

The Canadian Geotechnical Society's 1980s Canadian Geotechnical Heritage Book Project



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ABSTRACT

In the early 1980s, the Canadian Geotechnical Society began an initiative called the "Canadian Geotechnical Heritage Book Project". The project was to document the history of Canadian geotechnique through the eyes of Dr. Robert Legget and Dr. Robert Hardy, the two most prominent figures in the history, and more than 70 other individuals who were interviewed. Unfortunately the project was halted in 1986, but all information collected, including paper transcriptions of the interviews, was archived at the University of Alberta. Since then, a small portion of the information collected has been used, and is being used, for various research purposes. There is still a tremendous amount of additional primary source information available for researchers of the history of Canadian geotechnique.

RÉSUMÉ

Au début des années 80, la Société canadienne de géotechnique a initié le projet de livre Héritage géotechnique canadien (Canadian Geotechnical Heritage Book Project). Le projet devait documenter l'histoire de la géotechnique canadienne à travers les yeux des Drs. Robert Legget et Robert Hardy, les deux figures les plus importantes de cette histoire, ainsi que plus de 70 autres individus qui ont été interviewés. Malheureusement, le projet fut arrêté en 1986. Cependant, toute l'information recueillie jusqu'à ce moment incluant les transcriptions sur papier des interviews fut archivée à l'Université de l'Alberta. Depuis, une mince proportion de cette banque d'information a été et est toujours utilisée à diverses fins de recherche. Il subsiste toujours une source d'information substantielle encore non utilisée à la disponibilité des chercheurs dédiés à l'histoire de la géotechnique canadienne.

1 INTRODUCTION

In the early 1980s, the Canadian Geotechnical Society (CGS) began an initiative to document the history of the geotechnical profession in Canada. Almost 40 years later, the entire story has yet to be told. This paper relates the story of what became known as the "Canadian Geotechnical Heritage Book Project", and summarizes what it accomplished and its legacy. This paper also briefly explains why Robert Legget and Robert (Bob) Hardy were considered, by the 1980s heritage project, to be the two most prominent figures in the history of Canadian geotechnique.



Robert (Bob) Hardy (left) and Robert Legget taken in Edmonton in 1983 (photo source University of Alberta Archives)

2 BEGINNING OF THE PROJECT

In 1981, the President of the CGS, John Adams, and the society's directors asked Jack Clark, then Past President of the CGS, to chair a small committee to consider the best way to record the history of the geotechnical profession in Canada. Clark, after forming and conferring with his committee, reported back to the CGS that an effective way to tell the story would be by interviewing Legget, Hardy and a few other selected individuals, and telling the story through their eyes. In the fall of 1982, the CGS agreed in principle with the idea and the project began.

Clark asked David Townsend to assist him, and retained Jean Crozier to be primary researcher and editor for the project. At the time, Townsend worked with

Clark at Hardy Associates in Calgary (R.M. Hardy and Associates was formed by Bob Hardy in the early 1950s). Crozier, based in Edmonton, had been Director of Library Services for Hardy Associates. By 1982, Crozier had formed her own library and information consulting firm. Because of her education and experience, and her familiarity with both the industry and its professionals, she was well-qualified for the task.

From the *CGS News*, December 1982 (Townsend 1982):

...*"The proposed book is intended to be a living history, concentrating upon the period from 1936-1966 and the*

contributions that Dr. R.F. Legget and Dr. R.M. Hardy have made to the geotechnical profession...

The objective will be to record the early development of geotechnical engineering in Canada and, through the eyes and recollections of living engineers, to show the humanity that underlies the development of major geotechnical projects in Canada...

A substantial portion of this early development can be attributed to two outstanding engineers – Dr. R.M. Hardy and Dr. R.F. Legget. In different times, each made significant contributions to the field – through the education of students, the stimulation of their colleagues, the contributions to design solutions and the sharing of their enthusiasm. Their imprint upon the profession will provide a consistent thread through the chapters.

