Forests and Technology
Les forêts et la technologie

XVIIth Biennial Conference
XVIIe colloque biennal

Canadian Science and Technology Historical Association
Association pour l'histoire de la science et de la technologie au Canada

Canada Science and Technology Museum, Ottawa
Musée des sciences et de la technologie du Canada, Ottawa

18-20 November / novembre 2011

Welcome message from the CSTHA President

On behalf of the executive and the conference committees, I am delighted to welcome you to the seventeenth biennial conference of the Canadian Science and Technology Historical Association. In this International Year of Forests, we are very pleased that Dr. Graeme Wynn, a leading scholar on the subject of forests, will give the keynote address. The conference is rounded out by some forty papers by historians, information and museum professionals, scientists, and students, demonstrating the spectrum of interests and subjects represented in the Association. We are grateful to Claude Faubert, Director General, Science and Technology Museum & Vice-President, Exhibitions, for arranging for the Canada Science and Technology Museum to host the conference. Several people worked diligently to make this conference a stimulating experience. In particular, the programme committee (Suzanne Zeller, Dorotea Gucciardo, and Scott Campbell) deserve our thanks. Kristen Abraham, Suzanne Beauvais, Danielle Naoufal, Fiona Smith Hale, Franz Klingender, and Randall Brooks were especially helpful in attending to numerous details. In addition to attending sessions and social events, and chatting with colleagues, I encourage you to attend the Association's general meeting. Enjoy the conference and the numerous attractions of Ottawa.

Bertrum H. MacDonald
President

Mot de bienvenue du président de l'AHSTC

Au nom des membres du bureau et du comité organisateur du colloque, il me fait plaisir de vous souhaiter la bienvenue à ce dix-septième colloque biennal de l'Association pour l'histoire de la science et de la technologie au Canada. Dans le cadre de l'Année internationale des forêts, nous nous réjouissons du discours d'ouverture de M. Graeme Wynn, Ph.D., un spécialiste de premier rang dans le domaine. Quelque quarante articles d'historiens, de professionnels des musées et de l'information, de scientifiques et d'étudiants enrichiront le colloque, ce qui témoigne de façon éloquente de l'intérêt et de la gamme de thèmes représentés à l'Association. Toute notre reconnaissance va à Claude Faubert, directeur général du Musée des sciences et de la technologie du Canada et vice-président des expositions, pour l'accueil du colloque au Musée. Plusieurs personnes se sont activement affairées à faire de ce colloque une expérience enrichissante. Nous adressons des remerciements particuliers au comité de la programmation (Suzanne Zeller, Dorotea Gucciardo et Scott Campbell). Kristen Abraham, Suzanne Beauvais, Danielle Naoufal, Fiona Smith Hale, Franz Klingender et Randall Brooks ont pour leur part accordé une attention toute spéciale aux nombreux détails. Je vous encourage donc à assister aux différentes séances et événements, à discuter avec vos collègues et à prendre part à l'assemblée générale de l'Association. Profitez pleinement du colloque et des nombreuses attractions de la capitale.

Bertrum H. MacDonald
Président

Conference Schedule
Programme du colloque

All conference plenary and concurrent sessions will be held in
Toutes les séances, y compris les séances pleinières, se tiendront dans

the Canada Science and Technology Museum, 1867 St Laurent Blvd / Musée des sciences et de la technologie du Canada, 1867, boul. Saint Laurent, Ottawa, Ontario

Friday / vendredi ~ 18 November / novembre 2011

1:30-6:00 Registration / Inscription   Front foyer / Hall d'entrée

2:00-4:00 Tour / Visite guide

Tour the collections of the Canada Science and Technology Museum / Visite de collections de la Musée des sciences et de la technologie du Canada

4:00-6:00 Session / Séance

1: Displayed Artifacts: Museums and Their Collections / Objets exposés : les musées et leurs collections

Location / emplacement : Room / salle   Auditorium

Chair / président d'assemblée : Anna Adamek

William Knight (Carleton University): "Building the Whale: Cetacean Display and Craft Labour at the Dominion Fisheries Museum, 1913-1914"

Erich Weidenhammer and Ari Gross (University of Toronto): "Building a Collection of Scientific Instruments at the University of Toronto"

Eric L. Mills (Dalhousie University): "Attractive to Strangers and Instructive to Students: The Thomas McCullochs' Nineteenth Century Bird Collection in Dalhousie College"

Michel Labrecque (Canada Science and Technology Museum): "The Challenges of Collecting Aerospace Technology"

6:00-7:00 Reception / Réception

Location / emplacement : Room / salle   Locomotive Hall / Salle des locomotives

Welcome and remarks by Denise Amyot, President and CEO, Canada Science and Technology Museum / Adresse par Denise Amyot, présidente-directrice générale de la Société des musées de sciences et technologies du Canada

7:30-9:00 Plenary Session / Séance plénière

Official Welcome and Conference Announcements / *Mot de bienvenue officiel et announces* : Bertrum MacDonald

"Developed or Plundered? An 'Envirotech' History of Canada's Forests"

Keynote Speaker / Conférencier d'ouverture : Graeme Wynn (Professor of Geography and Environmental History, and Brenda and David McLean Chair in Canadian Studies, University of British Columbia)

Location / emplacement : Room / salle   Auditorium

Chair / président d'assemblée : Bertrum MacDonald

9:15 Observatory Tour and Stargazing / Visite d'observatoire et observation des étoiles

Saturday / samedi ~ 19 November / novembre 2011

8:30-10:00 Choice of Concurrent Sessions / Choix des séances concomitantes

2a: The Built Environment: Forest, Hydro, and Industrial Heritage / Le milieu bâti : Le patrimoine forestier, hydroélectrique et industriel

Location / emplacement : Classroom / Salle de class   4

Chair / président d'assemblée : Hugh J. McQueen

Pat Bowley (University of Guelph): "Forest Conservation on Southern Ontario Farms in the 1930s"

Daniel Macfarlane (Carleton University): "Rapid Changes: Technology, Environment, and the Creation of the St. Lawrence Seaway and Power Project"

Anna Adamek (Canada Science and Technology Museum): "Industrialo Woodland: Cultural Perceptions on the Canadian Forest and Forest Management"

2b: The "Problem" of Women in Science and Engineering in Canada since the 1960s: The Construction and Shaping of Gendered Debates and Policies / Le « problème » des femmes en sciences et en génie au Canada depuis les années 1960 : précision des débats et politiques sur les rapports selon le sexe

