensions, set out and cut the grooves with knife, tenon-saw, chisel, and old woman's tooth.

Separate the feet, and fit them into the grooves with knife and chisel.

Draw the construction of the hole for the top, and cut it out with centre bit, key-hole saw, knife, and file.

Glue the feet in.

Prepare the pieces for the sides, nail them together, draw the construction, bore the hole, saw out the shape, and trim up the same.

Nail the side pieces on the stool.

Punch the nails down.

Trim up the object with smoothing plane, file, scraper, and sandpaper.

No. 40.—SQUARE.

Saw out a suitable piece for the blade, and another for the handle, and plane them up to the right width and thickness.

Shoot one end of the piece for the handle.

Mark and saw out the slot, and finish it with chisel.

Fix the blade in at an exact right angle, using glue and clamp.

Saw off to the right length, and use the shooting board for finishing the ends.

Bore and fit the wooden pegs in the handle.

Bore the hole and finish with sandpaper.
No. 41.—PASTE BOARD.
WOOD—Pine Wood. NEW TOOLS—Tonguing and Grooving Plane.

Saw out the different pieces for the board.
Plane them up to the right width and thickness.
Plane the tongues and grooves for the joints with tonguing and grooving plane. The grooving is done first.
Fix them together with thin glue.
Plane up the broad surfaces and square up the ends.
Set out and plane the grooves in the beam, and the tongue in the board to fit tightly.
Fit them, and fix the cleat at each end with glue and nails.
Round the edges with plane and file, and finish off the article with smoothing plane and scraper.

No. 42.—MARKING GAUGE.
WOOD—Cedar. NEW TOOL—Center Gauge.

Square up a piece of wood to the right width and thickness for the stock.
Measure off the mortise on both sides and cut it out with mallet, narrow mortise chisel, and broad firmer chisel.
Saw off the length of the stock and finish the ends with chisel and file.
Plane up the beam and fit it.
Cut off and trim the ends.
Plane up and shape the wedges according to the diagram and fit them.
Fix a nail through the beam, with sharp point, for marker.
Finish each part with file, scraper, and sand-paper, before fixing them together.
No. 43—BRACKET.

WOOD—Birch, Alder, or Maple.
NEW TOOLS—Bent Gouge (Carver's Tool), and V Tool.

Saw out the various pieces.
Make plane joints where necessary.
Square up to the shelf to the right width and thickness.
Set out and cut the grooves for the supports.
Saw off and shoot the top ends.
Set out and cut the dovetails in the supports, and fit them into the grooves.
Copy the drawing, and saw out the shape.
Trim up the edges.
Cut out the grooves on the face of the supports with the carver's bent gouge.
Cut the shelf to the right length and square the ends.
Set out and bore the holes for the pillars.
Glue the supports, and see that they stand at right angles to the shelf.
Saw off and shoot the top ends.
Copy the drawing, and saw out the shape.
Trim up the edges.
Cut out the grooves on the face of the supports with the carver's bent gouge.
Cut the shelf to the right length and square the ends.
Set out and bore the holes for the pillars.
Glue the supports, and see that they stand at right angles to the shelf.
Saw off and shoot the top ends.
Copy the drawing, and saw out the shape.
Trim up the edges.
Cut out the grooves on the face of the supports with the carver's bent gouge.
Cut the shelf to the right length and square the ends.
Set out and bore the holes for the pillars.
Glue the supports, and see that they stand at right angles to the shelf.

No. 44—PICTURE FRAME.

WOOD—Birch, Maple, or Oak.
NEW TOOLS—Plane.

Saw out the pieces for the frame and plane them to the right width and thickness.
Cut off the length and shoot the ends.
Set out the half-lapping part, and cut it out with the dovetail saw.
Mark the rebate with cutting gauge, and cut it out with knife and chisel.
Glue the pieces together, and when set, smooth the sides with smoothing plane.
Mark the veins, and cut them with the V tool.
Shape and fit in the wooden suspender.
Square up a piece for the pyramids, shoot the end of the piece, saw off the height of the pyramid, and continue till you obtain the required number.
Shape the tops with the chisel and glue them on.
Place up the back, shoot the ends, and fit it in.
No. 45—Tool Stand.

Saw out the wood for the back and bottom in one piece.
Make the plane joint.
Square off the whole piece to the right width and thickness.
Saw off the part for the bottom, shoot the ends, and dovetail them.
Copy the drawing of the back, cut it out, and trim the edges.
Shoot the hole, set out the length of the bottom, saw off and short the same.
Glue the back and bottom together.
Prepare the pieces for the box, and dovetail (cut dovetails), three together, as in the drawing.
Draw and shape the front part of the box.
Dovetail.
Smooth up the back, bottom, and box with plane.
Fix the stand together with nails, and sink the heads with punch.
Plane the shelves to the right dimensions, cut off and square the ends with the shooting board.
Mark off and cut out the holes with shell bit, centre bits, chisel, and bradawl.
Plane up the angle for the supports.
Draw the construction, cut out the shape, and trim the edges.
Glue and nail the shelf and supports to the back.
Plane up the divisions of the box in one piece.
Cut off the lengths, shoot the ends, and glue them in.
Finish with file, scraper, and sand-paper.

No. 46—Tea Tray.

Saw out and plane up the pieces for the tray to the right width and thickness.
Set out the length and the angle with bevel.
Saw off, and square with the smoothing plane.
Plane the bevels on the bottom sides of the four pieces to the same angle as the ends.
Prepare the ends to the desired angle for dovetailing.
Mark and cut out the dovetails.
Draw the construction on the ends and cut out the same.
Trim the edges.
Glue the parts of the tray together.
Plane up the bottom.
Trim up the dovetailed parts.
Nail the bottom on, and finish the object with scraper and sand-paper.
No. 47.—BOOK SHELVES.
WOOD—Pine. NEW TOOLS—None.

Saw out a suitable piece of wood for the sides.
Square up face and edge, gauge and plane to the right width
and thickness.
Nail the two sides together and copy the drawing.
Shoot the ends.
Saw out the shape, and trim down to line with spokeshave.
plane, chisel, knife, and file.
Set out the grooves, and cut them out with saw, chisel, and
router.
Plane up the shelves to the right width and thickness, and fix
them into the sides with chisel and knife.
Shape the projecting front of the shelves with smoothing plane.
Trim up the separate pieces with smoothing plane.
Fix the shelves in with glue, and finish the whole with smoothing
plane, scraper, and sand-paper.

No. 48.—BUCKET.
WOOD—Deal. NEW TOOLS—Round Punch.

Saw out the pieces for the staves, and plane the tapered sides
to the dimensions required.
[NOTE.—The widths of the ends of the staves are found
by dividing the perimeters of the ends of the bucket by the
number of staves.]
Draw on each end of the staves the arc of a circle, and plane
to concave shape with the round, jack, and smoothing
plane.
Gauge the thickness of the pieces and plane them off.
Plane up and shape the bottom.
Set out the shape of the groove for the bottom with the bevel,
and cut it out with the saw, knife, and chisel.
Fit the staves to the bottom.
Use the beaded tool for fixing the staves together with wooden pegs.
Put the hoops on.
Saw off the right length of the bucket.
Trim up the top and bottom with the smoothing plane.
Draw and saw out the curves.
Finish off.
No. 49.—CABINET.

Wood—Dundie or Makejap. New Tools.—None.

Saw out the various pieces, and plane joints where necessary.

Plane up to the right width and thickness the four pieces which make the frame of the cabinet, cut them off to the right length, shoot the ends, and do the dovetailing according to the drawing.

Mark out the grooves for the back to slide in, and cut them out with the plough.

Glue the frame together.

Plane up the back and fit it in, nail it at the bottom, trim up the frame with the plane.

Plane up the pieces for the legs and mouldings to the right width and thickness, set out and level the edges.

Saw off the mouldings and mitre them, using bevel and mitre boards; fix them with nails. Drive up the shelf and its supports to fit them in.

Plane up the different parts for the door to the required dimensions.

Mark out the holes for the mortise, and cut them out with mortise chisel and mallet.

Draw and saw out the tenons, and fit them into the holes with chisel.

Mark out the groove for the panel with cutting gauge, and make the groove with the plough.

Plane the bevelled part of the panel, and fit it into the groove.

Glue the parts together, and when set, trim up with the plane, and fit the door into its place.

Sink the hinges and fit the lock.

Make the key-hole with shell bit and chisel.

Finish with scraper and sand-paper.

No. 50.—SMALL TABLE.

Wood—Dundie or Makejap. New Tools.—None.

Saw out the different pieces.

Plane up the legs and rails to the right width and thickness.

Fix all the eight pieces for the rails together in the bench, set out the lengths and the tenons, and cut them out with the tenon saw.

Fix the legs in the bench, and mark and cut out the holes for the tenons with mortise chisel and mallet.

Set out the tapering on the inside faces of the bottom of the legs and plane the same.

Mark out the bevels and cut them out with chisel.

Set out and cut the block mortise holes in the rails.

Glue the parts together, and when set, trim up with the plane, and fit the door into its place.

Sink the hinges and fit the lock.

Make the key-hole with shell bit and chisel.

Finish with scraper and sand-paper.
Appendix 4. The Macdonald Heritage

by Ruth MacKinnon Barlow

The MacDonald Clan as all can see
Had many branches on its tree,
The story told here in this tale
Is of the branch, Glenalladale.

This was a branch Moydart could boast
From rocky Hebridean coast,
Knoidart, Morar and Glengarry
Were branches too this tree did carry.

In thirteen hundred, history says,
In far off Little Hebrides,
Roderick of Tirom of Moydart
Seemed to give this branch a start.

'Tis said that Roderick gave his truce
and aid to the great Robert Bruce,
Was given land for many miles
And title too, "Lord of the Isles".

His daughter Amie was his heir
And she built a castle there,
To John of Islay she was married
And in Castle Tirom tarried.

The marriage did not last, however,
As John soon lusted after power.
He abandoned family on the Isle
And went to court to live in style.

High Stewart Robert's daughter,
Margaret, At the court became his
target, She did not know his past so
grim, And innocently married him.

Her father became the king in time,
And so began the Stewart line.
The MacDonnalds still their homage gave,
In time of stress, the crown to save.

From Moydart came the branch clan
Ronald, A great-great-grandson of that
Donald For whom the whole clan got
the name That spread across the world its fame.

The seventh Glannanlald was John
Moydart, He whom Glenalladale did start,
Son, Ian Og gave land o'glens
On pledge that passes he'd defend.

Clanranald Guardian he became -
Or Cashmer, by the Gaelic name.
Glenalladale became his seal
And his estates were on Loch Shiel.

Death knell of Stewart rang at Culloden
And here the clans too suffered, when
they aided Charlie to escape
Both homes and lands were due to rape.

Alexander MacDonald was seventh
Laird then Glenalladale and
Glenfinnan.
At Culloden he fought the prince to aid,
Now for his cause he dearly paid.

Alexander's heir was eldest son, John,
Educated in Germany's Ratisbon,
'Tis said seven languages he spoke
And business training did invoke.

When in sixty-one his father died,
His caniness soon was to be tried,
As at nineteen years it was his fate
To supervise his large estate.

Those days in Scotland had their griefs,
As lairds were tacksmen to their chiefs,
As go-between of chiefs and tenants
A laird's life seemed one of penance.

John had a longing to shed this yoke
And to this end some change evoke,
Adding now to his discontent
The chiefs began to raise the rent.

Then too, was their religious plight,
To worship God was each man's right,
To Reformed Church kinsman Boisdale had a mind To convert all - leave none behind.

Clanranald and Boisdale, South Uist divided When Boisdale on his scheme decided. He ordered tenants their faith to change And worship in ways that were new and strange.

Then Catholic Bishop, Hay and John Decided something must be done, And John proposed to mortgage land, Glenalladale and Glenfinnan. Emigration was his idea To that far land across the sea, Transport his people over there Where he could aid them with his care.

John's brother Donald in the Navy, Had seen the lands across the sea. He brought back maps of St. John's Isle And praised its beauty without guile.

Plans were made with the Lord Advocate, To buy some land, so settle their fate, A public subscription, too, was raised, And for his efforts, John was praised.

In seventy-one the land was bought in St. John's Island, 36 the lot. Brother Donald took men and went to prepare Cabins and land for the people's welfare.

Two hundred and ten sailed that day To leave their native land for aye, They turned their backs on fen and loch As they departed from Grenock.

T'were hard to leave their native heath Where forefathers were buried neath, To gamble on a foreign land So far removed from native strand.

For seven weeks they forward sailed, Before the welcome land they hailed, And by the time they had arrived, Except for one, all had survived.

Among the band were many names, But spiritual leader was Father James, A MacDonald cousin to good laird John He solaced all, the journey on.

Another cousin, "Dr. Roddy" Took care of all the ills of body. These two were dedicated then To give their lives to God and men.

The exodus had other trees MacIntosh, MacMillan, MacKinnon, MacPhee's MacCormack, MacRory, Gillis and Bain These, and others from mainland came.

Maclsaac, Maclnnis, MacIntyre and Martin, MacLellan and Cummin and also MacEachern, These were all listed on Laird John's record For paying their passages, these could afford.

Many others from Uist were aided by John, Though lacking in funds, he carried them on, With hopes that a new life would here be unfurled, He financed their journey to the New World.

In the month of June, Scotchfort was reached, On Hillsborough, east, the good ship beached. And Father James then led forth his flock With thanks for safety from Grenoch.

The bounteous land revealed its charms, As it was apportioned into farms, And cabins arose in the nick of time, While axes rang in the forest prime.

