THE ENGINEERING INSTITUTE OF CANADA
and its member societies

L'Institut canadien des ingénieurs
et ses sociétés membres

EIC's Historical Notes and Papers Collection

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ENGINEERING HISTORY PAPER #16

"History Activities of the Learned Engineering Societies in Canada"

by Ralph E. Crysler, Fathi Habashi and Andrew H. Wilson
(previously published as EIC Working Paper 4/1997 – Mar 1997)

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EIC HISTORY AND ARCHIVES

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Contents

The four individual papers in this Working Paper are:

These papers were presented at the biennial conference of the Canadian Science and Technology Historical Association (CSTHA) held at Queen's University, Kingston, Ontario in October 1995. At that time a fifth paper was also presented, by Leslie Shemilt of the Canadian Society for Chemical Engineering, but since it was concerned principally with the history of the discipline rather than with activities within the Society, it has not been included. The two Wilson papers and those by Crysler and Shemilt were presented at a session specially arranged and chaired by Professor Janis Langins of the University of Toronto. The Habashi paper was included in a later session of the conference.

The delay in publishing these papers as an EIC Working Paper is regretted, but was unavoidable.

Abstracts

The first Wilson paper deals with history activities within the Engineering Institute of Canada, although these were begun by its predecessor, the Canadian Society of Civil Engineers (the 'old' CSCE), which was founded in 1887 and was in operation until 1918. It begins with a very brief account of the story of the 'old' CSCE and the EIC, and then discusses various ways in which these institutions contributed to the archival materials, documents etc. that now provide important source material for the study of the history of engineering in Canada. It ends with a short account of the recent history-related activities within EIC, up until 1995.

The Crysler paper serves to underline the belief within the Canadian Society for Civil Engineering (the 'new' CSCE) that a

tangible record of significant historic civil engineering works should be preserved as part of the heritage of the people of Canada and in recognition of the civil engineers responsible for those works. This paper describes the origins and evolution of the History of Civil Engineering Programme of the Society since the organization of the 'new' CSCE in 1972. The paper also describes some of the initiatives undertaken within the programme and discusses the involvement of the members of the Society in it.

The Habashi paper begins with an outline of the history of metallurgy in Canada and then moves on to discuss the work of the CIM's Historical Metallurgy Committee. This Committee of the Metallurgical Society was formed in 1978 to provide a forum for members interested in the history of metallurgy and in order to promote the recording of Canadian achievements in this field. In 1995 the Society - one of ten technical divisions of the Institute - marked its 50th Anniversary. In 1998 the Institute itself will celebrate its Centennial.

The second Wilson paper traces very briefly the origins and the founding of CSME as a constituent society of EIC. It then reviews the activities of the History Committee of the Society for the 20-year period from its establishment in 1975 until 1995, and does so principally from the author's perspective. It also deals with some of the problems associated with the participation of engineers in the collection and presentation of historical material.

About the Authors

Ralph E. Crysler graduated in 1949 from the University of Toronto with honours in civil engineering. His professional career has been mostly with consulting practices in the fields of water resource and environmental engineering. He also has considerable experience in the restoration and reconstruction of historic buildings and water-powered mills. He is a Registered Professional Engineer in Ontario, a life member of the American Society of Civil Engineers, and a Fellow and life member of the Canadian Society for Civil Engineering. From 1993 until 1997 he chaired the National History Committee of CSCE.

Fahti Habashi is Professor of Extractive Metallurgy at Laval University in Quebec City. He holds a B.Sc. degree in chemical engineering from the University of Cairo (1949), a Dr. Techn. degree in inorganic chemical technology from the University of Technology in Vienna (1959), Dr. Sc. *h.c.* from the Saint Petersburg Mining Institute in Russia (1993). He was a postdoctoral fellow at the Department of Chemistry, University of Vienna (1959-60), then held a Canadian Government Scholarship in Ottawa (1960-62), taught at Montana College of Mineral Science & Technology (1964-67), and then worked at the Extractive Metallurgical Research Department of

the Anaconda Company in Tucson, Arizona, before joining Laval in 1970. In 1994 he was named an Academician of the Russian Academy of Sciences, and in that same year a Founding Member of the Académie Francophone d'Ingénieurs in Paris. He is an Honorary Professor at the Technical University of Oruro in Bolivia, an Honorary Citizen of the city of Oruro, Governeur de la Fondation de l'Université Laval, and a Member of Le Cercle des Ambassadeurs à Québec.

Andrew H. Wilson has been the Secretary for EIC History and Archives since 1991 and has twice served as Chairman of the History Committee of CSME. He is a graduate in mechanical engineering and has completed liberal arts studies that included economics and history. He began his professional career in marine engineering and was commissioned in the Technical Branch of the Royal Air Force. He was for many years in the public service of Canada, serving with AECL, the Science and Economic Councils, and NRC, retiring in 1986 to establish a consulting practice in research policy and management. He has also served as President of EIC and CSME, Chairman of the Canadian Engineering Manpower Council, and Chairman of the Canadian Association for the Club of Rome.

About the Working Paper Series

In June 1995 the Council of the Engineering Institute of Canada agreed that a series of 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. The papers may, or may not, be authored by members of the engineering profession.

The Papers will have limited initial distribution, but a supply will be maintained at EIC Headquarters in Ottawa for distribution on request. They may also be published later, in whole or in part, in other vehicles, but this cannot be done without the expressed permission of the Engineering Institute of Canada. The Series will be administered by the Executive Director and the Secretary for EIC History and Archives.

The opinions expressed in these Papers are those of the authors and are not necessarily shared by the Institute.

HISTORY ACTIVITIES:

THE ENGINEERING INSTITUTE OF CANADA

by

Andrew H. Wilson
Secretary for EIC History and Archives

Introduction

Some brief words on the story of the Institute itself.

A Canadian Society of Civil Engineers was founded early in 1887 and received its Charter from the Parliament of Canada later that same year. In spite of carrying the name 'Civil' and having the majority of its members in this discipline, the Society admitted to membership candidates from all of the recognized disciplines of engineering. Its Headquarters were established in Montréal (and remained there until only a few years ago, when the move to Ottawa was made).

The founding president was Thomas Coltrin Keefer, who was followed by his half-brother Samuel, Sir Casimir Gzowski and John Kennedy - all well-known names associated with the history of Canadian engineering. Its business and discussions were carried in the twice-yearly Transactions and in subsidiary reports and newsletters. From a founding membership of around 250, there were 600 CSCE members ten years later, and around 3000 by 1914.

In 1917 the CSCE Committee on Society Affairs recommended (among other things) that, to recognize the growing strength and importance of non-civil disciplines within engineering in Canada, the Society should be re-named. Also, to provide improved communications with its members, the re-named Society should publish a monthly magazine. These recommendations were accepted by the CSCE Council. The name change, to the Engineering Institute of Canada, went into effect in April 1918 and the first issue of the Engineering Journal appeared a month later.

Over the next several decades the Institute continued to prosper. It developed an extensive network of branches across the country, as well as a series of specialist committees dealing with technical and administrative matters.

By the early 1960s its membership had grown beyond 20 000 and the number of branches exceeded 50. But engineering, itself, was changing and becoming too specialized for the Institute's management to handle effectively with its current structure. So the Committee on Technical Operations studied the situation and recommended that its technical divisions should be encouraged to

become self-governing societies within the Institute's Charter. The Council accepted this recommendation and, as a result, the first of the member societies - for mechanical engineering - was founded in 1970. The founding of societies for civil (the 'new' CSCE) and electrical engineering and the Canadian Geotechnical Society soon followed. A fifth society - for engineering management - was formed more recently. The Institute itself has become, in effect, a federation of learned engineering societies.

There exists relatively little written material about the history and development of the Canadian Society of Civil Engineers and the Engineering Institute. Most of it was published in the Transactions and the Annual Reports of the Society and the Engineering Journal of the Institute, although the development of the 'old' CSCE was discussed at some length in Rodney Millard's book, The Master Spirit of the Age, published by the University of Toronto Press in 1988. For the most part, the primary sources reside in the Council and Committee Minutes, membership files and other material held in the National Archives or by the Institute.

However, the 'history' situation within the Institute an its member societies has been changing. Both the Mechanical and 'new' Civil Societies have been formally active in this area for some time now, and their activities are discussed in two of the companion papers that follow. Since 1991 the Institute itself has been active in archival and historical matters and has begun to publish material on its history, of which this present Working Paper is an example.

The 'Transactions' and the 'Journal'

The Transactions of the 'old' Civil Engineering Society appeared in two annual parts from 1887 until 1918, and then irregularly - as the Institute's Transactions - until 1974. The CSCE Transactions contained, principally, the technical papers that had been presented at meetings of the members and were later submitted for publication. But during the first ten years or so of the Society's life, the Transactions also included reports of the Annual General Meetings, the presidents, the Council and its committees, the election of members, membership lists, biographies and obituaries. Subsequently, much of this material appeared in separate publications. As well, between 1907 and 1915 a Bulletin was published, which included notes on Society affairs and programs.

