

A H S T C

Association pour l'histoire de la science et
de la technologie au Canada

C S T H A

Canadian Science and Technology
Historical Association



Dominion Astrophysical Laboratory

XIII^e conférence de Kingston

17 au 19 octobre 2003

13th Kingston Conference

October 17-19, 2003

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Friday, October 17th, 2003
Vendredi, 17 octobre 2003

Critical Histories: A Round Table on Historiography of Science

Les histoires critiques:
table ronde sur l'historiographie de la science

[19:30-21:00 Plenary Session /
Séance plénière]

Richard Jarrell, chair /
président

Stéphane Castonguay,
Matthew Evenden,
Edward Jones-Imhotep,
Jennifer Keelan,
panel / participants

Suzanne Zeller, commentator /
commentatrice

Saturday, October 18th, 2003
Samedi, 18 octobre 2003

Society in Engineering La société dans le génie

[9:00-10:30 Session / Atelier A1]

Richard White, chair /
président

*Confederation within the Engi-
neering Profession*

Andrew H. Wilson

The engineering profession in
Canada currently has four national
institutions: Engineering Institute
of Canada (EIC), Canadian Council
of Professional Engineers
(CCPE), Association of Consulting

Engineers of Canada (ACEC), and
Canadian Academy of Engineering
(CAE). While there is no talk
about merging these into a single
institution, the EIC and CCPE did
attempt to "confederate" in the
1930s and again in the 1950s. This
paper will discuss these two, quite
different, attempts—and why they
both failed. It will postulate that an
attempt to do so in the near future,
with or without the ACEC and the
CAE, is unlikely to be made. ☪

*L'ingénieur sanitaire entre la
médecine et le génie,
1890-1930*

Natasha Zwarich

À Montréal, comme dans plusieurs
autres villes canadiennes du XIX^e
siècle, l'industrialisation et l'urbani-
sation entraînent une concentra-
tion accrue de la population dans
un espace restreint. Cette densifi-
cation affecte les conditions sani-
taires de même que
la qualité de vie en
milieu urbain. Très
peu de logements
ouvriers sont en
effet dotés d'ins-
tallations sanitaires
adéquates. De plus,
les épidémies, telles
que le typhus, le choléra
ou encore la variole, provo-
quent chaque fois la
mort de centaines
de citoyens et, de ce
fait, témoignent de
la faiblesse et même de l'inexis-
tence de mesures hygiéniques et
sanitaires. On assiste alors à une
prise de conscience de la gravité
des problèmes chez un certain
nombre de réformistes qui font
pression pour que soient adoptées
des mesures d'hygiène publiques.
Afin de mettre un terme à cette
situation, les dirigeants municipaux
font appel à des experts dans
différents domaines. Les ingé-
nieurs, par exemple, soumettent
des solutions aux problèmes posés

par l'urbanisation (réseau d'égouts,
aqueduc, collecte des déchets).
Tandis que les médecins devien-
nent des acteurs importants dans
l'élaboration de politiques en santé
publique. Un autre acteur impor-
tant fait alors son apparition dans
les officines de l'administration
publique : l'ingénieur sanitaire.
Alliant le savoir médical et les
connaissances de l'ingénieur, ce
nouvel expert joue un rôle dans la
mise en place d'infrastructures
urbaines et dans l'élaboration de
politiques sanitaires. Or, il nous
apparaît vital de montrer que
l'émergence de ce nouvel acteur
doit beaucoup à la lutte entre
médecins et ingénieurs pour
investir les lieux de pouvoir déci-
sionnels. La formation de l'ingé-
nieur sanitaire témoigne d'ailleurs
de l'ambiguïté de cette spécialité
qui loge tantôt à l'enseigne des
facultés de médecine tantôt sous la
bannière des écoles de génie. En
effet, nous nous sommes interro-
gés à savoir quels est la place et le



Engineering Institute of Canada
Institut canadien des ingénieurs

rôle de l'ingénieur
sanitaire dans
l'administration
municipale et
comment ils se
sont organisés en
société pour faire la
promotion de leur
spécialité. C'est grâce
à leur regroupement au
sein d'associations profes-
sionnelles telles
que la *Canadian
Health Association*,
la *Montreal Sanitary
Association* ou le *Canadian Engi-
neering Institute* et, plus tard par la
création d'une corporation profes-
sionnelle, que les ingénieurs sani-
taires sont en mesure de s'affirmer
comme groupe social. Cette com-
munication vise à mieux compren-
dre la mise en œuvre d'un travail
éminemment social menant à la
construction d'une identité spécifi-
que aux ingénieurs sanitaires. ☪

Training Good Engineers at the University of Toronto during the Interwar Years : The Construction of Masculine Engineering Identities at the Faculty of Applied Science and Engineering 1920-1940

Ruby Heap

The historical study of Canadian women engineers is still largely in its infancy. The scholarship devoted to their education in faculties and schools of engineering is even less developed. The international literature on this topic, which has been produced above all by sociologists and other social scientists, examines mainly the patterns of exclusion and marginalization of women in engineering education, and it tends to focus on the more recent period. The paper I wish to present is part of an ongoing research project on the professional education of women in selected Quebec and Ontario faculties of engineering between 1920 and 1990. It proposes to examine the process of gender construction at the Faculty of Applied Science and Engineering (FASE) during the interwar years. More specifically, I am interested in the shaping of specific masculine identities in this particular setting responsible for the transmission of technical expertise, where women were either absent or present in very small numbers. By consulting a wide range of sources (annual reports of the President of University of Toronto and of the dean of the FASE, university calendars, the FASE yearbooks, student newspapers, the local press, etc.), I will attempt to see how institutional structures and policies, educational practices (course content and course schedule, pedagogical practices, extra-curricular activities, etc.), as well as various forms of symbolic representations, led to the construction of engineering identities at the FASE that were based on the