It is the intention of the editorial committee to get the local sections involved with the project. It is only at the local level that it is possible to collect many of the stories, anecdotes, recollections and impressions of the early days. With this in mind, local correspondents have been established across Canada as follows [with affiliations in 1982]:

Victoria, Doug VanDine [Thurber Consultants]
Vancouver, John Gadsby [Thurber Consultants]
Calgary, Jack Clark [Golder Associates]
Edmonton, Stan Thomson [University of Alberta]
Saskatoon, Dave Noonan [Golder Associates]
Winnipeg, Don Shields [University of Manitoba]
Toronto, Fred DeLory [University of Toronto]
Ottawa, Bill Eden [Division of Building Research,
National Research Council]
Montreal, Lionel Peckover [CN Rail]
Quebec, Guy Lefebvre [Université de Sherbrooke]
Halifax, John Brown [Technical University of Nova
Scotia, now part of Dalhousie University]

The local correspondents will be working with the local executives in taping and transcribing some of the interviews....It is hoped that all the local section work will be done this winter [1982-1983] and completed prior to April 1983. Collating all the material and providing proper geotechnical references will be the responsibility of a research editor, Ms. Jean Crozier, and the target is to complete the second phase by the fall of 1983. At that time, the CGS Directors will be able to make a decision about printing the final distribution.

The editorial committee will consist of Dave Townsend (Calgary), Jack Clark (Calgary), Doug VanDine (Victoria), Bill Eden (Ottawa) and Geoff Meyerhof [Technical University of Nova Scotia] (Halifax) with continued involvement by Ms. Crozier. A start up grant of \$7,000 has been provided [by the CGS] to get activities underway."

3 PROJECT'S RISE AND FALL

More than 70 in-person interviews were carried out across the country during 1982 and 1983. The interviews were carried out either by Crozier, or by geotechnical professionals in the local CGS sections under her

guidance and supervision. (She remembers lugging a cumbersome reel-to-reel tape recorder across the country.) These interviews were a significant pan-Canadian undertaking by Crozier and almost 20 different interviewers. The interviews were transcribed by Crozier and several secretaries who worked for various geotechnical consulting firms. The interviewees, interviewers, interview locations and the dates of the interviews (where known) are summarized in the Appendix.

In either 1982 or 1983, Townsend put together a proposed "Organization for the Book". He prefaced his proposal with the following:

"Because of the scope and diversity in geotechnique, it is difficult to have a simple, chronological pattern for its development. Initial considerations suggest the following structure for the chapters and overall framework."

Townsend then went on and listed these chapters:

"Before 1936 Notable projects which introduced elementary geotechnical concepts or encountered soil problems: Beauharnois Canal [QC], St. Clair River Tunnel [ON], Miramichi Bridge [NB], and the background of those attending the first International [Soil Mechanics and Foundation Engineering] Conference in 1936 [at Harvard University].

Early Education The introduction of soil mechanics courses at Alberta, Queen's, Toronto, Ecole Polytechnique, and later the first graduate work and theses.

Dam Construction Soil as an engineering material in controlled conditions: the Shand Dam [Grand River, ON], the Gardiner (South Saskatchewan) dam, Grand Rapids (Manitoba) Dam, St. Mary's (Alberta) Dam, Kenney Dam for Kitimat [BC], Duncan Dam (BC) and others.

Road and Train Transportation How a knowledge of the terrain influenced development: Alaska Highway, Quebec North Shore Railway, TTC Subway, development of airport and highway pavement design.

Conference and Committees The important role of the Associate Committee [on Soil and Snow Mechanics, later Associate Committee on Geotechnical Research, [precursors of the CGS] and the annual 'soil mechanics' conferences. Terzaghi's visit at the 1956 conference.

Our Land Recognition that Canada has unique geotechnical problems which only we can solve: early frost action work, the influence of the military on muskeg studies, permafrost studies and the location of Inuvik, snow and ice.

The Contribution of Geology How landslides and glacial history have aided our understanding: the marine clays of Quebec (Nicolet), the tills of Ontario, the overconsolidated clay shales of Western Canada, rock falls and debris slides in BC."

Unfortunately, this project was one of many that were negatively impacted by the economic downturn in the early 1980s. In addition, in 1984, Clark, the driving force behind the project, left Calgary and took a demanding position with C-CORE in St. John's, NL. For these

reasons, and perhaps others, the project languished until 1986 when the committee was disbanded and the project halted.