Location / emplacement : Classroom / Salle de class   5/6

Chair / président d'assemblée : Ruby Heap

Mike Thompson (University of Ottawa): "Meeting Canada's 'Manpower' Needs: Gender and the Training of a Skilled Workforce for Economic Growth and Competitiveness, 1960s-1980s

Caroline d'Amours (Université d'Ottawa): « « Une conquête inachevée? » : L'État québécois dans la promotion des femmes en science et génie, 1979- 2003 »

Anne Millar (University of Ottawa): "'A thousand for each one that died': The Impact of the Montreal Massacre on the Promotion of Women in Engineering at Canadian Universities"

10:00-10:30 Coffee / Café   Conference Hall /   Salle de conférence

10:30-12:30 Choice of Concurrent Sessions / Choix des séances concomitantes

3a: Cross-border Communications: Imperial and Continental Connections / Les communications transfrontalières : des liens impériaux et continentaux

Location / emplacement : Classroom / Salle de class   4

Chair / président d'assemblée : Randall Brooks

Beth A. Robertson (Carleton University): "Technologies of the Disembodied: Scientific Apparatuses of Psychical Research, 1918-1939"

Andrew H. Wilson (private scholar, Nepean, Ontario): "Rolt, Petroski, and Legget: Three Historians of Engineering"

David Orenstein (University of Toronto): "Helen and Frank: A Personal and Professional Astronomical Partnership"

Sean Graham (University of Ottawa): "'The Voice You Heard': The Early CBC and Technological Investment"

3b: "Object"ivity: Artifacts and their Histories / Obje(c)tivité : les artéfacts et leurs histoires

Location / emplacement : Classroom / Salle de class   5/6

Chair / président d'assemblée : Dorotea Gucciardo

Lorna Chisholm, Charles Bourne, Yannis Pahatouroglou, and Mallory Richard (Canadian Museum of Civilization): "Transcribing the Transcorder: Reading an Artifact from the Canada Science and Technology Museum"

Chris Miedema (Ashbury College): "A Periodic Table in Three Dimensions"

David Pantalony (Canada Science and Technology Museum): "Semiconductors, Thermoelectricity and the Artifacts That Came in from the Cold"

Sean Tudor (Canada Science and Technology Museum): "The Peaceful Atom: Exporting Objects of Promise"

12:30-2:00 Sandwich Lunch / Déjeuner

Location / emplacement : Room / salle   Conference Hall / Salle de conférence

CSTHA / AHSTC General Business Meeting / Réunion d'affaires

2:00-3:30 Choice of Concurrent Sessions / Choix des séances concomitantes

4a: Science in the Federal Government: Strategies and Experiences from the Second-half of the 20th Century / Les sciences au sein de l'administration fédérale : stratégies et expériences de la seconde portion du XXe siècle

Location / emplacement : Classroom / Salle de class   4

Chair / président d'assemblée : Richard Jarrell

Jonathan Turner (University of Toronto): "Science in Canada Following the Second World War: Solandt and the DRB"

Matthew Wallace (Environment Canada): "The Meteorological Service and the Growth of Atmospheric Science in Canada"

Philip Enros (Environment Canada, retired): "Doing More With Less: Budget Cuts and Policy for Science in Environment Canada"

4b: Modernizing the Cityscape: Industrialization, Technology, and Environment in Urban Canada / La modernisation du paysage urbain : industrialisation, technologie et environnement au Canada urbain

Location / emplacement : Classroom/ Salle de class   5/6

Chair / président d'assemblée : Suzanne Zeller

Hugh J. McQueen (Concordia University) and Larry McNally (Library and Archives Canada): "Metal Industries Around Montreal 1760 to 1910 – Canadian Industry Cradle"

Ivan Carel (Université Concordia) : « Un homme, son vélo et le monde »

Darcy Ingram (Ottawa): "Cyclists' Rights: Technology, Culture, and Environment in Nineteenth-Century Montreal"

3:30-4:00 Coffee / Café   Conference Hall / Salle de conférence

4:00-5:00 Choice of Concurrent Sessions / Choix des séances concomitantes

5a: Contemporary Concerns: Science and Technology in Modern Canada / Des préoccupations contemporaines : les sciences et la technologie au Canada

Location / emplacement : Classroom / Salle de class   4

Chair / président d'assemblée : Philip Enros

Florian Olsen (Office of Hon. Hélène Leblanc, Science and Technology Critic for the Official Opposition): "Moving Forward: the 'Jenkins Report' on federal R&D spending and beyond"

Jordan Schoenherr (Carleton University): "The Impact of Federal and Provincial Funders on Scientific Integrity Policies at Canadian Universities"

5b: Made of Metal: Irons and Gears / Fait de métal : Fers et Engregages

Location / emplacement : Classroom / Salle de class   5/6

Chair / président d'assemblée : Sean Tudor

Emily Gann (Carleton University): "A 'Pressing' Past: Evolution of Iron Design as a Form of Social Process in Canada from 1889 to 1960"

Sarah Kriger (University of Toronto), Brighita Lungu (McGill University), and Scott Campbell (University of Waterloo): "Replication and Representation: Shedding Light on Cultural Meanings of Technology"

5:30-6:30 Plenary Session / Séance plénière

Location / emplacement : Room / salle   Auditorium

Chair / président d'assemblée : Bertrum MacDonald

Ruby Heap (University of Ottawa), Yves Gingras (Université du Québec à Montréal), Richard Jarrell (York University), and David Pantalony (Canada Science and Technology Museum) : The Future of the History of Canadian Science, Technology, and Medicine / Le avenir de l'histoire de la science, de la technologie et de la médecine canadienne

7:30-10:00 CSTHA / AHSTC Banquet / Banquet, Locomotive Hall / Salle des locomotives

Sunday / dimanche ~ 20 November / novembre 2011

8:30-10:30 Choice of Concurrent Sessions / Choix des séances concomitantes

6a: Indigenous Influences: Cultural Engineering and Native Technologies / Influences indigènes : ingénierie culturelle et technologie autochtone

Location / emplacement : Classroom / Salle de class   4

Chair / président d'assemblée : Scott Campbell

Angela Byrne (University of Toronto and National University of Ireland, Maynooth): "Interpreting Displays of Romantic Science among Northern Indigenous Communities"

Galen Perras (University of Ottawa): "'A number of soldiers could bomb with wonderful results': Charles Heming and the Lacrosse Stick Grenade Launcher in 1941"