promotion of a specific type of masculinity. What kind of man did the FASE wish to produce? What was the profile of the *good engineer* promoted by the faculty? Do we observe some changes in this respect, or do we depict, rather, persisting patterns? The interwar years constitute an interesting period to conduct this study as a few women were now enrolling at the FASE and receiving degrees in various branches of engineering education. These women are part of the “pioneering” phase in the history of women at the FASE. As “gender-benders,” they attracted considerable attention at the time. How was their arrival greeted by the FASE? Did it lead to any change in the faculty’s educational practices? Was masculinity expressed differently? Did gender play a different role in the shaping of engineering identities now that women had begun to enter this highly masculine enclave? Exploring the construction of engineering identities at the FASE, which we see as an ongoing process, will provide important insights into the ways the gender/technology relationship played out in this particular environment at a particular time, and that it will lead, as a result, to a better understanding of the type of experiences lived by those women who were the first to be admitted to this faculty. ☪

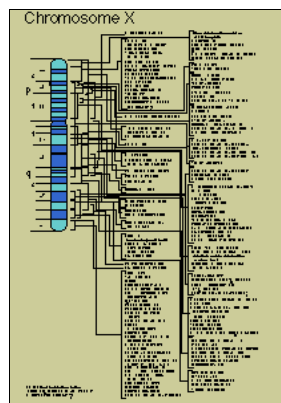


Chart of the disease-linked genes along the X chromosome
Charte des maladies génétiques liées au chromosome X

Discourse and the Social Body
 Le corps social et ses discours

[9:00-10:30 Session / Atelier A2]

Michael Eamon, chair /
 Président

Genomics and Health: The Canadian Context

Ted Everson

I will discuss my Ph.D. research in progress of the history of Canadian genomics, in the context of its putative relevance to medicine. The Human Genome Project, the international effort to map the genes and sequence the DNA of humans and other organisms, is typically justified by resorting to medical benefits, and advocates have provided specific examples of genomic technologies relevant to improving public health. But critics argue that public health levels are best explained by environmental and socioeconomic factors. Territorial expansion, “molecularization,” ideological shifts in public policy theory, and political economy have all been invoked as alternative explanations of the popularity of a genetic approach to health and illness. I will consider these debates about the genetic approach to health in the context of the development of Canadian federal funding infrastructure for genomics. ☪

Innovation, Safety and “Risk” in Victorian Culture: Anaesthetic Technology Revisited

J.T.H. Connor

In an era before government inspection and regulation, hospital safety review committees, and

patient advocacy groups how did the public and doctors assess innovative medical technology that was perceived to be beneficial yet potentially life threatening? What investigative and corrective mechanisms were triggered when patients died apparently as a result of a relatively untried or “experimental” procedure? Did doctors and the public develop a common understanding of “risk” as applied to surgical technology? Was doctor-patient trust altered under these new conditions? Using the introduction of general inhalation anaesthesia to Canada during the mid-19th century, this paper begins to explore these and related questions. In particular, it examines published reports of patients who, when insensible due to the inhalation of ether and chloroform, either died or had been allegedly sexually assaulted. Preliminary results show that when law courts and coroners undertook investigations of catastrophic medical events they were sympathetic to doctors, but were willing to admonish or prosecute practitioners that they believed to be at fault. The public *qua* patients exhibited a mixed response ranging from steadfastly refusing to be “put under” while undergoing surgery thereby asserting their agency; reluctantly inhaling anaesthetic agents believing that all was in the hands of fate; and eagerly embracing any new technology that would mitigate pain and suffering. Canadian doctors for their part initiated rudimentary experiments and tinkered with anaesthetic delivery devices in an effort to minimize patient danger; participated in legal proceedings usually to protect professional values and colleagues; and invoked the power of statistics to buttress the case that general anaesthesia



Appareil pour inhalation anaesthesia
Appareil pour anesthésie par inhalation

was “safe.” Overall, anaesthetic technology raised important questions about practitioners’ responsibilities/patient safety and it was one of the first Victorian medical innovations that prompted both the public and doctors to confront what constituted an acceptable level of risk. ☪

L'émergence du mode de raisonnement statistique au Bas-Canada

Jean-Pierre Beaud et
Jean-Guy Prévost

C'est au seuil du XIX^e siècle que l'on peut fixer l'émergence de l'activité statistique moderne: en quelques décennies, on assiste dans plusieurs pays à la mise en place de recensements décennaux (à partir de 1790 aux États-Unis, de 1801 en Angleterre, ...), à la constitution de « sociétés de statistique », à la prolifération d'enquêtes sur les phénomènes qui inquiètent les élites de l'époque (crime, folie, suicide, mortalité infantile, pauvreté, ...) et surtout à l'utilisation de plus en plus fréquente d'arguments fondés sur le nombre dans les discours destinés à convaincre. La rupture évidente que marque cette période a été décrite, par ceux qui l'ont examinée, au moyen d'une série de métaphores suggestives: « l'ère de l'enthousiasme » (Westergaard), « la grande explosion des chiffres » (Porter), « l'avalanche des nombres » (Hacking). On assiste donc, au cours des mêmes décennies, à une transformation dans le domaine de la rhétorique, des modes de pensée et des habitudes intellectuelles et à la mise en place progressive d'organisations dont le rôle est précisément de fournir aux autorités et au public cultivé des informations chiffrées. En prenant pour objet le

cas à la fois exemplaire et atypique du Bas-Canada, nous montrerons comment se mettent en place, en gros pendant la première moitié du XIX^e siècle, un ensemble de discours et de pratiques qui font du chiffre leur matériau privilégié et bientôt la traduction la plus sûre et la plus juste du réel. Surtout, nous chercherons à préciser comment se fait la domestication d'une série d'outils statistiques simples comme le tableau, le pourcentage ou les taux de progression. Notre exposé tournera autour de trois problèmes pratiques que rencontrent alors les auteurs d'ouvrages cherchant à rendre compte de l'état du pays, en l'occurrence le Bas-Canada (comment représenter le monde ? ; comment comparer ? ; comment appréhender le changement ?), et des solutions qui ont été dégagées (le tableau comme outil cognitif ; les pourcentages comme instrument de mise en équivalence ; les calculs de progression comme moyen de rendre compte de l'évolution dans le temps). ☪