Some land had been cleared and left first-rate By expelled Acadians in fifty-eight. Even today, some cellars remain Their tragic loss was the Scotsmen's gain.
Now the long winter that lay ahead,
Began to fill some hearts with dread.
On winter’s arrival, should food they
need, How could they all these people
feed?

Supplies from Scotland failed to arrive
And the settlers needed this help to
survive. Rations were low and illness
was rife - The people dejected became
with the strife.

In seventy-three, his affairs then in
hand, Laird John left Scotland, to join
his band, From Boston a vessel he
brought with supplies To the needy
settlers on St.John’s Isle.

His disheartened settlers were ready to
go And related to John their sad tales
of woe, To them the future looked very
dark; But courage and hope he was
able to spark.

In seventy-three the Revolution began
And John was called to defend his new
land. This led to Halifax, far from his
hame And 'twas there Captain John
he became.

His Highland Regiment rose with might
And led the defenders in a good fight
To keep the invaders from seizing the
strand
That shore of New Scotland, so near to
their own land.

But back to his own land rents were
unpaid, Captain John’s sister, Nellie,
wrote, justly afraid For "Seizure" was
whispered over hill and dale,
The threat to seize land of
Glenalladale.

For "quit rents" were unpaid, since
John was not there To tend to his
estate and protect with his care.
In eighty-one to England he went
To protest the loss of his lands, his
intent.

Governor Patterson had led the attack
While absent John had been "stabbed
in the back." By high-handed action
Captain John had been caught
While, for his new country, so bravely
he fought.

In eighty-three, the Scot’s Regiment
disbanded And Captain John his
release being handed, At last was free
to pick up the reins Of tending his
settlers welfare again.

Withal Captain John had been sorely
tried, In action, in eighty, brother
Donald had died. Away from the colony
many had died. Away from the colony
many had died. Some in Cape
Breton tried life on their own.

For hospitality Scots are famed
And Captain John was true to his
name,
A new house was built where his own
land lay. It stood at the head of
Tracadie Bay.
His love for his homeland was
demonstrated When, at his call, his
clansmen celebrated
The birth of Saint Andrew, to all so
dear
That in their hearts they would always
revere.

The Caledonian Society John began
Lest they forget their native land,
While in memory of his late wife and
son
The official tartan was named the
Gordon.

The quit rents were cancelled in 1806.
Providentially, John was let out of his
fix,
Which hampered his progress for many
a year
And filled him with grave apprehension
and fear.

Lot 35 had been leased by John,
Now, he wished to buy it for his own.
In '92, General Maitland he sought
And from him, the purchase was finally wrought.

In ninety-three, he chose a new spouse, 'Twas Margaret MacDonald of Ronald's house. A kindly soul of great dignity, She was known as the Queen of Tracadie.

From this union came Flora, Donald, William and John, And finally Roderick Charles came along. To John, education was almost a law - He hired a tutor named Donald Shaw.

Alas, Captain John in his sixty-eighth year, Left this mortal life and those he held dear. Margaret most bravely her burden did bear With so young a family left in her care.

Captain John left a will, his land to divide For his wife and children to provide. Grand Tracadie was willed to his wife, Margaret, And near in Donald's town, Flora he sent.

The eldest son, Donald, New Glenalladale went, While William to district St.Martin's was sent. New Moydart was chosen for son John's part, While Arasaig was Roderick's start.

But Castle Tioram and part Arasaig, Were meant to be sold to provide a nestegg, To pay his just debts and thus do his best, To pass from this world with his conscience at rest.

Margaret kept the estate intact, Castle Tioram and Arasaig divided in fact Among all the heirs. Her own share She gave to Roderick Charles, deeming it fair.

To Stonyhurst, as Captain John meant Donald and William were to be sent, But, alas, William was lost at sea, For him the plan was not to be.

Daughter Flora moved to Donald's Town in '21, Mrs. A. MacDonald she has become. Their marriage was blessed with children five, In Donald's Town she lived and thrived.

In 1819, Donald chose as his mate Ann Matilda Brecken, his choice was first-rate, The marriage performed by MacAulay, J.P. As divergent beliefs would not let them agree.

This strong minded union was later to bear Fruits of division and many would care, Religious beliefs were a very strong note, For at this time Catholics had no right to vote.

In the 30's, however, a change came to be And this minority at last were free To have a say, and as their voice Donald MacDonald was their choice.

His popularity he retained, And Head of Assembly he had gained, When in '54, in Quebec, he died Of cholera, with strangers by his side.

To son John, the church became his vocation And in England spent years in this relation. His father's example, deciding to try He, too, brought out settlers to P.E.I.

Both Scottish and Irish Catholics came In 1830 to his land, New Moydart its name, So landlord and priest, he combined with verve But found it impossible two masters to serve.

His problems so complex he failed to solve And from his dilemma he could not evolve, Returning to England he decided to stay And live out his life in a quieter way.
Roderick Charles was true to Captain John's thought, And to educate men he also sought, The Maritime colonies owed much to his mind, A continuing memorial he left behind.

Donald's death was a trick of fate, For he had failed his will to make, Of his seven children, five still remain And their brother, John Archibald, as attorney retain. A Scottish custom, and one deemed fair, The oldest son should be the heir, To this the family all agreed And to John Archibald went the deed.

Though Augustine and William began business in oil, They later turned to a crop from the soil, An unfortunate affair caused the partners a rift And William was left, on his own now, to shift.

Tobacco was destined to be a choice which Within a few years would make William rich, A gifted financier, William proved to be And would hang choice fruits on the family tree.

In 1886, John Archibald had been Wed to Mary Ellen Weeks, then aged eighteen, From this marriage twelve children came - Donald's one son to carry the name.

For the isle of his birth William's love remained With a keen sense of heritage always retained. He built a large house seen for many a mile For John and his family to live there in style.

In ninety-eight, his favours in sight, Queen Victoria dubbed him a knight, Henceforth as Sir William he was noted And to good deeds he remained devoted.

In his program for youth he could always rely, on Dr. James Robertson, his staunch ally, Short courses in farming, Manual Training, too, He introduced, with the future in view.

In Montreal, William's house was bought, Where his mother and sister shared his lot. When they passed on and he was alone, His lovely niece, Anna, shared his home. But then with his family he caused a rift When Anna got married, he cut them adrift, Though education he still provided Further interest in them subsided.

The farm was changed to Sir William's name. By financial arrangement he now held the claim. In nineteen o' three, when John Archibald died, To sell Glenalladale he did decide.

A lamentable trait in his character we find, A stubborn Scotsman can't change his mind! But in nineteen-seventeen, before his end, Niece Anna became, once again, his friend.

Consolidated schools, wishing to try, He built one in Hillsboro, in P.E.I. He was fifty years in advance of his time, Though the school later closed, the idea was fine. His life, though ascetic, his goal was for all,

Now we in the present, his name can recall And honour the scion of this noble clan, Whose aim through his life was to benefit man.

So hail to this clan, may it never fail It's branches Moydart, Clanranald and Glenalladale, In Canada's history this name is prime, And so will continue in the annals of time

This narrative poem commemorating the 200th anniversary of the arrival of the MacDonald settlers to Lot 36, Isle of St. John, in 1772 is dedicated to the memory of Philip Whidden Barlow, husband of the author
Appendix 5. The Macdonald Sloyd School Fund

This is a revised report of an address given by PROFESSOR Robertson before the PUBLIC SCHOOL BOARD OF OTTAWA, on the evening of Thursday, November 3, 1899. It has been enlarged by quotation from "The Theory of Educational Sloyd": George Philip & Son, London.

The Macdonald Sloyd School Fund

Manual Training
IN
PUBLIC SCHOOLS

JAS. W. ROBERTSON,
Commissioner of Agriculture and Dairying

for the
Dominion of Canada

OTTAWA 1899.
Printed in the office of E. J. Reynolds, Spark Street.
Manual Training.
May I be permitted to say at once that if Manual Training were in any
sense one of the "fads," which every now and then are pushed to the front as a
sovereign remedy for the ills of humanity, in its childhood or mature age, I
would not for one moment advocate or promote it.

Instead of that, it is the practical application of an educational movement which,
during the last Ten years particularly, has won an ever-widening place in the
school systems of the foremost countries in Europe and also in the United States.
It is already correcting some of the school influences which have been
complained of alike by parents and teachers. It has been said that the schools,
where book studies are the only or chief ones, turn the children from
contentment with occupations in which bodily labour plays an important part,
and also incline them to leave rural homes for cities, and clerical and professional
pursuits.

While much has been said and written about the danger of overeducating
the rural population and thereby leading them to leave the farms, I do not think
it is possible to over educate anybody. On the other hand it is easily possible and
has been quite common to over-school boys and girls, as well as grown people.
Perhaps one of the many causes which have helped to bring about a preference
for clerical, professional and scholastic occupations, in those who have no natural
fitness for them, and a corresponding distaste for "manual and bodily labour has
been the too exclusively book and language studies of the common schools.

When a spirit of bare scholasticism pervades the primary schools, the high
schools, the colleges and the universities, it is likely to leave the young men and
women facing backwards, perhaps modestly proud of their knowledge of the
history and theories of the past, but without ability to fill a man's or woman's
place in the present. But when scholarship and practical and manual instruction,
join hands in the schools to train the whole child, and not merely tie memory and
language faculties, the children will leave school facing aright, capable and
happy in making the right things come to pass, at the right time and in the right
way.

General Education.

As Commissioner of Agriculture I find that the efforts of the Department
to help the farmers are chiefly intended to increase intelligence, to develop skill
and to promote cooperation. These are all educational objects. However, I do not
speak tonight, in an official capacity; but as a private citizen. We are all
interested in education. We have not come to a state of mind when the wrongs
of child-life cease from troubling. Education begins with the child's life, and should continue of the right sort throughout. It seems unnecessary and wholly undesirable that the school period should be different from the years which go before and follow it, in its influence on the development of some of the most important faculties. Before the child goes to school, it is receiving most of its education, by its senses bringing it into conscious relationship with the material world around it, and by doing things with its hands. After the boy and girl leave school, they are required to do things with their hands, and to recognize and control their relationships to the things about them. Is it too much to expect that education in the school period, while imparting information and developing the general intelligence, should have cultivated their senses to be keen and alert, and to report accurately and fully on what lies all round them? That prepares the mind for frequent experiences of "the joy of clear apprehension." None the less should their hands and eyes be trained to obey readily and skillfully the desires of the mind. Manual Training is a means of developing mental power. These systematic training of the senses, of the hands and eyes, and of the mind are some of the objects of practical and manual instruction.

As nearly all educational movements begin in cities and spread into the country districts, this also will doubtless follow the same course. That is one reason why the schools of the Capital are chosen, for its introduction rather than those in rural districts. In the cities, as well as later on in the country parts, it will surely give many boys such a love for manual, industrial and productive labor for its own sake, that they will choose such occupations and delight in following them.

Not Trade Schools.

Manual and Practical Instruction (under the name of Schools of Industry) was advocated a century ago mainly as a means to fit the children of artisans to earn their own living successfully. These schools were more generally promoted in Germany than elsewhere and were not educationally a success. Manual and practical instruction is now recommended as an educational means for developing intellectual and moral qualities of high value, in all children, without particular regard to the occupations they are to follow afterwards. It is not technical education; although it gives, during the period of general education, the necessary preparation whereby anyone may derive the full measure of benefit from technical instruction at a later age.
Some Good Results.

The following extract from the Annual Report of the School Committee of Boston for 1892 shows some of the excellent results from manual instruction in the schools there. It is from the Head Master of the Agassiz School:

"Manual training in the form of wood-work combined with drawing has now been a part of every pupil's education in the upper grades of the Agassiz School for three years. The time is too short to speak in a dogmatic manner of the effect of such training, but I think I can discern the following good results: First, a distinct pain in accuracy, not only the habit of doing work more accurately, but also a better appreciation and knowledge of what accuracy really means. ** Second, this makes the pupil more thoughtful. Third, it makes him more attentive. Fourth, it makes him more observant. Fifth, the good effect of this training is quit noticeable in drawing and in arithmetic, especially in the subjects of mensuration and square root. Sixth, it has given certain boys increased interest in school."

Royal Commission on the Subject.

In 1896 the Commissioners of National Education in Ireland requested the Lord Lieutenant to appoint a Commission to inquire and report with a view to determining- how far, and in what form, manual and practical instruction should be included in the Educational System of the Primary Schools under the Board of National Education in Ireland. The following are extracts from the fourth and final report submitted on 25th June, 1898:

"In carrying out the task imposed upon us by Your Excellency's Commission of January 25, 1897 we have had ninety-three meetings, of which fifty-seven were sittings for the receiving of evidence. We have taken the evidence of 180 persons whom we considered qualified to give information on the matters submitted to us, and we have visited 119 schools, in most of which we have had an opportunity of seeing Manual and Practical instruction actually given."

Note.—The Commissioners visited schools in Ireland, England, Scotland, Sweden and Denmark.

"With a view to ascertain, the existing facts with regard to Manual and Practical Instruction in Germany, France, Switzerland and Holland, we employed as our assistants to visit these countries, Messrs. Purser, Rollesfcon, Bonaparte Wyse, and Hughes-Dowling. The reports of these gentlemen will be found in Appendix B. We have had the advantage, too, of the assistance of Mr.
M. E. Sadler, Director of Special Inquiries and Reports to the Committee of Council on Education, who was kind enough to furnish us with a memorandum on Manual Training for boys in Primary Schools in foreign countries. For our information regarding schools in the United States, we are indebted to the very complete and exhaustive Reports issued by the United States Bureau of Education. We have also had the benefit of the experience of one of our colleagues, Professor Fitzgerald, who took the occasion of a visit to America, in the autumn of last year, to see some of the primary schools in that country."