Jordan Baker (McMaster University): "Engineering a Municipal Reserve: Roads, Technology and Intergovernmental Relations at the Six Nations of the Grand River Reserve, 1918-1939"

Dorotea Gucciardo (King's University College): "Why Drop Bombs When You Can Drop Rattlesnakes: Popular Inventions and Suggestions from the Second World War"

6b: Networks of Knowledge: Science and Engineering in North America / Réseaux de savoir : sciences et génie en Amérique du Nord

Location / emplacement : Classroom / Salle de class   5/6

Chair / président d'assemblée :

Bertrum H. MacDonald (Dalhousie University): "'For the Increase and Diffusion of Knowledge':

Distribution of Scientific Information in Nineteenth Century Canada by the Smithsonian Institution"

Suzanne Zeller (Wilfrid Laurier University): "Humboldt's Analytical Empire: Auroral Science in Arctic British North America, 1819-1884"

Pierre-Luc Beauchamp (McGill University) : « Léon Provancher et le *Naturaliste canadien*: parcours d'une revue savant »

Jean-Louis Trudel (Université d'Ottawa) : « Clockmaking in New France: A Craft that Belied Its Name »

10:30-11:00 Coffee / Café   Conference Hall / Salle de conférence

11:00-12:00 Choice of Concurrent Sessions / Choix des séances concomitantes

7a: Cultures of Innovation: Institutional Responses to New Technologies / Cultures d'innovation : la réaction des institutions aux nouvelles technologies

Location / emplacement : Classroom / Salle de class   4

Chair / président d'assemblée : Dorotea Gucciardo

Scott Campbell (University of Waterloo): "Early Entry to Computer Science in Canada"

David Theodore (Harvard University): "'A Strange Hair Dryer'; Computers and the Montreal Neurological Institute, ca. 1975"

7b: Politics and Policies: Large-scale Technologies in Post-War Canada / Vie politique et politiques : la technologie à grande échelle dans le Canada d'après-guerre

Location / emplacement : Classroom / Salle de class   5/6

Chair / président d'assemblée : Bertrum MacDonald

Randall Brooks (Canada Science and Technology Museum, retired): "On the Trail of Smuggler's Booty: The Modest ZEEP Reactor and Its Impact"

Rénald Fortier (Musée de l'aviation et de l'espace du Canada): "A Swing for the Better - The Saga of the Canadair CL-44D Civilian Freight Plane"

12:00-1:00 Sandwich Lunch / Déjeuner

Location / emplacement : Room / salle   Conference Hall / Salle de conférence

CSTHA Executive Meeting / Réunion du bureau de l'AHSTC

Conference Closes / Clôture du colloque

Abstracts
Résumés

Anna Adamek: "Industrial Woodland: Cultural Perceptions on the Canadian Forest and Forest Management"

This paper explores the Canadian forest as a site of the industrial heritage. The exploitation of the Canadian forest reflects cultural perceptions projected on the forest by various ethnic groups that constitute the multicultural Canadian society. These perceptions compel us to extend the definition of the industrial heritage in the context of the Canadian woodland. This paper will first look at the multicultural perceptions on the forest. It will then examine two examples of culture-specific perceptions and practices that constitute a part of the industrial heritage found in the Canadian forest: the Aboriginal concept of the Culturally-Modified-Tree, and the influence of Indian-Canadians on harvesting and the international Model Forest movement.

Jordan Baker: "Engineering a Municipal Reserve: Roads, Technology and Intergovernmental Relations at the Six Nations of the Grand River Reserve, 1918-1939"

First Nations reserves are rarely seen within the history of technology, even though as administrative units dealing with public works they have often played significant and dramatic roles. My initial research, focusing on the Canadian Department of Indian Affairs records, reveals that the centralization of road and bridge development between 1918 and 1939 led to the Grand River Six Nations reserve taking on a complex municipal identity that could never adequately fit within national, provincial, or local frameworks. This paper examines these archival findings and indicates that it was the creation of jurisdiction and technological responsibility through the control and determination of infrastructure by both the Government of Canada and the Province of Ontario that helped to entrench this municipal distinctiveness. This in turn dramatically impacted the relationships between different elements of the Grand River Six Nations community, provincial engineers and auditors, and Indian Affairs agents and officials.

Pierre-Luc Beauchamp : « Léon Provancher et le *Naturaliste canadien*: parcours d'une revue savant »

L'objectif de cette communication est de mettre en lumière le parcours de l'Abbé Léon Provancher et de sa revue, le *Naturaliste canadien*, fondée en 1868. L'étude de l'évolution de cette revue permet de mieux cerner le contexte de publication et de diffusion des travaux scientifiques avant la création d'un système formel de publications universitaires. De plus, en tant que lieu de rencontre des premiers savants canadiens français, elle nous renseigne sur l'état des réseaux académiques francophones à la fin du 19e siècle. Par ailleurs, les travaux de Léon Provancher et ses publications témoignent de l'essor de la botanique et de l'entomologie au Québec, deux domaines phares de la quête de scientificité par les premiers savants canadiens au tournant du 19e siècle. Enfin, le modèle de publication mis en place par la revue et les institutions qui la soutiennent marquent les étapes de l'évolution du réseau de

publications savantes au Québec. Précurseur de Marie-Victorin et de sa *Flore laurentienne*, Léon Provancher et sa revue sont un maillon essentiel pour comprendre l'évolution des sciences au Canada.

Pat Bowley: "Forest Conservation on Southern Ontario Farms in the 1930s"

In the mid-1930s, southern Ontario farmers and their representatives responded to the cumulative effects of deforestation with an organized conservation movement, the Ontario Conservation and Reforestation Association (OCRA). As a way of stabilizing production during the Depression, when weak export markets decimated off-farm sales, farmers acted to restore forests and woodlots, and renovate rural natural resources. The OCRA also promoted education programs for school children, and the establishment of county forests on lands which were unsuited to cropping. Forestry initiatives by farmers were fundamental to natural resource conservation. In 1938, the Ontario Crop Improvement Association was formed as an educational association with the goal of speeding up the dissemination of scientific information about the relationship between crops and soils to farmers. In southern Ontario, where mixed farming on small to medium sized acreages was the norm, crop and soil improvement blended features of American watershed authorities and local initiatives to rehabilitate Ontario agriculture.

