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“Regarding CSME’s 25th Anniversary Commemorative Volume ...”

by Andrew H. Wilson

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CSME History Committee

WORKING PAPER 12/1998

THE COMMEMORATIVE VOLUME...AND AFTER

by

Andrew H. Wilson

February 1998

Abstract

From Steam to Space: Contributions of Mechanical Engineering to Canadian Development was published in late 1996 as a written commemoration of the 25th Anniversary of the founding of CSME in 1970. It is essentially a series of essays by many authors describing, on the one hand, some of these contributions from the mid-19th century to the present day and, on the other, the background to the founding of the Society and to some of its subsequent activities. Other societies have produced publications for similar occasions. The main purpose of this paper is to examine upwards of a dozen of them from countries around the world in order to suggest what research and writing CSME and, in particular, its History Committee should now encourage in order to bring still more of the story of mechanical engineering in Canada to the attention of the public generally and the profession itself.

This paper was originally written for presentation at the 1997 CSME History Seminar at Université Laval.

About the Author

Andrew H. Wilson is a graduate mechanical engineer whose educational background includes some economics and a little history. He has followed all three fields throughout a career that began in the mid-1940s and continues today. His contributions to the history of engineering have been made principally through CSME and the Engineering Institute of Canada.

About the Working Paper Series

In June 1991, the Board of Directors of CSME agreed that its History Committee should be responsible for the production of a series of Working Papers on topics related to the history of engineering generally and to the mechanical discipline in particular. The Papers may or may not be authored by members of the Committee or the Society. They may also be published again later, in whole or in part, in other vehicles, but this cannot be done without the expressed permission of the Canadian Society for Mechanical Engineering. The Papers will have limited initial distribution, but CSME Headquarters in Ottawa will maintain a supply for distribution on request.

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

One Further Note...

References for the Commemorative Volumes discussed in this Working Paper have been listed on pages 25 and 26.

Introduction

The idea behind CSME's 25th Anniversary Commemorative Volume was not original. Quite a number of learned societies, institutes and institutions have produced similar mementoes of their own or national anniversaries, ranging from the 25th to the 100th, and even to the 200th. The CSME book was modelled most closely on the one edited by Leslie W. Shemilt to help commemorate the 25th Anniversary of the founding of the Canadian Society for Chemical Engineering.

This paper reviews briefly a dozen or so celebratory Commemorative Volumes published by engineering and other technical societies with a view to suggesting what practical steps CSME might take next to increase public and professional awareness of the achievements of the mechanical discipline and its engineers in Canada and abroad and to promote the wider interests of the Society.

It should be noted that, for most of the books, an author has been identified. But in practice each was assisted by others - members and officers of the societies or of the industries under discussion - and this assistance has been acknowledged. For the remaining books there was an editor, and all or most of the material was written by others. Also, the books have page sizes of 9 x 6 inches or thereabouts unless another size has been mentioned.

The books reviewed have been arranged in chronological order of the events they commemorate. But before moving on to them, let us look again briefly at the contents of CSME's *From Steam to Space....*

It has the usual Foreword by the president and Preface by the editor, both of which help explain the background to the production of the book. It has acknowledgements. It also has a description of the symbolism behind the Society's logo, including the reason why the colour 'rusty-orange' - or simply 'rust' - is closely associated with CSME. Essentially, this logo stands for "mechanical engineering, in Canada, in the service of people, with sympathy and understanding." Almost all of the material in this book had not already appeared in print and was specially written for it.

There is an Introduction to Part One - the part that occupies two-thirds of its pages. It begins on page 1 with these words:

The essays in this part of the Volume have a lot to do with research and development and the application of mechanical engineering in practice. They also have a strong connection to engineering in Canada since the middle of the 19th century, and to the mechanical discipline of it in particular. They have things to say about the beginnings of engineering education in this country and about how it has changed in the past quarter

century. They are descriptive, rather than purely technical, and illustrative rather than definitive in their coverage.

Descriptive, in this case, means 'described by words' since there are only a few photographs and line drawings to illuminate the text. And, being non-definitive, the full story of mechanical engineering in Canada remains to be told. This latter is, in practice, a time-consuming task for which the 25th Anniversary of CSME could not wait.

The 18 essays on R&D and application topics were written by authors with industry, government, academic and museum backgrounds. The authors of the six education essays were, with one exception, from the academic community.

Part Two of the book is about CSME: where it came from, and what it has accomplished in its first 25 years. The Introduction says, on page 283:

This part of the Volume - the shorter one - has been devoted to the Canadian Society for Mechanical Engineering, and has two sub-parts. The first is the story of the founding of the CSME and its activities since 1970, up until the end of its 25th Anniversary year. The second consists mainly of biographical material and lists of people who have won awards or have served the Society in one way or another over the years.

Eight of the nine essays that tell this story were written by former officers of the Society, and the ninth by the two members of the American Society of Mechanical Engineers who have probably been the most knowledgeable about CSME-ASME interactions since 1970.

The second part ends with 14 pages of photographs drawn from the Society's archives.

The Institution of Engineers, Australia (1)

Australia, as a country, dates from the landfall of the First Fleet at Botany Bay, south of what is now Sydney, New South Wales, in January 1788. Over the next two hundred years it emerged from its penal colony beginnings to become a thoroughly modern nation. In 1988, as one of its three contributions to the celebration of the Australian Bicentennial, the IEAust - as it is usually called - published an elegant Commemorative Volume, *The Engineers: 200 Years at work for Australia*. Written by Brian Carroll, a freelance writer with years of experience in the communication of engineering ideas and projects to general readers, this 300-page coffee-table book describes many of the achievements of engineers in Australia since

that first landfall.

The Institution, which covers all disciplines of engineering, had resolved to produce a book on engineering at the time of the 150th Anniversary, but this project was not pursued. When planning began for a book for 1988 that was both rigorous and comprehensive in its coverage, the Institution found that the 'ideal' material might easily fill six books of the size it had in mind and that, while a lot of this material was already available, there were gaps that still needed to be filled. Also, a broader base and heavy editing would be required to ensure evenness of style. The guiding philosophy for the eventual Commemorative Volume, as described on page 291, evolved this way:

The Institution...decided that its Bicentennial publication should not attempt to cover the entire history of engineering in Australia. Early in 1987, it decided to focus on the achievements of some of Australia's better known engineers and outstanding engineering projects, notably those that had a special role in...national development. Information on these could be drawn from the material already contributed.