The first issue of the Engineering Journal appeared in April 1918, and the last at the conclusion of the Centennial of Engineering celebrated in 1987. For most of this period, it appeared on a regular monthly basis but, by the mid-1970s, had become effectively a bi-monthly or quarterly. From 1984 until early 1987 it appeared as a four- or six-page insert in another widely distributed engineering magazine. In historical terms, the four main strengths of the Journal were: its technical papers; its news of activities,

issues etc. at the national, regional and branch levels; its biographical material; and its advertising, which demonstrated engineering 'fashions' as well as technical and business progress. At first, the new member societies of the Institute tended to use the Engineering Journal and the EIC Transactions for their own publications but, as they developed, established their own equivalents.(1)

With time, the various Transactions, the Journal and the other material published by the 'old' CSCE and the Institute have become important parts of the record of engineering in Canada and, consequently, of historical value. They are, one might say, 'sleeping' or 'accidental' components of written-down history of engineering in this country.

Awards

Another 'accidental' component of this history is the program of annual awards developed by the 'old' CSCE and the Institute. The early awards, in particular, were for meritorious technical papers presented by members at Society and Institute meetings, many of which described projects that had already been completed. The later awards recognized merit in professional performance and service over the longer haul. Collectively, these awards provide a means for identifying those who made significant contributions to engineering, to engineering science and to the profession in Canada.

The first of the annual awards, the Gzowski Medal - recognizing an original paper judged as best by a selection committee - was established in 1889 when a fund for its support was provided by the president, Casimir Gzowski. As awards for other disciplines were established, the Gzowski was given for papers in civil engineering. Much later, a second civil engineering award - the Keefer Medal, named in honour of Thomas Keefer - was established. At the end of World War I, three medals were established for best papers in mining, electrical engineering and chemical and metallurgical subjects. They were named for two presidents, R.W. Leonard and R.A. Ross, and for the late Dr. J.H. Plummer. The Duggan Medal was established in 1935 by George H. Duggan, by then a past president of CSCE, for the best paper dealing with the use of metals for structural or mechanical purposes. The Angus Medal was established in 1957 in honour of the late Robert W. Angus for the best paper in a mechanical engineering subject. Over the years, the subject areas covered by these 'papers' medals have changed, the Leonard and Plummer Medals have been 'retired,' and the administration of the others has been assigned to the member societies.

The Institute has four distinguished service medals, which it continues to administer. The first - the Sir John Kennedy Medal - was named after the fourth president of CSCE, and was established

in 1927 to recognize outstanding merit in the profession. It is the senior award of the Institute. The Julian C. Smith Medal, founded in 1939 to perpetuate the name of a late past president of the Institute, recognizes 'achievement in the development of Canada.' The John B. Stirling Medal, founded to commemorate another past president and with financial support from the E.G.M. Cape Company, and the CP Rail Medal, with financial support from that company, were awarded for the first time in 1988. The first recognizes service to the Institute at the national level, and the second at the regional and local levels. In recognition of professional distinction in more general terms, the EIC has awarded Fellowships since 1963. The 'old' CSCE and the Institute also awarded Honorary Memberships - sparingly - over the years, often to distinguished non-engineers.

Main Historical 'Connections'

From the points of view of both the 'old' CSCE and the EIC, these have been mostly in written-down form, in the publications, Minutes and other records of the two institutions. Of particular importance in the early years were the presidential addresses, some of which attempted assessments of the status of engineering as a whole in Canada. Among the most notable was the very first, by President Thomas Keefer, in which he discussed the reasons for the formation of the CSCE and the steps taken to do so. A notable one in later years was the address by Henry H. Vaughan, who held office at the time of the change-over from CSCE to EIC, which covered the manufacturing of munitions in Canada during World War I - a development that helped to lay the foundations for large scale manufacturing in this country.(2)

In 1925 the EIC Council established a Committee on Biographies whose function - not surprisingly - was to write the biographies of distinguished deceased members. Some of these eventually appeared in the Engineering Journal - for example: the one by Committee members M.J. Butler and J.S. Dennis on Walter Shanly was in the December 1926 issue; the October 1929 issue carried a biography of Sir Casimir Gzowski, written by his grandson, namesake and fellow engineer; and the October 1930 issue carried a biography of Sir Sandford Fleming written by Peter Gillespie, who had been the founding Chairman of the Committee on Biographies. The November 1933 issue included one on E.H. Keating, written a decade earlier by C.E.W. Dodwell. For whatever reason, this Committee 'ran out of steam' in the early 1930s.

Over the years there have also been articles in the Journal that dealt quite intentionally with non-biographical historical matters - for example: the paper by J.G.G. Kerry on the chronology of early Canadian engineering that appeared in the August 1947 issue; the statistical material on the Institute and its membership put together in the late 1940s-early 1950s by Huet Massue; and the

numerous articles contributed over the years by Robert F. Legget, including the one that was titled "Every Engineer Needs a Sense of History"!

Special issues of the Journal have also made 'connections.' For example, the June 1924 issue was devoted to the Canadian contributions to the First World Power Conference, held in London, England, that same year. There was the large and impressive issue of June 1937 that commemorated the Semicentennial of the founding of the 'old' CSCE. Appropriately, it had a gold cover. Its contents, apart from the advertising material, were in three sections. The first was called "The Story of the Institute" and it described briefly the events leading up to the founding of the Society, as well as some of the things that had happened since then. The second gave short biographies of the past presidents - from Thomas Keefer to Ernest Cleveland - and a listing of Honorary Members of the Society and the Institute. The third, and by far the longest, section was composed of essays recalling Canadian achievements in engineering in 17 sub-disciplines - from waterways and hydro-electric engineering, through bridge building, to industrial and manufacturing development.

Another special issue, in May 1943, commemorated the 25th anniversary of the first issue of the Engineering Journal, and the April 1958 issue commemorated 40 years of publication. The September 1962 issue was designated to mark the 75th anniversary of the founding of the Society/Institute, and the September 1968 issue the 50th anniversary of the Journal.

In 1957 the Institute published a book by Frank Norman Walker called Daylight through the Mountain, which covered the professional lives and letters of engineer-brothers Walter and Francis Shanly, the former of whom was the Member who introduced the original CSCE Bill into Parliament in 1887. A second book, a biography of Sir Casimir Gzowski by Zubkowski and Greening, was published under the auspices of EIC in 1960.

At least three of the Institute's branches have written up their stories. The first to appear was in 1959, from Ottawa, in celebration of the 50th anniversary of its founding. It was followed by one from Cornwall and one from the Niagara Peninsula. It should be noted in this same context that, from time to time, branch-related historical material would appear in the Bulletins published by the Ontario Region and the Montréal Branch.

In the mid-1970s a series of articles appeared in the Journal on the beginnings and development of the Institute and of the engineering schools in the Canadian universities. During this period, Professor George Richardson of Queen's University was the Contributing Editor (History) of the Engineering Journal.

The very last issue - late in 1987 - commemorated the 100th

Anniversary of engineering as an organized profession in Canada. It included a description of the jury-selected 10 most important engineering advances of the past century: the CPR line to the West Coast; the St. Lawrence Seaway; the Québec-Hydro high voltage transmission system; the trans-Canada microwave network; the Polymer plant at Sarnia; the Syncrude plant at Fort McMurray; the Alouette satellite; the CANDU nuclear reactor; the de Havilland Beaver; and the snow vehicles developed by Armand Bombardier. Also in 1987, the Engineering Centennial Board - on which the EIC was represented - in association with the National Museum of Science and Technology commissioned Norman R. Ball to research and write a book on the history of engineering in Canada, which was published under the title Mind, Heart and Vision: Professional Engineering in Canada 1887 to 1987.

In contrast with all of this written material, it should be noted that Society/Institute sparingly commemorated engineering achievements and the achievements of individuals through cairns, plaques, tablets or other means.

For example, in November 1924 the Niagara Peninsula Branch of the Institute sponsored a 'semi-public' dinner to commemorate the 100th anniversary of the first Welland Canal. In July 1928 the Institute - jointly with the Association of Professional Engineers of British Columbia - unveiled a cairn at Spuzzum, B.C., to commemorate the work of the Royal Engineers in the construction of the original Cariboo Road. A memorial tablet - erected by the EIC's Peterborough Branch - was unveiled in June 1929 on the Lift Lock at Peterborough, Ontario, in memory of R.B. Rogers, the Superintending Engineer of the Trent-Severn Canal at the time the Lift Lock was built. The Institute erected its own plaques at its Headquarters in Montréal to commemorate those members who served in World War I. Another tablet was unveiled in February 1958 in the concourse of the Canadian Pacific Railway terminal building in Vancouver to honour the work of Henry J. Cambie, one of the senior engineers who contributed significantly to the building of the section of the original CPR line that crossed British Columbia, through the Fraser Canyon, and on to Vancouver. This tablet can still be seen in the refurbished terminal building.

In 1978, the Institute - whose Annual Meeting had just concluded in nearby St. John's, Newfoundland - presented a certificate of recognition as a Canadian Engineering Heritage Project to the Petty Harbour Power Plant. The report on this plant that led to the recognition was prepared by a group of engineering students at Memorial University under the supervision of Professor John Molgaard, who participated in the ceremony.