Randall Brooks: "On the Trail of Smuggler's Booty: the Modest ZEEP Reactor and Its Impact"

Among the approximate 8,000 artefacts in its scientific apparatus collection, the Canada Science and Technology Museum preserves many related to the nuclear industry in Canada. The most significant is the ZEEP nuclear reactor – the first reactor to go critical outside the US. It and Canada's nuclear industry are all tied to an event in Norway in 1940 – the smuggling of heavy water to France. I will follow the trail of the event and the heavy water to see how it determined Canada's nuclear path and the individuals who were instrumental in making it happen. I will also look at the war time relations with the US and post-war impact on the nuclear industries of Britain, France, India, and other countries. Who knew a bit of water could have such an impact?

Angela Byrne: "Interpreting Displays of Romantic Science among Northern Indigenous Communities"

This paper examines two examples of interactions between travelling "men of science" and Northern indigenous/native peoples in the late eighteenth century: the traveller, antiquary, and mineralogist Edward Daniel Clarke's experience of launching a balloon among the Sami, 1799; and the curiosity and fear excited amongst First Nations by the surveyor and fur-trader Peter Fidler's scientific instruments, c. 1790. These interactions represent simultaneous attempts to bridge and widen the gap between native and newcomer as these travellers confronted peoples they considered to hold "superstitious" beliefs with their own forms of rational, explicable "magic," embodying the complexity of Romantic travels, British interests in Northern regions, and these travellers' worldviews. As these men practiced their science – "our surprizing qualifications" (Fidler) – among these communities, they became the object of fear and scrutiny, turning the tables on traditional perceptions of the Native as subject.

Scott Campbell: "Early Entry to Computer Science in Canada"

Does early entry into a field provide a leg-up in establishing a leading department in that discipline? Computing historian William Aspray first posed this question a decade ago. He showed that despite

first mover advantages the five schools in the United States that entered the field of modern computing in the 1940s and early 1950s did not prove to be successful at creating and building strong departments of computer science by the 1960s and 1970s. In my talk I will consider the Canadian context using this analytical framework. The story starts with the University of Toronto, the earliest Canadian entrant to modern computing, but will include other universities as they too acquired computers and established their own departments of computer science. In the big picture, this work is about how objects and devices can be related to the foundation of disciplines.

Ivan Carel : « Un homme, son vélo et le monde »

L'impact d'une découverte technologique comme la bicyclette sur le rapport entre l'homme et son environnement proche ou plus lointain n'a été que peu abordé. C'est ce bouleversement que nous comptons aborder ici à travers deux moments de l'histoire de la bicyclette. Tout d'abord, à la fin du 19e siècle, cette invention participe pleinement d'une modernisation conquérante : le corps enfin propulsé et autonome peut parcourir un territoire de plus en plus large, à explorer, à cartographier, à sillonner. « L'homme vite » peut quand il le veux quitter son univers quotidien et découvrir le monde. Puis après un siècle où l'automobile arrache du vélo le flambeau du progrès, c'est par l'écologie et l'éloge de la lenteur que réapparaissent les bicyclette. Cette fois aussi, c'est à une redécouverte et à une reconquête de son territoire – de son quartier comme du reste du monde – qu'appelle l'usage renouvelé du vélo. Nous observerons donc comment, dans ces deux cas, à travers l'usage de cette invention, peut se lire le rapport entre l'homme et son environnement.

Lorna Chisholm, Charles Bourne, Yannis Pahatouroglou, and Mallory Richard: "Transcribing the Transcorder: Reading an Artifact from the Canada Science and Technology Museum"

A primary function of museums is the collection of significant, rare, beautiful, and representative objects for preservation and public exhibition. Interpretation and public display of these objects are major challenges for museums. At the Reading Artifacts Summer Institute of 2011, four of us were confronted with these problems head-on when we took on the task of examining, studying, and researching an object that, at the outset, we could not identify. Classified by the Museum as a transcriber, further research revealed that it was a "transcorder" – a device used to process seismographic readings taken by geophysicists searching for oil in Alberta in the 1960s. As part of an early step in the process of transferring analog readings to digital formats, the artifact represents a significant and interesting time in Canadian technological history. This paper will address our collective experience of researching the transcorder. Using material culture theories and personal recollections, it will seek to highlight some of the stories, insights, and questions that artifacts pose to researchers, and will represent our own attempts to untangle them through this specific case study.

Caroline d'Amours : « « Une conquête inachevée? » : L'État québécois dans la promotion des femmes en science et génie, 1979- 2003 »

En 1979, la parution du livre vert du Parti québécois, Pour une politique québécoise de la recherche scientifique marque le lancement d'une véritable politique scientifique québécoise. L'État se positionne alors comme le principal moteur du développement scientifique nécessaire à la souveraineté du Québec dans ce domaine. L'accès d'un plus grand nombre de femmes en science et en génie permettra d'atteindre cet objectif. Dès lors sont mises en place des politiques gouvernementales favorisant

l'intégration des femmes dans ces secteurs. Celles-ci culminent en 2000 avec le projet mobilisateur sur le Soutien à la progression des Québécoises dans les sciences et l'innovation technologique, dont le bilan paraît en 2003. Cette communication s'attarde sur le rôle de premier plan du gouvernement québécois dans la promotion des femmes en science et en génie entre 1979 et 2003, sur la nature des politiques qu'il met en place, et sur les rapports entre l'action de l'État dans ce domaine et ses objectifs politiques, ainsi qu'avec le mouvement des femmes au Québec.

Philip Enros: "Doing More with Less: Budget Cuts and Policy for Science in Environment Canada"

Environment Canada was created in 1971 at a time of economic prosperity. However, in a few years circumstances had changed. For the next several decades the Department normally dealt with tight budgets and a series of minor and major cuts. This presentation looks at two major budget cuts in Environment Canada's history – one in 1979, the other in 1993 – and their impact on the organization and activities of the Department's effort in policy for science. The two episodes exhibit certain similarities (e.g., both cuts were followed by extensive reviews of the Department's science) as well as differences (e.g., in how policy for science was subsequently organized). The paper concludes with some observations on the position and functions of policy for science in a federal science-based department such as Environment Canada .