During the production of the book, writer Brian Carroll was one of the half-dozen-member team under the general direction of an IEAust past president, Bruce Sinclair.

The book has six parts, each one covering - progressively - a part of the two centuries: From Gaol to Sheep Run; Engineering for Golden Prosperity; Into the Twentieth Century; Engineering in War and Peace; Australia Unlimited; and Proceed with Caution. This last part ends with a very short, forward-looking chapter on The Challenge Before Us.

Each part has an introductory section before it goes on to describe specific industries, applications, topics or people, or combinations of several of these. Engineering education is discussed in most of the parts, as is the development of the profession itself.

Included in Part 2, for example, is an account of the contributions of the brothers George and W.B. Chaffey, originally from Canada, to the solution of irrigation problems affecting the Murray River in the 1880s and 1890s. Part 4 discusses, among other things, the innovative bearing developed by A.G.M. Michell to overcome the problems of lubrication failure, overheating and seizure. The first working model of this bearing was installed in pumps at Cohuna on the Murray River in 1907. Part 4 also has a chapter called Dr. Bradfield: Mr. Sydney Harbour Bridge, and in Part 5 there is a one-page biography of his son, Dr. K.N.E. Bradfield, who built airports in Australia and in other parts of the world. Part 5 also includes a chapter on the Snowy Mountains Hydro-Electric Scheme,

masterminded by Sir William Hudson in the years just after World War II.

This book is well- but not over-illustrated, and is indexed. At the very end there is a list of 40 people who contributed papers to the Institution on historical aspects of engineering in Australia that were used in the preparation of the text. A second list, with 33 names, records those who helped with advice, reviews, illustrations and other kinds of support.

The Institution of Mechanical Engineers

This Institution was 150 years old in 1997, and had a full year of activities planned. These did not, as far as can be seen, include a special book recording the history of the Institution or of the mechanical discipline in Britain. Perhaps the organizers felt that the commemorative volume that was published for the centennial in 1947 would suffice. It was called *A History of the Institution of Mechanical Engineers: 1847-1947* and was written by R.H. Parsons, a distinguished senior member of IMechE. Interestingly, it begins on page 1 with these words:

Mechanical engineering, as a profession, came into being mainly as a result of the development of the rotative steam engine. The introduction of such engines by Boulton and Watt in 1782 made possible the application of steam power to duties other than pumping, and so created a field for machinery of all kinds necessary to the general mechanization of industry....

This book has 300 pages and 17 chapters - six of which deal with the history of the Institution itself, five with some of the topics that were discussed at technical meetings from 1847 to 1896 with a short, ten-page sixth chapter commenting on the topics discussed from 1896 to 1946. The next three chapters are concerned with the distinguished early presidents - George and Robert Stephenson, Sir William Fairbairn, Sir Joseph Whitworth, Lord (William) Armstrong, Robert Napier, John Ramsbottom and Sir William Siemens - and with the winners of the James Watt International Medal between 1937 and 1945, only two of whom were British (one of the non-British being A.G.M. Michell). The last two chapters discuss the 'treasures' of the Institution, and the Benevolent Fund. The final pages of the book are devoted to appendices: a chronology of the main events in the Institution's history; a full list of the presidents from 1887 to 1947; a list of members of the 1946-47 Council; a subject index; and a name index.

The book has 16 full plate photographs, mostly of the distinguished early presidents and the Institution's Headquarters facilities at Storey's Gate in London. There is a graph showing the growth of the

Institution's membership, a reproduction of the original list of 70 members, and around 35 graphs and line drawings of 19th century machinery. The membership graph shows that IMechE's principal growth during its first century took place after 1900 - from 3,000 to roughly 24,500 in late 1946.

So while the Institution's own history is well enough covered throughout this first century, the historical material on engineering practice is more or less confined to the first half of it. But as the book itself explains, this was due principally to the growth of research and development. Parsons wrote on page 230:

If one compares the contents of modern volumes of the *Proceedings* of the Institution with those of former times, it will be noticed how much the tenor of the papers read has changed with the passing of the years. It is impossible to assign any particular date to the change, for it took place almost imperceptibly in accordance with the development of the profession. Its reality and extent, however, will be fairly demonstrated by contrasting the *Proceedings* of the first half century of the life of the Institution with those of the second half. During the former period papers were mainly of the descriptive kind, written with the object of bringing some new engineering work to the notice of the members in order that it might form the subject of a useful discussion.

Later in the text, it appears that this neglect of engineering practice during the second half-century clearly bothered some members of the Institution. In other words, the technical developments that the majority of those who had been members of the Institution up until 1947 - as well as the senior engineers with whose names they may have been most familiar - were, for the most part, missing.

The Royal Canadian Institute

This Institute was founded in Toronto - without the 'Royal' connection - in 1849. It was originally intended to be a professional society for engineers, surveyors and architects. The first slate of officers included: Hamilton H. Killaly, who had been Chairman of the Board of Works of the United Province of Canada from 1841 to 1846; Charles Rankin, a pioneer land surveyor; J. Stoughton Dennis, a soldier as well as a surveyor and the father of the president of the Canadian Society of Civil Engineers (CSCE) in 1917; Sandford Fleming, then a very young civil engineer; J.O. Browne, another civil engineer; Kivas Tully, an architect; and F.W. Cumberland, an architect who later became a civil engineer. A number of these men were subsequently among the founding members of

the CSCE in 1887.

The Institute, however, got off to a rocky start. To correct this, it opened its membership to professions other than the three original ones and extended its concerns to include 'the general advance of science.' It received a Royal Charter in November 1851.

