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**L'Institut canadien des ingénieurs**

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## **EIC's Historical Notes and Papers Collection**

(Compilation of Articles, Notes and Papers originally published as  
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## **ENGINEERING HISTORY PAPER #29**

### **“The By Design Book Project”**

**by J. W. Disher**

(previously published as EIC Working Paper 17/2003 – Dec 2003)

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EIC HISTORY AND ARCHIVES

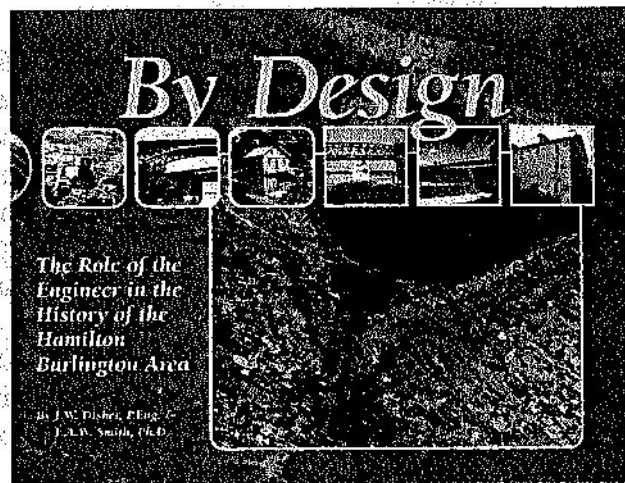
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## Abstract

In 1995, a small group of retired Hamilton area engineers with leadership from the Hamilton Engineering Institute (as it was then called) set out to research, write, publish and market a book about the contribution of engineers and engineering to the history of the Hamilton-Burlington area of Ontario. It became a Millennium Project. The author of this present paper was leader of the project and co-author, with E. A. W. Smith, of the book *By Design: The Role of the Engineer in the History of the Hamilton Burlington Area*. The paper tells the story of the conception and birth of the project and of the book in some detail and from his own standpoint.

This paper was 'commissioned' for the EIC Working Paper series because no 'how to' book about such an important and extensive project - undertaken by a group of engineers - existed\*\*. The book itself is of 'coffee table' size of around 200 pages, and is attractively illustrated. Its main material is covered in five chapters: the story of the Hamilton-Burlington area and of engineering in the early days; a discussion of the evolution of engineering itself; an account of the growth of railways in the area and beyond it; a discussion of industries and companies; and a chapter on engineering for the municipalities. Each of them deals with more than engineering, weaving into their stories the salient physical, economic, political and social factors that 'drove' the engineering in the first place and some facts about the engineers involved in it. A sixth chapter identifies lessons from the experiences related in the previous five chapters. There is an appendix on engineering education at McMaster University, by L.W. Shemilt, followed by endnotes, a bibliography and a subject index. The publisher, in 2001, was Hamilton Engineering Interface Inc.



\*\* EIC History Working Paper 9/2001, *Turning an Engineer into an Author* by R.G. Harvey, was a 'how to' paper written from the point of view of a single author working independently.

### About the Working Paper Series

In June 1995 the Council of the Engineering Institute of Canada agreed that Working Papers on topics related to its history and development, to the history and development of other institutions serving the engineering profession in Canada, and to engineering generally should be published from time to time.

These Papers have limited initial distribution, but a supply is maintained by the EIC History & Archives Committee for distribution on request. They are listed and summarized in the History & Archives section of the EIC's website ([www.eic-ici.ca](http://www.eic-ici.ca)) and electronic copies may also be obtained through this same source. The individual Papers may also be published later, in whole or in part, in other vehicles, but this cannot be done without the expressed permission of the Institute. The series is presently administered by the Publications Sub-Committee of the main Committee in co-operation with the executive director of the Institute.

Opinions expressed in the Working Papers are those of the author(s) and are not necessarily shared by the Engineering Institute of Canada or its History & Archives Committee.

*The editors of this present Working Paper were Peter R. Hart and Andrew H. Wilson*

### About the Author

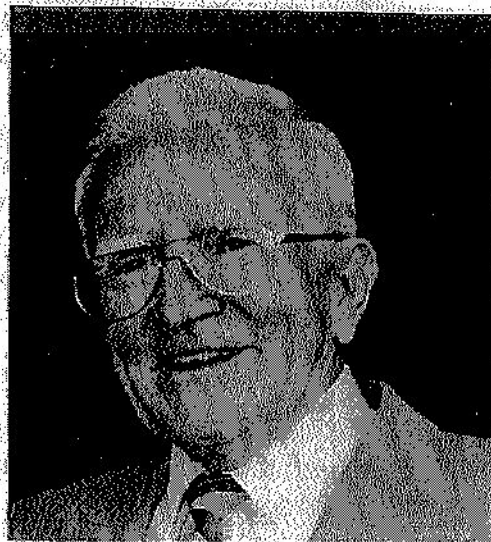
Jerrold W. Disher was born and raised in Ridgeway, Ontario, and is a 1952 graduate in civil engineering of Queen's University, Kingston. After a short partnership in Disher-Farrand in Toronto in the design-build field and a year with Defence Construction (1951) Ltd., he joined C. C. Parker Consultants Ltd. of Hamilton as a junior engineer in 1953. Over the next 20 years, he developed the highway planning and design and the municipal engineering departments of the firm, and was made the partner in charge of these areas in 1974. He became president of C. C. Parker in 1988 and retired from this position at the end of 1992 at the age of 65 and after almost 40 years of service.