Result of Inquiry.

"After careful consideration of the evidence laid before us, and of the facts which we have seen for ourselves, we now proceed to report, in accordance with your Excellency's Commission, how far, and in what form, Manual and Practical Instruction should be included in the system of primary education carried out by the National Education Board in Ireland. We may at once express our strong conviction that Manual and Practical Instruction ought to be introduced, as far as possible, into all schools where it does not at present exist, and that, in those schools where it does exist, it ought to be largely developed and extended. We are satisfied that such a change will not involve any detriment to the literary education of the pupils, while it will contribute largely to develop their faculties, to quicken their intelligence, and to fit them better for their work in life."

Reasons.

"The considerations by which we have been led to the general conclusions above set out, will be fully discussed in the second part of this Report, under the several heads of Manual and Practical Instruction. But we think it will be for your Excellency's convenience, that the general summary of our conclusions should be here followed by a general summary of the grounds on which they are based."

Reasons Mainly Educational.

1. "First, then, there are reasons founded on educational principles. The present system, which consists largely in the study of books, is one sided in its character; and it leaves some of the most useful faculties of the mind absolutely untrained. We think it important that children should be taught not merely to take in knowledge from books, but to observe with intelligence the material world around them; that they should be trained in habits of correct reasoning on the facts observed and that they should even at school, acquire some skill in the use of hand and eye to execute the conceptions of the brain. Such a training we regard as valuable to all, but especially valuable to those whose lives are to be
mainly devoted to industrial arts and occupations. The great bulk of the pupils attending primary schools under the National Board will have to earn their bread by the work of their hands; it is therefore important that they should be trained, from the beginning, to use their hands with dexterity and intelligence."

Reasons from Experience.

2. "Next, we have the practical experience of those schools in England, Scotland, and on the Continent of Europe, in which such a system as we recommend has been already introduced and tested. The evidence we have received on this point, is absolutely unanimous and, as we think, entirely-conclusive. We have been told, over and over again, that the introduction of manual and practical training has contributed greatly to stimulate the intelligence of the pupils, to increase their interest in school work, and to make school life generally brighter and more pleasant. As a consequence the school attendance is improved the children remain at school to a more advanced age and much time is gained for the purpose of education.

"We inquired particularly whether the literary side of school studies reading, writing, arithmetic, grammar, and geography had suffered any loss by the change and the answer was uniform, that no such loss had been observed. In some cases, we were assured that the literary studies had been positively improved by the introduction of Manual Training. This result was accounted for, partly by the, increased intelligence of the children, partly by the constant change and variety of their occupations, many of the most useful exorcises being only a kind of organized play, and partly by their increased interest in their work"

"We regard it also as a very significant testimony to the value of Manual Training, that wherever it has been once introduced, it has, with hardly an exception, been continued and extended. There have been practically no disposition to go back to the old system, which made primary education almost exclusively literary in its character and after an experience extending over some years, there is a general consensus of managers of schools, inspectors, and parents, that the value of primary education has been greatly enhanced by the change."

A Basis Needed for Technical Education.

3. "Lastly, there is a consideration of a practical character, which seems to us deserving of no little weight. A strong desire exists throughout this country, and it is growing stronger every day, for the introduction of a general system of Technical Education. It is thought that a good system of Technical Education would contribute largely towards the development of arts and industries in
Ireland; and in this opinion we entirely concur. But the present system of primary education is so one-sided in its character that it leaves the pupils quite unprepared for Technical Education. The clever boys trained in the National Schools, if they are disposed to seek for a higher education, may pass with advantage into Intermediate Schools of the kind now general in Ireland; but they are not fit to enter a Technical School, even if they had such a school at their doors. Now it seems to us the changes we recommend would go far to remedy this defect. The system of National Education, modified as we propose, would give an allround training to the faculties of the children, and would thus lay a solid foundation for any system of higher education—literary, scientific, or technical which might afterwards be found suitable to their talents and their circumstances."

Conclusion.

"In presenting this report to your Excellency, we venture to express our conviction that, if our recommendations be adopted, the system of education carried out in the primary schools of Ireland can he made, within a few years, very thorough and complete. At present, no doubt, it is excellent in some respects; but in other respects it seems to us seriously deficient. Insisting too much, as it does, on the study of books, it leaves the faculty of observation and other important faculties comparatively uncultivated; and it neglects almost entirely that training of the band and eye which would be so useful to the children in their after life, and which is now regarded both in England and on the Continent of Europe, as an element of great importance in primary education.

"The development of Manual and Practical Instruction, on the lines we have pointed out, will remedy these defects, and will not, we are satisfied, inflict any injury on the literary education which is now given. It will not disturb what is good in the present system, but only supply what is wanting. It will quicken the intelligence of the children, brighten the tone of school life, and make schoolwork generally more interesting and attractive. With the system of National Education modified as we propose, the children will be taught not by means of books only, but also by the more simple and effective agency of things; and they will be better prepared for their work in life, which for the great bulk of them, must consist mainly of manual occupations.

"It is hardly necessary to say that the changes we have recommended cannot be carried out without a considerable expenditure of money. But we feel confident that the State, which so largely maintains and controls the system of National Education in Ireland will not hesitate to provide the necessary funds for improving that system, within reasonable limits. The progress of the people in
wealth and material prosperity must largely depend on the education given in the primary schools; and to make that education thoroughly efficient and fit for its purpose is a task, we submit, which may well be undertaken, in the highest interests of the State, whatever the necessary cost may be."

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I have quoted freely from that Report. I am greatly indebted to it. I consider it peerless even among Parliamentary Blue Books for the thoroughness of its information. Its statements are clear as sunshine, strong as the words of wisdom, and convincing as truth itself.

**The Governor-General of Canada.**

His Excellency the Governor-General has expressed a keen interest in the welfare of the children of Canada; and the Countess of Minto, desirous of doing all she can to promote a good movement, is visiting schools in England, at present, to see and learn for herself the results of manual and practical instruction there.

**What I Saw in London.**

During the summer I had an opportunity to visit some of the primary schools in London in company with the School Board's organizer of manual instruction. Manual Training in the primary schools was begun in London about 1886. As woodwork was not then recognized by the English Education Department as a subject to be taught in Elementary Schools the School Board was unable to use public monies to maintain it. Next year a grant of one thousand pounds was obtained from the Drapers' Company through the City and Guilds' Institute. A Joint Committee was formed whereby the funds were administered. The Manual Training was found so thoroughly useful and acceptable that it was speedily extended. In 1890 woodwork was recognized by the Education Department as a school subject The School Board was thus enabled to expend its own funds upon this branch of school work, and in the same year money was provided by Parliament for grants for it from the Imperial Exchequer. Now there are about 150 Manual Training centres and as nearly as I could learn, about 50,000 boys between the ages of nine and fourteen are receiving courses of instruction in wood-work, iron-work, brass-work or leather-work in the Public Board Schools of London.

At a typical school which I visited, a room was fitted with some forty benches, each provided with wood-working tools. There was also a supply of general tools for the room, in addition to the particular tools at each bench. One
instructor and an assistant were sufficient for the forty boys. The course of instruction is a three years' one; and each boy gives half a day per week to it. Consequently the manual training room, in that instance, provided facilities for 400 boys, there being ten half days in each school week.

A series of articles called models are made by the boys. The things are articles of use, and are known to be such by the pupils. Each one is wholly made by the pupil. When the teacher needs to give practical demonstration, he gives it on another piece of wood, and not on the piece on which the boy is working. It is not much learning, but much interfering which makes anybody mad. The pupils make the objects by copying directly from the actual models. Later on they make drawings of the models from measurements, and make the objects from the drawings.

I observed that the children were deeply interested in their work. A casual glance of observation was all they gave to the, visitors. A spirit of earnestness, self-reliance and careful perseverance seemed to pervade the whole school. The teacher told me that in accuracy of observation and accuracy of expression there was a noticeable improvement in the children after they had gone through the Manual Training course, I found similar equipment and equal satisfaction reported in regard to the Board Schools in Liverpool.

Different from Apprentice Work.

The system of education is called English Sloyd. Sloyd is a Swedish word for "dexterity." Educational Sloyd is an entirely different thing from carpentry.

The Manual Training room is not a workshop where operations are carried on with a view to the commercial value of the articles turned out. A workshop is a money-making institution, whereas a room for Manual Training for Sloyd work in connection with a school, is for the training and developing of the children, without regard to the intrinsic value of the work turned out, or to the length of time required to make any particular object. Sloyd work is really a series of exercises so arranged as to have educational results.

A floor area of about six hundred square feet is enough to accommodate about thirty pupils and one bench for each. A room 24 x 30 feet would be amply large; and would provide also for the instructor's bench and for a group of pupils to watch what he was doing. Ten classes of thirty pupils each, or three hundred in all could be passed through such a room in the week. The benches are of convenient height and size, and each one is fitted with a rack for the holding of tools, and also with tools. Some of them are also fitted with a simple device for
the holding of the drawings, so that the work with the tools may proceed with the drawing in full view all the time. General class instruction with the aid of a blackboard, is given by some teachers in a fifteen minutes talk, before the particular work of the half-day begins; and instruction is given also to each of the pupils individually as the work at the benches proceeds.

Nature of the Models.

In some schools the first object to be made is a plant label. This involves (1) cutting to an exact length, (2) cutting the ends square by the use of a fine saw, (3) reducing to the proper thickness and width, and (4) making a taper with the same angles as those of the model. In other schools a small pointer is the first model; and in others some object equally easily made. The first article is easily made; the second introduces some slightly different use of a tool or the use of some different tool, and so they proceed, arousing, training and gratifying the child as he makes all of each one himself.

It is to be remembered that the pupil makes each article wholly himself. At first he makes directly from the models. Later on he makes drawings from drawings of the models. Further on he makes his own drawings directly from the models. Then finally he is trained to make the articles from his own drawings of the models. The course may be arranged on a plan of from thirty to sixty or more articles to be made by the pupil during the three years.

The following extract is from a statement by Most Rev Dr. Walsh of Ireland, on the subject of Manual Training:

"These objects are of no-commercial value, at least they are not valued for their own sakes. So far as intrinsic value goes they might be destroyed as soon as they are made. As has been well said, in one of the best expositions of the system, they are, in this respect, like the pages of the copy-book that the child fills in when learning to write. It is not the Objects themselves, but the making of them that is looked to. It is the work of making them that constitutes the means to the end that is aimed at—that end being the cultivation, not only of manual dexterity but of accuracy, of carefulness in little things, of neatness, of self-reliance, of patience, of perseverance, of concentration of thought upon the work to be done, of love for honest, well-finished work—in a word, the training and cultivation of all those faculties and habits which is of the highest importance to cultivate as a preparation for the business of life."

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The following are a few of the models which, have been used. Round Flower Stick; Rectangular Flower Stick; Key Label; Pen Rest; Flower Pot' Cross; Metre Measure; Flat Ruler; Lamp Wall Stand; Set Square; Bracket; Picture Frame; Book Shelves. Some of the last mentioned ones are from the High School Series.

The lectures of Mr. Otto Salomon, the renowned Director of the Seminarinm for teachers at Naas, Sweden, furnished valuable suggestions on the choice of models and on the arrangement of the series of models. An authorized edition of those lectures is published under the name of "The Theory of Educational. Sloyd." 189.

GENERAL PRINCIPLES RELATING TO THE SERIES OF MODELS.

A.—Ten points on the CHOICE of models.

(1.) All objects of Luxury—Knick-Knacks should be excluded

From an educational point of view, we must first teach what is necessary; secondly, what is useful; thirdly, it time permits, what is agreeable. These terms are, however, relative.

What is necessary to one person may be useful to another, and what may be useful to one, agreeable to another. What is a luxury in one age or country is not necessarily so at another time or place.

What is a luxury to a poor man may be a necessity to a rich.

In regard to nature the terms are more absolute. What is necessary to one is necessary to all. It is necessary to eat food; it is useful to eat food sufficient, and of good quality; it is agreeable to have it "well cooked and prepared.

(2.) All Models should be serviceable in the house.

If this is to be the case, the models will vary to some extent in different schools. Not only will the models be different in different countries, but in different districts of the same country; e.g., in country schools it would not be wise to teach the manufacture of objects only useful in towns. It would be preferable to substitute models which may be used in agriculture; but in substituting other models, care must be taken not to disarrange a carefully graduated series of exercises. So, too, if the school be near a lake, objects concerning boats: and fishing should receive attention. The general principle by which we should be guided is: that the series of models made in the school should give the best expression to objects needed at home or in the district.

(3.) They should be capable of being finished by the children without help. Hence models should not be a part merely of something, but the whole.

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189 To it I am indebted for the following : (George Philip & Son, London)
For this reason it has been found necessary to exclude many things which would otherwise have made useful models.

(4.) *The models should be of wood, and only wood should be worked in, as a rule.* To this rule there are one or two exceptions, as the cloak suspender, the clothes rack, and bucket; and these have been inserted because teachers in the country districts of Sweden cannot buy them but there is no reason why they should be retained in an English series.

When it is said that the models must be made of wood, it is not implied that there is any objection to the purchase of iron fittings.

(5.) *The objects should not be polished or stained.* In the first place, because children cannot polish well. Models are frequently spoiled by it.

Many juniors cannot polish well, i.e., French polish. In the second place, it is important that children should not be taught to think too much of the surface. It is not so important that a thing look well, as that it be done well. Polishing and wood-carving exert a morally bad influence, if done to cover up bad or indifferent work. It is a degradation of the polisher's and carver's arts to use them for such a purpose.

(6.) *The objects made should be such as to require as little wood as possible.*

Some models require much wood, but if the same exercises can be furnished by smaller objects equally useful, then these should be preferred.