Rénald Fortier: "A Swing for the Better - The Saga of the Canadair CL-44D Civilian Freight Plane"

L'industrie aérospatiale canadienne compte parmi les plus importantes au monde. Des exemples de son esprit d'innovation sont présents tout au long du 20e siècle. Au cours des années 1950, par exemple, Canadair met au point un avion cargo à queue pivotante à grande autonomie, le CL-44D. Cette nouvelle approche de la société montréalaise facilite grandement le chargement et le déchargement de l'appareil. Réalisant l'importance grandissante de l'industrie du fret aérien, Canadair lance une vaste campagne de promotion visant à faire connaître le CL-44D. L'entrée en service des premiers avions de ligne à réaction, plus rapides et capables de transport des charges imposantes, limitent toutefois le succès commercial de l'avion canadien. La décision du transporteur national, Trans-Canada Air Lines / Air Canada, de ne pas commander de CL-44D est par ailleurs un dur coup. Cela dit, l'avion cargo de Canadair et ses dérivés militaires demeurent encore aujourd'hui le plus imposant appareil jamais construit au pays..

Emily Gann: "A 'Pressing' Past: Evolution of Iron Design as a Form of Social Process in Canada from 1889 to 1960"

In this paper I will speak about on my experience working with a domestic technology collection (pressing irons) at the Canada Science and Technology Museum this past summer. I will briefly present my initial research and cataloguing tasks as a contract researcher, and comment on how this methodology helped direct larger material culture questions. By examining the changes in iron design present at the turn of the twentieth century to the tool's eventual electrification, this paper will trace the changing, and mutually constructive, relationship between gender and technology. In doing so, it will discuss the changing status and identity of women within the domestic sphere in Canada from the later 1880s to the 1960s. This paper will contribute to the larger historiography surrounding domestic

technologies and gender, which have traditionally focused on larger items/tools within the home. The pressing iron allows for a continuation of this conversation.

Sean Graham: "'The Voice You Heard': The Early CBC and Technological Investment"

When it took over from the Canadian Radio Broadcasting Commission (CRBC) in 1936, one of the Canadian Broadcasting Corporation's (CBC) first priorities was to improve its transmission facilities and expand its broadcast coverage area. In order to achieve their goals, CBC administrators had to invest heavily in new technology – particularly in the form of high power transmitters. By placing an emphasis on technological development, the CBC signalled to Canadians that it was serious about improving on the deficiencies of the CRBC and establishing a truly national broadcasting system. This paper examines the CBC's early investment in improved technological facilities/equipment and the important role of those improvements in building its national network. The CBC's focus on technology was instrumental in securing both political and popular support as well as putting the Corporation in a position to capitalize on the broadcast opportunities presented by the 1939 Royal Tour &World War II.

Dorotea Gucciardo: "Why Drop Bombs When You Can Drop Rattlesnakes: Popular Inventions and Suggestions from the Second World War"

Throughout the Second World War, the Canadian government encouraged its citizens to offer innovative suggestions that could help save time, money, and – most importantly – lives in the battle overseas. The response was overwhelming; thousands of letters poured in, which described creative schemes and inventions to help win the war. The ideas ranged from freezing clouds and mounting guns on them to hanging machine gunners on trapeze; they revealed a breadth of Canadian imagination whose recognition adds an interesting footnote to the historiography of the Second World War. The influx of letters prompted the federal government to establish the War Inventions Board (WIB) mandated to disseminate and classify civilian ideas and inventions submitted to various government departments. Historically, Canadians had submitted invention ideas to the three military services since the First World War, but not until the creation of the WIB did the federal government actively encourage civilian input in the realm of military and technological development. Drawing from methodologies in the history of science and technology, this paper will analyze the invention ideas within the context of the Second World War, and provide comment on the meaning of "invention."

Darcy Ingram: "Cyclists' Rights: Technology, Culture, and Environment in Nineteenth-Century Montreal"

My paper stems from a current research project on the relationship between bicycle technology, social activism, and the built environment. My specific focus is the development of the Cyclists Rights Movement in Montreal during the late nineteenth century, which gave political shape to decades-long frustration with cycling conditions in and around the city. I argue that while the bicycle gave Montrealers new ways of understanding the natural as well as the built environment, a sense of agency in regards to their capacity to reshape that environment did not emerge among cyclists until changes in bicycle technology gave rise to the bicycle craze of the mid-1890s, and only then in response to efforts on the part of the municipal government to regulate cycling in the city. As such, this project brings current historiography on the development of cycling technology to bear on the cycling "cultures" of the nineteenth century in order to show how these intersected with politics, policy, and environmental change.

William Knight: "Building the Whale: Cetacean Display and Craft Labour at the Dominion Fisheries Museum 1913-1914"

Displays of whale skeletons were "de rigeur" in natural history museums in Europe and North America by the late nineteenth century. In Canada, the Dominion Fisheries Museum in Ottawa placed a finback whale skeleton on display in 1914. The museum, which stood between 1884 and 1918, exhibited natural history specimens alongside commercial fishing exhibits. This presentation traces the history of this display from the whale's capture and disassembly in Norway to its cleaning and re-articulation in Ottawa – and to its disposition when the fisheries museum was demolished in 1918. This paper also highlights the craft labour of the museum's self-taught osteologist, Alexandre Rochon, who began work as the museum's labourer in 1903. Rochon cleaned the skeleton, forged its connective hardware, and re-assembled it in six months. The whale display reveals both the obscured labour of museum workers such as Rochon and the transnational commercial networks that subtended natural history displays.

Sarah Kriger, Brighita Lungu, and Scott Campbell: "Replication and Representation: Shedding Light on Cultural Meanings of Technology"

On first examination of the Canada Science and Technology Museum's recently acquired replica Babbage Difference Engine No. 1, one might be tempted to dismiss it as a non-functional copy of the original – a failure, devoid of historical interest. However, through artefactual analysis, we will incorporate understandings of material culture from history of technology, theories of representation, and architecture theory to demonstrate that an investigation of the history of this particular artefact can still shed light on issues of relevance to historians and theorists alike. Specifically, understanding who made this artefact, where it was made, why it was made the way it was, and how it travelled through its life to end up at the CSTM is crucial to the exploration of the cultural significance of historical computing technologies in both Western and non-Western societies. Moreover, we will examine how the meaning of technology can be constructed visually and how the value of replicas qua replicas can be assessed.

Michel Labrecque: "The Challenges of Collecting Aerospace Technology"

The Canada Science and Technology Museum recently acquired a solar panel used during the test phase of Radarsat-1, Canada's first remote sensing satellite. Built by a Canadian aerospace company which no longer exists, the solar array is a full-scale deployable engineering model used by engineers at the David Florida Laboratory to test the array's deployment mechanism. Notable for being developed and constructed in Canada, the object is one of the few Radarsat-1 related pieces remaining anywhere. This paper explores the challenges of collecting, researching, and interpreting a unique piece of Canadian aerospace technology and provides avenues for further research. The Radarsat-1 solar array structural model will be unveiled for the first time at the conference.