Communication and the Diffusion of Science

Communication et diffusion de la science

[9:00-10:30 Session A2 / Atelier A2]

Philip Enros, chair /
Président

The Smithsonian Institution as Promoter of Science: The Diffusion of Scientific Information in Nineteenth-Century Canada

Bertrum H. MacDonald

In the middle of the nineteenth century both Canadian and American scientists voiced the view that as far as science was concerned the

political boundary between the two countries was meaningless. However, the border was important and as the latter half of the century unfolded it became even more pronounced. Even so, scientific information flowed freely between the two countries and this traffic took on increasing importance with the creation of the Smithsonian Institution. The first two secretaries, Joseph Henry and Spencer Baird, initiated massive collecting efforts which extended into both the settled and frontier areas of Canada. As biological specimens and archeological artefacts were shipped south to Washington, DC, north-bound correspondence carried books and scientific publications to staff members of the trading posts of the Hudson's Bay Company, to individual naturalists throughout the country, to scientific societies, and to scientists associated with research agencies, like the Geological Survey of Canada. Henry's and Baird's extensive correspondence complemented the Smithsonian's international scientific publication exchange program well documented in Nancy Gwinn's dissertation. In this paper, I will draw on research conducted, as a Dibner Library Resident Scholar, in the Smithsonian Institution Archives in Washington, DC, coupled with an extensive foray into archival records of Canadian scientists, to show that while the Smithsonian Institution was an American organization its impact on promoting the development of scientific work in Canada through the dissemination of scientific literature was substantial. Although the border between the two countries mattered, in the realm of science the boundary could be quite porous to the benefit of both. This paper will underscore the international nature of scientific work. ☞

Le Canada et les communications internationales: analyse d'un échec

Claude Beauregard et
Alain Canuel

Aujourd'hui on présente les États-Unis comme étant une hyperpuissance. En effet, ce pays occupe le premier rang dans les domaines économique, militaire et culturel. Cette puissance américaine trouve son origine dans la collaboration qui existe entre l'appareil gouvernemental, l'entreprise privée et les forces armées. En 1942, les États-Unis mettent sur pied *Voice of America* qui diffuse partout dans le monde le point de vue de l'Amérique. Alors que le deuxième conflit mondial s'achève, les responsables de la propagande des États-Unis facilitent la diffusion des films, des livres et des magazines américains à l'étranger. Pour sa part le Canada est incapable de s'affirmer dans le monde des communications.



Radio-Canada International

L'exemple de Radio-Canada International (RCI) le montre bien. RCI commence à fonctionner à la fin de la guerre en 1945. De plus, les budgets consacrés à cette radio sont minimes en comparaison à ceux des autres pays. Pour démontrer nos propos, nous commencerons avec la naissance de la radio aux États-Unis au cours de la Première Guerre mondiale pour enfin terminer avec les budgets consacrés aux communications internationales aujourd'hui dans le monde. ☞

Révolution scientifique et nouveau paradigme dans le discours social : Crick et Watson, pères d'un nouveau discours ?

Pascal Théroux

L'histoire et la philosophie des sciences étudient depuis longtemps le phénomène des révolutions scientifiques surtout depuis une quarantaine d'années, avec Kuhn. L'invention du concept de paradigme est fait dans un contexte qui peut influencer la construction de celui-ci, ou inversement. La question que nous posons est donc la suivante : est-il possible de mettre en évidence les interrelations complexes entre la démarche et le contexte de ces révolutions scientifiques ? En d'autres mots, nous cherchons à établir les corrélations entre les paradigmes scientifiques et les axiomes de base des « croyances sociales » (imaginaire populaire et discours des médias non spécialisés) par l'analyse du discours de cette époque. Dans le cadre de cette présentation, nous nous limiterons à l'émergence du nouveau paradigme génétique qui s'instaura suite à la découverte de la structure à double hélice de Watson et Crick en 1953. Nous tenterons de cerner l'impact du modèle de l'ADN et du fonctionnement de la réplication qu'ils proposèrent sur le discours scientifique et sur l'imaginaire social et littéraire canadiens. Il n'est pas question ici de prétendre mettre en lumière des liens de causalité directs entre les travaux de Watson et Crick et les créations des écrivains de l'époque, mais bien d'examiner les corrélations entre les facteurs apparemment externes au paradigme propre (les a priori métaphysiques et moraux, l'imaginaire social, etc.) et les liens qui les relie à celui-ci. L'objectif de cette communication est de signaler des interrelations entre les découvertes savantes et l'évolution du discours scientifique hors du cercle fermé

de la seule communauté scientifique des biologistes et généticiens. La méthodologie suivie, en regard du discours social, est celle de l'analyse du discours telle que pratiquée en histoire, en étude littéraires et en journalisme, alors que la sociocritique servira de base pour l'analyse du corpus littéraire. Notre approche est pluridisciplinaire, reflétant la nature de notre objet d'étude. Nous suivrons les balises épistémologiques posées par Kuhn en regard de la révolution paradigmatique que représente ce nouveau modèle pour les différents spécialistes de la génétiques au Canada. Les sources que nous utiliserons pour l'analyse du discours sont des revues spécialisées ainsi que des revues de vulgarisation scientifique, le journal *The Gazette* ainsi que certaines fictions d'auteurs canadiens du début des années 1960. ☞