The sixth volume of the *Transactions* of the RCI, published in 1899, was designated as the 'Semicentennial Memorial Volume' and included an account of the early days of the Institute written by Sir Sandford Fleming. This particular article was used extensively in the preparation of *The Royal Canadian Institute Centennial Volume: 1849-1949*, which was edited by W. Stewart Wallace, then Librarian of the University of Toronto. The Preface to this 230-page book was written by the Chairman of the Centennial Committee, Wills Maclachlan. In it, on page v, he said:

For this Centennial Volume we have been fortunate in securing the co-operation of a number of competent authorities, who have contributed short résumés of the advance in various phases of science over the past century as they affect Canada. The authors have been requested to write these articles for the benefit of "the interested man in the street" and not as scientific treatises. Science has been broadly divided into ten phases: astronomy; anthropology, with special reference to the Indian and the Eskimo; botany, with special reference to forestry and agriculture; chemistry; engineering; geology, with special reference to mining; medicine; meteorology; physics; and zoology. These by no means exhaust the divisions of science, but they give a comprehensive view.

The ten 'science' articles take up half of the book. The short geology article was written by F.J. Alcock, the Curator of the National Museum in Ottawa, and the one on physics by Professor E.F. Burton of the University of Toronto. The equally short article on engineering was written by Dean C.R. Young of the Faculty of Engineering at the University of Toronto. It has in two parts - engineering achievements in Canada before, and since, 1849, and is one of the few articles with illustrations. Railways, bridges, canals and water power are briefly covered, as are public health engineering, irrigation, river control, electricity and communications.

The other half of the book is devoted to sketching the history of the Institute itself, written by Stewart Wallace, and to a lengthy appendix giving biographical notes on those who served as officers and councillors of the RCI between 1849 and 1949.

The National Academy of Sciences

This U.S. Academy was founded in 1863, celebrated its centennial in 1963, but did not publish a Commemorative Volume until 1978. Called *The First Hundred Years: 1863-1963*, research for this book had to wait until 1966 when the Academy's archives were deemed to be in order. In his Foreword, past president Frederick Seitz wrote:

The desirability of producing a history of the first hundred years of the National Academy was first discussed in a Council meeting in 1961 and revived again in 1966, with the ultimate result that Rexmond C. Cochrane was commissioned to prepare such a history. He would be building upon Frederick True's history, written to commemorate the Academy's semicentennial in 1913.

Presumably twelve years in preparation, this 700-page book records the Academy's antecedents as well as its development following incorporation by the Congress of the United States at the height of the American Civil War by means of an Act signed by President Lincoln.

The Academy's function as set out in the Act was "whenever called upon by any department of the Government, (to) investigate, examine, experiment and report on any subject of science or art..." However, the departments - engrossed as they were with the conduct of the War when the Act was passed - were only vaguely aware of the existence this new body of wise men at their service and had little idea of what they might do with it. As Dr. Seitz reported (on page 592), the Academy was asked for advice in 1863 on "a few tentative problems, dealing with such matters as coinage, weights and measures, iron ship hulls, and the purity of whiskey..." - with no sense of urgency. A hundred years later, the Academy was much less shy about being asking for advice.

Interestingly, the majority of the formal chapters of this book cover the periods in office of one or more of the presidents. For example, Chapter 6 is called The End of the Nineteenth Century and the presidents were William Barton Rogers, Othniel Charles Marsh and Wolcott Gibbs. Two of the chapters deal with the creation and early years of the U.S. National Research Council, which grew out of the Academy of Sciences.

But this book is much more than a Commemorative Volume recording the blow-by-blow development of a single institution and the contributions of its leaders. It is a history of scientific activities, science-related policies, and scientific organizations in the United States for the one hundred years that followed 1863 and, as such, it is massively footnoted and heftily appendixed. The draft manuscripts and chapters of this book were sent for comment to something like 50 distinguished members of the Academy and

others for comment. The book has both name and subject indexes.

The American Society of Mechanical Engineers

ASME was founded in 1880. In 1980 it published a Commemorative Volume, *A Centennial History of the American Society of Mechanical Engineers: 1880-1980*, written by Bruce Sinclair - then a professor at the University of Toronto and the Director of the Institute for the History and Philosophy of Science and Technology. Unlike its British counterpart, it is almost exclusively a history of the Society, written from a personal point of view. As the author himself explains in the Preface (page xi):

This book...is entirely of my own devising. It necessarily reflects my ideas about institutional history and my conviction that writing about the past is more of an art than a science. For instance, even though the occasion might seem to call for a work of record - a detailed survey of all the different activities the organization has carried on over the past century and a register of the names of all those who have been involved in them - I have instead tried to catch the essential qualities of the Society's existence. My ambition was to identify the well-springs of sentiment and action, as if I were analysing a human life, and it appears to me that, as with personal history, an institution is characterized by enduring themes, most of which are present from the beginning.

The chapter division of this 250-page book includes discussion of the 'essential qualities' of ASME's technical and social existence and spheres of action. The reader also meets some of the dominant founding members of the Society, such as Alexander Lyman Holley, Robert H. Thurston and Frederick R. Hutton. The development of standards by ASME and the production of its Boiler and Pressure Vessel Code - a source of considerable income over the years - are described and discussed. And so are problems with, for example, ASME's early New York-centred activity and the steps that were taken - not all of them successful - to broaden its geographical appeal. Other chapters are devoted to a description of the semicentennial of the Society in 1930, to the complications created by the activities of critics such as Morris L. Cooke and John C. Parker, and to the lawsuit involving ASME and the Hydrolevel Corporation. The last chapter discusses the future of the Society, leading up to the Century Two Convocation in 1978. At the end of the book there is a complete list of ASME Council members from 1880 to 1980 and a subject index.

Sinclair has added a postscript in which he discusses Writing ASME's History. Two consecutive paragraphs from this short piece

(on page 225) are worth repeating here since they reflect the author's experience and are relevant to the problems of preparing Commemorative Volumes related to engineers and engineering:

The connection between candid, original documents and balanced history is a fact engineers need badly to recognize. They are prone to care about the judgment of history, but the historians who make the judgements are dependent upon the documents they see. Clarence Davies (ASME's Secretary from 1934 to 1957) complained, for example, that the complete truth of Morris L. Cooke's relations with the Society was never known. But, ironically, Davies saved practically none of his own records, which might have more evenly illuminated that episode in ASME's history, while Cooke preserved every scrap of his papers.