During his career, Jerry was active in the Engineering Institute of Canada (EIC) and the Canadian Society for Civil Engineering (CSCE). He chaired the civil engineering committee of the Hamilton EIC Branch in the 1960s. He became a member of the CSCE when it was formed in 1972 and, in 1975, was elected vice-president for its Ontario Region. Over the next three years, he developed an appropriate structure for this region - one that became the model for most of the other CSCE regions across the country. He was elected senior vice-president of the Society in 1978 and served as its president in 1979-80. He has been elected a Fellow of both the EIC and the CSCE and is a registered professional engineer (P.Eng.) in the province of Ontario.

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Jerry became a member of the Hamilton Engineering Institute (HEI) in 1974, the year it was founded by William A. H. (Bill) Filer and a small group of dedicated engineers who saw a need to coordinate engineering activities in the Hamilton-Burlington area, to monitor their success and to develop programs to bring engineers and the general public closer together. One of the HEI's great successes is the annual Hamilton Engineering Week, which began in 1979. Its annual luncheon continues to be one of the most successful in Canada, drawing attendances between 600 and 800. Jerry was asked to chair the steering committee for the first luncheon. In 1987 he chaired another steering committee for the celebration of the Centennial of Engineering, which brought the artifacts of the ship *Mary Rose* for display at the Hamilton Art Gallery. Among the other centennial activities a cairn, whose design was based on the engineer's iron ring, was placed on the grounds of the City Hall. This was a joint project of the HEI and the CSCE's Hamilton Section.

On his retirement in 1992, Jerry became president of the HEI. In 1995, his idea for a book on the history of engineering in the Hamilton-Burlington area was accepted. It became the Institute's Millennium Project - and Jerry managed the work that produced *By Design*.



*Copies of By Design: The Role of the Engineer in the History of the Hamilton Burlington Area can be purchased from Hamilton Engineering Interface Inc., 99 Margate Avenue, Hamilton, Ontario L8T 1N2. Copies cost \$42 each. To save the additional \$7 cost of packaging and mailing, contact can be made with Jerry Disher at (905) 388-2042 to arrange for a convenient pick-up. The book is also available for purchase at the Art Gallery of Hamilton and at selected book stores in the city.*

## Introduction

As Canadians, we are often too busy to record our past achievements adequately. Our engineers, in particular, become caught up in the excitement of working on projects and, when they are completed, quickly learn to turn to the next challenge without taking a backward look.

As Canada's history has unfolded, engineers have found themselves at the forefront of developments in every new era. Each new machine or process that was designed and built, as well as the environments in which they functioned, required the knowledge and experience of engineers, in co-operation with entrepreneurs, to assess their future physical, economic and other impacts.

The Hamilton area is a case in point. The present city and its surroundings are products of its past. After being discovered by European settlers in the late 18th century, the area was a stepping stone for exploration to the west. Indians had used the region for hunting and fishing and, at the time of the American Revolution, in the 1770s, the land was untouched except for the many bush trails. But the United Empire Loyalists, arriving from the United States from the 1780s onwards, changed this, first by farming, then by developing mill sites along the fast-running streams that crossed the nearby Niagara Escarpment, to process their farm products. At that time water was the main mode of transportation and the source of power for industry. Eventually, timber was added to flour as the area's main 'exports' and, later still, the manufacturing of secondary products began.

Since those times, the Hamilton area has developed into a significant part of Canada's industrial heartland. It adopted the products of the Industrial Revolution, from the steam engine and railways to electricity. It prospered with the development of innovative industries, supporting rail and road systems, harbour development and, in the years leading up to the recent Millennium, air transportation. Its engineering activities continually broadened as new fields were added. The early military engineers and surveyors were succeeded by civilians in the ever widening array of disciplines that became needed up to the present time<sup>1</sup>.

Until recently, no one had taken the time to provide a record of the history of engineering and its impact on this area, and the coming of the Millennium provided the logical opportunity. Consequently, the decision was made to do so.