As the result of an initiative originating with its Ottawa Branch, the EIC began negotiations with the federal government that led in 1972 to the establishment of the Canadian Engineering Heritage Record (CEHR), which was based on an agreement between the

Institute and the (then) Department of Indian Affairs and Northern Development (DIAND). Its objective was a national survey of engineering landmarks that would provide a permanent record of the tangible remains of Canada's engineering and technical heritage, as well as bringing to the attention of the 'responsible authorities' those items that might warrant consideration for preservation or commemoration. The federal government, in addition to funding, provided the assistance of the (then) National Historic Sites (NHS) Branch of DIAND. The Institute's role was to organize regional committees that would encourage the participation of their members in the identification of sites, plants etc. and provide information about them to the NHS Branch. A National Committee of representatives of the federal government and the Institute was formed to coordinate the work. The Chairman was a member of the NHS Branch, and the Secretary was a member of the Institute - as well as a historic restoration engineer in the Department.

The CEHR produced a catalogue of recorded items for the years from 1972 to 1974 from information gathered in nine of the ten provinces and in the Yukon Territory. Thereafter, activity slackened off. An attempt was made to rejuvenate the program, with some success. For example, it encouraged the work at Memorial University that led to the study of the three oldest power plants in Newfoundland - including the one at Petty Harbour mentioned above. And regional activities continued for some years in Ontario, where Ken Serdula of Deep River was the enthusiastic coordinator.

The CEHR program was finally terminated in 1979, for a variety of reasons. The whole story of this joint EIC-government initiative would take quite some time to tell and is beyond the scope of this present paper. But thanks to the intervention of people like Norman Ball, the material collected under the CEHR program was consigned for safekeeping to the National Archives.

On the positive side, this program helped to encourage the establishment of the Ontario Engineering Heritage Record Foundation (OEHRF) by a group of interested engineers (and which is still in operation in 1995). On this side, also, the failure of the CEHR led to the establishment in 1979 by the EIC Council of an Institute-wide History and Heritage Committee with regional and individual representation. This move had the strong support of the EIC Life Members' Organization (LMO). (As mentioned in a companion paper, the case for such a committee was also made in a study done for the EIC President by the Chairman of the CSME History Committee.)

The EIC History and Heritage Committee met for the first time in 1981 in Ottawa, and again in 1983. But it, too, did not last long, becoming a victim of financial constraints as much as lagging enthusiasm for the longer haul that is so important for engineering history activities. But while it lasted, this Committee was able to provide encouragement for the OEHRF and, with LMO sponsorship, for a regional committee in Quebec that continued to meet regularly for

for quite a few years more under the chairmanship of Alan Connelly.

More Recently...

In 1991, EIC President Ferguson invited me to accept appointment as the Institute's Secretary for Public Awareness, History and Archives. The mandate included the devising of means for increasing the public's awareness of the contributions of engineers and engineering to Canada's development, researching and writing up more of the story of the 'old' CSCE and the EIC than had so far been told, and attempting to preserve as much as possible of the remaining archival material associated with the Institute and its national, regional and branch activities over the years.

Unfortunately, under the financial pressures which the EIC experienced between 1991 and 1994, the public awareness activities were marginally useful and were eventually dropped from the mandate. But in general terms these activities will - in the longer run - derive some benefit from the historical and archival work that has remained within the mandate.

To compensate, the history research and writing activities I now pursue have a somewhat broader focus. While the main thrust continues to be associated with the 'old' CSCE and the EIC, some work can be done on the history and development of other professional institutions in engineering in Canada and elsewhere and on the work of Canadian engineers 'generally' and 'in the field' over the years. In June 1995 the EIC Council agreed that, in order to provide a publication vehicle for my work and the related work of others, a series of Working Papers on historical subjects should be initiated, and this has been done.

While some of the archival material associated with the 'old' CSCE and the Institute and its activities has already been placed in the National Archives in Ottawa, much more of it has been destroyed. The work of encouraging the preservation of the portion of this material that still remains has been moderately successful, and is continuing.

On the recommendation of Ralph Crysler - the Chairman of the National History Committee of the 'new' CSCE - and myself, the EIC Council also agreed in 1995 to establish an Advisory Committee of Engineering Society Representatives (ACESR) to provide recommendations to the Historic Sites and Monuments Board of Canada for the national commemoration of Canadian engineering achievements and Canadian engineers.

As EIC Secretary, my work is assisted by the considerable efforts of the National History Committees of the 'new' CSCE and the CSME and by the work of members of the Geotechnical Society and IEEE Canada. This sharing of the load is essential to get the job done.

I also maintain contact with the EIC LMO, with a number of federal and other agencies, and with non-EIC societies and associations active in the engineering history field.

In Summary...

The activities and contributions of the Canadian Society of Civil Engineers and the Engineering Institute of Canada to the history of engineering and the profession in this country have been, for the most part, indirect, sporadic and informal. The Transactions of the 'old' CSCE and the Institute's Engineering Journal have become, with time, important parts of Canada's historical engineering record, and a fuller appreciation of their value for research is still needed.

Not all of the initiatives that the Institute, in particular, has taken to stimulate research have been sustained and their success has been quite limited. It is clear that there is plenty of work still to be done!

Notes

(1) The 'story' of the Engineering Journal has been told in:

Andrew H. Wilson, The Engineering Journal, 1918-1987: Some Notable Highlights, EIC History and Archives Working Paper 1/1995, December 1995 (available from the EIC Headquarters in Ottawa).

(2) H.H. Vaughan, "The Manufacture of Munitions in Canada" Transactions of the Engineering Institute of Canada, Vol. XXXIII, Part I, Montréal 1919.

THE CANADIAN SOCIETY FOR CIVIL ENGINEERING

HISTORY OF CIVIL ENGINEERING PROGRAMME

by

Ralph E. Crysler, FCSCE
Chair, CSCE National History Committee

The Beginning

The Canadian Society for Civil Engineering was reconstituted into its present form in 1972 as part of the reorganization of the Engineering Institute of Canada. Its mandate was to be the principal technical society for civil engineering in Canada. Quite understandably, during the early years the efforts of the Society's members were directed to the organization of local Sections and their programmes, and to the establishment of technical committees. In addition, annual technical conferences were organized and their locale rotated amongst various centres across the country.

In the late 1970s, a few members expressed concern about the need for a History Programme. It was recognized that many civil engineers had little, if any, appreciation of the work and accomplishments of their predecessors. Like the public, many took for granted those great civil engineering accomplishments that had been necessary for the development of Canada as we know it today. By this I refer to such visible achievements as the railways, highways, bridges, canals, harbours and grain elevators, as well as such mundane, less visible, but nevertheless necessary things as water and sewerage systems, land drainage or irrigation systems, or the hidden structural skeleton of every large building.

Although some concerns were expressed in the late 1970s, it was not until early in 1982 that the Directors of the Society asked the late W. Gordon Plewes to develop an appropriate programme. During the Annual Conference in May of that year, Gordon convened a small meeting to consider how this could be accomplished. Out of this meeting came a statement which formed the basis of the Society's History Programme. Let me quote two parts of that statement. First:

> Broadly speaking, the purposes of the programme are to record and preserve whatever tangible evidence remains of the significant works of earlier generations of civil engineers and through suitable publications and publicity to make the general public, and even engineers themselves, more aware of the importance of civil engineering in the historic development and welfare of Canada.

Then, in discussing how this was to be accomplished, it was recognized that:

> ...the ultimate success of the Society's civil engineering history programme depends on the interest and action of individual members throughout the country, and its organization must extend to all Regions and Sections.

The statement also included a list of initiatives to be undertaken as part of the overall objective of publicizing the history of civil engineering in Canada.

A National History Committee was formed and each of the Society's five geographic Regions was asked to name a representative to it. This would give the programme a presence in each Region and, hopefully, would encourage each local Section to become active in the programme as it evolved. The aim was clearly to make the members of the Society and, through them, the general public more aware of the historic importance of civil engineering works in Canada and more aware of the individual engineers who were responsible for those works. This was to be done, initially, by the presentation of papers at the Society's annual conferences, at regional or local conferences and meetings, and where possible, at meetings of non-engineers.

One year later, at the 1983 Annual Conference, held that year in Ottawa, a session of papers on the history of civil engineering was organized. A number of papers were presented. Among the speakers were Mrs. Phyllis Rose and the late Dr. Robert F. Legget. There was also a paper by Neil Fitzsimmonds of the American Society of Civil Engineers describing their History Program, and a paper by Gordon Plewes on the evolution and intent of the Canadian programme. Since then, there has been a session of papers on the history of civil engineering at each Annual Conference. The transcripts of most of these papers have been published as part of the Proceedings of the Conference. To date, more than sixty papers have been published. In addition, many of the Section and Regional conferences have had one or morepapers on the subject and a number of our members have spoken to public meetings and student assemblies.

The Programme and its Elements

One of the components of the programme that was considered in 1982 was the compilation of an inventory of existing historic civil engineering works, listing their location and salient features. This was seen as a first step towards a full documentation of the more significant and historically important civil enginering works in Canada and would build on the lessons of the Canadian Engineering Heritage Record (CEHR). It is only recently that this component has been actively pursued.

A very active and important component has been a programme of placing plaques on or near important national historic civil engineering projects. This is seen as a means for bringing such projects to the attention of the public. It was in 1983 that the first such plaque was placed on the 1859 Pumping Station in Hamilton, Ontario. This plant had been designed by Thomas C. Keefer who was, amongst other things, the first president of the original ('old') Canadian Society of Civil Engineers when it was formed in 1887. The initiative for this plaque came from a group of civil engineers in the Hamilton Section, an early indication that the Sections were supporting the programme.