As part of the Centennial observance, the various subdivisions of the Society were encouraged to write their individual histories. Those kinds of topically limited efforts have the potential to serve much better the legitimate desire for 'works of record' that a centennial stimulates. But local sections, technical divisions, and the other units of ASME are even more disadvantaged than headquarters concerning the source materials of their history. Their officers, who come and go each year, imagine that New York keeps what they find unable to save for themselves. Almost inevitably, therefore, the chronological coverage of the histories they prepared for the Centennial was fixed by the memories of those who wrote them. That I nonetheless found many of them valuable is a testimony to the care with which many engineers tried to reconstruct their past.

In 1980, ASME also published *Mechanical Engineers in America Born Prior to 1861: A Biographical Dictionary*. This commemorative project was sponsored by its History and Heritage Committee. Its inspiration was, in part, a similar volume published in 1972 by the American Society of Civil Engineers. As was pointed out by Robert M. Vogel on page v of his Preface:

The fundamental purpose of the dictionary is to supply essential biographical data on a selected group of American mechanical engineers active from the late 18th to the early 20th century, both as a resource for scholars in the history of technology and to give mechanical engineers (and others interested) a basis for their conviction that the foundation of the profession is and always has been the engineers themselves.

This 330-page book lists 1688 mechanical engineers who practiced - but were not necessarily born - in the United States. Of this number, 500 were selected for biographical treatment in some depth (on average, each got one-half of a printed page), and photographs or portrait reproductions were included in several dozen cases. An editor-compiler carried the principal burden of searching the literature, assembling the names and data for inclusion, and preparing the final manuscript - but many others helped with these tasks. The sources of the data were understandably extensive.

The Introduction to this book was written by Eugene S. Ferguson - the first to chair ASME's History and Heritage Committee. It is, in itself, of considerable value as a 'capsule' view of the early history of mechanical engineering in the United States. In it, Ferguson wrote on page xiii:

As mechanical engineers, each of us carries a piece of history that we ourselves have lived, and many of us know at first hand the remarkable accomplishments of the 20th century. It is easy to assume, if one is unaware of earlier advances, that the engineering works of 1880...were crude, quaint, and in spirit closer to the Stone Age than to the present. If we have such a view, a closer look at the history of the 19th century would be instructive, dispelling our tendency to dismiss the past as unimportant and to consider the present and future as the only times worthy of our attention.

The Institute of Electrical and Electronics Engineers

At least three history books helped IEEE celebrate the centennial of the founding in 1884 of one of its predecessor societies, the American Institute of Electrical Engineers (AIEE). The other society, the Institute of Radio Engineers (IRE), was founded in 1912. The merger of the two became effective on 1 January 1963. A key factor in the desire for this event was the influence of post-war technical advances in electronics.

One of the books is called The Making of a Profession: A Century of Electrical Engineering in America. It was written by an historian, A. Michal McMahon, and published by IEEE in 1984. It incorporates massive amounts of detail in its 300 pages - including extensive references and an index, but no appendices - and tells the parallel stories of the development of electrical engineering and of the three Institutes. As Edwin T. Layton pointed out in his Foreword (page xii):

The history of an engineering society can be dull; this one is not. Dr. McMahon's history of the IEEE and its predecessors marks a bold departure in the writing of the history of engineering societies. The dilemma of such an

act lies in the fact that the history of the society is part of a much larger history. The committees, officers, and the constitutions constitute only the outer husk. They find their full meaning when seen in the context of the history of a field. It has become quite common to tell the history of an engineering discipline without reference to its professional organizations. But the history of neither is complete without the other. The engineering society not only fosters the technical development of a field, but it is the means by which a profession can express itself and articulate its values.

McMahon enlarged on this philosophy in his Preface (page xiii), when he wrote:

Two major goals have guided my work on this Centennial Volume of electrical engineering in America. First, I have sought to identify the cluster of engineering values that has gathered around the organizations of professional electrical engineering, namely (IEEE, AIEE and IRE). To this end, therefore, this book concentrates on the object that has historically concerned the engineering societies themselves: the state of the profession. Second, besides ferreting out the central issues of professionalism, I have sought to relate the main currents in the history of the profession, from rough beginnings in telegraphy before the Civil War and the emergence of an embryonic electric lighting and power industry in the late nineteenth century to the rise of an ubiquitous electronics and the organizational merger of the discipline in the late twentieth century.

The two aims are mutually supporting....

The first sentence of this quotation is very important. Readers searching this book for recognition of the many contributions to the field/discipline by engineers and others working in countries outside the United States will be disappointed at how little non-American material has been included. But to a greater or lesser degree, all Commemorative Volumes exhibit this same characteristic. It therefore becomes important for serious students of the histories of engineering institutions and of the fields/disciplines to balance their national reading with international material.

In this same Preface, McMahon went on to say that, to tell a story so potentially vast, he had followed the careers of representative engineering figures and had examined pivotal events in the history of the engineering societies and the collective profession. He gave examples of the latter as the stories of the participation of electrical engineers in the research efforts of the two World Wars. Since the contributions of engineers to these efforts had been virtually ignored in the leading histories of twentieth century

science and technology, the prominent roles played by electrical engineers during these two Wars made these discussions necessary for understanding the electrical engineering experience.

As McMahon tells the story, the two thrusts of his book are interwoven and combined with biographical material on some of the most important members of the electrical engineering profession in the United States - for example, A.G. Bell, T.A. Edison, C.P. Steinmetz, Lee deForest, D.C. Jackson and F.E. Terman.

The second IEEE book also appeared in 1984. Its dimensions are inches larger than those of the more conventional first one. It is called *A Century of Honors* and the first 70 or so of its 400-odd pages list the past presidents of AIEE, IRE and IEEE, and the winners of their major medals, field awards, service awards, prize paper awards, and honorary memberships. Occupying the majority of its pages, however, are the names of Fellows who were deceased or were no longer members of IEEE and, with short citations, the names of those still alive and active in the Institute in 1984.

The third book is devoted to electrical engineering in Canada. Coffee-table size, 180 pages long and attractively illustrated, it was published by IEEE's Canadian Region in 1985 and is called *Electricity: The Magic Medium*. Authored by Canadians, it was compiled by an Editorial Board as well as an Advisory Committee. The written contributions are in four parts, the first containing essays on communications and control, electric power, electric utilities, and electrical manufacturing. The second part includes a single essay on electrical engineering and technology education, the third is a short essay on the past, present and future of electrical engineering in this country, and the fourth is on the IEEE Canadian Region.