In 1994, as the first step in the production of what was to become the 'coffee-table' book *By Design: The Role of the Engineer in the History of the Hamilton Burlington Area*, the Hamilton Engineering Institute (HEI) appointed a committee made up of local senior engineers to determine the availability of information and of funding for such a project. Within a year, this committee had found that sufficient information was available, but felt that a professional writer should be hired to work with

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<sup>1</sup> EIC History Working Paper 14/2003, *An Engineering Entrepreneur in Early Canada: John Gartshore in the 1800s*, by Ian S. Gartshore and Sondra (Gartshore) Jernigan, provides some additional insight into early engineering in the Hamilton Burlington area. Beam engines built by his company were installed in the Hamilton Waterworks in the late 1850s.

the research team. Since the HEI did not have the financial resources to do this, the project was shelved until sufficient funding could be found.

This paper deals with the process by which this book was produced, and especially the funding, research, writing, layout and marketing aspects of it. However, the HEI found it necessary to form a non-profit corporation to ensure funding for the project from a variety of donors. The Institute has, therefore, been known as Hamilton Engineering Interface Inc. (HEI Inc.) since 2000, of which I - the book's co-author Jerry Disher - am still president. At the time of writing of this paper, I am still involved in selling the book.

### **How and When It All Began**

The idea of the book came to me in 1992 when I was preparing to retire and helping to assemble a historical review of the C. C. Parker Company's accomplishments over its first 50 years. But I experienced some difficulties with the research, not having the views and experience of some of the major players to call upon, some of whom had died by then or had moved on to other organizations.

At this time I could see there was a need to write about the role of the engineer in the development of the Hamilton area, whose rich industrial past could be traced back to the Industrial Revolution in Europe. I raised the subject in 1994 at a meeting of the board of directors of the HEI, proposing specifically the preparation of a history of the role of engineering in our area. Such a project would be in keeping with the Institute's mandate to foster understanding and comradeship between engineers and the public. It would also make an ideal Millennium Project for the HEI. Its object would be to produce a book that would be of interest to high schools, universities and the general public. The board members were enthusiastic and decided to set up an Investigating Committee to determine its viability. They agreed that the project would be undertaken on a non-profit basis, using volunteer help. The book's price should be sufficient to recover its costs.

In 1995, retired engineer Waldo Wheten was asked to chair the Investigating Committee. I drew up the terms of reference for the project and the board assembled a list of members for the committee, which included several retired engineers and senior engineers from various industries and consulting groups, together with a retired architect, a retired dean of engineering from McMaster University and the four members of the HEI board. The terms of reference defined the scope of the project - to trace the history of engineering in the Hamilton, Wentworth and Burlington area from the beginning of settlement in the late 1700s to the end of the 20<sup>th</sup> century. Specifically, the committee was asked to:

- identify accomplishments in all fields of engineering;
- identify specific engineers who had provided advancement to engineering in the area;
- identify and trace the development of engineering societies and organizations, including the Engineering Institute of Canada (EIC), the Professional Engineers of Ontario (PEO), the Consulting Engineers of Ontario (CEO), etc.;

- include the many areas of engineering, including those in industrial, railway, municipal, transportation, environmental, waste disposal, harbour and canal engineering, building design, housing construction, consulting, etc.;
- prepare a time-frame schedule for the main components of the project;
- prepare a budget for expenses;
- prepare terms of reference for the working sub-committees in each of the subject areas;
- interview engineers or the families of engineers; and
- review all possible avenues for financial assistance.

The following were members of the Investigating Committee, all of whom - except the architect - were members of the PEO and were designated P.Eng.:

- Chair: **Waldo A. Wheten**, former city engineer of Hamilton and former commissioner of engineering, Regional Municipality of Hamilton-Wentworth
- Members: **James R. G. Leach**, former commissioner of engineering, Regional Municipality of Hamilton-Wentworth  
**Leslie W. Shemilt**, former dean of engineering at McMaster University  
**William A. H. Filer**, president, Filer Consultants Ltd.  
**Leslie H. Chater**, former chief engineer, Stelco Inc.  
**David H. Samson**, former chief engineer, Dofasco Inc.  
**William T. Chatham**, president, W. T. Chatham & Associates  
**John B. McCallum**, former manager at Westinghouse Canada  
**Patrick J. McNally**, former president, S. McNally & Sons  
**William C. Souter**, architect  
**J. S. Robin Beck**, former president, C.C. Parker Consultants Ltd.  
**D. Haig Leckie**, independent consulting engineer  
**James A. Aitken**, former vice-president, National Steel Car Corporation Ltd.  
**John D. Monkman**, president, Soil-Mat  
**James A. Cran**, former manager of sales, Stelco Inc.  
**Jerrold W. Disher**, former president, C. C. Parker Consultants Ltd.