Bertrum H. MacDonald: "For the Increase and Diffusion of Knowledge: Distribution of Scientific Information in Nineteenth Century Canada by the Smithsonian Institution"

Scientific communication blossomed in the latter half of the nineteenth century, as the growing number of scientists and amateur naturalists sought the latest scientific information in order to keep abreast of discoveries and contribute to scientific literature. The Smithsonian Institution became a major

international distribution centre as its reputation spread beyond the United States into many countries, and Canadians in all walks of life corresponded with the Smithsonian Secretaries. Thousands of letters, often accompanied by scientific publications, made their way in and out of the Institution's headquarters in Washington DC. By drawing on the archival holdings of the Secretaries' letter files, I will outline characteristics of the correspondence networks that reached many locales in Canada. This paper will illustrate an active communication system, which promoted scientific initiatives through the dissemination of scientific information. Without question, Joseph Smithson's wish for the "increase and diffusion of knowledge among men" was fulfilled through this massive letter-writing system.

Daniel Macfarlane: "Rapid Changes: Technology, Environment, and the Creation of the St. Lawrence Seaway and Power Project"

The St. Lawrence Seaway and Power Project, built jointly by Canada and the United States between 1954 and 1959 after a half century of negotiations and failed attempts, is the largest navigable inland waterway in the world, an enormous hydro-electric development, and is widely renowned as one of the greatest engineering feats of the twentieth century. Moreover, the flooding entailed by the project required perhaps the most significant planned relocation and rehabilitation project in Canadian history. In addition to outlining the technological advances engendered by this project, this presentation will explore the extent to which elite and popular attitudes towards progress, technology, and environmental impacted the creation of the St. Lawrence Seaway and Power Project. In particular, I will use the St. Lawrence project as a means of assessing a "high modernist" outlook in Canada.

Hugh J. McQueen and Larry McNally: "Metal Industries around Montreal, 1760 to 1910 – Canadian Industry Cradle"

Innovation between 1760 and 1910 was not usually the result of scientific research but implantation of manufacturing techniques locally novel in response to demand and financing availability by ambitious craftsmen who had a mixture of academic and craft training. The presentation includes canals, steamship engines, railroads, bridges, machine shops, iron foundries, and rolling mills. The foundry industry in Montreal started with a cupola furnaces about 1800, specializing in stoves or architectural decorations, pillars, and beams. The first marine steam engine was built in 1809 and between 1819 and 1837 produced 33 low-pressure, walking-beam models. The industry grew rapidly in the 1850s, casting long-wearing railway wheels. After the deepened Lachine Canal (1851) brought water to turbines at every lock, rolling mills (1858-68) produced iron sheet for nails. After 1881, steam powered mills for rods and pipes led to conversion to steel and founding of Canada's biggest steel company (1910). The Grand Trunk Railway's main shops at Pointe Saint-Charles in Montreal were a major manufacturing centre for passenger and freight cars as well as repairs to cars and locomotives. While the Victoria Tubular Bridge (1859) required English fabrication and Irish workmen, Montreal's Dominion Bridge fabricated half the Victoria Truss Bridge (1898) and provided an innovative design for the Quebec Bridge (1917) that saw worldwide use.

Chris Miedema: "A Periodic Table in Three Dimensions"

An unusual item was offered up for identification and examination at the Reading Artifacts Summer Institute at the Canada Museum of Science and Technology this past August. The artifact was a 3-dimensional model of the periodic table, designed by Dr. Donald Stedman of the National Research Council, starting in the 1940s. Investigation into the career of Dr. Stedman, which included personal interviews with fellow scientists, as well as an examination of archival documents, paint a picture of a

brilliant but eccentric individual. His diverse body of work would be considered unusual by today's standards. His accomplishments were not limited to chemistry as he developed a prototype for a Forest Fire Hazard Recorder in the 1960s thus making him one of the few scientists that can be celebrated during what is both the International Year of Chemistry and the International Year of Forests.

Anne Millar: "'A thousand for each one that died': The Impact of the Montreal Massacre on the Promotion of Women in Engineering at Canadian Universities"

This statement made by Monique Frize following the 1989 Montreal Massacre, soon after her appointment as the first national NSERC Chair for women in science and engineering, illustrates the emotional response which this tragedy provoked within the community of women engineers in Canada. Mainly written by feminist scholars from the humanities and social sciences, the literature produced so far on the Montreal Massacre tends, overall, to frame the massacre as a product and symbol of the larger problem of violence against women. It has largely ignored the views and reactions of the engineering community in Canada, especially those within universities: engineering students and professors, heads of faculties, and women in engineering advocates. This paper attempts to fill this gap by examining the perspectives of the academic and professional engineering communities on the Massacre and its meanings, as well as their response to this tragedy. It will focus on the various programs and policies adopted by universities in the 1990s to recruit, retain, and promote more women in engineering. It will argue that the Montreal Massacre acted, in many ways, as an unforeseen and dramatic catalyst for change, by triggering and intensifying efforts aimed at the full and equal participation of women in this highly male dominated profession.

Eric Mills: "Attractive to Strangers and Instructive to Students: The Thomas McCullochs' Nineteenth Century Bird Collection in Dalhousie College"

Thomas McCulloch (1776-1843), Free Church minister and educator, founder of Pictou Academy, first President of Dalhousie College 1838-1843, established a museum in Pictou, NS, about 1817, including a bird collection. To McCulloch, the order of the natural world inculcated in students principles of a liberal education and a model of society. His first collections were sold, but when McCulloch came to Dalhousie in 1838 he started a new collection and museum. In this he was aided by his son Thomas (1811-1865), who had been trained as a taxidermist. The younger McCulloch expanded the collection until his death, after which it passed to Dalhousie College. The current McCulloch Collection, mainly the work of Thomas McCulloch, Jr., seems to exemplify purposes and practices of nineteenth century natural history. But research shows that the collection has a hybrid origin and must be viewed with great caution as an historical artifact. This is a case study in the difficulty of interpreting nineteenth century natural history collections without careful examination of their history.

Florian Olsen: "Moving Forward: the 'Jenkins Report' on Federal R&D Spending and Beyond"

This discussion paper is meant to stimulate dialogue and reflection on some of the recommendations contained in the report of the Expert Panel on Federal Support to Research & Development (R&D). This paper contributes to a consultation process that the office of Ms. Hélène LeBlanc (MP, LaSalle-Émard) is undertaking as part of an extensive review of science, technology, innovation, and research and development policies. Indeed, there is increasing evidence that despite extremely generous funding, key Canadian policies and programs are failing to promote Canadian innovation and private

research spending with regards to international standards..