The Canadian Society of Civil Engineers

Sometimes referred to as the 'old' CSCE to distinguish it from the 'new' CSCE formed in 1972 (see below), this Society was founded in 1887. Its name was changed to the Engineering Institute of Canada in 1918. In the early 1970s, the Institute began the process of forming constituent (or member) societies, with itself as the senior member of a federation of learned societies within the engineering profession in Canada.

Along the way, commemorative issues of the Institute's monthly magazine, the *Engineering Journal*, have appeared on anniversaries of the 1887 founding date. The most spectacular one was the semicentennial issue that appeared in June 1937. With its distinctive gold cover, its almost 300 pages made it the largest issue in the magazine's 70-year history. The first two articles in this issue cover the story of the founding of the Society and its

evolution into EIC, and provide biographical information on the presidents who served from 1887 until 1936. They were written by the Institute's staff under General Secretary R.J. Durley, who was also the editor of the *Journal*. However, the principal part of this issue takes the form of essays by distinguished author-members on achievements in engineering in 17 industrial and public service sectors.

To commemorate the centennial of the founding of the 'old' CSCE and its significance as the beginning of engineering as an organized profession in Canada, the Engineering Institute and its member societies, along with the Canadian Council of Professional Engineers and the Association of Consulting Engineers of Canada and their provincial associations, sponsored and organized a year-long series of events and activities during 1987.

Among the events was the publication of a book by the National Museum of Science and Technology in co-operation with the Engineering Centennial Board called *Mind, Heart and Vision: Professional Engineering in Canada 1887 to 1987*. It was researched and written by Norman R. Ball, an engineering historian, archivist and teacher. It is around 175 pages long, is impressively illustrated and is indexed. While this coffee-table book does not provide a definitive history of engineering in Canada, it does record the sweep of the profession's achievements in Canada and by Canadians abroad, from the building of the Rideau Canal in the 1820s-30s to overseas projects in the 1980s. It devotes some space to the evolution of the profession and to companies that made significant contributions to its output and achievements. And it demonstrates once again that engineering has been a major factor in the history and development of this country.

The Ontario Association of Architects

The OAA was formed in 1889. In 1939, the Association intended to commemorate its semicentennial with a celebration, but this was rendered impossible by the outbreak of World War II. For its centennial, however, OAA published a most handsome book with very readable print, high quality paper and lots of excellent black and white and colour photographs and sketches. It was written by Geoffrey Simmins and called *Ontario Association of Architects: A Centennial History 1889-1989*. Much of the source material came from earlier publications - an OAA history covering the years from 1890 to 1950, and an article from a 1901 OAA *Proceedings* - and from an unpublished typescript on OAA completed in 1930. It also came from the Association's minute books, several professional journals, and personal recollections. Extensive notes support the text, and there is a bibliography and an index.

The 300-page text is mostly about the development of the

Association, legislation affecting architects in Ontario, and the profession and practice of architecture. This is explained by the author in his Introduction, on page 7:

A limitation to the present publication should be stated here. Its principal goal is to trace the means by which the practice of architecture in Ontario has been regulated. This is not the same thing as undertaking the history of architecture in Ontario; this is the history of an organization.

As soon as this goal is stated, readers - whether architects or interested lay persons - might be forgiven if their eyes close half-involuntarily, if their fingers itch to flip through the illustrations, or if they just pick up another book. For how can the step-by-step history of a professional organization command interest? Yet the story of the OAA *does* command interest, and respect - it is full of drama and intrigue, at times even passionate.

The story of the dispute between OAA and the Association of Professional Engineers of Ontario that preceeded the passage of the Architects Act of 1984 in Ontario has been included. But events occurring in practice, as well as individual buildings, have also been described in the course of the narrative. The activities of the member societies of OAA have been included, as have chronological listings of the relevant statutes and events as well as photographs of the past presidents.

The cost of this publication was substantially funded by an Association member and his wife in honour of a friend and colleague and by several hundred patrons, sponsors, supporters and contributors.

The South African Institution of Mechanical Engineers

SAIMechE has published two commemorative volumes.

The first one appeared in 1967, the 75th anniversary of its founding in 1892 as the South African Association of Engineers and Architects. At this time the main industry was mining and most engineers served it either directly or indirectly. The architects soon left the Association to form one of their own, but the members that remained belonged to all of the engineering disciplines. SAAE became the SA Institution of Engineers in 1910 and, although there was a strong mechanical bias, the disciplines remained together until 1951 when SAIMechE was formed.

This first book is called *The Engineer's Contribution: A History of*

the South African Institution of Mechanical Engineers 1892-1967. It was written by J. Ralph Draper. Part One deals with the history, issues and activities within the Institution itself. Part Two has chapters dealing with the mechanical engineering aspects of the dominant industries - mining, railways, the power industry, water supplies, and the processing and manufacturing industries - but it also has a chapter on of civil engineering and structures. Part Three has three chapters: on military engineering; research; and education, training and status. The 'status' section deals principally with the statutory recognition of engineers and the differences between engineers, technologists and technicians. The photographs reproduced in the book are mainly of the leading members of the Institution over the years and mechanical equipment in use in South Africa. The book has 260 pages and two appendices - one for past presidents and another for Gold Medal winners - plus an index of names and one for subjects.

Two of the comments on the writing of this book, by a non-engineer, made in the Preface (page xv) by past president L.T. Campbell Pitt are of interest. He wrote:

Mr Draper's task was a formidable one. The history is taken mainly from the journals of 75 years, which contain some 900 papers and addresses with their attendant contributions. Fortunately, valuable aid came from many prominent members who contributed notes on sections of the records in which they were specialists...

Mr Draper has, I believe, presented a story that will interest both laymen and engineers. The book is unique in that among the many excellent histories and stories of South Africa it is the only one devoted to engineers, who receive scant acknowledgement in other (historical) works. It seems that they must produce their own history or leave their contributions to their country's progress to remain unknown to their countrymen as a whole.