Break / Pause [10:30-11:00]

Science and Technology and the City

La science et la technologie dans la ville

[11:00-12:30 Session / Atelier B1]

Stephen Bocking, chair / président

Traffic Engineers and the Metropolitan Toronto Region, 1950-1970

Richard White

This paper will begin by tracing the origins and evolution of the specialized field of "traffic engineering" in the United States and Canada after the Second World War. Although the specialty was born, strictly speaking, before the

war, it is perhaps best seen as one of several post-war applications of the Operations Research mindset, and it did not truly come into its own until the introduction of computer modeling in the 1950s. Traffic engineers played a central role in shaping urban growth in the post-war boom throughout North America, a job for which they are rarely thanked or congratulated. Their role in the Toronto region, however—which the paper will then go on to explore—is rather surprising. The engineers who had the greatest influence on public transportation policy in those critical years, all of whom are little known, believed in maintaining a mix of public and private transit, and of matching transportation plans with a rational land use plan. Their views, manifested in the Ontario government's Metropolitan Toronto and Region Transportation Study (1962-67), had considerable influence on the endurance of Toronto's reasonably compact, transit-friendly form. Whether this was due to the engineers themselves or to the politicians and public servants who hired them is a question that will be considered. The paper draws primarily from government records in the Archives of Ontario and the City of Toronto Archives, published reports, and interviews with participants. It is part of the author's ongoing work on the history of post-WWII urban plans and planning in the Toronto region. ☞

L'organisation du Département du feu, Montréal 1800-1850 : un frein à la modernisation des techniques de lutte contre les incendies

Dany Fougères

L'association entre la disponibilité en eau et la lutte contre les incendies tient du sens commun. Dès le

début des années 1850, le potentiel d'un réseau d'eau sous pression pour la lutte contre les incendies est clairement exprimé et se concrétise progressivement au cours des décennies suivantes. Mais au cours de la première moitié du XIX^e siècle, la question est plus complexe. Avant 1850, la présence de conduites dans certains secteurs de la ville de Montréal permet, pour ces endroits, d'accroître le nombre de points de ravitaillement en eau. Aux tonneaux des porteurs d'eau transportés sur les lieux des sinistres, aux citernes qu'on a peut-être eu la bienveillance d'installer, et l'eau directement puisée dans le fleuve lorsque l'incendie est à proximité s'ajoutent alors, les *fire plugs* du service d'eau potable ; des robinets qui font office de poteaux d'incendie, permettant de remplir les tonneaux qui sont ensuite transportés sur les lieux des incendies. L'eau est par la suite jetée sur les flammes à l'aide de seaux ou lancée grâce à l'emploi de pompes à incendie actionnées manuellement. Avant 1850, le poteau d'incendie, tels qu'on le connaît aujourd'hui, d'où l'eau jaillit sous l'effet d'une forte pression dès l'ouverture des orifices, n'est pas encore envisageable. Pour en arriver là, pour que les responsables montréalais de la lutte contre les incendies s'ouvrent à un nouveau registre technique (voire la contribution d'un réseau d'eau sous pression étendu à l'échelle de toute la ville), il faut que les problèmes d'organisation de la lutte contre les incendies qui dominent tout le premier demi-siècle (direction et composition des effectifs de pompiers lors des sinistres) soient solutionnés, laissant enfin place aux interrogations sur les formes d'approvisionnement en eau et les procédés par lesquels celle-ci serait conduite, puis utilisée. Ceci étant, comme dans les autres villes occidentales, il faut, à Montréal, que l'hydraulique urbaine gagne aussi (en paral-

lèle) en maturité et en fiabilité pour que puisse être revue la contribution du service d'eau à la lutte aux incendies. ☪

Driven by Choice: the Role of Municipalities and Specialized Production in the Survival of the Canadian Industry of Fire-Fighting Vehicles, 1945-1965

Suzanne Beauvais

Unlike the Canadian automobile industry which early in its history fell under foreign control, a Canadian industry that designs and produces fire-fighting vehicles has survived. Its existence contradicts the “New Canadian Political Economy” interpretation according to which Canada lost its industrial and technological capacities with the changes brought to the Patent Act in 1872 and with the adoption in 1879 of the National Policy tariffs’ wall. These measures encouraged the establishment of subsidiaries and branch plants in Canada which lead gradually to our strong dependency on foreign technology and capital. In this paper I will illustrate how the Canadian fire-fighting industry contradicts this interpretation in a manner consistent with the works of authors like John Vardalas and Graham Taylor. What are the factors that made possible the existence and survival of this Canadian industry? In agreement with Philip Scranton, I argue that the fire-fighting vehicle industry is an example of specialized production which allowed the coexistence of American and Canadian companies in Canada. This specialization was driven by its clientele—composed up to 80 to 85% of cities, towns and villages—and the civic responsibility attached to fire fighting. Accordingly, I will also argue that the custom fire truck is a socially made technology. Whether a real necessity or not, custom fabrication of fire fighting

vehicles has been perpetuated by this clientele. In this paper I will discuss about three companies that dominated the Canadian market from 1945 to 1965 and their interaction with their clientele: LaFrance Fire Engine and Foamite Ltd situated in Toronto, Ontario (a branch plant of the American LaFrance company), Bickle-Seagrave/King Seagrave company situated in Woodstock, Ontario (which had a licensee agreement with the Seagrave Corporation) and Camions Pierre Thibault situated in Pierreville, Québec (a Canadian francophone family enterprise). ☪