In June 1995, my memo to the Investigating Committee chair established the project goals. Each member was asked to chair a working sub-committee. Sub-committee guidelines were also prepared, to be used to direct their work. The goal of these guidelines was to locate, list and preserve where possible all materials pertaining to the history of the subjects assigned to each sub-committee. Included were the following items:

- the chairs would represent their sub-committees at the meetings of the Investigating Committee;
- the chairs were encouraged to add people to their sub-committees to assist in the accumulation, recording and preservation of information and artifacts pertaining to the subjects assigned to them;

- each sub-committee would submit to the Investigating Committee a plan and time frame for the completion of its assignments;
- each sub-committee would:
  - \* identify and list areas of historical interest, from the late 1700s to the present;
  - \* identify and determine the accomplishments of individuals, groups, companies and/or governments who may have contributed to the development of engineering;
  - \* trace by year or era the development of the subject areas, identifying the benchmarks in time where significant developments occurred;
  - \* log all information (biographies, books, periodicals, reports, artifacts etc.) of interest;
  - \* prepare a short paragraph (or two) on each individual or organization of interest;
  - \* retain the information for turn-over to the Investigating Committee.
- determine the influences that drove and changed engineering in the subject areas due to:
  - \* the provision of potable water;
  - \* the steam engine;
  - \* the railways;
  - \* access to the Great Lakes;
  - \* the licensing of engineers;
  - \* the introduction of national standards;
  - \* the automobile;
  - \* the airplane;
  - \* wars;
  - \* economic depressions;
  - \* city corporations, regional governments;
  - \* women in the workforce;
  - \* improvements in the transportation system;
  - \* electronic calculators, the computer era.
- identify 'firsts' in manufacturing (and other industries);
- identify the fields of engineering that contributed to the subject areas being investigated;
- identify people who should be interviewed for information in the subject areas, and carry out these interviews; and
- prepare a summary report of the sub-committee's findings and recommend action to be taken by others.



In 1996, after several meetings and the collection of a significant number of historical records, the Investigating Committee concluded that there was enough information available to undertake the project. It also recommended that the HEI should hire a professional writer to assist the research teams and to provide continuity to the writing, a view based on interviews with local publishers and with a professional writer known to us. The book was estimated to have between 200 and 250 pages with illustrations, half in colour and half in black-and-white.

The HEI was faced with the need to find over \$100,000 before proceeding with the book and was forced to shelve the project until the needed funds became available. Down-grading the publication to a black-and-white paperback would have missed the purpose of the project, which was to reach out to the public with our history of engineering. In the meantime, all logs of information and other written documentation, books, booklets etc. were collected from the sub-committee research teams. While the intention had been to have each of them summarize its findings in a paper, it was decided to delay this part of the project until the writer was available to assist the sub-committees.

The information that the sub-committees had assembled was of great importance to the success of the final document. The Investigating Committee thanks them for the part they played in making the book a success. On hindsight, it was fortunate that their research was collected when it was. Three of the sub-committee chairmen had died by the time the project was restarted.

The sub-committee which I chaired dealt with mills, dams, canals and Hamilton Harbour, and the material it gathered became the subject of the first chapter of *By Design*. From 1996 to 1999, we continued our investigations during this period of waiting and financial uncertainty, but at a relaxed pace. I found this activity to be of great value since I was able to use the material to test ideas for the appearance and make-up of the book and settle on its final format and content. The members of my committee were two engineers, Robert R. Hennessy, the port director of Hamilton Harbour and David C. Cramm, a former president and bridge department manager at C.C. Parker Consultants Ltd, together with Robert Chrystian, a non-engineer, who had been with the Hamilton Regional Conservation Authority and the Hamilton Parks Board. Each enthusiastically took on small assignments. We found our meetings during these three years to be both motivating and enjoyable.

However, some of the other chairmen were reluctant to add members to their sub-committees and tended to rely on their own background knowledge to assemble the information, although none of them was familiar with historical research and there was no textbook to follow. As has been mentioned elsewhere, this last point was one of the main reasons I was invited to write this Working Paper!

During the waiting period (1996-1999), I read a multitude of history texts and pamphlets and kept a book of loose-leaf lined paper handy by my chair to make notes. I still have this book, which is now around 3 cm thick, with notes written on every line and on both sides of each page. As I learned more about the history of the area, I was fascinated by the men and women who had come before me, and by the energy they had expended in dealing with adversities, wars, rebellions, aboriginal people,

and financial setbacks, as well as with the limitations they experienced in travelling and in their daily living.

### Funding

In 1999 the Millennium Bureau's Partnership Program advertised in most Canadian newspapers that it would assist with the financing of millennium-related projects that met the published criteria. This possibility for our project was brought to my attention by Leslie Shemilt, a member of the Investigating Committee. I immediately began to prepare a submission on behalf of the HEI that described the details of the book project and requested financial assistance for it. I also developed a time line and budget and included the time estimate in the submission. Using the published criteria, I included a dollar estimate of our requirements as a 'volunteer' effort, but also included quotations I had received from a printer and a professional writer.