Fortunately, Crozier had the foresight to archive all the materials that had been collected as part of the project – her notes, some photographs and the paper transcripts of the interviews. This material is now in the University of Alberta Archives. Also included in the collection are the project's administrative files, proposed book and chapter outlines, a few related publications, corporate brochures, and other associated materials.

4 LEGACY OF THE PROJECT

In 1987, what was supposed to be the first chapter in the Heritage Book was eventually published in the *Proceedings* of the "CGS Canadian Engineering Centennial Convention" (Chapuis and Devenny, editors 1987). The paper was titled, "Early History of the Geotechnical Profession in Canada", and covered the period up to 1936, the year of the first International Conference on Soil Mechanics and Foundation Engineering (VanDine 1987). The 1987 proceedings also included non-historic, but state-of-the-art (up to 1987), papers related to the Canadian geotechnical profession: building construction; mining; hydroelectric projects; highways; railroads; waste management; nuclear fuel waste; mine waste; petroleum resources development; northern development and the future of the profession.

In 1997, Cyril Leonoff, then recently retired from Klohn Leonoff, coordinated and edited the 150-page "Geotechnical Engineering in Canada: an Historical Review" (Leonoff, editor 1997). This review was initiated in 1995 by the Vancouver Geotechnical Society and was published as a commemorative edition of *Geotechnical News* to help celebrate the 50th CGS Canadian Geotechnical Conference, held in Ottawa in 1997.

In the preface to that review, Leonoff specifically referred to the Canadian Geotechnical Heritage Book Project:

"In 1992 an attempt was made to revive the Heritage Book Project, building on the original work. Because of my background, both in geotechnical practice and in historical writing, I was asked to submit a proposal to complete the book. The CGS Board supported the project 'provided the necessary funding can be secured'. But again the society seemed to lack the collective will to raise the necessary funding, and in the fall of 1993 the board decided to 'abandon the project indefinitely.'"

Some of the material collected during the 1980s heritage project was used to help produce the 1997 historical review. The contents of this publication included short articles on: geotechnical engineering in Canada - an overview; profiles of Robert Legget, Robert Hardy, Ibrahim Morrison, Robert Peterson, Geoffrey Meyerhof, Karl Terzaghi and Ralph Peck; articles on women in geotechnical engineering, embankment dams, tunnel engineering, permafrost, offshore development, oil sands, surface mining, tailings dams, airphoto

interpretation, earthquake engineering, the St. Lawrence Seaway, and the James Bay Hydroelectric Development.

Since 1997, very little has been done with the materials in the University of Alberta Archives. The second author of this paper is currently the Chair of the CGS Heritage Committee and has recently visited the archives to review and copy some of the material available. David Devenny, CGS President in 1985-1986, had copies of some of the transcribed interviews that he recently donated to the Heritage Committee.

In 1983, specifically for the Canadian Heritage Book Project, Robert Legget wrote a rough draft of a manuscript, entitled "Geotechnique in Canada, a Personal Memoir". This 104-page memoir was prepared on his manual typewriter and then hand-edited. In the same year, because the first author of this paper was a member of the editorial committee of the 1980s heritage project, he was given a photocopy of Legget's manuscript. A supplement and corrections to the manuscript were recently found in the University of Alberta Archives. Over the past several years, the first author has been using Legget's manuscript and the supplement as the focus to write Legget's biography.

5 ROBERT LEGGET AND ROBERT HARDY

The following briefly describes why Legget and Hardy were considered the two prominent figures in the history of Canadian Geotechnique.

Robert Legget (1904-1994) spent most of his career as founding Director of the National Research Council's Division of Building Research (1947-1969). Among many other things, in that capacity he was instrumental in: establishing a first-rate national geotechnical research centre with research programs in the geotechnically-related field of soil mechanics, permafrost and muskeg; introducing the relatively new field of soil mechanics into the National Building Code of Canada; establishing federal funding for research in the earth sciences (including geotechnique); organizing the first 16 Canadian geotechnical conferences; founding the *Canadian Geotechnical Journal*; and establishing the Geotechnical Engineering Division of the Engineering Institute of Canada from which evolved, in 1972, the Canadian Geotechnical Society.