In contrast, the second book is coffee-table size, 200 pages long, with glossy paper, and is called *A Century of Mechanical Engineering 1892-1992*. It was published by SAIMechE in 1993 to help celebrate its centennial. Written by Jack Kros, a journalist, and edited by L.R. Robinson, it is profusely illustrated with both colour and black and white photographs of industrial plants and equipment and of the leading members of the Institution. As a result of the delay in publication, it also includes some photographs of the celebrations.

This book is in some ways a sequel to the earlier one but discussion of the Institution itself is minimal - limited to three chapters, the first dealing with the Institution, the second with the profession, and the last with issues and options for mechanical

engineering as a profession, as seen in 1992. The remaining nine chapters deal with mechanical engineering on an industry-by-industry basis, much as was done in the earlier book, and within a historical/development framework. But as Kros noted on page vi, it would have required several more volumes to cover all the industrial undertakings that should have been included.

The New Zealand Institution of Engineers

Written by W.L. Newnham, a Fellow and past president, and edited by F.N. Stace, *Learning, Service, Achievement: Fifty years of engineering in New Zealand*, was published by the NZIE in 1971, seven years after its semicentennial in 1964.

The New Zealand Society of Civil Engineers (NZSCE) was formed in 1914 and had an initial membership of exactly 100. It became the NZIE in September 1937, with membership between 500 and 600. By 1964 this number had risen to 2900, mostly civils. The Institution considered itself too small to have separate societies for the other disciplines. In 1955, it merged with the Professional Engineers Association, which was looking after economic welfare matters.

Almost 400 pages long, this Commemorative Volume has three main parts corresponding to the first three words in its title, and a series of appendices that includes the lists of presidents, award winners, officers etc. The first and third parts are mainly concerned with the history and development of NZSCE and NZIE, the second with the contributions and achievements of engineers to the development of the country and its industries. The book has a fair number of black and white photographs, almost evenly divided between people associated with Society/Institution activities and industrial equipment. It has a combined name-subject index.

On page 1 of the Introduction two points, among others, are raised that are significant for books of this kind, wherever they may originate:

In New Zealand...much engineering history has already been lost for lack of proper records and, unless something is recorded now, future generations of engineers will never know how their professional forefathers lived and worked to lay the foundations on which are based many of today's amenities....

In this history the main difficulty has been to decide what would be of interest and worth recording. The main objective has been to show the development of the Institution and its work and policy, and to describe briefly events concerned with these developments.

Undoubtedly some items of interest and importance will have been omitted, but reference to most of them will be found in the *50 Year Index of Publications* published by the Institution in 1964.

The Institution of Engineers, Australia (2)

IEAust was founded in 1919 by the federation of state-wide specialist associations/institutes for the main disciplines of engineering. In 1969 this Institution celebrated its semicentennial and, four years later, published a book in association with Angus & Robertson (Publishers) Pty. Ltd. called *The Institution of Engineers Australia: A History of the First Fifty Years, 1919-1969*. It was written by Arthur Hardie Corbett, then professor of engineering at the University of New South Wales, who had joined the Institution as a student in 1926.

Almost 300 pages long, the contents of this book have been organized into 16 chapters and a series of eight appendices. Apart from three of the chapters, or about 50 pages, the text has been devoted to telling the story of the Institution and its activities. This is not surprising since IEAust is a multi-discipline Institution (in which the main disciplines have been organized as constituent colleges). During the 50 years covered by the book, it was the arbiter of professional qualifications, ethics and - until the formation of the Association of Professional Engineers, Australia in 1946 - the status of engineers. There are only a few photographic illustrations, half of them devoted to the people involved in the founding of IEAust and to the buildings that served as its headquarters, and half to engineering projects across Australia. It has a selected bibliography and an index.

The genesis of this book was described in the Preface (page ix) written by the author:

At its 191st meeting held in Hobart in March 1967, the Council of the Institution of Engineers, Australia invited Professor Douglas Pike, General Editor of the Australian Dictionary of Biography, Professor C.E. Moorhouse, a Past-President of the Institution, and the author to form an Editorial Committee for the production of a history of the Institution's first fifty years. The Council hoped that it would appear during the Golden Jubilee celebrations. Unfortunately pressure of the author's academic duties and the magnitude of the task prevented the achievement of that goal. The task has not been lightened by the complexity of problems considered by the Council and its Committees. The author has interpreted his field to be the history of the Institution as a federated body, rather than the

histories of the eight Divisions, except where recommendations of Division Committees have influenced decisions of Council. Because the life of the Institution continues, important decisions between 1969 and the completion of the manuscript have been included as footnotes at the end of chapters.

To a considerable extent, the lack of historical material in this book on engineering activity in Australia has been offset - but not until 1988 - by the publication of *The Engineers: 200 Years of Work for Australia*, discussed above.

The Chemical Institute of Canada

This Institute - the CIC - was formally established in 1945 under a federal Charter to continue and expand the activities previously the responsibility of the Canadian Institute of Chemistry, the Canadian Section of the Society of the Chemical Industry, and the Canadian Chemical Association. Two books on its history have been discussed in what follows.

The first, *Chemical Canada*, was published in 1970 as part of the celebrations of the Institute's 25th Anniversary. Written by Charles J. Warrington and Brian T. Newbold, who had industrial and academic backgrounds respectively, it is 300 pages long. Its four parts discuss the chemical industry (40 percent of the whole book), education, research and development, and the development of chemical associations in Canada, including CIC itself and its predecessors. Each of the parts ends with a list of references and a chronology of the events discussed. There is a series of ten short appendices that provide further descriptive information about the Institute and other associations within the chemical industry, university courses, and industrial and R&D expenditure statistics. The book makes extensive use (with permission) of material that appeared in *A History of Chemistry in Canada* by Warrington and R.V.V. Nicholls, published in 1949 by the Chemical Institute. There are, however, no photographic or other illustrations.

It should be noted that, during the 1945-70 period, the Canadian Society for Chemical Engineering - CIC's first constituent society - was formed in 1966 from the Institute's Chemical Engineering Division. Its own history book is discussed below.