I should comment at this point that applications for funding require clear thinking and good estimates. Most funding sources ask for details of the tasks to be performed, as well as estimates of the time and money required to do them. They are looking for evidence that applicants have been thorough in their approach in order that they, the sources, can have confidence in the information presented. They are also concerned that applicants are being realistic and have a firm grasp of the costs involved. Letters of support are required from people knowledgeable in the field of the project, who can also confirm the value of the project and the applicant's ability to complete it.

The overall estimate of the 'out-of-pocket' costs of the project came to \$107,000. This included the printing of the book and the writer's fees, together with the lesser costs for mapping, film and rentals for photography. To this sum was added \$73,000, which was the estimate of the dollar equivalent for the volunteer work, bringing the 'real' value of the project to \$180,000. The HEI requested financial support of \$60,000 from the Millennium Bureau. The balance was to be covered by a donation from HEI, donations from local sources, an anticipated contribution from the Ontario Trillium Foundation and the income from the sale of 500 copies of the book. In November 1999 word was received that the contribution from the Bureau would be \$51,000, based on monthly payments that responded to our progress billings, which were to include the time spent by the volunteers as well as all paid expenditures.

In making application to the Ontario Trillium Foundation, we discovered that it would only contribute to non-profit companies in Ontario. Although it was already a non-profit organization, this meant that the HEI would need to apply for incorporation to qualify for funding. The decision was made to do so, after which I prepared the necessary documentation and proceeded with name searches to register the company. After some initial difficulty, the name 'Hamilton Engineering Interface Inc.' was settled upon and the application proceeded. The letters patent were granted on September 1, 2000. An application to the Foundation was made, asking for \$20,000. The grant actually received was for \$15,000, to be spent on the actual publication and to be paid to HEI Inc. after the printer had been paid.

This federal and provincial support was considered to be 'pretty thin.' The situation was, of course, complicated by the fact that it was to be made available only *after* the money had been spent and the necessary justifications had been approved by these sources. It also required a lot more additional work. It meant that bridge financing would be required, which had not been taken into account originally. However, our available financial resources were stretched, using such tactics as delaying payment in some cases and relying on the patience of the vendors. At the same time, the sales target was increased to 1000 copies of the book. Since the budget included these sales, this income could not be spent until it had been received, and this could be a year or more after printing, with the result that the bridge financing would also have to be extended. To cover this situation, HEI Inc. borrowed funds to cover the printing costs. As things turned out, we survived and these costs were close to the original budget estimates. The time for completion was stretched to the limit, with publication in May 2002.

### Researching

Research is like detective work - reading everything that can be found on the subject and jotting down information as you investigate. However, I am afraid I cannot provide a lot of detail on the rules of historical investigation. Basically, researchers are required to keep track of the sources of all the historical information they gather and must make sure that known facts are not changed. This kind of information may sometimes be found in the appendices of books as well as in the main texts. When gathering historical facts, researchers must not extrapolate them into guesses; nor can they take credit for anything that is not original, or copy texts without crediting the sources. Personal opinions can be included, but only so long as they are clearly stated as such.

The history of the area at the western end of Lake Ontario is very interesting and a considerable amount has already been written about it. Some local histories are picture books showing the area as it was, while others deal with political developments, the lives of well-known politicians and with the influence of economic factors. However, the book *By Design* is unique. It tells the story of the area through the eyes of engineers, with the support of black and white photographs of the past, coloured ones of the present, and illustrative maps.

A great deal of information about Hamilton area history is retained in the Special Collections section of the Hamilton Public Library. But there is also material that can be found with some effort in other sections and in other libraries, as well as in privately held family histories. Internet websites can be helpful. For our book, interviews were carried out for the side-bars. I asked some engineers to write short accounts of the work they did during their working lives, and to make comments and observations based on their experiences. I also asked Leslie Shemilt, a former dean, to write an account of the history of the Faculty of Engineering at McMaster University. This appears in full as Appendix A in the book, with excerpts in the text of Chapter II.

## Writing

After meetings with the board of the HEI to discuss funding applications, bridge financing, additional sales to offset a possible funding shortfall and other matters related to the production of the book, it was decided in November 1999 to proceed with the writing of it. To help us do this, E. A. W. Smith was hired to be my co-author. Ted Smith was then a mature student completing a doctorate in history, but he agreed to begin work with me before his course was formally finished.

By this time, a significant amount of research had been done on the dams, mills and canals and the Hamilton harbour, and I had begun drafting the first chapter based on my sub-committee's work. I had also begun to assemble the information gathered by the other sub-committees that still had to be researched and written up.