1960 American LaFrance Fire-Fighting Vehicle
Camion American LaFrance de lutte contre les incendies de 1960

Innovation, Instrumentation and Production

Innovation, instrumentation et production

[11:00-12:30 Session / Atelier B2]

Bill Rawlings, chair / président

Uniquely Canadian: Canada’s adoption of the Machine Gun

Donald Parker

The Canadian military is a unique, and in many ways understudied, body. Built on the traditions of the British Army, and yet shaped by uniquely Canadian experiences. An

example of this unique tradition can be found in the Canadian army’s adoption of the machine gun in the First World War. When Canada joined Britain and declared war in 1914, Canada’s military leaders were quick to promote the image of a modern and effective army. As a result, the Canadian army embraced the machine gun as a symbol of modernity and professionalism. Unlike Britain’s professional officer class, Canada’s officers saw the machine gun as a symbol of elitism. The upper class of Canada rushed to create machine gun units as a symbol of marshal pride. Using extensive secondary sources, as well as soldiers’ journals, the paper will demonstrate how Canada’s military adopted this new technology. ☪

Forty Years of Analytical Studies

Randall C. Brooks

Over the years a number of researchers studying scientific instruments have used modern techniques and equipment to analyse historic instruments. One study, if not the first, was that by Turner and Bradbury (1967) of the microscope test rulings made by Friedrich Nobert in the mid-19th century. Since then, most of these analytical studies have dealt with optics in one form or another. This paper will review many of these studies to summarize what has been learned and to suggest where we might most usefully direct future studies. Reference to a couple of studies of relevance to artifacts in Canadian Museums will be made. ☪

Towards a History of Canadian Manufacturing

Larry McNally

There is no single history of Canadian manufacturing, not even

a basic one that tells us who made what, where and when. Unfortunately this gives the impression that we were (and are) only drawers of water and hewers of wood. In fact, Canada has a long history of manufacturing and some of it quite innovative. This paper will outline some new sources that will help us reconstruct and evaluate Canadian manufacturing. Projects which are largely supported by government subsidies have become a major source of information. This includes the *Dictionary of Canadian Biography*, the *Historical Atlas of Canada* and the Canadian Institute of Historical Microreproductions. The censuses of 1871, 1881, 1901 and 1906 are providing a wealth of detail. Recent monographs on Canadian companies and industries will be mentioned. Historical studies by enthusiasts (buffs) are important, but they are often neglected by professionals. Some of the factors that need to be documented include production statistics; the type of production (custom, batch or mass production) and the nature of manufacturing such as copying, adaptation/innovation and production for internal or foreign markets. ☞



George John Romanes

Nature, Land and Water in 19th-Century Science

La nature, la terre et l'eau au dix-neuvième siècle

[11:00-12:30 Session / Atelier B3]

Suzanne Zeller, chair /
présidente

*Darwin's Research Associate,
George John Romanes*

Donald R. Forsdyke

Darwin was well aware that there were major inconsistencies in his 1859 theory of the origin of species by natural selection and he spent the rest of his life attempting to resolve them. For eight years prior to his death in 1882 it is likely that, apart from his immediate family, he spent more time discussing these inconsistencies with his young, Kingston-born, Canadian research associate, George John Romanes, than anyone else. In 1886 Romanes presented a theory of the origin of species by "physiological selection" to the Linnean Society. He claimed to have resolved the inconsistencies, but invoked abstract elements (e.g. "a peculiarity of the reproductive system"), which were incomprehensible to his Victorian contemporaries. He was strongly attacked by the elder statesmen of science—Wallace and Huxley—and died of a brain tumour at age 46 in 1894. Results of recent research on various genome projects have led to a new reinterpretation of Darwin's theory that has much in common with that of Romanes (see *The Origin of Species, Revisited. A Victorian who Anticipated Modern Developments in*

Darwin's Theory. McGill-Queen's University Press, 2001). ☞

E.T.D. Chambers, the United States Fish Commission, and the Pisciculture Movement in the Province of Quebec.

Darin S. Kinsey

In the 1850s, the science of Pisciculture began to make its way in translation from France into England and North America. For the first twenty years or so the science remained a mere curiosity with information about it being passed on by little read scientific texts and pamphlets at local agricultural fairs. Prior to the 1870s, in both the United States and Canada it was a science practiced by only a handful of individuals. As it became clear that the industrial revolution was having a negative effect of fish stocks, however, the science became the subject of more widespread interest, especially in the northeastern United States. By the 1870s, Pisciculture was being viewed by both state and federal agencies as a progressive enterprise that could both check the decline of native fish stocks, and serve as a tool to introduce a wide variety of non-native species which would promote tourism through sport fishing. In Canada, the effects of industrialization upon the fisheries came more slowly to the attention of government. The importance of preserving and restoring fisheries, eventually caused the Federal government to begin developing Pisciculture operations after the First World War. In the 1920s, the Ottawa turned over authority for Quebec fisheries to the Province and along with this new authority came several fledgling fish hatcheries. These hatcheries would quickly be integrated into the Quebec government's programs to develop new industries and to promote

tourism, in the form of sports angling, from abroad. Mr. E.T.D. Chambers, who had previously been working for the government to establish a fox breeding program, was called upon to become the superintendent of the Quebec hatchery operations. This paper will give an overview of how and why Pisciculture became established as a science in Quebec and its role in creating a new industry of leisure in the form of sports angling. The social, political, and economic consequences of the development of this new leisure industry will also be discussed. Finally, the paper will attempt to illustrate both local and foreign influences in the evolution of the science of Pisciculture, including the important influence of the United States Fish Commission in this process and the unique role played by the first Superintendent of the Provincial Government hatcheries, Mr. E.T.D. Chambers. ☞