The value of the object must be in the child's work,—and not in the amount of material used. This recommendation has a further value, in as much as it teaches the child to use small means in effecting ends. Children should be trained—to be economical by taking care of those pieces of wood for smaller objects which they have spoiled in making larger ones.

(7.) *The children should be taught to work in harder and softer kinds of wood—but not in the hardest or the softest.*

(8.) Turnery and carving should be used very little.

(9.) *Objects chosen should be such as will develop the sense of form.*

(10.) *All the exercises (embraced by the particular kind of Sloyd in question) which the child is capable of making, should be properly graduated and included in the series in due proportions.*

B.—EIGHT PRINCIPLES ON THE ARRANGEMENT OF THE SERIES OF MODELS.
(1.) The series should proceed from the easier to the more difficult, and from the simpler to the more complex; which expressions, as we have seen, are not identical in meaning.

(2.) A refreshing variety must be afforded.

(3.) In the early part of the series, the models should be capable of being quickly and easily made and should be so progressively arranged that, later on, the objects arrived at should require more time and skill, and yet be capable of being done without help.

Children expect to have results as quickly as possible. They have not sufficient patience and foresight to derive any benefit or satisfaction from results which are expected to crown their labours in a few days or months. For this reason the objects further on in the series should take more time, in order to cultivate patience and foresight.

(4.) In the production of the early models, few tools should be required, but as the series progress, new tools and manipulations should be introduced.

(5.) That every model should be so placed in the series, that the necessary qualifications for doing it exactly are found in the child, who therefore does noticed the help of the teacher. It should not relatively be more difficult for a child to do one model than another. A model may be more complex, but this does not imply an increase of difficulty; for the child—when it reaches it—has acquired greater skill. A person who has used one tool will use a second better, although it be of another kind; he will use a centre bit better for having previously worked with a knife.

(6.) The models must be so arranged that the pupils can always make not only a serviceable, but an exact copy. The degree of exactness is a very important feature. It is easy to make a table if exactness be not required.

(7.) That the Knife—as the fundamental tool—be used frequently especially at the beginning. By the fundamental tool, we understand that tool with which the child is most acquainted and can most easily use, hence we begin with it; secondly, that tool which cultivates the greatest amount of manual dexterity; and thirdly; the tool which in after life will be meet useful to the child, and most ready to hand. These advantages the Sloyd knife possesses. We must not be understood to imply that this tool is the one most used throughout the series of models.
That generally in the early models the softest wood should not be used. It is more difficult to use a knife on a very soft wood than on a wood not so soft; so that it is advisable to avoid using the softest kinds of pine and fir.

Schools in Canada.

We all know schools have a two-fold use; the imparting of knowledge, and the drawing out of the natural powers and capacity of the pupils; but it is the teacher—the human element in the school and in the system—that counts for most. The personal qualities of the teacher are the prime power outside the pupil which make for educational culture—that is for growth by a leading out of the powers of the child. The main endeavor should be to lead out the mind by nourishing ideas, rather than to cram in a knowledge of unprofitable facts.

The object of education, the real controlling influence which shapes its direction, depends on the ideals of the people. When the mothers want to see their sons ministers, and doctors, and lawyers and such, unconsciously perhaps but certainly, the schools will be turned that way. What is it desired that the children shall be when they grow up? On that question hinges the educational system. If the ideal be riches and easy life, or luxury or ostentation, it will be pernicious. If the supreme desire be that the children, and the grown people, shall be happy and capable, in the Sphere of life in which they are to live, then the education and educational processes should be directed to attain these ends.

Power to Overcome Obstacles.

Manual Training develops in children habits of industry and leads them to thoughtfully adjust their acts to desired ends. That of itself is of great educational value. It helps to keep out of later life-whimsical and capricious conduct. It brings about the mental habit of appreciating, good work for its own sake; and is quite different from that sort of education which consists in informing the pupils about the facts within a definite area of knowledge in order that they may be able to pass examinations on the subjects included within it. The so-called dull boys, who are not quick at book studies, have in many cases been found to show great aptness in the Manual Training part of education. It prevents them from being discouraged with school life, and from feeling any sense of 'inferiority to the quick children. It gives them self-reliance, hopefulness and courage, all of which react on their mental and physical faculties. It also is a soothing and strengthening corrective to the quick and excitable children who become over-anxious about examinations on book studies.
The glow of satisfaction —akin to the joy of triumph —from having done something well, has a stimulating effect. Is it different from what is revealed by the sacred historian when he wrote: "And God saw everything that he had made, and behold it was very good" Indeed one can hear the echo, if you will, of that Divine satisfaction in the murmur of the waves, in the rustle of the leaves, in the soft, almost silent cadencies of the ripening grain, in the singing of the birds, in the trees of the forest clapping their hands, and in the lullaby of the sunshine and breezes to the cattle on a thousand hills.

It is a good thing to let every boy and girl become partaker of this Divine joy in their own work. The reaction gives mental power, power to overcome obstacles; and the power to overcome obstacles is perhaps the most desirable mental quality, inherited or acquired.

The Kindergarten.

Kindergarten takes its name from two German words signifying a children's garden. It has come to indicate the method of teaching and training, and also the place where these are carried on. A gardener does not furnish plants with leaves and fruit to be attached to them. He does everything necessary that they may grow. Since the order of mental growth is Desire, Action, Sensation, Thought, the desire of the child must be quickened towards an action or series of actions, having an educational value. Thus mental growth begins and thus mental power is gained. The spirit, and the principles of true kindergarten teaching should continue throughout the whole educational course, —even if that lasts during the allotted three score years and ten.

Book Studies Alone.

As now supplemented, the literary side of school studies has been greatly improved. But everybody says too much of the present system is based on the study of books; and too much time is given to memorizing symbols and names. That is one-sided; and renders children more capable of answering questions and explaining methods than of enjoying themselves in doing delightful beneficial work. They are able to answer all sorts of questions; but it is not so conducive to happiness to be able to explain the universe, as to be able to do well one's work in it with unselfishness.

The school studies have been devoted too exclusively to the falsely so-called intellectual life. A child is one and indivisible, a being with physical, mental and moral qualities and powers; and surely a school course is deficient which does not provide as fully as is practicable for the development and training of faculties of the body, mind and soul.
Manual Training as a Corrective.

Over-feeding of subjects is a common cause of mental dyspepsia,—a most uncomfortable and unfortunate state of mind. There is a difference between informational subjects, and an educational process to train the useful faculties of the mind and body; and in the process of education the development and training of the bodily as well as the mental faculties are to be aimed at.

The training of the child is the main object and not the mere memorizing of information. Wherever it is necessary to lighten the school course, to leave room and time for real training exercises, might some 'of the informational subjects be let go? They won't be missed, except as the letting go of an unnecessary brake would be missed going up hill.

The introduction of Manual Training, which is really hand and eye training (and there is already a little of that in writing and drawing) should not be in the nature of adding a new subject or study to the already over-burdened school course. The aim should not be a formal literary education plus manual education; but education of which Manual Training is an integral and highly valuable part. The object and order should be to train the child with system and care to observe, to interpret, to construct and to describe. That is the purpose of Manual Training. It is educational hand-work, not trade hand-work.

Outline of Its History.

Only the barest reference can be made here to the history of Educational Sloyd. In fact I am not sufficiently acquainted with it to make more than mention of a few matters. Perhaps the movement has had its widest extension and best application in the elementary schools of Sweden. The following are quotations from "The Theory of Educational Sloyd," already referred to:

"The Sloyd movement in Sweden had begun in the late sixties and early seventies. It was first of economical rather than educational significance, i.e., it was a movement for home industries, which, it was soon seen, must begin in the school if it was to have any lasting effect. Sloyd schools were started in different neighborhoods by private individuals, some of them close at hand in the lan or county of Alfsborg, where Count Sparre, the chief of the county, had formed a Sloyd Union. Struck by the new movement, Herr Abrahamson, in February, 1872, opened a work-school for boys at Na5s, and two years later a similar one for girls, with his nephew Mr. Salomon for director."
"In 1874 Herr Salomon became Inspector of Sloyd Schools for the middle district of Alfaborg lan, a post which he held for several years."

"To meet the demand for Sloyd teachers, Messrs. Abrahamson and Salomon, in 1874, opened a training department in connection with their school, this being the first attempt of the kind."

"The question now began to be looked upon from an educational rather than an economical point of view."

"One thing was already quite clear. The teacher only could make Sloyd educationally useful, and so he strove henceforth to make the Sloyd School and the Folk School one. From 1878, therefore, he began to take ordinary teachers from his own lan in 5-or-6-week holiday courses in Sloyd, whilst still continuing the work of the Seminary on the same plan which he had begun four years before. But in 1882 came a thorough change. The twelve month courses ceased, and the short courses were extended, first, to all "Sweden, and then to teachers from abroad."

"At the same time, too, all other forms of Sloyd were dropped in favour of the one that was found the most useful educationally, viz, Wood Sloyd. The concentration of attention upon this one allowed of a development of it for educational purposes which if can scarcely be said to have received elsewhere. And there can be no doubt, too, that it is this concentration which has been a powerful help in securing the introduction of Sloyd into the 1,900 elementary schools in, which it is now taught in Sweden."

"NASS is a good Sloyd school, and much besides. It is the meeting place of leading teachers of all degrees and all nationalities, for common work, and for the interchange of ideas. Professors, inspectors, secondary and elementary teachers, women as well as men, meet on common ground as comrades. It fulfils, more than any other institution that could easily be named, the ideal we are aiming at in England in the Teachers' Guild. And this is due to the earnest cooperation, for the last 20 years, of three men, each of whom in his own sphere has done his very best. Herr Abrahamson, has made a noble use of his wealth in founding the Seminary, and providing for its continued existence; as a kindly host, too, he makes his interest and presence felt in all that concerns the common work and the common pleasure. His nephew provides the ideas and the direction; whilst Alfred Johansson is mainly responsible for the teaching in bench work, which occupies such a large part of the day. But the chief burden falls on director Salomon."
Thus Sweden and in a measure all Europe are indebted to these two benefactors, Messrs. Abrahamson and Salomon, for the wise and unselfish use of wealth and personal ability.

"The last thirty, or forty years may be taken as the period within which the movement now in progress for the introduction into primary schools of a system of manual exercises arranged with a view to their general educational advantages, had its beginning."

"Within the present century, Finland was the first country to give a recognised place in the curriculum of the primary school to woodwork and other manual exercises. That it did so was in great measure due to the influence of Uno Cygnoeus (1801-1888.) His project for the re-organization of the primary schools of that country was carried into effect during the years 1858-1866. Cygnceus laid great stress on the general educational discipline given by manual exercises, as distinct from the economic advantage to be derived from the early acquisition of manual skill. In 1806, instruction in some branch of manual work, such as woodwork, basket work, tin work, or ironwork, was made compulsory in the Training Colleges for male teachers, and in all primary schools for boys in country districts."

"In Norway this branch of school-work was first recognized in the official programme in 1860. It is only within recent years that much attention has been given to the usefulness of a system of manual exercises as a branch of general primary education. Since 1891 it has been compulsory in all Norwegian Training Colleges and town schools."

"In Germany, the false start originally made by the establishment of the Schools of Industry naturally put a serious obstacle in the way of the introduction of woodwork and other manual exercises as a part of primary education. But now, throughout Germany, there is in progress a movement for this purpose, thoroughly inspired by the educational idea, and this movement is steadily gaining ground."

"Until very recently, the movement in Germany had to depend exclusively on private effort. Its chief support came from an energetic Association, the German Association for Manual Work, for Boys. A great number of the best teachers of this branch of school-work in Germany have been trained in a Training College established by this Association at Leipzig, under the directorship of Dr. Gpetze, who is one of the leaders of the movement throughout Germany. This College is open to foreign students, and has been largely attended by them."
"The movement in Germany has at length won its way so far as to have its claim recognized for State-aid to the work it has undertaken to promote. The governments of Prussia, Saxony, and Baden, now make state contributions in aid of this branch of school-work."\textsuperscript{190}

In England and Scotland, gifts of money by private individuals and guilds enabled educational reformers to give the system a fair trial at many centres. During the decade now closing it has been taken up and extended by School Boards with the cooperation and financial support of the Department of Education.

In the United States it is making rapid headway. In most places where it has been introduced, the generosity of private individuals gave it a start; and it was taken up and made part of the public school-system. I visited a school in Boston lately, where I was informed this movement had its beginning in 1890. It is an endowed school and the trustees (I am, not sure of the correct designation), used part of the revenue to establish and maintain Manual Training. The report of the Committee on Manual Training intimates that the expenses of teachers at other schools in Boston for several years were paid by "Mrs. Hemenway and Mrs. Shaw, whose names have become 'household words' in Boston." It is now part of the educational system under the school authorities and this year learned that there were 27 Manual Training centres in the public schools of the city.

The Macdonald Sloyd School Fund.

In this movement the desire is to aim only at what is feasible and sure to be practicable. By the generosity of a friend of education in Canada, the plan proposed for the introduction and extension of manual and practical instruction in primary schools in Canada is as follows:

Everybody has heard of SIR WILLIAM C. MACDONALD, OF MONTREAL, and his splendid benefactions to the cause of higher education in Canada. It is reported that his gifts to McGill University exceed two and a half millions of dollars. He is keenly interested in primary education as well as in University training and extension. He now offers to pay for the equipment required for educational Manual Training in one place in every province in the Dominion; and also to meet the expenses of qualified teachers, and of maintenance for three years in all those places.