Ted and I met at my home roughly every two weeks and more often when needed. One of our main tasks was to develop the text for the whole book and determine the order of the chapters. We also had to deal with the chapters individually. At each meeting, we would review the drafts of the recently developed material, discuss the need for additional text and for changes, and set targets for our own research and writing to be completed before the next meeting. I would develop drafts of the text from the research and the logs collected from the committee chairs, from which Ted would form his impression. We would then review and 'mould' the context until it was acceptable. We did this for the first chapter and were satisfied that it was a good approach for the rest of the book.

As has been mentioned already, I had read a significant number of books and had made notes from them. Since Ted's knowledge of the history of the area was extensive, he was able to add understanding to them and to the industrial history of the area generally. I became fascinated, for example, by the electrical work done in the late 1800s in - and for - Hamilton and, in particular, the story of the DeCew Falls hydro-electric generating station, which had used the leading edge technology of its time. I paid the station a visit and found, not only that it had just celebrated its centennial, but that some of the original machinery was still operating. Ontario Hydro, then the operators of the station, were also able to provide information on the people - the 'five Johns' - who had developed it.

The chair of another sub-committee, Jim Leach, assembled a significant amount of background information on municipal services. To it, I added my own research in this field from the Special Collections section of the Hamilton Library, with particular reference to sewers, sewage treatment and roads. I found, for example, support for the positive steps taken by the Hamilton city fathers in building sewers and clean water facilities following the cholera epidemic of the summer of 1854, which resulted in the construction of the city's now famous waterworks later in the decade<sup>2</sup>. I also learned more about transportation problems in the area. For example, the Niagara Escarpment runs

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<sup>2</sup> The Hamilton Waterworks has been designated as a National Historic Civil Engineering Site by the Canadian Society for Civil Engineering. The Gartshore beam engines that were built for the Waterworks have also been commemorated by the Canadian Society for Mechanical Engineering.

through the built-up area of the city and the surrounding area, which includes Ancaster, Dundas, Stoney Creek and Burlington. As it rises 150 metres above the shore line of Lake Ontario, it effectively divides into two relatively flat areas, the lakeshore and the plateau above the escarpment, which pose some significant technical problems in the provision and servicing of transportation between these two levels.

In a more speculative vein, Chapter VI of the book deals with the authors' impressions of the impact of history on the past and future of the area.

Taken in its entirety, *By Design* deals with these main topics:

- The political/social/economic history of the Hamilton-Burlington area, and the role of engineering in it, from the time of the first non-aboriginal settlers in the late 1700s to the Millennium year, 2000.
- The development of engineering from the time of the millwrights and the surveyors. In the earliest years, engineering itself was in its infancy. Most student engineers, for example, worked either in the military or as apprentices supervised by the recognized engineers of the day. We identify one surveyor-millwright who offered his services to entrepreneurs similar to the ones offered by modern consultants. Also, the need for manuals of Canadian practice was demonstrated by reference to one of the best known American manuals of the time, published by Oliver Evans and called *The Young Millwright and Miller's Guide*.
- The evolution of engineering, which is discussed in Chapter II, concerns the development of engineering from the trial and error construction of the ancient world, through the Middle Ages, when engineers copied the successful works of the past, to the modern computer era and its mathematical analysis and quality control of materials.
- Thomas Keefer, one of the best known Canadian engineers of the 19<sup>th</sup> century, was hired by Hamilton's city fathers in the 1850s to design the first clean water supply for the city. Thanks to the foresight of the city engineers who followed, Keefer's pumphouse, and the Gartshore engines in it, have been preserved as a museum by the city. They are wonderful examples of engineering and workmanship in the mid-1800s.
- In 1854, at New Brunswick's King's College, the first engineering courses in British North America were offered<sup>3</sup>. In Chapter II, the French and British systems of engineering training are compared, as well as and the evolution of university education in Canada. Included are histories of Hamilton's Mohawk College and McMaster University. The recognition of professional engineers, which grew out of the need to regulate engineering standards and to protect the public is emphasised.
- Chapter III is about railways and tells of the first major railway in Ontario, the Great Western, which was headquartered in Hamilton and began operations in January 1854 between Niagara Falls in New York State, Hamilton, London and Windsor in Ontario,

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<sup>3</sup> In recognition of this, New Brunswick's King's College has also been designated as a National Historic Civil Engineering Site by the Canadian Society for Civil Engineering.

and Detroit, Michigan. The frustrations involved in dealing with multiple rail gauges in railway development at a time when wars with the United States were still expected are described. The construction and maintenance of this railway was 'engineered' by men who migrated to Hamilton from railway contractors and companies in Great Britain. Locomotives and cars for the rolling stock of the railway were built in the Great Western Railway shops in Hamilton: shops whose engineering became a major influence on the industrialization of the city. Also covered are the Radial Electric Railways, which extended from the city to places such as Brantford, Vineland and Oakville to bring people, from the surrounding areas, into Hamilton to work and their families for shopping and other activities.