Commencing in 1984, at the Annual Conference in Halifax, it has become an important feature of each that a plaque be unveiled to identify a National Historic Civil Engineering Site near the locale of that Conference. To date, twelve sites have been commemorated in conjunction with Annual Conferences.

The original Canadian Society of Civil Engineers was founded in 1887. In 1987 to mark the Centennial of that occasion, each Region was encouraged to identify and commemorate a site within its geographical area. In addition, through the initiative of local Sections, a number of plaques have been placed on other sites. To date, a total of twenty-one National Historic Civil Engineering Sites have been identified and marked with a plaque. In addition, one site has been identified and marked as a regionally important historic civil engineering site. All of these are listed in a brochure published by the Society.

There is a well defined procedure that must be followed before a project or site can be recognized as a National Historic Civil Engineering Site by the Society. First, it is necessary for the sponsoring Section to research the history of the project and to document why it deserves to be so recognized. It is a rule that, to be considered for recognition, a site or project must be at least fifty years old. The documentation prepared by the Section must be reviewed by the National History Committee. If satisfied, the Committee then recommends to the Board of Directors of the Society that the site be recognized as a National Historic Civil Engineering Site. Board approval is required before any site can be so recognized. It is also required that the sponsoring Section organize a suitable unveiling ceremony at which the plaque is formally presented by the Society to the owner of the site or project. The owner must, of course, agree to accept the plaque and to maintain it. The full documentation of the site and its histroic significance and of its commemoration is deposited with the National Archives of Canada for safekeeping and to be available to scholars.

In cooperation with the American Society of Civil Engineers, we have commemorated two International Historic Civil Engineering Landmarks. The Quebec Bridge was so commemorated in 1987, and then

in 1994 the White Pass & Yukon Railway, which runs from tidewater at Skagway, Alaska, to Whitehorse in the Yukon, was commemorated. It is interesting to note that in 1982, when our programme was just being introduced, the ASCE approached us with the idea of commemorating the White Pass Railway. After some initial correspondence, the idea seems to have been dropped. About ten years later, in 1993, it was raised again, both by ASCE members in Alaska and CSCE members in the Yukon, leading to the 1994 commemoration. The White Pass & Yukon Railway was commemorated by unveiling one plaque in Skagway and another in Whitehorse. A third plaque was placed near the summit of the route, close to the Canada-USA border.

It is anticipated that in 1996 this Society, together with the ASCE, will commemorate the Alaska Highway. For this, one plaque will be located in Dawson Creek, British Columbia, which is the southern terminus of the highway, and a second plaque at Delta Junction in Alaska, which is the northern terminus. It is probable that a third plaque will be placed at Haines Junction in the Yukon, and possibly a fourth at Fairbanks, Alaska.

Our plaques are quite simple. They merely identify the site or project, the principal engineers involved and either the years of construction or the year of completion. All plaques must be in both official languages. Since there is nothing on the plaque to indicate the significance of the site or project, it was realized that some interpretation of the site was necessary for the public to appreciate the significance of the project. For this reason, we commenced in 1993 to prepare descriptive 'tourist type' brochures of the various sites. It is intended that these should be distributed through various tourist bureaux or at local interpretive centres, such as exist near the reversing falls in Saint John or at Craigellachie, the site of the last spike on the CPR. This idea is still being developed. Four brochures have been produced to date on a trial basis. We are now looking into long term financing of this initiative as well as the distribution methods.

In 1990, the National History Committee initiated a programme of oral history, through which senior and experienced engineers would discuss their careers and comment on the profession. The National Archives of Canada expressed an interest in this programme and provided a number of high quality audio tapes for the interviews on the understanding that the originals would be deposited in the Archives. Recognizing that this project would require a skilled interviewer, the Committee sought the assistance of Professor Janis Langins of the University of Toronto. Through him, we were able to secure the services of a graduate student, Richard White, now Dr. Richard White. To date, Dr. White has interviewed seven senior engineers. Listening to these tapes one gets an interesting set of perspectives on the engineeeering profession - its successes and its foibles - as well as some fascinating social commentary. Of

necessity for logistical and financial reasons, all of these interviews were with engineers resident in Southern Ontario. We think of what has been done so far as a very successful trial period, and we are now looking for ways to expand it. This will require the participation of the Sections and of individual members across the country.

Another interesting concern of the History Committee comes from the legacy of Harry F. McLean. Mr. McLean was not an engineer, but was a very successful civil engineering contractor active in Canada during the 1920s, 1930s and into the 1940s. The story of Harry McLean is really material for a separate lengthy paper on the history of civil engineering construction in Canada, or even of Harry McLean himself. Suffice it to say that McLean was ahead of his time in his concern for the safety, comfort and well-being of his employees on remote and isolated construction sites. Among his legacies to the people of Canada were the cairns he erected at the sites of some of his major projects. They were erected "In Honour of the Men Who Worked and Died on this Project - The Sons of Martha." Each of the four faces of each cairn carried two of the eight verses of Kipling's great poem "The Sons of Martha" which derives from the story of Jesus visiting Mary and Martha, as recorded in Chapter 10 of St. Luke's Gospel. The Committee was aware that there were a number of these cairns in Canada and that no provision had been made for their maintenance or care. From the National Archives we learned that there were nine such cairns known to be in this country, and possibly three more in the United States. We also learned that the Lake of the Woods Chapter of the Association of Professional Engineers of Ontario had restored the cairn at Hawk Lake, near Kenora.

Over a period of several years, the Committee wondered what could be done to preserve the cairns, but in fact did nothing. Finally, in 1994, the Committee decided to find out if all of the cairns still existed and what condition each was in. This was a first step towards their preservation. With the assistance of several people, it has now been determined that eight of the original cairns in Canada still exist. Each is being inspected, photographed and measured. The ninth one, near Merrickville, Ontario, seems to have disappeared, possibly in the expansion of the quarry which was part of one of McLean's first major projects. We are now working with the people of Churchill, Manitoba, towards the restoration of the cairn there. We hope to be able to encourage the restoration of the other cairns, and to make the story behind them known to the public.

McLean was born and raised in Bismarck, North Dakota. It was while searching in the State Archives there that, almost accidentally, we found one cairn in the Town of Washburn, some forty miles to the north. McLean's father had been the first mayor of Bismarck, and the county surrounding Washburn had been named in his honour. McLean wished to erect a monument in Washburn in honour of the

pioneers and early settlers. However, the State Legislature insisted that the monument be placed in Bismarck, the capital. This was done, and McLean placed one of his cairns in Washburn in place of the monument. This cairn has been well preserved by the people of there. Although everyone in Washburn knew the "Sons of Martha" cairn, no one knew what it commemorated or who erected it. We have since provided them with background information on McLean, his works, his cairns and his legacy. Also, we found a considerable amount of information about McLean and his early life in the State Archives, and we have subsequently exchanged information with the Archivist there.

A while back, some of us became concerned that this Society, with its extended programmes of conferences and lecture tours as well as its many committees, Sections and Regions, had no prescribed philosophy or procedure for the retention of its own records. There was, and still is, no system or policy for the preservation of the archives of the Society. There is no central repository for records of the many committees, Sections and Regions, and we realized that many of the records of the Society were stored in the personal files of many members and that some of these records were being lost as files were 'house-cleaned.' There is an obvious dichotomy between having a Committee concerned with preserving the history of civil engineering in Canada while, at the same time, doing nothing to preserve the records of the Canadian Society for Civil Engineering. Therefore, at our own request, the Directors instructed the National History Committee to form a Task Force to establish and implement an Archival Policy. We are now working on this.

One of the objectives of the History Programme is to recognize, through honours and awards, outstanding contributions in furtherance of the knowledge and study of the history of civil engineering. To this end, the Society created a History of Civil Engineering Award in 1992 and named it in commemoration of the late Gordon Plewes. This award is given - on the recommendation of a sub-committee of the National History Committee - to an individual who has made particularly noteworthy contributions to the study and understanding of the history of civil engineering in Canada, or of civil engineering achievements by Canadians elsewhere. The recipient need not be an engineer, and this is one of the very few honours awarded by the Society that can be given to non-members. The first recipient, in 1992, was the late Dr. Robert F. Legget. In 1993, it was awarded to M. Gilles Desaulniers, in 1994 to Phyllis Rose, and in 1995 to Roy Minter. Each of them has contributed greatly to the study of the history of civil engineering in Canada.

The Organization of the Programme

So far, this paper has outlined the origins and elements of the History Programme of the Canadian Society for Civil Engineering,

and has described some of the initiatives undertaken within it. Let us now look at how the programme is organized within the Society.

Earlier in this paper, I quoted Gordon Plewes as having written that:

> ...the ultimate success of the Society's civil engineering history programme depends on the interest and action of individual members throughout the country and its organization must extend to all Regions and Sections.

This concept was reflected in the programme outline he drafted. The Sections were given the responsibility to prepare an inventory of historical civil engineering works within their area of influence, to collect, catalogue and preserve documents, artifacts and publications of significant historical interest, and to identify civil engineering works potentially worthy of national recognition. They were encouraged to form Section History Committees. The Chairs of the Section History Committees serve as members of the Regional History Committee. The Regions were given the responsibility of encouraging and coordinating the work of the Sections. In addition, the Chair of the Regional History Committee is a member of the National History Committee.