The second CIC book, *Chemical Canada 1970-95*, was published in 1995 by the Institute on the occasion of the 50th Anniversary of its establishment. Robert V.V. Nicholls, a former professor at McGill University, edited the book. Its four sections were authored by: T.H. Glynn Michael (the Chemical Institute); Brian T. Newbold (universities, colleges, schools), Leslie W. Shemilt (industry); and Alfred W. Tickner (government). The Institute and industry

parts include useful lists of officers, medal winners, industrial production statistics and association memberships. There is also an index for people, and one for subjects, but again no illustrations.

In his Foreword, Harry G. McAddie wrote that in 1990 - mindful of the approaching 50th anniversary of the Institute - CIC's Advisory Committee of Past Officers and Directors found favour in the suggestion that a successor volume to the one by Warrington and Newbold should be written to cover the period from 1970 to 1995. The Committee invited Dr. Nicholls to edit it and to select appropriate authors, who would describe the development of the chemical profession within Canadian academia, industry and government, as well as its evolution in response to this development. He went on to say that the task took three years of dedicated, voluntarily-contributed labour by the editor and the authors to complete.

Between 1970 and 1995, CIC established two more constituent societies - the Canadian Society for Chemical and Biochemical Technology in June 1973, and the Canadian Society for Chemistry in 1985. The latter action was in part the result of the decision taken by CSChE in 1982 to incorporate separately while maintaining its status as a constituent society of CIC. In the late 1980s the CSCBT dropped 'Biochemical' from its name.

The Canadian Society for Chemical Engineering

Chemical Engineering in Canada - An Historical Perspective was edited by Leslie W. Shemilt - a former dean of engineering at McMaster University - and published by CSChE in 1991 to help celebrate the 25th Anniversary of the Society's founding in 1966. As noted above, CSChE was the first of the CIC constituent societies and was incorporated in 1982. (Since 1997, CSChE has also been a member society of the Engineering Institute of Canada's federation.)

The CSChE book provides histories of the development of chemical engineering in Canada and of the Society itself. It is coffee-table size, but not of the glossy picture-book kind. It has 365 pages, four sections and 28 chapters. The first section is about chemical engineering education, and each of its three chapters was specially authored. The second section is about the Society and its *Journal*, and the profession of chemical engineering. It includes photographs of CSChE activities and people. Its three chapters were separately authored. The third section is mostly biographical and autobiographical. Two of the chapters present abstracts from the reminiscences of the distinguished Canadian chemical engineers, J.S. Bates and J.R. Donald. The final section provides material on Canadian chemical engineering achievements. The contents of the 16 chapters in it were reprinted from other publications or specially

contributed by selected authors. Some of the articles carry photographic or line drawing illustrations.

The philosophy behind the compiling of this book was explained by Les Shemilt in his Editor's Preface (page v):

With 1991 thus marking its 25th anniversary, the Society planned to include, in recognition thereof, the publication of an historical document recounting some of the history of chemical engineering in Canada. At the request of the Board of Directors, I agreed to coordinate the preparation of such a work, the definition of which was left most flexible. Contemplation of the task led to the conclusion that a record of the 25 years of the CSChE would properly need reasonable detail on its antecedents. Further, it was important to consider the educational source of professional knowledge, that is, the chemical engineering education system in Canada, and its historical origins. A request that a series of presentations on chemical engineering successes in Canada also be organized for the celebratory 25th anniversary chemical engineering conference in Vancouver in October 1991 was accepted later. Through the individual engineers involved, such historical components of the practice of the profession are at the heart of professional activity. A society or organization exists and grows merely to facilitate and support such activity. The assembling of Society history, the story of Canadian chemical engineering education and of some eminent Canadian chemical engineers, and some case histories of successful Canadian achievements in chemical engineering into a single document was thus proposed to the CSChE Board of Directors in mid-1990 and accepted by them. The net result is this volume.

Of the books considered in this Paper, the CSChE's had perhaps the shortest gestation-cum-preparation period of them all.

The Canadian Society for Civil Engineering

As noted above, the 'new' CSCE was formed in 1972 by roughly the same process as the three other EIC constituent societies of that period (CSME, CGS and CSEE). Its 25th anniversary therefore fell in 1997 and the launching of the Society's history book was timed for the Annual Conference that year, held at Sherbrooke, Québec. This 170-page book is called *A Civil Society: A Brief Personal History of the Canadian Society for Civil Engineering*. It is indeed a personal history - written by Peter R. Hart, a practicing engineer as well as a past president of the Society with many years of direct involvement in its affairs.

This book has three parts. The first is a very short one that traces the early history of professional institutions and societies in engineering both world-wide and in Canada. The second and principal one has seven chapters, the first of which deals with the situation and process that led up to the founding of the 'new' CSCE. The next five cover the development and activities of the Society over five-year periods. The last one asks the question: Planning Ahead - Is there a Future? - and answers it with one word: Yes! The third part consists of a series of ten supporting appendices, the first two of which cover the Minutes of the First General Meeting of the 'old' CSCE in February 1887, and the notable first presidential address by Thomas C. Keefer, delivered a year later. The third appendix explains the significance of the Society's logogram, adopted in 1981. The others include two landmark documents from the Society's history, lists of officers, honorees, and historic sites commemorated, and the locations of the annual conferences. It was decided that the book would not include photographs in order to keep its costs within bounds and in recognition of the fact that the Society's magazine, the *Canadian Civil Engineer*, had published - and would continue to publish - photographs of a historical nature from time to time.

The Canadian Geotechnical Society

The last of the Commemorative Volumes to be discussed in this Paper is not actually a book, but - like EIC's semicentennial Commemorative Volume - a special issue of a regularly published magazine. The October 1997 issue of *Geotechnical News* commemorated both the Golden Jubilee Canadian Geotechnical Conference and the 25th anniversary of the founding of the Canadian Geotechnical Society (CGS) as a constituent society of the Engineering Institute of Canada. This magazine is published quarterly by BiTech Publications Limited of Richmond, British Columbia and is distributed to registered members of CGS.

The commemorative edition of *Geotechnical News* was edited by Cyril E. Leonoff, a Vancouver consulting engineer. In his Preface (on page 3) he tells how it came into being.