- Hamilton being known as the 'electric city' in the late 1800s is written about in Chapter IV. Five Hamilton entrepreneurs - the 'five Johns' mentioned above - formed the Dominion Power and Transmission Company that built the hydro-electric generating station at DeCew Falls, from which were transmitted to the city the first alternating current supplies in Ontario. At the time, this was a great engineering feat. This plant is still in operation, now owned by Ontario Power Generation. From it, cheap and ample power was made available to the communities around the head of the lake. The electrification of Hamilton in 1898 also made possible the huge industrial expansion of the city's waterfront.
- Also in this fourth chapter we discuss industrial development, which was originally dependent on the water power amply available in Dundas, Ancaster and Waterdown. But with the development of the steam engine in the early 1800s and the later electrification of the area, industry was able to locate anywhere that transportation was available so that Hamilton's bayshore, with its rail and harbour facilities and cheap electricity, became a preferred location. This chapter also discusses the influence engineers had on the area's industries and recalls the many industrial 'giants' that founded their organizations there. Included is a comparison in the different backgrounds to the growth of Stelco and Dofasco, both of which relied heavily on engineering know-how. They still do, although the financial environment for their operations is less conducive to success today.
- The history of the city of Burlington and its outgrowth from the village of Wellington Square is discussed in Chapter IV. Beginning in the mid 1950s, the population of this city has grown exponentially, from a bedroom community serving the Hamilton area to a more balanced modern city with hi-tech and other secondary industries.
- The area around the head of Lake Ontario was the staging area for westward growth during the early years when water was the main mode of transportation. In Chapter V, the discussion of engineering in the municipalities tells the story of the development of the system of roads, from the Indian trails of the early days to the superhighways of the present day. Descriptions of the many railway bridge crossings of the Desjardins and Burlington canals are given, including the failures and the tragedy of 1857 in which 59 people were killed. With time, bridge construction improved as structural analysis and materials improved. City street development and many of the road and bridge projects are discussed, as well as environmental services such as water supply and

distribution, sewage collection and treatment, which actually began in the 1850s. Growth within the area has required continuous improvement in water and sewer systems in the municipalities and at the head of the lake. Engineering continues to be the key to the maintenance and expansion of the municipal infrastructure.

- Finally, Chapter VI discusses possible solutions to the problems that are now being faced in the Hamilton-Burlington area and the application of some of the lessons that history has taught us that may help to solve these problems.

### **Designing the Layout of the Book**

Usually, this work is done by the publisher. Our printer could have done it for us but, because I had an overall design in mind, he agreed to work with us on the layout I was suggesting. I did a draft layout of each page, with space for photographs, maps and the standard sidebar.

It was decided to use 9x12 inch (30x22.5 cm) pages, which would give the book a wide side horizontal opening of two feet, suitable for maps and photographs. There would be colour throughout. We tried to have some 'action' on each page in the form of a map or photograph and decided to have coloured sidebars on all of the pages that were not fully covered by maps or photographs. The layout of these actually moved the text around, but we tried to keep everything coordinated.

While a page mock-up may not be completely accurate, it gives the printer a good tool to work with. He then computerizes the material and produces black-and-white prints for review, similar to the galley proofs of pre-computer days. After review, and minor modification, each page is 'frozen' and no further changes can be made. It is at this point in the process that the author(s) must take responsibility for the text and the layout!

### **Sidebars and Engineers' Biographies**

Because the book was to be in the 'coffee table' style, it was decided to introduce biographies in the sidebars, which would be put on light-coloured backgrounds on each page to give the browsing reader short subjects to read. Ted and I reviewed the *Dictionary of Hamilton Biography* and began a list of well known engineers from by-gone years, which we supplemented with names that had surfaced during our research. We decided that the sidebar biographies would be limited to those who were deceased. However, we asked several 'contemporary' engineers in different fields of practice to write a few lines on some work they had done during their careers to date. These would also be included in the sidebars (or in the main text) to add to the human interest.

### **Maps**

To avoid readers' confusion with complicated maps, it was decided that all maps should be clear and uncluttered. I was able to interpret the information made available by the sub-committees, as well as from my own research, to establish the design of the maps. A technician was hired to help

develop digitized maps, using colour to advantage. These were then delivered to the printer. While I am sure that many engineers thought them somewhat simplistic, feedback has indicated that many readers found them more interesting because they were easy to read and understand.

### **Photography**

Most historical books show black-and-white records of the past. Since the span of our project was over 200 years, it began before the camera was invented, hence our reliance on old copies of drawings and sketches from archives as well as on photographs.