The National History Committee consists of the Regional History Chairs and individual members having special interests or expertise who are appointed by the Chair, who is, in turn, named by the Board of Directors. The National Committee has broad responsibilities to encourage the formation and ongoing operations of the Regional and Section Committees, as well as doing on a national scale what the Sections are to do at the local level. The Committee also has the responsibility of vetting any recommendations for the commemoration of National Historic Civil Engineering Sites.

The original 1983 programme, as written by Gordon Plewes, was slightly modified in 1989. In June of 1995, the Board approved a major re-write of the programme. Although the aims and objectives of the programme remain essentially unchanged, the re-write was necessary to accommodate certain changes within the structure of the Society itself and to recognize the way the programme had evolved.

Finally, one may well ask how successful the programme has been. Like any volunteer organization, it has had its ups and downs. A few Sections have, from time to time, been actively pursuing the History Programme, but this has waxed and waned depending on the interest and enthusiasm of the Section Executive Committee and of individual members. Similarly, some Regions have, from time to time, taken an active interest in the programme, depending upon the interest of the Region Executive Committee, and more importantly, the enthusiasm of the Regional History Chair.

Taking the long view, I think the History Programme has been reasonably successful. Slow but steady progress has been made. We have a long way to go, but with new Sections and a full complement of Regional History Representatives, I believe the future of the programme looks very promising. I believe that it will succeed in making engineers and non-engineers more aware of the very important roles that civil engineers have played in the development of Canada.

THE HISTORICAL METALLURGY COMMITTEE OF THE CANADIAN INSTITUTE OF MINING, METALLURGY AND PETROLEUM

by

Fathi Habashi
Chair, CIM Historical Metallurgy Committee,
and Université Laval

Introduction

Canada is a major producer of minerals and metals, ranking first in the world in uranium concentrate production, second in niobium, tantalum and asbestos, and third in elemental sulfur. In refined metal production, Canada ranks first for zinc, second for nickel, third for aluminum, gold and platinum, fourth for copper and magnesium, fifth for silver, and sixth for lead. The value of annual mineral production in Canada today is more than $40 billion, of which 55% comes from fuels, 34% from metals, and 11% from industrial minerals. Contributions by provinces are as follows: 41.4% Alberta, 18.7% Ontario, 10.5% British Columbia, 7.7% Saskatchewan, 7.2% Quebec, and 14.5% the other provinces. The major growth of this industry began in the late 19th century.

In 1898, several provincial associations of Canadian mining and metallurgical engineers formed a federation which became the Canadian Mining Institute, known today as the Canadian Institute of Mining, Metallurgy and Petroleum (Figure 1). In 1945, a division of the Institute was created, which became the Metallurgical Society, to cater to the interests of professionals in the field of metallurgy (Table 1). In 1979 the Metallurgical Society founded the Historical Metallurgy Committee (Figure 2). Its objectives were to bring together members interested in, or active in, archeometallurgy and the history of metallurgy, and to promote the recording and preservation of Canada's metallurgical heritage. Before summarizing the activities of this Committee, it is worthwhile to review a little of the history of Canada's mining and metallurgical industry.