David Orenstein: "Helen and Frank: A Personal and Professional Astronomical Partnership"

Frank Hogg came to Harlow Shapley's graduate programme in Astronomy at Harvard, from the University of Toronto, in the 1920s. So did Helen Sawyer, from Mount Holyoke College. There they met, got married, and earned their PhDs. Helen joined Frank in Victoria as an unpaid research assistant, when he was hired as an astronomer at the Dominion Astrophysical Observatory in Victoria. In 1935 they moved to the University of Toronto's newly opened David Dunlap Observatory, he as a professor of Astronomy, she as a PAID research assistant. There they built their family and their professional careers in a spirit of strong mutual support and love until Frank died tragically of a heart attack on New Year's Day 1951. Their story is amply documented by the 15 running meters of the Helen Hogg Fonds at the University of Toronto Archives.

David Pantalony: "Semiconductors, Thermoelectricity and the Artifacts that Came in from the Cold"

Thermoelectricity was a blossoming field in the late 1950s and early 1960s with far reaching applications in space, transportation, household appliances, and medicine. Research in semiconductor materials created the foundation for these efforts. As a practical showcase for this promising field, Soviet scientists developed a cheap, portable kerosene thermoelectric generator used to run radios in remote regions. Stamped "Made in U.S.S.R," the Soviets intended to export them throughout Europe, North America, and developing countries. In response to this robust and potentially successful Soviet technology, the U.S. government commissioned the 3M Company of Minnesota to make a similar generator. Canadian physicists at the National Research Council (NRC), leaders in semiconductor research in the 1950s, acquired and tested both versions of the rival generators. The actual instruments used by the NRC scientists have recently been rediscovered at the Canada Science and Technology Museum. In this paper, I shall describe (and display) these artifacts, their life stories, and what they tell us about a forgotten chapter of Cold War physics.

Galen Perras: "'A number of soldiers could bomb with wonderful results': Charles Heming and the Lacrosse Stick Grenade Launcher in 1941"

When Europeans arrived in eastern North America in the seventeenth century, they discovered that many native peoples played lacrosse, a sport that many called "the little brother of war." In the Second World War, Canadian travel agent Charles Heming, a Great War Canadian Expeditionary Force veteran, took that meaning quite seriously. Known in the Hamilton region for his frequent commentaries on military subjects in local newspapers, Heming, inspired by a news item about German anti-tank tactics in the Soviet Union, contended in 1941 that troops using lacrosse sticks could launch hand grenades with deadly accuracy up to 100 yards against tanks and German landing ships. Using his political and military connections, Heming declined to use the accepted means – submitting suggestions via the National Research Council's Invention Board – in favour of contacting the Ottawa-based Inspection Board of the United Kingdom and Canada. Heming's gambit was only partly successful. His idea was examined by a number of officers, including the Deputy Chief of the Canadian General Staff, a level of expertise and influence that few inventors ever reached. However, like the vast majority of would-be military inventors, Heming's proposal was ruled to be impracticable. So while

Heming's advocacy – which also included public tests reported in newspapers – was out of the ordinary as wartime inventors in Canada and their officials judges normally relied on secrecy, his failure was not unique as the vast majority of invention submissions were dismissed quickly.

Beth A. Robertson: "Technologies of the Disembodied: Scientific Apparatuses of Psychical Research 1918-1939"

North American psychical researchers utilized a range of technologies to create a scientifically controlled environment for the systematic production, measurement, and analysis of paranormal phenomenon. The spirits seemed to reciprocate, as psychical researchers reported the spirits' use of ectoplasmic devices to achieve telekinesis and direct communication. In such an environment, even the medium could slip from scientific subject to technological mechanism as psychical researchers manipulated the clairvoyant as an "instrument" to be carefully manipulated for the successful production of phenomenon. Examining two sets of connected, cross border psychical experiments in Boston, Massachusetts and Winnipeg, Manitoba during the 1920s and 1930s, this paper will analyze the use of technology within the séance room. Blurring the lines between object and subject, the employment of scientific apparatuses embodied the disembodied and materialized the immaterial. Ultimately, such mechanisms acted as a central means by which experimenters constructed a science of the paranormal.

Jordan Schoenherr: "The Impact of Federal and Provincial Funders on Scientific Integrity Policies at Canadian Universities"

Considerable interest has emerged over the creation, modification, and implementation of research integrity/misconduct (RIM) policies within the last few decades. Motivated by a recent review of institutional policies (Schoenherr & Williams-Jones, 2011) that noted numerous similarities and differences in RIM policies, the present study considers the impact of federal and provincial initiatives on Canadian academic institutions. Specifically, the present study assesses the impact of Office of Research Integrity (U.S.) and Tri-Council policy statement (TCPS-IRS) on the creation of policies of Canadian universities as well as the Fonds de la recherche en santé du Québec. An examination of the policy inception and modification dates and policy elements indicates that the introduction of the TCPS was likely the primary influence of for the creation of scientific integrity policies at Canadian institutions. The study concludes that the past and future role of federal initiatives appears central to any successful scientific integrity initiative.

David Theodore: "'A Strange Hair Dryer': Computers and the Montreal Neurological Institute, ca. 1975"

This paper looks at the role of the computer-as-object in the development of positron emission tomography at the Montreal Neurological Institute. The MNI acquired the first PET scanner in Canada in 1975. Instead of the flashing lights and minimalist computer control room familiar from popular films, patients and researchers interacted with a rather different machine and setting. CJ Thompson recounts that it "looked rather like a strange hair dryer." The paper explores this "unfinished" setting, long before the breakthrough in terms of clinical use for the PET scanner occurred with the so-called Positome II in 1979; the Positome II used bismuth germanate detectors to make high-resolution images, and thus was part of the emerging commercial development of brain scan technology. Based on published photographs and technical reports, the paper is part of a larger project looking at how

computers made the move from military and specialized academic research institutions into hospitals and clinical settings.