Land Drainage in Mid-Nineteenth Century Ontario: Science, Technology and 'In the Field' Applications to an Agricultural Problem

Pat Bowley

In the mid-1800s in Ontario, land drainage (also known as soil drainage) was implemented by many farmers, mainly to increase their productive acreage, but also to improve the fertility of those acres already under cultivation. The best techniques of land drainage were discussed in the popular rural press. As seasons passed, articles imported from Great Britain describing drainage systems gave way to essays and letters from Canadian farmers and engineers who adapted British methods for Canadian climates and soils. Successful land drainage entailed much more, however, than just the

application of technology and hard work to remove standing water from a field. The new discipline of agricultural chemistry was an integral part of land drainage, and the same rural newspapers, as well as widely circulated text books, offered current explanations of plant, soil and animal chemistry to the interested farmer. Thus land drainage, when carried out correctly, married the science and technology of crop production to the advantage and profit of the astute farmer. Land drainage was common practice in Ontario, despite reports that Canadian farmers were lazy and sloppy, and well before the Ontario Agricultural College (OAC) was established in 1874. In fact, a selected committee of experienced Ontario farmers used their intimate knowledge of land drainage, its causes, effects and implications for efficiency in farming, to reject the original site of OAC and choose the permanent site, the Stone Farm just south of the growing town of Guelph. ☞

Lunch / Dîner [12:30-14:00]

Government Science
Science et gouvernement

[14:00-15:45 Session / Atelier C1]

Yves Gingras, chair /
Président

L'Office provincial des recherches scientifiques et le développement de la science au Québec, 1937-1960

Mike Almeida

À sa création en 1937, l'Office provincial des recherches scientifiques avait pour mandat de coordonner la recherche effectuée dans les laboratoires de la province de Québec et de pourvoir à la forma-

tion de nouveaux chercheurs. En 1960, à l'époque des grands bouleversements institutionnels qui caractérisent la Révolution tranquille, il est intégré au Bureau des recherches économiques du ministère de l'Industrie et du Commerce et disparaît sous cette appellation. Ainsi, on a souvent affirmé que l'Office était un « échec relatif » dans le développement de la science au Québec. Une étude approfondie de l'organisme nous permet de nuancer ce jugement. En effet, nous avons découvert que l'agence gouvernementale finança, du moins en partie, pas moins de 173 mémoires de maîtrise et 56 thèses de doctorat, assurant ainsi un recrutement plus régulier d'étudiants des cycles supérieurs, là où s'acquiert le « métier » de chercheur et la connaissance des règles du jeu en vigueur dans chacune des disciplines scientifiques. De plus, l'Office s'est efforcé, dans sa première phase d'existence (1938-1948), d'orienter les recherches universitaires vers des applications pratiques à l'industrie, formant l'une des premières structures institutionnelles de liaison entre l'université et l'entreprise privée au Québec. Au cours des années 1950, l'Office est marqué par un changement de trajectoire. Le volet recherche de l'agence étatique prend alors la forme de ce que l'on pourrait appeler un « bureau gouvernemental de consultation technique et scientifique ». Ses activités de recherche se limitent donc à des analyses d'échantillons, au contrôle de la qualité de certains produits, à la solution de divers problèmes de fabrication, bref, à assister et conseiller les entreprises qui en font la demande. Bien qu'il n'ait jamais eu l'ampleur ni les moyens du Conseil national de recherche du Canada (CNRC), l'Office a joué un rôle important dans la formation de la communauté scientifique québécoise. ☞

The Founding of Canada's National Radio Astronomy Observatories and the Politics of Institutions

Richard A. Jarrell

In 1959, the Associated Universities Inc. opened the National Radio Astronomy Observatory in Green Bank, West Virginia. It was a modest affair, with one radio telescope, but it did signal that Americans would now embrace radio astronomy in an attempt to compete with the field's leaders, the United Kingdom and Australia. A year later, the much smaller Canadian scientific establishment opened not one, but two, national radio observatories, one in Algonquin Park in Ontario, one at White's Lake, near Penticton, B.C. The Americans had worked with a focused vision since 1954; the Canadians had developed their proposals later as part of internal politicking in the National Research Council and the Dominion Observatory. There was no coordination, no overarching policy, not even a pool of trained personnel. This paper will examine the piecemeal approach to planning that led to institutions that never quite lived up to their potential. ☪

Enid Charles (1894-1972): Her times, life and work

Sylvia Wargon

This report presents the proposed design for a manuscript on Enid Charles. At the present time, the plan is to begin the manuscript with a description of the important social, cultural and demographic features of late 19th and early 20th century Britain that were the "background" or "times" in which Charles was born and grew up. This will be followed by a description of how these influences were clearly reflected in her personal life

as wife and mother, and in her professional work as a pioneering demographer. In addition an Introduction, a Bibliography of Charles' published and unpublished work, References and an Index are planned. ☪

Metrologies :
The Cultures and Politics of Standards
Métrologies : la culture et la politique des unités

[14:00-15:45 Session / Atelier C2]