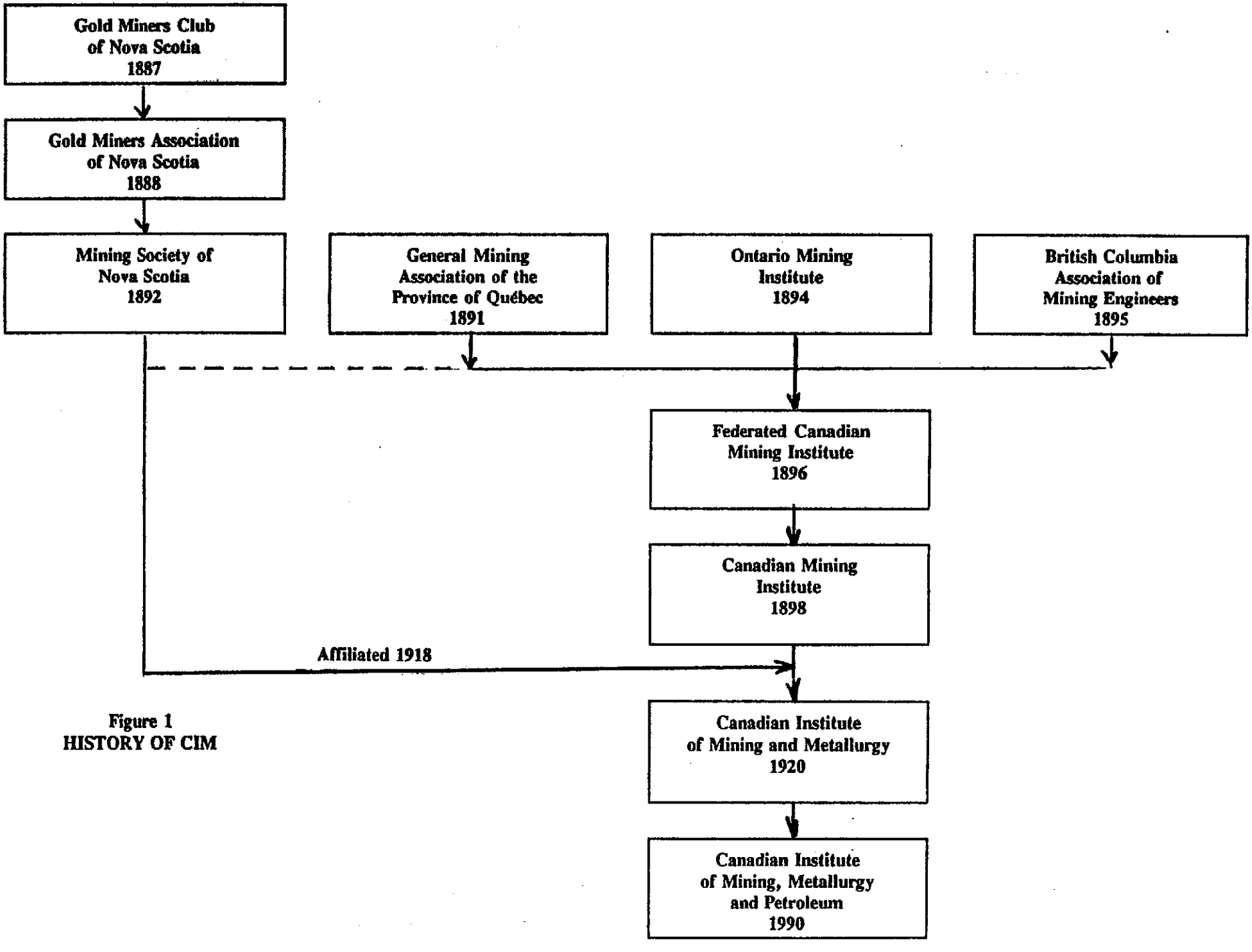

Figure 1
HISTORY OF CIM

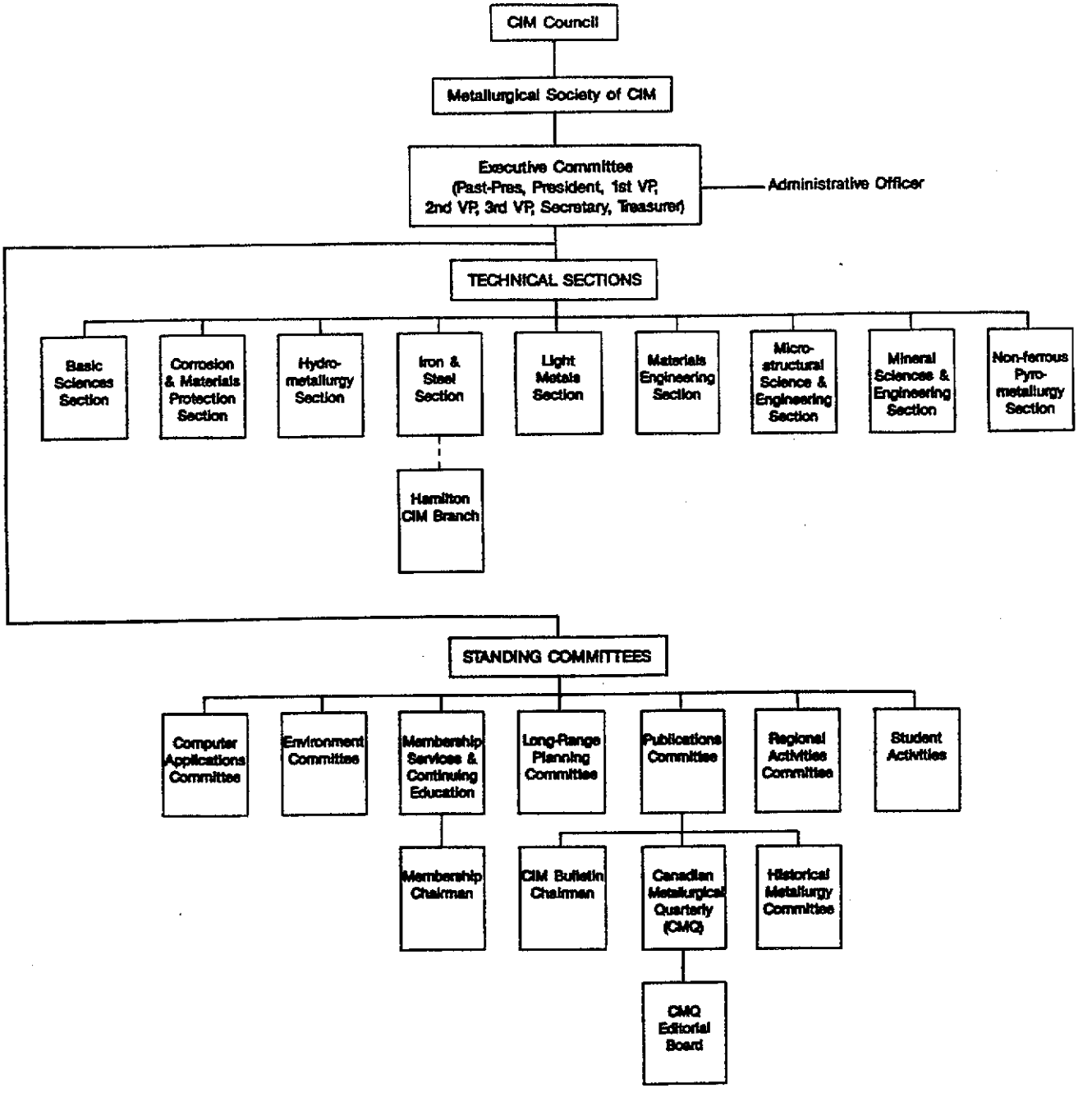

Figure 2
Sections and Committees of the Metallurgical Society

Table 1 - CIM Divisions/Societies

Year of Foundation	Division or Society
1892	Mining Society of Nova Scotia
1934	Industrial Minerals Division
1944	Coal Division
1945	Geological Society (formerly Geology Division)
1945	Metallurgical Society (formerly Metallurgical Division)
1946	Metal Mining Division
1949	Petroleum Society (formerly Oil and Gas Division)
1961	Maintenance Engineering Division
1962	Canadian Mineral Processors
1965	Mineral Economics Society (formerly Mineral Economics Committee)

Contribution of Canadian Metallurgists

The first metallurgical operation in Canada was an iron works at the Forges Saint-Maurice near Trois-Rivières in the Province of Quebec. It operated continuously from 1736 to 1883, when its technology originally imported from France and based on charcoal as a reducing agent became obsolete. In England, it was discovered that coal could be transformed to coke which effectively replaced charcoal and allowed larger and more economical iron furnaces to be built.

The 19th Century

Contrary to common belief, the first oil well in North America was drilled by the Canadian James Miller Williams (1818-1890) at Oil Springs near Sarnia, Ontario, and not by Edwin Drake (1819-1880) in Pennsylvania. Williams' well was drilled in 1857 and Drake's in 1859. During the second half of the nineteenth century, many other important mineral deposits were discovered in Canada: nickel, copper, asbestos, and phosphate rock.

* *Nickel.* In 1883 a rich copper discovery was made accidentally near what is now Sudbury, Ontario, during the construction of the Canadian Pacific Railway. The Canadian Copper Company was then formed and in 1886 ore was sent to the Orford Works in New Jersey for smelting at the Orford Copper and Sulfur Company. However, it was found that on smelting the ore produced a pale yellow metal and not the red metal. On analysis, the product was found to be an alloy of copper with nickel. The company was thus faced with two

problems: no method was available at that time for separating copper from nickel, and the uses for nickel were restricted. Nickel was used mainly in making German silver, coinage, and electroplating and the only nickel produced at that time came from the garnierite ore in the French Colony of New Caledonia. Both problems were eventually solved with great success and nickel production shifted from French to Canadian hands.

Of the numerous attempts to make the separation of nickel from copper, the one tried in 1891 using sodium sulfate as a flux was the most promising. Sodium sulfate was a waste product of a nitric acid plant treating the sodium nitrate from Chile with sulfuric acid, to make explosives. When the matte was produced in the presence of sodium sulfate and coal and allowed to cool, two layers separated: the upper layer contained most of the copper, while the lower layer contained most of the nickel. This resulted in what became known as the Orford process. In 1902, the Canadian Copper Company and the Orford Copper Company merged to form the International Nickel Company, now known as INCO.

An important use of nickel emerged in 1885 when the superiority of armour plate from French nickel-steel was demonstrated and the U.S. government decided to adopt it. During World War I, the world consumed all the nickel that could be supplied. The manufacture of stainless steel, in which nickel and chromium are major components, came later. The Orford process continued to be used until 1948, when it was replaced by the controlled cooling process.

* *Copper.* The Acton mine in Quebec, which operated from 1859 until 1864, was for a time considered the most important in the world. In 1888 a large copper deposit was discovered at Britannia in British Columbia. from 1925 to 1930, the Britannia mine was the largest copper producer in the British Empire. The mine, which is now a National Historic Site, produced 50 million tons of ore during its 70-year history.

* *Asbestos.* The fireproof properties of asbestos were recognized by the Greeks and Romans, but its industrial use only began when large deposits were discovered in the Province of Quebec in 1874. Mining began on a small scale in 1877, and fifty tons of raw fiber were produced in 1878. This preceded by many years production in other countries: Russia in 1895, and South Africa in 1900.

* *Phosphate Rock.* The growing fertilizer industry in Great Britain in the second half of the 19th century was dependent on mines in Quebec and Ontario for its phosphate supplies. The first of these mines started in 1850 and was most active between 1878 and 1892, reaching a peak in 1890 when over 31 000 tons were shipped. By 1895 output had declined to 1 822 tons owing to the discovery of deposits in Florida. Inspite of this, in 1897 the Electric Reduction Company was founded at Buckingham, Quebec, and an

electric furnace was built to produce elemental phosphorus from phosphate rock. This was one of the world's earliest electric phosphorus plants.

The 20th Century

In 1902 the world's first electrolytic lead refining plant, using the Betts process, was installed at Cominco in Trail, British Columbia. This plant is still operating today. In the year 1904 the Shawinigan Carbide Company was set up in Shawinigan Falls, Quebec, to exploit a process developed ten years earlier by T.L. Willson, a Canadian engineer, for the production of calcium carbide. This was the first commercial calcium carbide plant.

* *World War I.* The year 1915 saw the first commercial production of magnesium in North America by the Shawinigan Electro Metal Company. Canada's first nickel refinery was built in 1916-1918 at Port Colborne, Ontario. In 1916, Cominco introduced the electrolytic process for zinc production; the process was developed in cooperation with the Anaconda Company in Montana.

* *World War II.* The need for uranium metal for the war effort and the presence of large uranium deposits in Canada created a strong uranium industry. One result was the world's first modern plant for the acid leaching of uranium ore. Also, the need for magnesium resulted in the development of a new process by Lloyd Pidgeon, a metallurgy professor at the University of Toronto. The process is based on the reduction of calcined dolomite with ferrosilicon.

* *After the War.* A major event occurred in 1952 when the world's first oxygen flash melting furnace for the production of copper started up at INCO's Copper Cliff smelter. The use of tonnage oxygen (liquid oxygen) simultaneously displaced coal as a fuel, reduced sulphur dioxide pollution, increased energy efficiency, and decreased production costs. The Orford process was replaced in 1950 by a new, more economical route: slow cooling of matte to separate copper sulfide from nickel sulfide. Also in 1950, a smelter was started up at Sorel, Quebec, employing a novel process for treating ilmenite to produce cast iron and titanium slag, known as Sorelslag.

Canada is famous for the development of pressure leaching processes for metal extraction. Ammonia was used for the first time on a commercial scale in the 1950s to solubilize nickel-cobalt sulfides in autoclaves at Sherritt Gordon Mines in Fort Saskatchewan, Alberta. The metals were precipitated from solution by another novel process using hydrogen under pressure. Ammonium sulfate fertilizer was produced as a by-product.

In the 1960s many other new processes were developed in Canada:

* the direct electrorefining of nickel sulfide at INCO's refinery at Thompson, Manitoba;

* the top blowing rotary convertor for converting nickel sulphide into metallic nickel at INCO's refinery at Sudbury, and copper sulphide into metallic copper at Afton, British Columbia;

* oxygen bottom blowing was invented by researchers at Air Liquide in Montreal to produce better quality steel in larger tonnage and in shorter time.

In the 1970s, Noranda developed a unique reactor for producing metallic copper directly from concentrates. INCO introduced the pressure carbonyl process for refining nickel at Sudbury. In the 1980s, Canadian Copper Refiners in Montreal East developed a new process for treating anode slimes from copper refining using a top blown rotary converter.

Canada was the first to adopt German technology for producing iron by the direct reduction process known as Midrex at a plant in Contrecoeur near Montreal in 1970. In 1981, Canada was also the first to adopt the Japanese Mitsubishi process for the continuous production of copper at Kidd Creek in Ontario.

In the 1980s, the direct pressure leaching of zinc sulfide concentrates in autoclaves was applied by Sherritt Gordon at the Cominco refinery in Trail. The process is now used successfully outside Canada.