\textsuperscript{190} From memorandum on Manual Training for boys in Primary Schools in foreign countries, by M. E. Sadler, Esq., Director of Special Enquiries and Reports to the Committee of Council on Education England.
In Ottawa, he offers to equip and maintain for three years as many centres as are required to give all the boys about 1,000 between the ages of 9 and 14 in the public schools an opportunity to receive this training.

It is hoped that after a year or two, an equally valuable course of practical instruction suited for girls of the same ages may some how be provided; and doubtless, 'nature studies' will be given a proper place in rural schools.

Sir William has authorized me to make a similar offer to the school authorities of Brockville, Ont. of Charlottetown and Summerside, P.E.I.; of some place in the Province of Quebec; of Truro, N.S.; of Fredericton, N.B.; of Winnipeg, Man.; of Calgary, N.W.T.; and of some place in British Columbia.

In every one of the provinces there are many places where the children would derive immediate and undoubted benefit from its introduction. Public opinion is ripe for it. In naming the places to receive the first offer, consideration has been given to the desirability of selecting centres from which the movement could spread most readily throughout each province, and most quickly and effectively benefit its school system and its children.

To begin it on right educational lines, thoroughly trained and experienced teachers of high attainment will be brought at first from Scotland, England or the United States. Next summer it is proposed to pay the expenses of several teachers from Canada to Great Britain and Sweden to take the course of training there, to see for themselves the educational systems and methods of those countries and to meet teachers and other educational reformers in them. When those Canadian teachers return they will be as lights set on hill tops. The fire of their inspiration, information and enthusiasm will spread.

Such in brief outline is the proposal I have the supreme satisfaction and happiness of announcing. It must result in immediate, lasting, far-reaching benefit to the boys of Canada; and I am sure all will join in the earnest hope that the wisely patriotic and generous benefactor, may long live, gladdened by knowing that the children and grown people of Canada rise up and call him Blessed.
University of British Columbia
Faculty of Education
Survey of Technology Education in BC
1998

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stephen.petrina@ubc.ca

PLEASE COMPLETE AND RETURN BY 12 June 1998
(Use the Self-Addressed Stamped Envelope Provided)
University of British Columbia

Survey of Technology Education in BC

ALL INFORMATION PROVIDED WILL REMAIN CONFIDENTIAL AND WILL NOT BE REPORTED ON A PER SCHOOL BASIS

Please Complete Each Section as Completely as Possible.
Thank You For Your Assistance!

1. School: ____________________________________________

2. District: __________________________________________

3. Teacher Attrition and Demographics:
   Total Number of Technology Teachers in Your School FT _____ PT _____
   Total Number of Women Technology Teachers in Your School FT _____ PT _____
   Total Number of Teachers Retiring This Year or Next Year _______
   Total Number of Teachers Retiring Within the Next Five Years _______
   Total Number of Positions You Anticipate Filling This Year FT _____ PT _____
   Total Number of Positions You Anticipate Filling Next Year FT _____ PT _____

4. How Would You Categorise Your School’s Program?
   ____________________________ Industrial Education
   ____________________________ Technology Education
   ____________________________ Combination of Industrial and Technology Education
   ____________________________ Career Preparation

5. How Would You Categorise Your School’s Labs or Shops?
   ____________________________ Unit Specific (e.g., Auto, Metal, Transportation, Wood)
   ____________________________ General
   ____________________________ Combination of General and Unit Specific
   ____________________________ Modular

6. How Would You Categorise the Equipment in Your Labs and Shops?
   ____________________________ Traditional (‘Old’ Technology)
   ____________________________ ‘New’ Technology
   ____________________________ Combination of ‘Old’ and ‘New’
7. Please Place a Check Beside the Courses Currently Offered.

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<th>Course Titles</th>
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<td>Animation</td>
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<td>Applied Academics (App. Math or Physics)</td>
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<td>Architectural Drawing</td>
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<td>Art Metal or Jewellery-Making</td>
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<td>Arts and Crafts</td>
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<td>Bio-Technology</td>
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<td>Manufacturing and Production</td>
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<td>Metalworking and Machining</td>
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<td>Plastics</td>
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<td>Power Mechanics</td>
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<td>Photography</td>
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<td>Radio and Television</td>
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<td>Science and Technology</td>
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<td>Silviculture</td>
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<td>Transportation</td>
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<td>Video Production</td>
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<td>Welding</td>
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<td>Woodworking (Cabinet Making, etc.)</td>
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<td>Other</td>
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8. Please Place a Check Beside New Units You Plan to Offer in the Near Future.

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9. Please List Any Locally Developed Courses Offered.

10. Please List Any Technology Career Preparation Courses Offered.

11. Please List Any Courses Offered Only for Young Women.

12. Please Provide Any Concerns or Feedback That You Have For Technology Teacher Education in BC (Attach Notes if Necessary).
Appendix 7. Chant Royal Commission of Inquiry

Summary of findings and recommendations:

34 public hearings were held, 336 briefs submitted and the commissioners visited 116 schools.

"The Primary Aim of the education system of B.C. is that of promoting the intellectual development of pupils."

"The Primary Purpose of Schools is to develop the character of young people, teach them to be good citizens, and teach them the fundamental skills of learning necessary for further education and adult life."

"A good school program develops a child in two ways -- as an individual and as a good citizen."

"not everyone agrees regarding what a child should be taught, both with regard to the improvement of virtue and a happy life." Nor is it clear whether the object of it should be to develop the reason or amend the morals. It is hard to tell from the present mode of education what people want, whether to instruct the child in what would be useful to him in life, or what tends to virtue, or what is excellent, for all these have their present advocates."

1. Lack of Research - in schools, by the Department, by Educational scholars.
2. Centralize Dept. of Education in one building, restructure the Dept.
4. District Consolidation - each district should offer G1-12, employ at least 100 teachers.

5. Recommend longer school year 200 days, also longer school day for secondary pupils - 6 hours.

6. Make school superintendents the chief educational officer of the district.

7. Constrain school size 600 elementary; 1200 for secondary.

8. Non-public school curriculum should be approved by Dept. of Education.


10. Encourage teachers to teach in rural areas - better pay, scholarships, loans.

11. Eliminate temporary certificates.

12. English, Math, Sciences, Social Studies should be regarded as most important courses.

- less time for art and music
- reduce personal development and health courses

13. Rec. high school examinations.


MOE (1959)

Programme of the Intermediate School

I: THE CURRICULUM OUGHT TO BE BROAD AND ELASTIC
Since every student does not require the same course of studies, the basic curriculum of English, history, geography, and elementary science must be supplemented by additional studies, such as handwork, in consideration of their immediate and future needs.

II: THE MIDDLE SCHOOL IS FOR ALL CHILDREN WHO ARE NOT SUBNORMAL
Entrance to the middle school between the ages of fifteen or fifteen and a half years shall not be decided by discriminatory tests. Instead each student shall start based on their age, and then progress according to their natural ability until the age of fifteen or sixteen years.

III: LOCAL CONDITIONS MAY MAKE IT NECESSARY TO COMBINE MIDDLE SCHOOL WITH ELEMENTARY OR WITH HIGH
Some towns and cities may find it profitable to have a middle school in a separate building and under different management from elementary or high school. Within the school itself, the departmental method, consisting of several specialized teachers replacing the single teacher should be used.

IV: THE ROTARY ORGANIZATION IN A MIDDLE SCHOOL
This method is to be used in response to economizing. It consists of dividing the student body into two equal groups of similar grades and course of study, so that the student should spend half of the day under one homeroom teacher, and the other half under three or four different teachers.

V: THE MIDDLE SCHOOL PROGRAMME MUST SUIT VARYING NEEDS OF PUPILS
Due to the individual growth of the student and their differentiating needs at this age, the curriculum of the middle school must provide optional school experiences that will be beneficial to their future.
VI: CONSIDERATION OF A TYPE PROGRAMME
The type of programme chosen for a school will be dependent upon the number of students and teachers within it. The previously mentioned rotary organization divides the school day into eight forty-minute recitations with four in the morning and four in the afternoon. The proposed programme will also affect the number and type of rooms and facilities within the school.

VII: CERTAIN BASIC SUBJECTS ARE FOR ALL
The curriculum should contain a core of basic subjects including arithmetic, English, geography, history, civics, hygiene, physical exercise, home economics (for girls), shop work (for boys), and supervised study periods that will be compulsory. This type of programme would provide options in three directions. The first was towards an academic high school, second was toward an immediate industrial vocation or technical or industrial high school, and the third toward an immediate commercial vocation or a commercial high school.

VIII: THE LENGTH OF THE SCHOOL DAY
The school day is to be three hundred and twenty minutes, or five and a half hours long, which includes the time for regular study, physical exercise, hand activities, library, supervised study, and auditorium work.

IX: THE VALUE OF MUSIC AND ART AS SCHOOL STUDIES
It is not only important to teach students how to manually perform these activities, but also to teach them an appreciation of the art forms. This is an important part of developing a distinct Canadian cultural identity. If possible the student should be provided training within the school, but if not, they might pursue it as an extracurricular activity and receive credit for it.

X: TRAINING FOR DUTIES OF A CITIZEN
Exercises such as auditorium work shall be used to teach students such skills as oral expression and public speaking, which are beneficial in all aspects of life. 'The success of this training depends upon the tact, wisdom, and breadth of view of the teacher in charge, and also upon the support given this teacher by the other members of the staff in discovering and organizing pupils' experiences and abilities around topics that naturally lend themselves to some form of expression.'
XI: THE VALUE OF A GOOD LIBRARY
The school system tends to attach too much importance to textbooks and too little to books in general, therefore a sufficient library must be established to provide the students with a chance to foster a taste for wide reading, and also to teach them how to get information from textbooks. The library makes some contribution to every phase of schoolwork and should include general literature, reference books, dictionaries, atlases, magazines, and newspapers.

XII: NATURE STUDY AND PHYSICAL EXERCISE: MILIARY TRAINING
Nature study should be based on observation, experimentation, outdoor study, and the project method, to prepare the student for courses in general science in further years. Physical exercise should occur everyday, for every pupil, utilizing such activities as organized games. It is recommended, when possible, for gender segregated classes, specifically with only females teaching girls. Having militia officers as instructors is discouraged.

XIII: ADVANTAGES OF Manual Training & HOME ECONOMICS
Both Manual Training and home economics, introduced as protests against the bookish standards of education, had to meet and overcome opposition from at least two different quarters. These quarters said that education should be wholly idealistic and cultural, and that the programmes have no practical or cultural value, when, in fact, they do. Much of this criticism has come from those who got none of this instruction rather than from those who received it.

XIV: WHY HANDWORK SUBJECTS ARE NOT UNIVERSALLY POPULAR
Many parents still believe that school is a place where a child goes to study a book. They also seem to feel that, for the school to attempt to teach a boy how to use tools or a girl how to sew or make bread is to put shame upon the father and mother who are highly accomplished along these lines. Also, mistakes in implementation often occur from either lack of knowledge of educational principles or from the use of only expensive materials, which are unnecessary to success in these programmes.

XV: ORGANIZATION OF HANDWORK CLASSES IN BRITISH COLUMBIA
In general, plan of class organization has been too costly. Equally good results can be had from 1.5 hour class as from a 3 hour class and the maximum use of the room and equipment by maximum number of pupils is achieved. Also, the theory of formal discipline is carried beyond all reason, while the correct theory, 'Learn to know by doing,' is ignored. Finally, the lack of adequate facilities and specialized teachers must be remedied.

XVI: A SPECIAL DIPLOMA FOR HANDWORK ACTIVITIES
A special diploma for handwork courses is justified while they are not part of the curriculum.

XVII: HANDWORK SHOULD BE FOR EVERY PUPIL IN AN ELEMENTARY OR MIDDLE SCHOOL
All pupils should receive handwork instruction with an aim to make real things rather than models. Thus, the normal schools should train teachers to provide a variety of handwork activities.

XVIII: LIFE PROBLEMS THE ESSENTIAL BASIS OF HANDWORK ACTIVITIES
When pupils enter middle school they should already have two years experience in handwork programmes. Therefore, in middle school, pupils should gain knowledge of both theory and practice, and should cover a broader field of work.

XIX: THE MIDDLE SCHOOL & VOCATIONAL GUIDANCE
Because of its involvement for nine years in the lives of students, the school has some responsibility for the child after the completion of middle school. As part of this, the province should establish a uniform card-index system as a record of achievement for each student that could follow the child during relocation. This system should contain information regarding the students' attendance, promotions, conduct, options taken, standing by subjects, interest in games, and special accomplishments. The school should also provide vocational advice through a vocational guidance bureau run under the Superintendent of Schools.

XX: HOW MIDDLE SCHOOL GRADUATES ADJUST THEMSELVES WHEN THEY ENTER A HIGH SCHOOL
The creation of a middle school system would make obsolete the use of highly objectionable entrance exams. It also determines the high school course of the
pupil through intelligence tests, achievement tests, and ratings of character, ability, and temperament. It is assumed that, after middle school, the majority of pupils will choose courses best suited for their own development.

XXI: THE COST OF MIDDLE SCHOOLS
While the establishment of these schools will not decrease the amount being spent on education, it will lead to the elimination of great waste and will secure a larger educational value for each dollar spent.

XXII: THE MIDDLE SCHOOL IN TOWNS & CITIES IN BRITISH COLUMBIA
Small classes and consequent waste were characteristic. The consolidation of small classes would save teachers, and the implementation of physical education, elementary science, music etc. would furnish a more interesting programme.

XXIII: THE MIDDLE SCHOOL IN MORE POPULOUS RURAL COMMUNITIES
It would be most economical house middle and high schools together. Rural and urban children essentially alike in nature and needs, and because of this, the extent to which the environment of one group of kids differs from that of the other must be the measure of differentiation in the curriculum. Although the basic subjects – English, history, mathematics, science, geography, health and physical exercise – admit no compromise, the options available will be dependent upon teacher qualifications and accomplishments. The establishment of an efficient middle school should be possible in every city, every district municipality, and any rural school where two or more teachers are employed.