Briefly, in 1982 some members of the CGS conceived the idea of a Heritage Book Project that would record the development of geotechnical engineering in Canada. The CGS Board of Directors gave its approval in principle and provided a start-up grant. An Editorial Committee was struck and local correspondents were appointed across the country. A total of 88 taped interviews were recorded and transcribed. By 1984 a chapter outline had been developed. But work on the project petered out. An attempt to revive it was made in 1992 on the basis of the work already done. Again the CGS Board gave its approval - providing that funding could be secured. But once again, a year later, it was shelved.

However, at the 48th Canadian Geotechnical Conference in Vancouver in 1995 - with the Golden Jubilee only two years away - the project was raised for a third time, successfully. An ad hoc commemorative edition committee was formed, including Cyril Leonoff and the managing editor of *Geotechnical News*. The Vancouver Geotechnical Society Board undertook to sponsor the project and to provide seed money for it. The CGS gave its blessing. Serious fund-raising began. In order that the material would be ready in time for the Ottawa Conference in October 1997, the ad hoc committee invited over twenty senior geotechnical engineers to prepare 'narrative historical rather than technical' articles on assigned topics for it. Their work now forms a permanent, if partial, record of Canada's geotechnical heritage.

The special issue of the *News* begins with an historical overview of geotechnical engineering in Canada by Cyril Leonoff, followed by biographical articles on six distinguished Canadian engineers in the field and a memoir by an American engineer who has been a consultant in Canada. Then follow four articles on Society affairs, and one on women practitioners. Finally, there are nine articles on specific aspects of geotechnical engineering, and two on major projects - the St. Lawrence Seaway, and the La Grand Hydroelectric Development at James Bay. The articles are illustrated with project and 'people' photographs. Biographies of the authors are also included.

The CSME Commemorative Volume...and After

To repeat, the main purpose of this Working Paper has been to examine a dozen or so Commemorative Volumes published by engineering institutions world-wide in order to suggest what practical steps CSME, and its History Committee, might take next to increase public and professional awareness of the achievements of the mechanical discipline and its engineers in Canada and abroad and to promote the wider interests of the Society.

The books that were chosen for examination may be grouped in two ways, both with sub-groups. In the first, based on content, there are three subs: those (like Peter Hart's CSCE book) that deal principally with the history of their subject institutions or societies; those (like the IEAust's Australian anniversary volume) that deal principally with the history of national engineering achievements; and those (the majority) that mix institutional and engineering histories. In the second group, based on compilation, there are two subs: those with an author (or authors); and those with an editor or editorial committee (or both) and a number of named contributors. *From Steam to Space...* clearly belongs with the majority and with the editor and contributors.

A number of threads run through the chosen books - for example:

- until most of these books were written, the members of the institutions that published them had few, if any, sources of assembled historical information about their development; however, when such information was available (assembled or not), it was apparently used; all of the books made extensive use of new material;
- a few of the books were written 'for the record'; most (and especially the coffee-table ones) were written for the information of interested readers, as well as for the provision of new resources for scholarly research in engineering history;
- most of the books were written using narratives, descriptions and at least some illustrations, with the result that, as histories, they are not usually boring and can be read with understanding by non-specialists and even by lay people;
- most of the books are non-definitive as histories of the institutions, of engineering achievements, or both; indeed, the possibilities that nationally definitive books will be written eventually are not great in view of the immense amount of coverage and detail that should be included;
- Canadian books tell the Canadian story, American books the American one, and so on; those interested in the broader spectrum of engineering history should, therefore, read internationally in order to balance their understanding of developments in their own and in other countries;
- some of the books have helped to highlight engineering activities in a number of countries during the 19th century (Canada included), and the fact that these should not be overlooked or underrated;
- those books that were authored professionally required significant technical and other inputs from professional engineers, and these engineers were usually volunteers; those books that had volunteer editors might otherwise have been too costly for their institutions to publish; also, professional writers (such as Sinclair and McMahon) tended to deal explicitly with the social factors in the engineering 'equation';
- many of the books (the coffee-table ones were the exceptions) had relatively little to say about the contributions of individual industrial firms to engineering, and those that did seldom drew more than examples from them; nor was the development of education

for engineers and technologists extensively described or discussed;

- in almost every case, the collection of material for the writing and publication of these books took several years to complete; and false starts could - and did - happen;

- the work of preparing these books stimulated the collection of archival material by the sponsoring institutions;

- around one-quarter of the books were written in the days before the Internet and Web Sites; these now present alternative opportunities for engineering institutions to reach much wider audiences than before.

So, what has CSME learned from publishing *From Steam to Space...*? What research and writing should it now encourage - and participate in? Should it contemplate the publication of other books?

Among the lessons are: first, volunteers cut costs, narrative/descriptive prose attracts readers, and illustrations help the narrative along; on the other hand, professional writers have special skills and interests. Second, if CSME does not write its own history, it is unlikely that anyone else will. Third, some readers have been surprised by how much mechanical engineering history some countries (like Canada) actually have. Fourth, publishing new historical material will help to reinforce this message, provide more resources for scholarly research, and deal with those (including sceptical foreigners) who doubt the value of engineering activities in Canada's development. Fifth, the writing of the society's history appears to have encouraged the collection and retention of CSME's own archival material on a continuing basis. Sixth, with so few active researchers and writers of mechanical engineering history in Canada, there is little likelihood that the supply of new material will dry up in the foreseeable future. And finally, as a result of experience with *From Steam to Space...*, CSME should have a better understanding of the financing of future publications and the markets for engineering history books.

However, having just produced a history of CSME from 1970 to 1995, it would seem unlikely that in the short term much more need be written about the Society itself. Instead, the work should perhaps concentrate on filling some of the less well covered parts of this first book, such as: industrial (and government) achievements in mechanical engineering research and practice; education in this discipline at both the professional and non-professional levels; the most difficult area for non-specialists and lay people - research; and biographical and autobiographical writing about, and

by, mechanical engineers.

From some of this, a coffee-table book may emerge as the best vehicle for publication. For other work, the standard soft- or hard-cover 9 x 6 books may suffice. And it should be remembered that Working Papers, magazine articles and other shorter pieces can always be assembled at a later date into useful books. And then there is the Internet...and the Web Sites....

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