The Historical Metallurgy Committee

Historical Metallurgy Notes

One of the first initiatives of the Committee was to sponsor a section in the monthly Bulletin of the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) entitled HISTORICAL METALLURGY NOTES. In 1989 a compilation of selected articles from the first ten years was published as a book under the title All That Glitters: Readings in Historical Metallurgy. This volume of 200 pages contained 26 articles directly related to Canadian metallurgical and mining history and 17 articles of general interest. It received many favourable reviews. It is expected that another volume of selected articles will be published in 1999.

* *Canadian Historical Metallurgy*

HISTORICAL METALLURGY NOTES has published original research on the history of Canadian metallurgical installations including:

Early History of Iron in Canada (Dunn, Feb. 1980);
The First Copper Smelter in Canada (Kossatz and Mackey, May 1980);
Metallurgical Developments of Deloro, Ontario, 1868-1919 (Towles, March 1982);
The First Cyanide Leaching Plants in Canada (Dutrizac, 1985);
The Historical Development of Copper Smelting in British Columbia (Bradford, Nov. 1987); and
Early Canadian Lead Smelters (Dutrizac and Sunstrum, Dec. 1988).

* *Anniversaries*

Reminders to practicing metallurgists of the anniversaries of certain events by means of published articles included:

1987 Hundredth anniversary of the cyanidation process for gold extraction;
1988 Hundredth anniversary of Bayer process for alumina production (this paper was published simultaneously, by special agreement, in Light Metals in 1988 and in the Arab Mining Journal);
1989 Fiftieth anniversary of the discovery of uranium fission;
1995 Hundredth anniversary of the discovery of x-rays;
1995 Fiftieth anniversary of the first atomic bomb.

* *The Great Empires*

Since ancient times, empires have risen and fallen. Technology, and in particular the use of metals, has been one of the dominating factors. A series of articles was devoted to tracing the development of chemistry and metallurgy in ancient empires such as the Egyptian, Greek, Persian, Euroasian and American Indian. Modern empires such as the Spanish, Swedish, Russian, British, French, German, Austrian, Belgian and American were also discussed. The article on the Spanish Empire was translated into Spanish and published by the University of Atacama in Copiapo, Chile.

* *Biographies and Obituaries*

Biographies and obituaries of distinguished metallurgists and mining engineers have been published from time to time - for example:

1980 Henry Clifton Sorby (1826-1908)
1981 James Douglas (1837-1918)**
1981 Henry Cort
1982 Edward Haycock**
1983 Charles Hayes**

1983 John George Miller (1841-1885)**
1983 Juan José D'Elhuyar (1754-1796)
1985 Ida Noddack (1896-1978)
1986 Charles Martin Hall (1863-1914) and Paul Héroult (1863-1914)
1989 Carl Wilhelm Soderberg (1876-1955)
1990 Gérard Letendre (1906-1988)**
1991 Charles Robb Masson (1922-1988)**
1993 Cyril Stanley Smith (1903-1992)
1993 Paulo Abib Andery (1922-1976)
1944 Alexander Sutulov (1925-1991)
1944 Georgius Agricola (1494-1555)
1995 Aloys von Widmanstatten (1754-1849)
1995 Franz Pawlek (1903-1994)

Those marked with a double asterisk (**) are Canadians.

* *Technical museums, historical landmarks and industrial archeology*

Technical museums are excellent places to study the history of technology. Articles on the Britannia Mines Museum and the Nelson Museum in British Columbia, iron museums, Poland's salt museum, blast furnaces in Slovakia and the Museum Library at Miskolc in Hungary were published. Ancient ruins or historical sites of metallurgical significance are worth conserving. They are reminders of old technology. Articles on the iron pillar of Delhi, the Ytterby mine near Stockholm, and the imposing ruins of the silver refinery at Antofagasta, Chile, were also published.

* *Miscellaneous*

A variety of articles of general historical interest have also appeared in HISTORICAL METALLURGY NOTES:

Metals and Alloys in Musical Instruments;
History and the Metallurgy Curriculum;
Mining, Metallurgy and Mythology;
Discovery of Metals;
A series of articles on the history of metals in chronological order;
Gold Through the Ages;
Discovery and Industrialization of the Rare Earths; and
History of Metallurgy in Finland: The Story of Outokumpu.

Conference of Metallurgists

The Metallurgical Society holds an annual Conference of Metallurgists in different cities across Canada. The Historical Metallurgy Committee holds its meetings at this Conference, with a

luncheon and an invited speaker. The Committee has also sponsored technical sessions at the Conference. For example, in 1983 a symposium was held on the history of ironmaking in Canada.

Book Reviews

The Committee has embarked on a book review program - a service to the readers of the CIM Bulletin and to publishers of historical books that are of interest to metallurgists. During the three-year period, 1992-1995, twenty books were reviewed.

Contacts with other Organizations

Contacts have been established with many organizations involved in the history of technology and metallurgy - for example:

* Historical Metallurgy Society, London, England. An agreement has been made with this Society whereby abstracts of papers published in the Society's Journal are published in the CIM Bulletin, and abstracts of papers published in the Bulletin are published in the Journal;
* Chemical Heritage Foundation in the United States, Philadelphia, Pennsylvania;
* Canadian Science and Technology Historical Association, Kingston, Ontario;
* Minerals, Metals and Materials Society of the American Institute of Mining, Metallurgical and Petroleum Engineers, Warrendale, Pennsylvania;
* Canadian Institute of Chemistry, Ottawa;
* Canadian Industrial Archeology Society, Ottawa;
* Engineering Institute of Canada, Ottawa;
* History of Chemistry Division of the American Chemical Society, Washington, D.C.;
* Das Deutsche Museum, Munich, Germany;
* Institute for the History of Arabic Science, Aleppo, Syria;
* Museum Library, Miskolc, Hungary;
* International Union of History and Philosophy of Science, Liege, Belgium; and
* Académie Internationale de l'Histoire des Sciences, Paris.

Special Projects

Several years ago, the Committee attempted to interest the National Museum of Science and Technology in Ottawa in collecting and preserving artifacts and in creating exhibits pertinent to Canada's mining and metallurgical heritage. The Forges Saint-Maurice, the

first metallurgical plant in Canada, has received special attention from the Committee. Besides several articles published in the CIM *Bulletin*, plans are underway to unveil a memorial plaque at the Forges in August 1996, recognizing it as a national historic site. An exhibition on the Forges prepared by Parks Canada was displayed during the Conference of Metallurgists in Toronto in August 1994, and at Laval University in Quebec City in October 1995.

Over the years, the CIM Bulletin has received many favourable letters commenting on the historical metallurgy articles. These are published as "Letters to the Editor."

Acknowledgement

The author is greatly indebted to Dr. Peter Tarassoff, founder of the Historical Metallurgy Committee and former President of CIM, for his editorial comments.

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29

HISTORY ACTIVITIES:

THE CANADIAN SOCIETY FOR MECHANICAL ENGINEERING

by

Andrew H. Wilson
Chair, CSME History Committee

Introduction

Up until the late 1960s most mechanical engineers who belonged to a Canadian 'learned' society were members of the Engineering Institute of Canada, which was open to all disciplines. The Institute did, in practice, encourage the formation of special interest technical divisions affiliated with its Committee on Technical Operations (CTO), which had responsibility for encouraging the writing and presentation of papers at annual and other meetings and conferences. One of these divisions was for mechanical engineering, and at least two others had close associations with this discipline.

During the 1960s, the EIC Council recognized that specialization was becoming more and more important for engineers and that the Institute had to become more effective in assisting the exchange of technical information. At the same time, it foresaw dangers for the learned aspect of professional development in the rapid growth that was taking place in the number of small, highly specialized 'splinter' societies of both domestic and foreign origin that were springing up in this country. The Council therefore accepted the rcommendation of the CTO that the technical divisions be encouraged to become autonomous constituent societies operating within the Institute's Charter. These societies would still be broadly based, but would provide satisfactory coverage for splinter groups within their respective disciplines. Two birds would therefore be killed with one stone, so to speak.

Accordingly, in June 1968 a Steering Committee - which became known as the Downing Committee after its Chairman - was set up and charged with the task of developing a plan for a mechanical engineering society. Around this same time similar committees were established in geotechnical, electrical and civil engineering. The Downing Committee was the first to complete its work and the Canadian Society for Mechanical Engineering was formally established as the first of the EIC societies in April 1970.(1)

The Beginnings of the History Committee

Currently, the CSME History Committee is among the most active within the Society. It was established in late 1975 when President

George Aldworth invited me to set up a committee that would deal with mechanical engineering history and heritage matters and "would contribute appropriate articles to various publications, participate in section meetings, and interface with the EIC and with federal government authorities." Interestingly, in my response to the President I wrote:

> I believe that what you have in mind is an excellent addition to the activities of the Society. In my own case, I feel that a project of this kind would make a desirable and rewarding retirement activity. However, since retirement is quite a few years away, my ability to participate will depend very much on the demands of my current employment.

As it happened, I was able to take on this project. But it was not until I had 'semi-retired' from full-time paid employment more than a decade later that I could devote anything like a satisfactory amount of time to CSME and other engineering history activities.