XXIV: MIDDLE SCHOOL EDUCATION IN VERY SMALL RURAL SCHOOLS
The inadequacy of many one-teacher schools may be remedied by the provision of free middle and high school training at the expense of the government for all children in 'assisted' school areas. Without this plan, there are only two alternatives. One is the consolidation of 'assisted' schools into larger units, and the other is the improvement of the quality of the teachers assigned for duty.
Junior High Curriculum, 1927/28: Foreword

The Junior High School, the course of study for which is now issued, represents a further step in the improvement of the provincial system of education in conformity with the recommendations of the British Columbia School Survey Commission. It expresses in concrete form the pronouncements of the science of education with respect to the educational provision which should be made to meet the needs of early adolescents. It introduces into the public schools of this Province the well-tested practice of Great Britain and other European countries, where secondary education has been commenced at an earlier age than has been customary in Canada. The growth of the Junior High School in the United States has, from its successes and from its failures alike, given fruitful instruction both as to what should be done and what it is wise to avoid.

Though the Junior High School as now inaugurated owes much to the practice, the research, and the philosophy of administrators and students of education in other lands, it nevertheless has been organized as a distinctly Canadian school, designed to fit Canadian conditions, to perpetuate what is best in our traditions, and, it is hoped, to make some contribution to Canadian life and education.

Inasmuch as the Junior High School is an outcome of the developing science of education, and as its function, broadly conceived, is the unifying of life and education, its character will inevitably experience change form time to time in the light of the growth of the science upon which it is based, and according as the specific objectives of the Junior High School, and the best means of reaching them, become further clarified.

It has not infrequently happened that a new educational movement has begun with high hopes and promise, but after the first enthusiasm attached to it has died down it sinks into routine and formalism. In order that the Junior High School may continue to realize the hopes that are entertained for it, it is essential that principals and teachers continue to be students of education, to keep themselves informed concerning the results of educational research, and to preserve that openness of mind which will enable them to consider upon their
merits new ideas and teaching procedures. While these statements are of universal application, it is particularly important that they be recognized at the present time, when the future character of the Junior High School is being determined by action which is taken now.

In order that the Junior High Schools which will be established throughout the Province may be a proper expression of the Junior High School ideal, it has been considered advisable to state with more explicitness the purposes which it is hoped to realize through them. They may be stated thus:-

I. The provision of a suitable educational environment for children of the early adolescent period (approximately from 12 to 16 years of age). To carry this out involves:-

(1.) An enlarged and extended background of experiences. This means that there should be: (a) Enriched curricula and courses of study; (b) laboratories, shops, libraries, assembly-halls, gymnasiums; (c) well-trained teachers, sympathetic with children of the early adolescent stage; (d) methods of teaching and social control justifiable in the light of what present-day psychology has contributed to our knowledge of the early adolescent.

(2.) Ample provision for common integrating education. The "constant" subjects have this aim. More particularly English and the Social Studies give that common background of ideas and experience necessary for the attainment of social solidarity.

(3.) Abundant facilities for the progressive discovery and experimental direction of pupils' interests, aptitudes, and abilities, involving especially: (a) Exploratory activities in varied occupational fields; (b) general and survey courses in the major academic fields; (c) flexibility in curriculum organization and administration; (d) individual diagnoses, leading to educational and vocational guidance.

(4.) Adequate provision for individual differences, involving especially: (a) Enriched curricular and extra-curricular offerings; (b) opportunities for gradual curriculum differentiation; (c) flexibility in methods of promotion; (d) provision for
varying rates of progress; and (e) vocational training for those who must leave school early.

(5.) Increased opportunities both for the development of leadership and for learning social co-operation and democratic citizenship. This should be effected through (a) an adequate programme of extra-curricular activities and (b) participation in such school duties as, under guidance, it may be possible for the pupil to assume.

II. To provide, in such matters as curriculum, methods of teaching and social and administrative control, a gradual and less abrupt transition from elementary to secondary education.

III. To provide equality of educational opportunity.

IV. To effect economy of time in education, through (a) provision of the conditions most favorable for learning and (b) that elimination of waste which should come from the adoption of a reformed and better adjusted curriculum.

The forgoing represents an ideal. Its complete realization may be impossible in many communities on account of inadequacy of resources. In particular it may be impossible to have the kind of school plant which is described above. Much may be done, however, by means of expedients, provided that, intellectually, the Junior High School is correctly conceived. The organization of Junior High Schools even under conditions far short of the ideal will frequently be found to be better than the continuation of the traditional school.

This course of study is a tentative one. Criticism of it, when based upon a thorough knowledge of the Junior High School, will be welcomed.
1. The Functions of the British Columbia System of Education

From the point of view of society, the schools in any state exist to develop citizens, or subjects, according to the prevailing or dominating ideals of the state or society. Any society desires to transmit its culture. All states seek to ensure their safety, stability, and perpetuity. The people of a democratic state such as Canada aim at more than this. They wish to have citizens able to play their part in a democratic state, but able also to make new adjustments in an evolving and progressive social order, so that social stability may be united with social progress. For these purposes they have established schools.

From the point of view of the individual the schools exist to aid him in his own growth or self-realization, in making adjustments to his environment, and, it may be, in modifying this environment, which is at once a social and a physical environment. These two processes, of adjustment and of growth, are largely complementary, but at times they involve conflict. From their reconciliation comes individual-social balance and the development of an integrated personality, socially efficient and capable of further growth and progressive adjustment. This capacity for progressive adjustment requires the development of critical thinking, of open-mindedness and freedom from prejudice, unimpeded by ill-regulated emotion.

Character, therefore, may be said to be the main objective of education. The school and its curriculum should be organized to achieve this end. This aim, in order to be significant in curriculum-making, must be further analyzed, particularly in the light of the teachings of psychology and sociology. Many such analyses have been made. Analyses will reveal aims common to all types of schools, and some peculiar to schools of special type, such as Elementary, Junior and Senior High Schools. The objectives of the special subjects in these various schools are designed to realize the general aims of education in so far as they are appropriate to the level of development of the pupils. Courses of study should be drawn up with these objectives in mind.
The curriculum consists of significant aspects of experience chosen to achieve goals implicit in the statement which appears above of the social and individual purposes of education. Experience may be direct or may be vicarious. It is the aim of organized education that learning should eventuate in desirable outcomes, which may be stated as:

- Knowledge
- Habits
- Skills
- Interests and Appreciations
- Attitudes
- Ideals

The curriculum-maker and the teacher will find it profitable to consider these outcomes in organizing the materials of instruction. What knowledge should be gained from the study of this subject, or of this unit? What habits? What skills? What interests and appreciations should be developed? What attitudes and what ideals?

2. The Social Nature of Education

Education and Adjustment to the Environment.

Education is a social function. The school assists the child in his adjustment to society. As society is constantly changing, the adjustment must be flexible and progressive. The child not only must make a temporary adjustment, but he must acquire capacity for readjustment. The power of reacting intelligently to his environment is the basis of individual growth.

The Nature of the Curriculum.

The materials of a curriculum should be a selection of subject-matter and experiences chosen and arranged to stimulate the growth of the child and to assist him in fitting into his environment. Subject-matter is not educative in and of itself, but only as it is made meaningful to the pupil.

Child versus Adult Needs.

There is no essential opposition between the demands of social living in childhood and in adult life. The best and most meaningful social experience at his own age-level is the best preparation for the child's later life. All intelligent adjustment is forward-looking. Children take keen interest in acquiring the knowledge, skill, and
experience which they observe in their elders. This interest gives meaning to much that is beyond their immediate needs and makes preparation for the future vital. There is no absolute criterion to determine whether or not any item of subject-matter is related to child-life. Some important materials, such as language and the rules of health, have immediate usefulness. These must be given place in the curriculum. On the other hand, a great deal must be included which is beyond the child's present need. The meaning of this can be revealed by intelligent teaching. Studies and occupations the full significance of which can be appreciated only at a much later time should be included only if necessary for indispensable learning to follow.

The makers of the school programme, therefore, should select content and experiences which are important for life, including adult life, and should assign them to the years childhood in which they will have the greatest immediate significance. These materials should be brought into relationship with the pupil by providing a setting out of which arise problems which call for their use.

Subject-matter as a System of Ideas.

Subject-matter has meaning for a pupil only as it helps him to solve problems that are real to him. Problems are difficulties in thinking. They may arise from practical activity with real things. Or from the pupil's attempt to grasp the sense of what is going on about him. All problems concern the meanings of things. A child's system of meanings becomes more and more independent of immediate concrete objects as he matures. The ability to work in the imagination and build up systems of ideas is essential in education. To limit the curriculum to that which has immediate practical application is to overlook this truth. Practical projects form the starting-point of learning and the first step in method, but they are not the goal.

Education for the Improvement of Living.

Education is continuous throughout life. It means progressive change for progressive living. The school should exemplify superior living to strengthen the influence of good homes and counteract the influence of others. The total experience of the school should contribute to ideals and standards of conduct that will function throughout life.
The Tools of Learning.

In ordinary life certain experiences which are necessary for intelligent living in later life are either lacking or so casual that they do not bring about the desired learning. Learning to read and to write are examples of this. It is the function of the school to supply this lack. The curriculum, therefore, should be a graduated and systematized course of experiences to meet such needs in an effective and economical way.

Interpretation of the Environment.

The school is our only means of furnishing effectively to the whole population an understanding of our natural and social environment. Modern life depends at every turn upon science. Scientific devices, however simple they may be to use, are too complex to be understood by the uninstructed. It is the task of the school to make things intelligible by presenting principles of science in simplified settings. The aims are: the development of the attitude of expecting and looking for explanations, the ability to make use of scientific literature, and good judgment as to whether explanations offered are reasonable and adequate.

Most of our social institutions and ways of behaviour cannot be understood unless one knows something of their origins. The historic point of view must be developed by the school. It must extend the child's environment back in to the past, must help him to interpret the present, and forecast the future in terms of a larger framework of meaning.

Education in Citizenship.

The social function of education gives citizenship a place in school-life. The community interests of the school call for organization. All group activities are preliminary and basic to the undertakings of adult life. The way and manner of lessons, activities, and games transcend in social value the measurable items of subject-matter.

The School and the Outside World.

The pupils should not regard school-life as an artificial existence unconnected with normal living. The activities of the school should derive their meaning, in the main, from their relation to the world outside. The teacher not only should interpret subject-matter by means of examples draw from the pupil's experience, but should make actual contacts with the life and work of the community, partly through well-planned visits and excursions and partly by the introduction of real things into the class-room.
The method of social adjustment is by living. There should be a maximum of free and spontaneous group activity, and opportunity for natural leadership expressing itself in informal as well as in organized ways. Children's purposes, interests, and preferences should come freely to the surface. While they cannot be the final determiners of the school programme, they should be the point of departure and the source of motivation.

To summarize, school should be thought of as a life to be lived where there is action, co-operation, and opportunity to develop desirable attitudes, habits, and ideals.

3. Education as Individual Development

Social Adjustment and Individual Development Complementary.

From the point of view of the individual, education is self-realization. Between the conceptions of education as adjustment and as self-realization there is no necessary conflict. Personal growth depends, either directly or indirectly, upon others, and in turn affects them. Individual development which is opposed to the social good is undesirable. The school, therefore, must foster the growth and development of each pupil in ways that are conducive to the good of all. It is the task of education to bring individual freedom and social adjustment into unity, that is to say, to effect an individual-social balance.

Individual Development Many-sided.

All-round personal growth involves every aspect of the human being. It includes the emotional life and attitudes as well as the ability to think and act. The powers of knowing, thinking, doing, and feeling are inseparably linked. It is the duty of the teacher to be conscious of this four-fold objective and to provide for the growth and functioning of all these powers. The lesson, which is the smallest unit of school-work, must stimulate thinking, add to knowledge, lead to action, and enrich emotional life. It is upon the side of action and appreciation that we have the greatest opportunity to improve and humanize our schools.

Education for Health and Physical Development.

For education as self-realization, health and physical development are primary objectives. The school is challenged to lay the foundation of personal habits and ideals which will result in a higher level of physical fitness throughout the whole population. The routine and activities of the school should establish a consciousness of health and safety and a personal sense of duty in relation to them.
Education for Moral Character.

All education has a moral reference. Every acquisition of knowledge, every judgment, and every effort put forth contributes to forming the character. The school should lead to the formation of high ideals and to noble conduct, by providing opportunities for right thinking, right action, and the satisfaction that results therefrom. These measures should supersede the negative method of rigid and external discipline. The development of the child's social nature is allied with his moral growth. As a counterpart to the process of adjustment to his environment, the pupil undergoes a progressive modification of his individual nature. He develops attitudes and outlooks which profoundly affect his character and personality. The life and work of the school should be so arranged and conducted as to bring the full socialization of each child.

Education for Aesthetic Development.

Artistic appreciation is in part an emotional response and in part a matter of understanding. Appreciation requires of the teacher that he be sensitive to aesthetic values. Appreciation depends in part upon social experience. The atmosphere of the group contributes to the response of the individual. Aesthetic experience is not a matter of impression only. Pupils should attempt artistic expression. Even if only moderately successful, such expression produces sympathetic insight into the work of others.

Education for Intellectual Development.