Frontiers of Technological Languages: Metric Conversion in Canada

Godefroy Desrosiers-Lauzon

In January 1970, the federal Minister of Industry and Commerce tables in the House of Commons a White Paper on metric conversion. This paper argues that most of the world's population is already using the metric system, and that even Canada's powerful southern neighbor is considering the idea. The conversion, it is said, will be beneficial economically, commercially, and technologically; it will also transform Canada's technological standards, whether they be industrial, commercial, or regulatory, hereby changing the whole way Canadians define their physical environment. Yet today, we Canadians live in a partly metric world, where Imperial units of measurement are still a feature in numerous moments of our daily lives, where Imperial standards still regulate whole fields of the technology we use, and where the United States stopped considering their own metric conversion. Resistance to conversion comes from many fronts: in some sectors of activity, business people argue

that their U.S. clients and suppliers will not adopt the metric standards. Members of the Opposition in the House of Commons denounce the whole initiative as high-handed and centralizing. Private citizens and editorialists will go as far as to see in metrication another proof of what they believe to be Prime Minister Trudeau's agenda of French Power, and Liberal party's policy of severing Canada's British roots. As if to encourage this kind of highly controversial interpretation, metrication will be more popular among Canada's french-speaking population. The coming to power of the Progressive-Conservative party in 1984 will spell the doom of Canada's Metric Commission, if not the reversal of metrication. As these conflicts go, so the program will be modified, and metric conversion in Canada will to this day be partial, the result of compromises. In this paper I intend to present metric conversion in Canada as a linguistic transformation of the way Canadians define their world, or at least the way they assign meaning to its physical features. This transformation will mobilize actors of many types, and will be the focus of many conflicts, which will provoke negotiations on the depth and meaning of the proposed changes. These conflicts are, for the actors and for the scholar, the occasion to assess conflicting interpretations on Canada's contemporary technology, economy, politics and identities. ☪

Setting the Standard: the Origins of a Canadian Technical Standards Regime

James Hull

The Canadian Standards Association had its origins as a response to the circumstances of interallied production during World War One. This was not however the

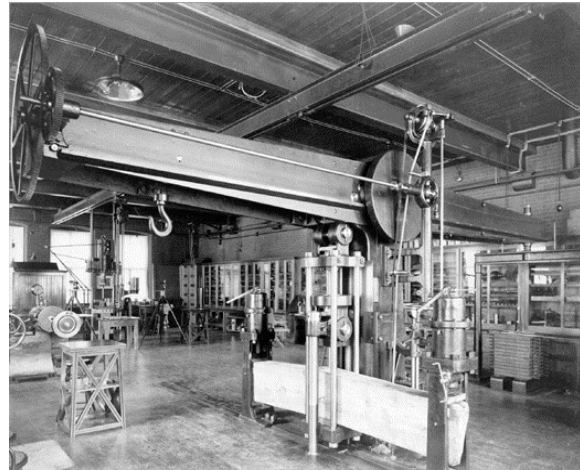
origin of standards setting in Canadian. The Canadian Society of Civil Engineers had already begun its own work in a number of areas. Canadian engineers were involved in the standards setting activities of US based organizations. Canadian trade associations were beginning to develop voluntary standards for their member firms. Municipal building codes, provincial health and highway standards and federal regulation of utilities had already drawn the State into the development, promulgation and enforcement of technical standards. So too had the activities of large public agencies such as Ontario Hydro. In addition, changes in industrial production, engineering practice and contract specification writing were all exerting influences on the emergence of a Canadian standards regime. This paper concludes with some historiographic remarks drawing attention to the similarities between the histories of technical standards and industrial research in Canada. ☞

Tests, essais et normalisation dans les laboratoires de génie des universités canadiennes, 1890-1930

Jean-François Auger

À partir des années 1890, les facultés de génie établirent des laboratoires, qui servirent à l'enseignement expérimental. Aux yeux des éducateurs, il apparaissait en effet incontournable de dispenser une formation en laboratoire sur des machines industrielles avec des instruments de mesure scientifique. On organisa ainsi les laboratoires en prenant des machines, des instruments et des artefacts des usines pour les installer dans les universités, de manière à créer un environnement tendant à reproduire la réalité industrielle. Quelques historiens, tels que Robert Fox et Anna Guagnini, se sont récemment interrogés sur les effets

de la pédagogie de laboratoire dans l'avènement de la recherche industrielle au sein des établissements d'enseignement supérieur. Dans cette communication, je chercherai à orienter le débat vers les fonctions de tests, d'essai et de normalisation des laboratoires, telles qu'elles se présentaient au cours de la Seconde Révolution industrielle. Une étude attentive des laboratoires de résistance des matériaux, de ciment, d'électricité et de mines des universités canadiennes permet de lever le voile sur cette pratique. Le mouvement de la recherche industrielle, animé par des scientifiques, des ingénieurs et des industriels, trouva dans les universités les ressources matérielles et humaines manquantes. Les entreprises privées du secteur industriel, en effet, intégraient progressivement à leur structure décisionnelle le contrôle de la qualité, la normalisation de la production et la recherche de nouveaux produits. L'État, qui prenait en charge l'assistance technologique aux entreprises, devait procéder à des expériences propres à déterminer les normes industrielles pour la réglementation et les spécifications des contrats. On vit également apparaître des laboratoires privés spécialisés dans les tests, les analyses et la certification. À l'image de ces derniers, quelques laboratoires de génie des universités commercialisèrent des services de tests, d'essai et de normalisation, ce qui leur donna, dans certains cas, un revenu suffisant pour acheter des appareils, engager des assistants et réaliser des travaux personnels. Les professeurs de génie participèrent de plus à la détermination de normes au sein d'associations, de sociétés



McGill University Testing Laboratory
Laboratoire de tests de l'université McGill

et de comités avec des ingénieurs de l'industrie et du gouvernement. Ainsi peut-on soutenir que la distance institutionnelle qui séparait autrefois les universités de leur milieu industriel s'estompait à cause des échanges de plus en plus intenses entre les professeurs, les entreprises privées et les organisations gouvernementales. ☞