Robert (Bob) Hardy (1906-1985) split his career between academia and consulting. As a Professor, Civil Engineering Department Chairman, and Dean of Engineering at the University of Alberta, he was instrumental in developing the undergraduate and graduate geotechnical engineering programs...the latter being the first such program in Canada. During his tenure at the university he also consulted widely on many projects of significance, both during and after the Second World War. In the early 1950s, he co-founded three companies: Engineering and Construction Services, Materials Testing Laboratories and Canadian Engineering Surveys – among the first such companies in Canada. The first two companies later amalgamated into R.M. Hardy and Associates (Goodman, 1983), and are currently part of the Wood Group. Over his long

career, Hardy had a tremendous positive influence on several generations of geotechnical students, graduates and practitioners.

Because of their significant contributions to Canadian geotechnique, Legget and Hardy are considered the "Fathers of Canadian Geotechnique". The CGS has named its most prestigious annual award for Robert Legget, and has named the most prestigious Canadian geotechnical conference lecture for Robert Hardy. More on these gentlemen can be found in Crawford (1997) and Harris (1997).

6 CONCLUDING REMARKS

Although it was not completed, the CGS Canadian Geotechnical Heritage Book Project, started almost 40 years ago, collected a tremendous amount of very valuable primary source material on the history of Canadian geotechnique. The paper transcripts of the interviews of over 70 professionals associated with the development of Canadian geotechnique, most of whom are now deceased, is invaluable. To date, only a small portion of the materials in the University of Alberta Archives has been accessed for historical research.

There is much more research that can be carried out. All materials in the archives can be viewed by booking an appointment, by email (for details visit www.library.ualberta.ca/archives). Anyone interested in carrying out further research is encouraged to contact the CGS Heritage Committee.

7 SOURCES

Most of the information for this paper comes from the associated material that is in the University of Alberta Archives, Accession No. 86-29.

A listing of Accession No. 86-29 is on the CGS Canadian Geotechnical Virtual Archives webpage http://www.cgs.ca/virtual_archives_history_cg.php, subheading "(1986) Canadian Geotechnical Heritage Project". Legget's 1983 unpublished memoir is on the same webpage under the subheading "Geotechnique in Canada, a personal memoir". Much of the information on Legget and Hardy is on the same webpage, in a copy of Leonoff (1997) under the subheading "(1997) Geotechnical Engineering in Canada: an Historical

Review". The *Proceedings* of the 1987 CGS Canadian Engineering Centennial Convention are on the same webpage, subheading "(1987) Proceedings, Canadian Engineering Centennial Convention, Montreal 18-22 May, 1987".

Tributes to Legget and Hardy and many other geotechnical professionals can be found on the CGS Canadian Geotechnical Virtual Archives webpage http://www.cgs.ca/virtual_archives_lives_lived.php.

8 ACKNOWLEDGEMENTS

Thank you to the CGS in 1981 for the having the foresight to initiate this project, and to Jack Clark, Dave Townsend, Jean Crozier and all others who contributed to it. Thanks to the University of Alberta Archives staff who catalogued, maintain and provide access to this valuable resource. Jean Crozier reviewed an early draft of this paper, and has added some valuable information. Lilianne Landry-Pare translated the abstract.

9 REFERENCES

- Chapuis, R.P. and Devenny, D.W. (editors), 1987. *Proceedings of the Canadian Engineering Centennial Convention*, Canadian Geotechnical Society, 160 p.
- Crawford, C.B. 1997. Robert Ferguson Legget and the National Research Council of Canada. *In* Leonoff, editor, 1997, pp 34-38.
- Goodman, K.S. 1983. Canadian Geotechnical Heritage Book Project interview (April 22, 1983) transcription. University of Alberta Archives.
- Harris, M.C. 1997. Robert Macdonald Hardy; Engineer, Consultant, Teacher. *In* Leonoff, editor, 1997, pp 21-26.
- Leonoff C.E. (editor). 1997. *Geotechnical Engineering in Canada, An Historical Review*. Geotechnical News, Commemorative Issue, October 1997, 150 p.
- Townsend, D.L. 1982. Geotechnical Heritage Book. CGS News, Canadian Geotechnical Society, December, pp 15
- VanDine, D.F. 1987. Early History of the Geotechnical Profession in Canada. *In* Chapuis and Devenny, editors, pp 9-21.