The education of the intellect is not storing of the mind with inert items of knowledge, but providing the child with the tools of thought and training him to use them. Education must furnish the pupil with a well-selected equipment of precise and manageable ideas and meanings, mainly in the form of generalizations applicable to a wide range of situations. Some definite information, thoroughly mastered, is indispensable as a basis for thought and intelligent action. The selection and orderly presentation of this material is vital. An excessive number of facts, taught as unrelated items, impede the grasp of principles. There must be a natural growth from knowledge that is fragmentary and causal to that which is unified, meaningful, and complete.
Skill in thinking comes from the use of one's equipment of ideas in solving real problems. Thinking calls for deliberation and reflection. Pupils should be given systematic practice in thinking through significant problems not only in the secondary school, but in all grades of the elementary school. They soon come to enjoy the mastering of difficulties and to scorn evasion and ready-make solutions. Learning may be thought of too much in the terms of acquiring ready-made responses through mechanical repetition.

Most of the significant learning of life is not of this sort. Mere repetition apart from effort and intelligent purposes gives negligible results. Furthermore, life does not provide detached stimuli to which to respond, but complicated situations which call for a grasp of their meaning. There is little opportunity for intelligence to operate in exercises of purely formal character. This accounts for the small amount of transfer from mechanical drills. Where intelligence is given greater scope, learning is easier and the carry-over to useful applications is greater. There is evidence to show that much that was formerly taught by laborious drill is now accomplished with less effort and greater effect in meaningful settings.

4. The Learning Process
The Place of Interest and Purpose in Learning.

Interest is the foundation of learning. Interests may be either native or acquired. The teacher should start with those that are native and lead to those which are the product of human thought. A child may be interested in events which affect him directly or in the doings of others, as experienced vicariously in pictures and language. Education should establish worthy interests which will endure through life.

When an interest becomes attached to an imagined future accomplishment and the will to achieve is aroused, a purpose results. A continuing purpose tends to direct the pupil's actions. External motivation is less necessary. The immediate and transitory interests of pupils should be transformed into enduring purposes.
The Active Nature of Learning.

All learning involves activity and effort upon the part of the learner. In ideal conditions the work should not be unpleasant or distasteful, but pupils must learn not to shrink from necessary labour because it is unpleasant. The spirit of play should be utilized in the early years and lead gradually to the disciplined labours of adulthood.

The Place of Satisfaction in Education.

Learning is facilitated by the satisfactions which accompany it. The greatest satisfactions are those which come from the overcoming of difficulties through strenuous effort in well-disciplined surroundings. The satisfactions of the learning process will be greater when the school is well governed and ably directed.

5. Education and Individual Needs

Instruction should be fitted to the needs of the individual. Pupils differ in native intellectual capacity and in physical nature and emotional disposition. They differ in background, outlook, and ambition. In the elementary school the chief purpose is to give to all children the common foundation of knowledge, abilities, and attitudes necessary for life. For this reason the adaption of the programme to individual needs will not be made by altering the basic course, but by making adjustments within it. The school must provide individual opportunities and responsibilities as well as group-work. There will be variation in the rate at which pupils learn. Variation will occur also in the way pupils participate in group activities, the leadership they assume, and in general, the wealth of the experience they derive.

In the Junior High School the curriculum is exploratory. Exploration enables the pupil to discover his tastes, aptitudes, and needs. Provision for individual differences becomes increasingly the function of the school. It is for this reason that the programme of the secondary school is organized upon the basis of Constants and Variables. The Senior High School will aim at mastery, appropriate to the maturity of the pupils, in the fields which they have chosen.

6. The Rural School

In spite of its obvious handicaps the rural school has many compensating advantages as an educational institution. The responsibilities of farm-life and the intimate contact with nature and the soil are educative forces that cannot be matched in the city.
The mingling of pupils of all ages in the school itself provides a natural learning situation which makes for responsibility, initiative, and comprehensive grasp. The programme of studies must be made adaptable to a school organized in three or four groups rather than in yearly grades, and the rural teacher must think in terms of essential end-products of education more than of minute subject details.

7. The Teacher

Throughout all types of school the character of the teacher is of fundamental importance. Of all the educative forces within the school, the personal influence of the teacher is the most potent in its effect. The good teacher must have many qualifications—the capacity of growth, a broad and well-matured conception of education, a thorough command of subject-matter, a mastery of the principles of teaching (including foundations in psychology and sociology), an understanding of the economic and social structure of the modern world, a wholesome and likeable personality, appreciation of aesthetic values, tact, kindliness, and high ideals. He should be himself what he would have his pupils become.

8. The School and the Home

The school should establish close contact with the home. The teacher should know the parents and home conditions of each child and should secure the goodwill of the family. The parents should feel that they play an important part in the total plan of education. Opportunities to visit the school during its every-day work as well as on festal occasions are means of cultivating interest in the school and an understanding of its work.

9. Conclusion

The foregoing may be compressed into the following statement of the aims of education for the various types of schools in British Columbia.

GENERAL AIM OF EDUCATION

It is the function of the school, through carefully selected experiences, to stimulate, modify, and direct the growth of each pupil physically, mentally, morally, and socially, so that the continual enrichment of the individual's life and an improved society may result.
THE AIMS OF EDUCATION FOR THE ELEMENTARY SCHOOLS.

To accomplish the above purposes the Elementary School should provide experiences necessary to meet the common needs of all children; that is:-

1. To develop an appreciation of the value of physical and mental fitness and to build correct health habits.
2. To develop the child as an individual through instruction, training, and experience based upon his needs, interest, and abilities.
3. To stimulate and develop desirable self-expression.
4. To bring children to a progressive understanding of the problems, practices, and institutions of social life; and of their responsibility for social and civic welfare and progress through acceptance of pupil contribution.
5. To develop to as high a degree as possible, skill in the fundamental processes in all school subjects and in life situation.
6. To encourage interests in art, music, literature, nature, and play for the enrichment and enjoyment of life.
7. To develop and practice desirable habits, attitudes, and appreciations of right behaviour which will enable the child to live more effectively and to co-operate in home and community life.
8. To develop habit of critical thinking and effective study.
9. To foster the desire for continuous education both in and out of school.

THE AIMS OF EDUCATION FOR THE SECONDARY SCHOOLS.

I. Aims of the Junior High School, or Grades VII., VIII., IX.

It is believed that the general aim of education may be realized best on the Junior High School level by directing and stimulating individual growth in the following ways:-

1. To improve further (according to individual capacities) the habits and skills in the fundamental processes through the use of materials and activities which in content and method are of vital importance to pupils at the beginning of adolescence.
2. To continue to develop the understandings, attitudes, and habits which are of importance in the realization of emotional, mental, and physical health of the individual and of the community.

3. To furnish for all pupils opportunities to explore some of the possibilities of the general fields of knowledge, in sciences and mathematics, in language and literature, in commercial, fine, and industrial arts, and so reveal to pupils some of the possibilities in the major fields of learning and their own dominant interests, capacities, and limitations for them.

4. To give all pupils a body of information about educational opportunities and occupations; then to help them to make wise choices in their future vocational activities or in the continuance of their education in the higher schools.

5. To develop habits, understandings, attitudes, and ideals in the class-room, library, club organizations, assembly- hall, lunch-room, and on the playground, which are essential to social living in the school, in the home, and in the community.

6. To develop tolerant and critical understanding and behaviour in relation to society and its problems through pupil participation, pupil co-operation, and pupil contributions.

7. To provide for active and vicarious experiences calculated to stimulate lasting appreciations of beauty and of leisure-time, interests in literature, music, art, nature, and science, philosophical reflection, practical arts, and human associations in order to satisfy the individual's desire for enjoyment; also, to develop in children, according to the degree of native ability, a reasonable skill in creating beautiful and useful things.

8. To develop in boys and girls through all fields of subject-matter and through every class-room situation an understanding appreciation of right and wrong, and a desire to attain a high standard of personal conduct. 9. To cultivate habits of critical and independent thinking, evaluation of propaganda, and to strengthen further the ability to study.

II. Aims of the Senior High School.

1. To continue to refine and improve the numerous skills required by society in the fundamental processes, especially in the cursory and study types of reading for various purposes, and in oral, written, and graphic expression by constant practice in all departments of instruction.
2. To develop the ability to solve problems; to do critical, reflective thinking; to summarize and formulate generalizations from concrete situations; to apply these generalizations to other fields, and to develop effective and economical study-habits.

3. To establish the understandings, habits, and ideals which are of importance in the realization of mental and physical health for the individual and for the community.

4. To provide varied and numerous experiences which will give the pupil the necessary understanding of himself and of vocations in order that he may be helped to choose intelligently, to plan his application for, to enter upon and make progress in his chosen occupation.

5. To develop interests in and habits of employing leisure-time for worthy enjoyment in order to promote personal growth and human betterment; to develop high standards of appreciation and enjoyment of the best in music, art, literature, drama, nature, architecture, and other arts.

6. To train pupils in the skilful and economic management of household affairs, to give them a knowledge of suitable, practical, and aesthetic standards of living to the end that the co-operation in the home of all its members may be secured.

7. To provide experiences which will make for tolerant understanding of modern social problems, and of the interests, possessions, privileges, and duties which one citizen shares with another in a democratic society.

8. To develop high and just standards of moral value and to develop right habits of action through high ideals of sportsmanship, the ideal of service, the faithful performance of duty, and the insistence on personal responsibility for conduct.


BCIT TECHNOLOGY EDUCATION NEEDS SURVEY

The Technology Education Needs Survey was conducted as one component of BCIT's curriculum review of its Industrial Education Teacher Education (IETE) program. Besides this survey, the IETE curriculum review included study of the demographics of recent BCIT IETE program students, IETE Faculty opinions and concerns, and a detailed examination of eleven similarly intended teacher education programs representing Canada, USA and the United Kingdom. These representative programs have been methodically compared, contrasted and evaluated on fourteen points of inquiry.

Curriculum reviews are routine in all programs at BCIT and are normally conducted about every five years. The major purpose of these reviews is to examine program content and verify that it is in alignment with the needs of the industry the program serves. The industry served by BCIT's IETE program is ultimately the public school system, hence the survey. The University of British Columbia's Faculty of Education jointly participates in the training of technical studies teachers and their input has also been gathered.

The Survey was administered to the Superintendent of each School District and every Technology/Industrial Education Teacher in B.C. The District Superintendents were identified through the 1993/94 Ministry of Education Listing of B.C. Schools booklet. The Teachers were identified through the BCTEA's complete list of B.C. Technical Studies Teachers.

The survey method used was based on Dr. Donald A. Dillman's (USA) research study findings about how to maximize survey returns. The recommended process was followed exactly, as an in-house field test on effective means to format and administer mail out survey instruments. The returns that have been counted for analysis are 56 out of 75 (76%) District Superintendents and 498 out of 927 (54%) Teachers. Also, as of this writing, an additional 2 District Superintendent and 15 additional Teacher returns have been received too late to be counted for analysis.
SURVEY FINDINGS SUMMARY (see also accompanying graphs)

Technology Education is clearly seen as a general technical education subject by both District Superintendents and Teachers.

86% of respondents support the belief that Technology Education broadens the scope of technical study to use tools of contemporary technologies.

81.4% believe that Technology Education is general in nature, assisting students to understand and develop capability in a broad range of technology. District Superintendents hold this view more strongly than teachers.

On the other hand, only 46% of respondents see Technology Education as leading directly to a career. This group appears to be mainly Career Preparation Teachers.

68% of District Superintendents stated that Technology Teachers are required to teach generalist technology courses. This finding is particularly significant when it is remembered that District Superintendents often hire new teachers.

Major findings of the survey support a Regular Program format for all Technical Teacher Education students.

There is a high requirement for Technology Education Teachers to teach a range of technical subjects as well as some academic subjects. 90% of respondents believe that these are either current trends or increasing trends in B.C. Secondary Schools.

At best, respondents believe that the requirement for Technology Teachers to have Trade Qualifications is a neutral trend (44%). Over twice as many respondents believe the Trade Qualification requirement is decreasing (29%) as those who believe the requirement is increasing (12%).

More recent Regular Program Graduates feel the technical training they received at BCIT was adequate (78%) than do recent Accelerated Program Graduates (58%). Only 22% of recent Regular Program Graduates feel the technical training they received at BCIT was inadequate, whereas 42% of recent Accelerated Graduates feel that way.

Even among beginning teachers, who have degree completion technical courses yet to complete, there is low interest in evening (9%) and summer courses (15%) at BCIT. This finding could mean that candidates would prefer a program of training that is completed in the regular September through May terms.
Other major survey findings are as follows.

There is a great deal of uncertainty about the connection between Secondary School courses and Post Secondary opportunities.

Between 23% and 33% of respondents answered “uncertain” when asked whether Technology Education courses were currently being recognized for entrance into:
- Trade Programs
- Community College Certificate Programs
- Technology Diploma Programs
- University Degree Programs

Also while 50% of District Superintendents believe that Secondary School Technology Education leads to Community College Programs, only 25% of the Teachers think so.

34% of District Superintendents believe that Secondary School Technology Education leads to a Technology Diploma whereas less than 13% of teachers think so.

The 3rd most popular written comment also focused on this uncertainty. 35 respondents made written comments expressing their concern about the need for High Schools to link with Post Secondary Institutions and partner with industry.

It is noteworthy that Jim Imrich, a District Superintendent and IETE Advisory Committee member, lamented at the recent Advisory Committee meeting that there are no clear pathways to technical careers. He said that the only Secondary to Post Secondary track that was understood is the one to University. Jim believes that defined Diploma Programs with clear prerequisites would assist in solving this problem.

Teachers claim to have great interest in a wide range of in-service content areas but feel that they have limited time in which to access them.

24 respondents wrote comments asking for convenient in-service with time and funding provided by their school district. This was the 5th most common comment made.

The most popular format for in-service continuing education are workshops in their own school district. 90% of teachers favoured this format.