Ted and I found most of the old photographs in the Special Collections section of the Hamilton Public Library, whose staff were very helpful in allowing us to have them copied by the printer. We also received some photographs from historical societies and during our research. While some of this collecting proceeded as we did the research, our trips to the Library for photographs were limited to the time after the pages had been mocked up, with the draft texts inserted, and spaces left for maps and photographs. This simplified and speeded up the project since we knew by then the subjects of the photographs we wished to insert.

The funding proposals included the use of colour photography. My electrical engineer son, Gary, took the colour photographs, as this is his hobby. He was also keen on the idea of the book. As it worked out, I gave him a list of those photos needed, including aerial photographs, and went with him to help find the locations. For the aerials, we rented a private plane, which had an opening in the floor for picture taking. We took hundreds of pictures on the ground and from the air. Knowing in advance what was wanted helped enormously, and the results were excellent.

### **Printing**

My relationship with the printer, Sheldon Griffin Graphics Inc. of Hamilton, was excellent. From our first meeting, Stewart Sheldon was helpful, patient and informative. We met several times before the detailed work began in order that I might understand his approach to the job. I worked with Elaine (Grahame) Zelynt of his staff during the detail phase, when the text was well along and the photographs were being taken.

My son's camera was unusual in that it used Advantix 27 mm film, which was of concern to the printer as he usually worked with 35 mm film. But as it turned out, after a trial run, he was satisfied and we proceeded with the photography. The printer digitized the photographs for use in the printing process since, at the time, digital cameras were not yet as suited to this process as they now are.

Elaine took our WordPerfect text discs and set them up on her computer, which would eventually provide the master copy for the entire book. She had done some trials to finalize the page layout, with the sidebar. We decided on a print font for the text and the various levels of headings. She suggested three or four cover styles that she had developed, and we selected the one that



seemed the most appropriate. We wanted to include on the cover a photograph of the Hamilton-Burlington area that Astronaut Chris Hadfield had taken from space very recently. He had used it the previous year when he spoke at the Annual Engineering Week Luncheon in Hamilton. It was included in each of Elaine's alternative covers. All in all, I was impressed with her talent. The last things we did included a check to see that the maps had been digitally transferred from our technician to the printer, that the Foreword had been written, the acknowledgements finalized and an index prepared. The rest was in the printer's hands!

As noted above, it had been decided to print 1000 copies - the best estimate. This was the number that would have to be sold to break even on the project cost, and it seemed to be all that we could expect to sell. The printer warned us that it would be fairly costly to set up the press to run additional copies, should he be asked to do so sometime in the future. But where was there storage space for 67 boxes of books? The printer saw our concern and offered to store those that could not be handled in the early stages of the sales. This was a great help.

On delivery of the finished book, all of us were amazed at the presentation and the colour photography. Since then, it has been necessary to tell purchasers that they should read the words as well as marvel at the pictures!

### **Book Sales**

So now you think it should be the time to take a breather: funding is in the pipeline, and the book has been published. Dreamer! It's time to *sell* the copies!

Bill Chatham agreed to be the sales manager for the book. We were also very fortunate to have the City of Hamilton give HEI Inc. a (champagne-less) party at City Hall to launch the book. If you want to sell books, you have to get them out into the public, and some ways to do this are:

- arrange for public or commercial place such as a city hall or a bookstore to launch your sales; we chose Hamilton City Hall and Wally Wheten was able to arrange a spot near the entrance to the Council Chambers;
- make a list of those people whom you would like to come to the launch, and invite them; pick a convenient time - seven p.m. was chosen; on the night of our launch, there was a special meeting of the Council - which was a great help;
- include among the invitees prominent political and historical society representatives, and ask them to speak for a few moments about your book;
- arrange for some display advertising; the use of a display frame from one of the local utility companies was arranged, and a colour display was prepared for it;
- advertise the book locally; the Dofasco and Chamber of Commerce newsletters were used in our case;
- prepare fliers for distribution and mailing, and include among the latter the local PEO Chapter and a number of other organizations;

- make visits; my wife, Lorna, and I visited all the high schools in the area, and we were able to sell at least one copy to each school; we also visited all the bookstores in the area, including Coles and Indigo, to place copies on consignment;
- create interest; most societies have great interest in a new book, so we continued to meet with them, including many historical societies; we also met with many clubs, including Probus and Rotary, with the CSCE Fellows and with area museums; these visits and the talks we gave were very successful in selling copies of the book;
- invite the local newspapers to write a critique of the book;
- it pays to advertise, when funds permit, and make sure it is easy for anyone to call or write to place an order for copies!

One final thought. If you are thinking about 'doing' a book, it is one of the most interesting projects you can undertake. In particular, in the investigative/research stage, you are continually discovering things that you had never known existed or had happened in history. Some of these discoveries may not be on the same subject as the book, but they are still intriguing and encourage you to follow them up. I enjoyed all of the aspects of the preparation and publication of our book - except for the time constraints. I wish you success!

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