Appendix follows

Appendix. 1980s Canadian Geotechnical Heritage Book Project, Interviewees, Interviewers, Locations and Dates

Interviewee	Interviewer	Location	Date
Adams, John I. (Ontario Hydro)	Roly Salvas	Toronto	May 2, 1983
Baracos, Andy (University of Manitoba)	Jean Crozier	Winnipeg	Nov 11, 1982
Bazett, Don (CBA Engineering)	Jean Crozier	Vancouver	Nov 21, 1982
Bozozuk, Michael (National Research Council/Division of Building Research)	Bill Eden	Ottawa	Apr 18, 1983
Brawner, Charles (Chuck) O. (UBC)	Iain Bruce	Vancouver	Jun 17, 1983
Brodeur, J. Clem (Burcan Industries)	Lionel Peckover and Jacques. Hurtubise	Montreal	Jan 12, 1983
Brooker, Elmer (EBA Engineering, Edmonton)	Jean Crozier	Edmonton	Apr 22, 1983
Burpee, Lawrence H. (retired from Foundation Co. of Canada)	Letters to Lionel Peckover		Sep 14, 1982; Jan 24, 1983
Charles, Major J.L. (consultant to CN Rail)	Jean Crozier and Don Shields	Winnipeg	Nov 11, 1982
Clark, Jack (Golder Associates)	Jean Crozier and Wayne Savigny	Calgary	Apr 29, 1983
Cook, Paul (retired from Cook Pickering Doyle)	Jean Crozier and John Gadsby	Vancouver	Nov 23, 1982
Crawford, Carl (NRC/DBR)	Wayne Savigny and Jack Clark	Calgary	May 3, 1983
Cronkhite, R.H. (retired from Alberta Transportation)	Jean Crozier	Edmonton	Aug 24, 1983
Curtis, Bill (Curtis Engineering)	Wayne Savigny	Calgary	Nov 18, 1983
DeLory, Fred (University of Toronto)	Jean Crozier	Toronto	Nov 2, 1982
Dowling, P. (retired from Franki Canada)	Written recollections		
Dyregrov, A. (Underwood McLellan and Associates)	Jean Crozier	Winnipeg	Nov 11, 1982
Eckenfelder, George V. (retired from Montreal Engineering)	Hugh Nasmith and Doug VanDine	Victoria	Aug 8, 1983
Eden, W.J. (Bill) (NRC/DBR)	Jean Crozier	Ottawa	Oct 28, 1982
Fisk, Ray (retired from CN Rail)	Hugh Nasmith and Doug VanDine	Victoria	Dec 1, 1983
Gold Lorne W. (NRC/DBR)	Bill Eden	Ottawa	Jun 8, 1983
Goodman, Keith S. (Hardy Associates)	Wayne Savigny and Jean Crozier	Calgary	Apr 22, 1983
Hall, Per (retired from Foundation Company of Canada)	Biographical sketch		
Hardy. R.M. (Bob), (Hardy Associates)	Multiple Interviews by Jean Crozier and Murray Harris	Edmonton	Aug, Sept, Oct 1982
Harris, Murray C. (Thurber Consultants)	Jean Crozier	Edmonton	Jul 24, 1983
Hemstock, R. Alex (Hardy Associates)	Wayne Savigny	Calgary	May 3, 1983
Hurtubise, Jacques (École Polytechnique)	Jean Crozier	Montreal	Oct 29-30, 1982
Jaspar, Louis (Prairie Farm Rehabilitation Administration)	Dave Noonan	Saskatoon?	Oct 29, 1983
Johnston, G. Hank (NRC/DBR)	Bill Eden	Ottawa	Apr 14, 1983
Kirkbride, Dave (formerly with PFRA and CIL)	Jean Crozier	Edmonton	Dec 8, 1982
Klohn, Earl (Klohn Leonoff)	Jean Crozier	Vancouver	Nov 21, 1982
La Rochelle, Pierre (Université Laval)	Guy Lefebvre	Quebec City	Nov 23, 1982
Lamb, Ken	Dave Noonan	Saskatoon?	Feb 14, 1983
Legget, Robert F. (retired from NRC/DBR)	Biographical sketch plus memoir		Mar 15, 1983
MacDonald, Don (H.G. Acres)	Fred DeLory	Niagara Falls?	May 11, 1983
MacFarlane, Ivan (NRC/DBR)	Bill Eden	Ottawa	Apr 18, 1983
McFarlane, Howard (University of New Brunswick)	P. Pheaney	Fredericton?	May 24, 1983
McLeod, Norman (retired from Imperial Oil)	Jean Crozier and Fred DeLory	Toronto	Nov 2, 1982
McRostie, Gordon (McRostie Genest St-Louis & Associates)	Jean Crozier	Ottawa	October 27, 1982