The existing Technology Education teaching force is an aging population.

More than 40% of respondents have been teaching over 20 years, while only 6% have been teaching less than 4 years. With retirement looming for many existing teachers, the future need for new Technology Education Teachers looks extremely positive.
This issue is dedicated to a look at the difficulties and frustrations apparent since Grade 7 was moved back to the elementary school and industrial arts has been denied Grade 7 for economic reasons.

Humans dislike change; this is also true of teachers. Major changes have occurred during my teaching, which started while manual training presented a challenge to B.C. boys through Thirty Models presented in a formal way during the pupils' Grade 6, 7 and 8 years. Those were happy days in an era when the province depended on hand skills. Pupils of that day stepped, at the end of Grade 8, directly into pioneer work, primary industry, or small secondary industries. Here man, with his ingenuity and skill, was master of his environment; boys worshipped their seniors and strove to become masters of their chosen craft; they were willing to apprentice and become all round tradesmen.

1924 - 1929 -- Saw the implementation of the Putnam-Weir Report.

Manual training gave way to industrial arts. The new form was less formal, employed machines and opened a new area to the boys. The work in Grade 7 permitted the opportunity to teach formally the fundamentals required for a sound base on which to develop or expand work related to the industries represented.

1930 -- The "dirty thirties" raised economic problems, which caused the closing of the Grade 6 shops that had remained in the district where I was employed. These Grade 6 classes bare the same relationship to industrial arts that kindergarten does to the three R's.

Teachers at that time felt the change: breakdowns and early retirement thinned the ranks of those men who had taught me the art of handling boys. If it interests you, I recall a few names: Bill Steele, Frank Templer, Archie Campbell, Willy Wilson, Charlie Crabb, Frank Morris, Frank Corp, Alexander Hamilton, James Sinclair and the youngest of them, who retired in 1958 after forty-one years' teaching and now enjoys his Island home, Charlie Cameron.

Yes, we all felt the change-over and we all fought to maintain the high standard which was given recognition when the I.A. Major was included in the University Entrance program.

Later the provincial terminal examinations in industrial arts were discontinued and we, the I.A. teachers, enjoyed full autonomy -- being sole judge of a boy's achievement and his right to be accredited.
Chant Report -- The Chant report raised issues, created a keener desire on the parents' part, to have their boys included in University preparatory programs and created a cloud which hangs over the future of I.A. and its new form, industrial education. This has been felt this year in Grades 10, 11 and 12 where the bright student has dropped his I.A. option. The classes lack the bright young brains, who in the past have created a challenge to the teacher and provided leadership, which kept the level of attainment on a high plane in the I.A. field.

Grade 8 -- Grade 6 and 7 formerly offered creative dextrous activity guided by a curriculum built around human achievement in fashioning materials through hand skills, and associated theory which explained the when and why these methods developed in human history. Now a void has been created.

The 1962-63 year is said to be an experimental year for the new Grade 8 curriculum.

The I.A. Teacher: -

The physical breakdown and the decline in morale of the 1930's was mentioned. The same symptoms are noted today.

The men with ten and more years' experience are not active in association work; they are groping for leadership. They should be the leaders.

Some are hostile, blaming their principals; others spend time teaching academic subjects while the shops are not used; still others have given up, meetings are poorly attended. The journal has all but died. Men from out-posts want to know the content of new courses; we do not have the answers. The ranks are faltering; early retirement is observed.

The cloud of doubt, created through the Department's reluctance or delay in revealing projected courses, must be lifted before the teachers will give of their best.

The Grade 8 students - These boys arrive keen, and desire an outlet beyond the music and art to which they have been exposed through their entire seven years of elementary school.

Student selection of the new "One" courses, particularly metalwork, reveals that due to lack of time, fundamentals without application have been presented in Grade 8. Now counselling is required to provide classes of minimum size in the new "One" courses for next year. While enrollment in art and music, where the students have a sound basic background, is fully subscribed.

The die is set for Grade 8.

5
The courses for Grade 9 and 10 are under way.

What is in store for Grades 11 and 12?

Will I.E. have the opportunity to serve future professional men, particularly engineers, master draftsmen and master technicians?

THE PRESENT BASIC TIME allotment in Grade 8 is proving to be too short to give the boys a picture of the content of the subjects.

Here are a few extracts from the minutes of meetings and letters received in recent weeks from local associations.

"The loss of I.A. in Grade 7 results in an older, more mature pupil reaching us in Grade 8."

"The Grade 8 course is 'exploratory' for these boys but there must be an attempt to teach some formal woodwork fundamentals."

"The boys, being older, are less interested in making the smaller type projects necessary to teach these fundamentals."

"The time allocation is such that the pupil has insufficient time to master some of these basic fundamentals ending in frustration for them, often discouraging rather than encouraging them into an elective I.A. program at the Grade 9 level."

"The Grade 8 Woodwork course as set out in the Course of Studies is too broad. The Committee (of a local association) feels a more limited basic core that all teachers would be able to cover in the minimum time available, is desirable. Other operations, etc., contained in the present course could be used to broaden and enrich the course for boys with more shop time."

"This is the first introduction to I.A. and H.E. for the students. From this introduction the students must be prepared to elect courses in Grade 9. Three-quarters of one period per school week is not sufficient time to prepare the students to make this choice."

"Since Grade 7 has been removed from the secondary school, the students have only Grade 8 in which to develop the skills which were previously developed in Grades 7 and 8. The new Grade 9 courses will introduce the students to machine work without sufficient grounding in hand skills that must be developed in 3/4 of one period per week in Grade 8."

"Three periods a week do not give sufficient opportunity to do a
proper job to introducing the prospective I.A. 10 student to your new subjects."

"N.E.A. (National Education Association) studies have concluded that any subject which has less than one period per cycle does no justice to the subject, the student or the teacher."

"The industrial arts teachers are expected to introduce the student to 4 new subjects in 3 periods while the same amount of time is allotted to teachers of French 8. It is not possible to do anything but skim the surface."

"The cutback in time coupled with the discontinuance of I.A. 7 mean that in future I.A. 10 classes will not be as advanced as were the pre-Chant I.A. 8's. This is a retrograde step rather than a sign of progress in an age of rapid technical advancement and change."

"The committee did not take cognizance of the fact that they would receive students with no Grade 7 industrial arts. Previously by the end of Grade 7 all students could measure to 1/8" and 1/16". But now 75% of Grade 8 students or entering Grade 8 cannot measure. The time involved in teaching how to measure is almost the equivalent of an extra unit."

1963 SHOP TEACHERS EASTER CONVENTION RESOLUTION

That this association inform the Department of Education through the BCTF that the time allotment for all industrial education Grade 8 courses is inadequate.

- Passed by a vote of 184 for and one opposed at BCSTA Annual Meeting.
Appendix 11. Correspondence. 1980-1983

October 27, 1980

The Honourable Brian Smith
Minister of Education
Parliament Buildings
Victoria, B.C.
V8V 1X4

Dear Mr. Smith:

1. Division of Industrial Education Building, Burnaby.

This building contains one of the finest institutes of its type in North America for training I.E. Teachers. The B.C.I.E.A. and the I.E. Teachers in British Columbia support a move from the B.C.I.T. campus onto the campus of U.B.C. to take our rightful place in the Faculty of Education.

Construction costs will rise 37.5% this year alone in B.C., so it is essential that work begin immediately to establish new quarters at the U.B.C. campus. Otherwise, the cost is going to rise far too dramatically and the facility will become a "Political Football".

In a time when stress is being placed on technical and vocational education, the very institute that trains the I.E. Teacher is threatened with extinction. The I.E. class is one of the few classes in the entire school system where enrollment has constantly increased while total school population has decreased.

Please do not place the division of I.E. into a declining enrollment secondary school or any other second rate building. We are not second class teachers and we wish to have the same advantages and opportunities that all education teachers now experience at U.B.C.


At a time when the Ministry is emphasizing that more technical education and vocational education career courses be offered at the secondary school level, more and more unqualified teachers are being assigned by administrators to teach I.E. courses.
The hobbyist and handyman are not the people to inculcate safe and proper practices in the industrial educational situation. A trained I.E. Teacher must develop a "sixth sense" to be very aware of potential problems and unsafe procedures. Unqualified teachers, however well meaning, do not have the expertise to teach acceptable techniques and machine procedures. The average classroom teacher who does not have the specialized training is unfortunately doing more disservice to students than providing a proper service.

If a classroom teacher wishes to pursue teaching in an I.E. shop, then the teacher should enroll in courses available to upgrade and change their direction of specialization, at the division of I.E., U.B.C.

3. Reinstatement of Technical Inspectors in B.C.

The B.C.I.E.A. and indeed a majority of Industrial Education Teachers in B.C. wish to have two Technical Inspectors reinstated in this province.

Teachers need reassurance as well as constructive criticism about the job they are doing. Many I.E. Teachers in this province do not have a "critique or report" on their teaching in over 10 years.

The Inspectors would also prevent a widespread serious abuse that is occurring in placing unqualified personnel into teaching situations in I.E. shops. A second abuse, is the turning of excellent shop facilities into compromise storage areas such as drama storage and other catch-alls, an altogether expensive waste!

In some areas district I.E. co-ordinators are "on top" of these situations, but these co-ordinators only exist in a small number of School Districts.

Finally, while we realize this reinstatement may be in opposition to current B.C.T.F. policy -- policies can be modified.

4. Numbers of Students in I.E. Shops

The B.C.T.F. has a policy on the numbers of students in shop areas. The B.C.I.E.A. would like the Ministry to acknowledge this policy by making some concrete decisions on student shop numbers.

At the present time, too much latitude is given to school administrators and counsellors to overload shop facilities beyond the acceptable safe numbers for which the facility was designed.
This overloading is occurring to the severe detriment of the student learning situation.

In today's industrial education shop there is a very high percentage of more power equipment being used than in 1960 when Grade 7 was moved back to the elementary school level. This change in situation has produced more safety problems for supervision and instruction, by the I.E. Teacher. The I.E. Teachers' potential for accidents has greatly increased by more power tool use -- a necessary development of our technical society -- without the additional problem of an overloaded facility.

5. Mainstreaming or the Handicapped in the I.E. Shop Situation

The B.C.I.E.A. would like a thorough investigation of the implications, problems and outcomes of placing handicapped students into untenable shop situations before any implementation occurs.

There are certain situations where the handicapped can be successful, but there are also many situations where pursuit of a career or vocation by a handicapped student is an unattainable goal.

6. New Curriculum in Industrial Education

Since our present curriculum guide (1977) is the result of many hours of input by knowledgeable Industrial Education Teachers in the field, the B.C.I.E.A. and the I.E. Teachers' of B.C. would like to have future input into any new curriculum guides before they become implemented.

Respectfully submitted,

G. Michael Sofko
President
B.C.I.E.A.
Mr. Gary Robertson,
President, B.C.I.E.A.,
c/o Greater Victoria School District #61,
Box 700,
Victoria, B.C.
V8W 2R1

Dear Gary:

This is in answer to your request for a statement regarding our current funding dilemma.

Traditionally the Industrial Education teacher training programs and facilities were funded on an "earmarked" basis by the Ministry of Education. When this Ministry was split to form the Ministry of Education and the Ministry of Universities, Science and Communications, the funding responsibility was transferred to the newly created Ministry.

In the Spring of 1982, U.B.C. was informed that this funding was to be phased out despite the long standing precedent of direct financial support. Reportedly this step was taken as part of a move to erase earmarked funding from the Ministry of Universities' budget. In effect, this decision reduced the 1982/83 appropriation by 50% and terminated further financial support.

The U.B.C. President's Office has provided some finances which will allow continued operation of the facility at least until the end of the 1982/83 fiscal year. However, due to financial cutbacks, there is little likelihood of receiving support from this source in the future.

To date all efforts to find alternative funding have failed. As a result, the future of the Division of Industrial Education is in serious jeopardy.

The assistance of the B.C.I.E. Association has been very much appreciated in the past. Now the support of the membership and executive is needed to make it known that to withdraw financial support at this time is unacceptable.

Yours sincerely,

Bill Logan,
Chairman,
Division of Industrial Education.
It was with regret that I read the Sun report that the University of B.C. senate had approved elimination of technical-content courses from the industrial/education bachelor of education program. Presumably the technical content will be offered by another institution.

Members of the B.C. Industrial Education Association have known about the proposal since early this year. Letters advising against the move have been sent from industrial education teachers and other educators at both secondary and post-secondary levels.

The facility where the technical content is taught is without parallel in Canada. The faculty are experienced educators who fully understand the requirements of the B.C. secondary school system, and the technical programs they offer are given overwhelming support from the field.

It seems inconceivable that such a successful operation will be eliminated in favor of an unknown quantity. Despite extensive enquiries, I have been unable to find any evidence of negotiations having gone on between the UBC faculty of education and any community college or vocational school to determine if the recommendation is feasible.

I find it difficult to believe that the question was not raised during discussion of the recommendation.

I hope that when feasibility discussions do take place that in addition to the question of the alternative institution's ability to offer equivalent technical content, the question of their "commitment and dedication" will be addressed. Those elements exist in the present program in large measure.

If implemented, the proposal will save UBC money and transfer costs to the community college system. That is, the financial responsibility will be shifted from the ministry of universities to the ministry of education.

As a taxpayer I see no merit in shifting costs from one publicly funded institution to another, particularly when the outcome of this particular recommendation completely lacks merit.

DENNIS POPOWICH,
President, B.C. Industrial Education Association
7320 — 254th Street
Aldergrove

Letters to the editor must be signed by and bear the address of the writer. Names and addresses may be withheld in special cases. The Sun may edit letters for brevity, clarity, legality, or taste.