Mike Thompson: "Meeting Canada's 'Manpower' Needs: Gender and the Training of a Skilled Workforce for Economic Growth and Competitiveness, 1960s-1980s"

This paper brings together two fields of research which have largely evolved in parallel – the history of S&T policies and the history of women scientists and engineers – by focusing on the official government discourses and federal S&T policies related to the training of a highly qualified "manpower" that would help advance Canada's industrial goals and foster national prosperity. We will see that, within the federal S&T community of officials and policy makers, women were not identified as a key source of highly skilled "manpower" that held the potential to enhance innovation and industrial growth until the 1980s, under the Trudeau Liberals and Mulroney Conservatives. The paper will discuss the reasons behind this pattern, including the lack of a coherent national S&T policy on the one hand, and the increasing influence of the women's movement and of women in science and engineering activists on the other hand.

Jean-Louis Trudel: "Clockmaking in New France: A Craft that Belied its Name"

New research brings to ten the number of clockmakers who may have worked in New France up to 1763. Little is known of this elite group of artisans, least of all whether they produced any clocks in New France. Nevertheless, the multiple crafts they practiced, the occupations of their parents and grandparents, and what is known of their actual work may be analysed to complete our understanding of timekeeping in New France. The clockmakers of the French colonial period all lived in the eighteenth century, at a time when clockmaking was gaining in complexity as a result of technical innovations and the subdivision of the labour needed to produce high-end clocks. Some of these factors may help explain why the handful of clockmakers present in 1763 gave rise to very few makers of clocks in Québec and Lower Canada during the British colonial period.

Sean Tudor: "The Peaceful Atom: Exporting Objects of Promise"

In a period when Canada's fledgling nuclear industry set out to be a provider of peaceful atomic power technologies, but prior to the 1970 Nuclear Non-Proliferation Treaty, Atomic Energy of Canada Limited embarked on a project to supply scientific and technological knowledge to help build the Canada-India Reactor (CIR). Although the peaceful intent is often over shadowed by the Pokrahn-I project, objects commemorating the original intent of the technology exchange do exist. One such example is a commemorative cross-section of a CIR fuel rod currently in the collection at the Canada Science and Technology Museum. An ongoing investigation of this piece is yielding a better understanding of the new international relationships formed between Commonwealth governments in the late 1950s and into the 1960s and Canada's role in the proliferation of "peaceful" atomic technologies.

Jonathan Turner: "Science in Canada following the Second World War: Solandt and the DRB"

The Defence Research Board (DRB) was created in 1947 after three years of administrative planning. The DRB's first chairman, Omond Solandt, described his vision for the research agenda that included work for which only Canada was suited based on nature or expertise, projects for the services that other

nations were unlikely to undertake, research that would support promising industries, and acquiring a basic understanding of developments in allied nations for future consultation and application. In this presentation I will discuss Solandt's realisation of his vision for the DRB through the intramural, extramural, and liaison programmes. This story tells important lessons about how government science can thrive in certain political and economic situations, how science was perceived in the early Cold War, the federal government's role in reconstruction following the Second World War, Canada's place in the world, and the importance of defence research to defence.

Matthew Wallace: "The Meteorological Service and the Growth of Atmospheric Science in Canada"

From 1945 to 1970, the Meteorological Service of Canada (MSC) made it a priority to develop atmospheric science, both within its own ranks and at universities across the country. The management of MSC in the post-war years focused on increasing science capacity as a fundamental part of the organization's mandate and as a means to address internal issues such as chronic staff shortages. Through the establishment of a science subventions program, the MSC formalized and strengthened its ongoing efforts to stimulate university research in a relatively unexplored field. This complemented the work of the MSC to promote atmospheric research through existing scientific structures dominated by the National Research Council. These efforts highlight the vision of MSC's science managers, as well as the challenges they faced, within a relatively small science-based governmental organization. In this sense, the federal context presents both opportunities and barriers to the development of a research field.

Erich Weidenhammer and Ari Gross: "Building a Collection of Scientific Instruments at the University of Toronto"

Since 1978, the University of Toronto's Institute for the History and Philosophy of Science and Technology has led repeated attempts to formally establish a collection of historically significant scientific artefacts. Most recently, the University of Toronto Scientific Instrument Collection (UTSIC) has eschewed pursuing lofty plans for a university museum in favour of a collaborative bottom-up approach, relying on volunteer graduate student labour, the development of personal contacts with individuals within science departments, and local expertise. By focusing on the development of a secure storage space and an accessible online catalogue (www.utsic.org), the UTSIC strives to transcend past failures to implement a university-wide plan for safeguarding historical instruments. This presentation will discuss the circumstances and challenges of dealing with historical scientific material in a university context. It will also explore several critical aspects of developing a formal collection, such as implementing museum standards and practices.

Andrew H. Wilson: "Rolt, Petroski, and Legget: Three Historians of Engineering"

These three men have made major contributions to the written history of engineering in Britain, the United States, and Canada – unusually for engineers. Part of the reason for this is the apparent lack of attention that engineers generally give to their own profession's history. But part is also due to the fact that engineering history is either downplayed by "real" historians or is, wrongly in my view, included as part of the history of science. This paper discusses the differing backgrounds and "products" of the three, what made them effective as historians, and the importance of their work in relation to the science-engineering dichotomy.

Suzanne Zeller: "Humboldt's Analytical Empire: Auroral Science in Arctic British
   North America, 1819-1884"

Although the Prussian scientific traveller and author Alexander von Humboldt (1769-1859) never visited British North America, his influence upon its northern regions was immeasurable. Humboldt's "cosmic" approach to the study of nature as a new form of "global geophysics" directly inspired British scientific explorers in their renewed search for a Northwest Passage after the end of the Napoleonic Wars in 1815. In particular, Sir Edward Sabine, R.A. and Sir John Richardson, R.N., who served on arctic expeditions led by Sir Edward Parry (1819) and Sir John Franklin (1819-1822, 1825-1827), respectively, applied Humboldtian insights to study the interconnectedness of meteorological and geomagnetic phenomena, including the aurora borealis. Sabine went on to direct the British Imperial "Magnetic Crusade," in which Sir John Henry Lefroy (1817-1890) undertook his magnetic survey of the British American Northwest and directed Toronto's Magnetic and Meteorological Observatory, Canada's first permanent scientific institution (1839); Richardson went on to recruit Hudson's Bay Company fur traders and other collaborators in his longterm investigations of the habitability of arctic lands. These Humboldtian networks, the first scientific forays into the arctic regions of British North America, deployed coordinated scientific instruments and analytical techniques, both statistical and visual, to appropriate these territories for imperial purposes. Their reach for scientific knowledge, however, exceeded their grasp, at least for the time being, at least where auroral studies were concerned.

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