Terms-of-reference for the new CSME Committee were put together in 1976. Somewhat grandly, they said that it was mandated to initiate and coordinate:

> - researches, documentations and examinations of the history of mechanical engineering in Canada;
>
> - the reproduction in appropriate forms of such researches etc. that are of particular interest and importance;
>
> - the organization of appropriate seminars, meetings and exhibitions; and
>
> - the historical work of CSME in cooperation with EIC and with other professional societies in Canada and abroad.

The Committee was also mandated to encourage:

> - the expansion of archives, museums and other collections of mechanical engineering drawings, papers and artifacts, and the opening of new ones; and
>
> - the participation of non-EIC and non-CSME members, as well as non-engineers, in its activities.

These terms-of-reference were sent to CSME's Technical Operations Committee for approval prior to being ratified by the Council of the Society early in 1977. The appointments of the initial members of the Committee were also approved at this time. These included representatives of the five main regions of Canada.

Some time earlier I had became aware of the EIC's involvement with the federal government in the Canadian Engineering Heritage Record (CEHR) and of the existence of a coordinating committee associated with it, but was never invited to help with its work. However, I was able to make contact with George Richardson, who was then the Contributing Editor (History) for the Engineering Journal. None of the other constituent societies had history activities at this time.

Working in Ottawa, I was able to approach the recently appointed Science and Technology Archivist at the National Archives on Wellington Street - Norman Ball - and sought his advice. From him I became aware of the relevant activities in the National and Provincial Archives and in several universities, and of the existence of the Canadian Science and Technology Historical Association (CSTHA).

Further afield, I looked into what American and British mechanical engineering societies had done from the historical point of view. From ASME I found out that it had a History and Heritage Committee and published historical and biographical articles, but its main activity appeared to be in what is called 'landmarking' or commemorative plaquing. I also learned that Bruce Sinclair, then at the University of Toronto, was about to embark on the writing of a commemorative volume to mark ASME's Centennial in 1980.

During my first term chairing the CSEME History Committee, which lasted until early 1980, only parts of the formal terms-of-reference were in fact implemented, although there was no lack of ideas about what might be attempted! A lot of time was spent learning the ropes. The main problem was to get some action.

The Committee's business was conducted by phone and letter since the cost of arranging for meetings at some central spot was more than the Society could afford. Undoubtedly this was not a good situation from the point of view of the individual members. Also, cost was the main factor in the failure to follow up a number of promising initiatives. As things turned out, the Committee's most visible product at this time was a series of articles, reviews and news items - some of them in a column called "From the Past" - written by several of the ten members, which appeared in CSME's Newsletter and Bulletin or in the Engineering Journal.

As Chairman, I wrote many letters to a variety of people exploring what might be done to get more history recorded, to unearth what had already been recorded, and to try to find financial support from outside the Society. The results were quite disappointing. On the one hand, since engineering had been practiced in Canada for many years, there was no need to rush to get its history written down. But on the other, there was the problem of preventing more of the records, papers and photographs associated with it from being destroyed. And there was a general lack of interest in matters

historical among the Society's members and among potential sources of financing.

However, I was able to give a number of talks to students on aspects of mechanical engineering history in Canada. In 1978 I joined CSTHA, whose biennial conferences enabled me to broaden my contacts with both academic and amateur historians of science, technology and engineering and to learn more about the 'business' of history.

In September 1978 I wrote an assessment of CSME's history activities up until then in a memorandum that was sent to selected members of the Society's Council and to the EIC President. By this time I had decided that the best approach did not lie in designing a specific program for the work of the Committee but, rather, in finding the right people to do the work, allowing them a lot of freedom to select and do projects, and letting the overall situation develop from there. One of the main problems was a lack of volunteers with historical interests and inclinations. Another was the gulf in knowledge of the subject between the amateurs and the professionals. Yet another was the lack of interest among engineers in general about the history of their profession. And then there was the collapse of the CEHR.

I concluded that, for the Institute as a whole, there should be a strong 'anchor' committee in the history field serving the Institute as a whole, and actually suggested that the CSME might 'collapse' its own into it. An anchor committee was actually set up by the EIC Council, under pressure from its Life Members' Organization (LMO), and functioned for several years in the early 1980s. CSME belonged to it - but its own committee was not disbanded.

Another conclusion was that it would be a relatively long time before CSME could write a definitive history of mechanical engineering in Canada with just a volunteer committee and a miniscule budget. So priority should be given to what might be called 'bite-sized' research projects and to the writing of a series of articles and papers from which, eventually, a book might emerge.

By 1979 the time I could devote to the History Committee had been shortened further. I had been elected Senior Vice-President of the Society and would be President a year later. I resigned the chair early in 1980 and was succeeded by John Molgaard, a professor of engineering at Memorial University, who had already established a reputation for teaching and leading student projects in the history of engineering, with special reference to Newfoundland. John chaired the Committee until his resignation in September 1983. But although he participated in the work of the EIC anchor committee, his main interest lay in the history of engineering in Newfoundland, and to this he devoted most of his energies. Having

been closely associated with the Petty Harbour project - which was recognized in 1978 by the EIC - he also had a strong interest in the CEHR and was disappointed when this program was discontinued.

In September 1984 Anthony W. Parfitt was elected to chair the CSME Committee. A busy consulting engineer with a well-known Montreal firm and an expert in the design and operation of both steam and gas turbines, he had recently published an article on the Rideau Canal on the occasion of its 150th anniversary. While in the chair, Tony attended the meetings of the CSME National Council regularly and made a number of useful recommendations for history-related activities, but his busy professional schedule left him little time for research and the rebuilding of the Committee.

I began a second term in the CSME History Committee chair at the Annual Meeting of the Society in Ottawa in May 1989. By then a full slate of new members was required. This time around I decided to build the membership over the longer haul by nominating from time to time those colleagues who had expressed interest in becoming members, as well as those who undertook special tasks on behalf of the Committee - such as organizing the annual seminars. While regional representation was again an objective, it - too - was achieved over the longer haul. As at the time of presentation of this paper, the Committee's membership was ten - roughly the same as it had been in the 1970s.

This time I began right away to develop material for the CSME Bulletin - now a much more sophisticated publication than its earlier counterpart - with the cooperation of the Editor, Robert F. Duston. This has emerged as three separate series of 'pieces' that have been appearing regularly since September 1989, namely: articles on topics of engineering/historical interest; articles on the beginnings and development of the departments of mechanical engineering in the Canadian universities; and news columns. Whenever possible, the university contributions have been written by the chairs or faculty members of the departments concerned. All of the History Committee's Bulletin material has been appearing under the heading DE RE HISTORIAE...

Some new terms-of-reference were developed for the Committee and approved by the CSME's Board of Directors in 1992. They read somewhat differently from the original ones, and all of them pertain to the development of mechanical engineering in Canada:

> - to encourage members of the Society to participate in the collection of papers, reports, drawings, photographs etc.;
>
> -to encourage some of these members to undertake and document specific projects;

- to promote the presentation and publication of papers and the exhibition of drawings, photographs, artifacts and other items;

- to maintain contact with other history committees and groups within the learned and other societies serving the engineering profession in Canada;

- to develop contacts with professional historians, archivists and others whose work involves the study of mechanical engineering.

Two years later, having thought carefully about the Society's possible role in landmarking and commemoration, a sixth part was added by the Board:

- to carry out a program of commemoration of sites, plants and artifacts of significance for the discipline by the selective placing of suitably inscribed plaques.

Over the past several years some action has been taken to implement all of these elements.

For example, with regard to publishing, a series of Working Papers has been initiated to supplement the material in the Bulletin, to provide a vehicle for longer articles and research reports, and to bring 'work-in-progress' to the attention of others who might find it useful. Since 1991 a History Seminar has been organized in conjunction with the Society's Annual Meeting, and sometimes in conjunction with visits of historical interest.

Under the banner of the History Committee, a major effort has been made to produce a commemorative volume in celebration of the 25th Anniversary of the founding of the Society. The Committee has also initiated a series of co-operative agreements with institutions in Canada whose interests include the history of mechanical engineering. The first of the commemorative plaques was presented in the fall of 1995.

As Chairman, I have made it my business to make and keep contact with the History Committees of other learned engineering societies, with the Science and Engineering Archivist at the National Archives, with Parks Canada and the National Museum of Science and Technology in Ottawa, and to attend the CSTHA biennial conferences. I also represent CSME on the Advisory Committee of Engineering Society Representatives (ACESR) that was formed under the EIC's initiative to make recommendations for commemoration of engineering achievements and engineers to the Historic Sites and Monuments Board of Canada.

In summary...

Making the History Committee of a learned engineering society 'work' is, itself, hard work. Few engineers have much interest in matters historical. Artifacts, mementos, drawings, papers and photographs of engineering and historical interest are routinely discarded, making their stories hard to reconstruct, if not lost altogether. Those who participate in historical endeavours are most often 'retired' from a regular job and do research between spells of consulting. In some ways, all of this is inevitable given the pressures under which professionals labour these days. But somehow or other today's younger engineers must be drawn towards this kind of activity. CSME in recent years has had some success in getting historical information into print. The next things will be some video and a world wide web site!

Note

This paper was used in the preparation of two of the contributions by its author to the CSME's 25th Anniversary Commemorative Volume, From Steam to Space...: Contributions of Mechanical Engineering to Canadian Development, published by the Society in November 1996.