Interviewee	Interviewer	Interview	Date
Meyerhof, G. Geoff (Technical University of Nova Scotia)	Eric Jordan	Halifax	Jan 24, 1983
Milligan, Victor (Golder Associates)	Fred DeLory	Toronto	Jan 1983
Mollard, Jack D. (JD Mollard and Associates)	Dave Noonan	Regina	Oct 28, 1983
Morgenstern, Norbert R. (University of Alberta)	Written document		Jan 1984
Morrison, Carson (retired University of Toronto)	Jean Crozier	Toronto	Nov 2, 1982
Nasmith, Hugh (Thurber Consultants)	Jean Crozier	Victoria	Nov 19, 1982
Peaker, Ken (Consultant, Toronto)	Fred DeLory	Toronto	Apr 26, 1983
Peckover, F. Lionel (CN Rail)	Jean Crozier	Montreal	Oct 29, 1982
Penner, Ed (NRC/DBR)	Bill Eden	Ottawa	Apr 1983
Peters, Nick (PFRA)	Dave Noonan	Saskatoon	Feb 15, 1983
Peto, E.M. (Bud) (Peto Associates)	Roly Salvas	Toronto	May 27, 1983
Piette, Guillaume (Dept. Roads, PQ)	Guy Lefebvre	Montreal	Nov 24, 1983
Ripley, Charles (Charlie) (retired from Ripley Klohn Leonoff)	Transcripts and Jean Crozier	Victoria	Oct 28, 1983; Nov 18, 1982
Rivard, Phil (PFRA)	Dave Noonan	Saskatoon	Nov 7, 1983
Robinsky, Eli (University of Toronto and E.J. Robinsky and Associates)	Roly Salvas	Toronto	Apr 7, 1983
Rutka, Alex (Ontario Min of Highways)	Roly Salvas	Toronto	Dec 22, 1982
Scott, J. Don (University of Alberta)	Jean Crozier and Iain Bruce	Edmonton	May 5, 1983
Sennerville, Claude (Terratech)	Jean Crozier	Montreal?	Oct 29, 1982
Spence, R.A. (Bob) (Consultant, Vancouver)	Iain Bruce	Vancouver	Jun 21, 1983
Taylor, Earl. M.(Ontario Hydro)	Roly Salvas	Toronto	Apr 11, 1983
Taylor, Harold (BC Hydro)	Jean Crozier	Vancouver	Nov 23, 1983
Thompson, W. Stan (University of Alberta)	Jean Crozier	Edmonton	Mar 31, 1983
Thurber, Stu (West Coast Drilling)	Jean Crozier and Doug VanDine	Victoria	Nov 19, 1982
Torchinsky, Ben (formerly with BBT Consultants)	Jean Crozier	?	Dec 14, 1982
Townsend, David (Hardy Associates)	Jean Crozier and Wayne Savigny	Calgary	Apr 28, 1983; Jan 16, 1984
Trow, Bill (Trow Associates)	Roly Salvas	Toronto	Apr 26, 1983
Vogan, R.W. (Public Works Canada)	David Townsend plus letter	Ottawa	Dec 19, 1983
Walter, John (Department of National Defence)	Roly Salvas and Alex Rutka	Toronto	May 25, 1983
Watson, Gordon (PFRA)	Dave Noonan	Saskatoon	Oct 27, 1983
Williams, Gaynor (DBR/NRC)	Bill Eden	Ottawa	Jun 9, 1983
Winnitoy, Bill (retired from Saskatchewan Department of Highways)	Dave Noonan	Saskatoon	Nov 1, 1983

The authors have added affiliations with which the interviewees were associated at the time of the interviews, where known.