Reliable Humans, Trustworthy Machines: The material and social construction of electronic reliability

Edward Jones-Imhotep

The Cold War was about distrust. It was, in the first instance, about the distrust of people and political actors: the distrust of humans. But it was also about the distrust of material and machines: the distrust of technology. This paper explores how concerns over the reliability of electronics during the early Cold War were rooted in anxieties over the reliability of people and their relationship to machines. Ranging from the mundane details of soldering techniques and ergonomics to the abstract iconography of semiconductor circuits, the paper argues that perhaps the central engineering task of the

Cold War—ensuring the reliability of electronic equipment—was bound up in establishing and enforcing the trustworthiness of humans. Rather than focus on the U.S. or the Soviet Union, the paper instead looks to Canada, where issues of technological reliability were shot through with concerns over cultural identity, territorial sovereignty and national survival under the totalizing effects of the Cold War. Historians of technology have generally treated the development of electronic reliability as a purely technical issue, as a consequence of the move to solid-state electronics made possible by sophisticated industrial production. My aim is not to delve again into the doping techniques, solid-state physics, and planar manufacturing processes so well covered in previous work. Nor do I want simply to recount, for a different national context, the intense collaboration of commercial firms and defence establishments that formed the “military-industrial complex.” Rather this paper seeks to complement well-established studies by examining how the creation and maintenance of cold-war electronics went beyond the institutional and scientific domains. Trustworthiness meant engineering people as well as machines. And, far from being a monolithic process, creating reliability among Western nations was the site of intense struggles for national autonomy and identity. To engage the broader social and technological arenas, the paper marshals a wide range of resources—popular films, documentaries, government reports, technical memoranda, military directives, and engineering diagrams—to show how electronic reliability required a combined social and technical architecture not reducible to semiconductors or production lines. In this way the paper contributes to a broader social and cultural history of post-war electronics. But it also demon-

strates how the history of technology contributes a broader understanding of the Cold War itself, one in which crucial struggles were fought out at the level of politics and popular culture, but also at the level of technologies and the social forms that surrounded them. ☪

Research and Higher Education

La recherche à l’université

[14:00-15:45 Session / Atelier C3]

Bridging the Great Divide: Creating and Sustaining University-Firm Partnerships

Matthew Lucas

Over the past decade Canadian policy makers have intensely promoted university-firm collaboration as a means of stimulating innovation. Universities now collaborate with firms on numerous research and training initiatives. Despite the considerable attention that analysts have given this phenomena we still understand very little about how university-firm collaborations create and share knowledge. To gain insight into the dynamics of the university-firm relationship this paper examines the creation and evolution of four formal collaborations between the University of Toronto and local firms: Photonics Research Ontario, the IBM Centre for Advances Studies, the Nortel Institute for Telecommunications, and the Bell University Laboratories. The paper investigates how the partners in each case study established project boundaries, managed institutional and cultural differences, carried out research, and shared knowledge.

Early Computer Science at the University of Toronto

Scott Campbell

The University of Toronto provided the birthplace of electronic computing in Canada. Between 1949 and 1952, a research team built the University of Toronto Electronic Computer, the first in Canada. It was replaced in 1952 when the University purchased a Ferranti Mark I, shifting the intellectual focus in Toronto from hardware to software. Although computer time was initially devoted to government work, faculty and student interests quickly expanded the range of research, often working in collaboration with other Canadian universities and corporations. Non-credit computer courses were also available for faculty, graduate students, and local business-people. As facilities expanded, courses were formalized, and the stature of the discipline grew, the Department of Computer Science was created at the University in 1965. My talk will show how early research and teaching practices emerged as this new department.

On the Middle Road: The Kingston Veterinary College at Queen’s University

T.W. Dukes

In the 1890s members of the Queen’s University medical faculty participated in the creation of a veterinary school in Kingston. Some physicians envisaged possible benefits to medicine from involvement in experimental and comparative medicine, others saw it as an essential element of practical science in universities. In this paper, I will explore the reasons for the founding of the Queen’s Veterinary School and for its closure only five years later, both

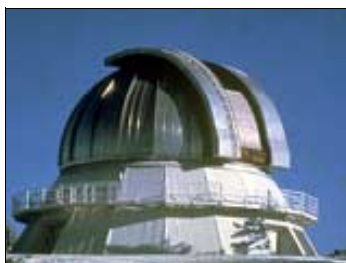
within the context of the rising discipline of experimental medicine and the changing nature of medical professionalism. Canadian formalized veterinary training had begun three decades earlier when two veterinary graduates from Edinburgh, Scotland came to Canada: Andrew Smith who started the Toronto School in 1862; and Duncan McEachran who founded a second school in Montreal four years later following a disagreement with Smith over standards of education. The Toronto school under Smith emphasized the “art” of veterinary medicine whereas McEachran’s school in Montreal emphasized the “science.” Both schools included a few physicians on their teaching staff, but the Montreal school maintained closer ties to the medical school at McGill and more stringent admission requirements. When the Kingston School was created in 1895 it was one of the many institutional achievements of Principal George M. Grant who is said to have unified Queen’s university from a collection of colleges and who was a strong supporter of practical education. Offering both diploma and degree programs, the Queen’s veterinary school took a middle road between the programs in Toronto and Montreal. The Kingston Veterinary College provides evidence of interplay between the two shifting branches of medicine in the process of definition: the plurality and rivalry of medical practice; and the transformation of academic medicine by physiology into an experimental laboratory science. ☞

L’astronomie à l’Université Laval entre 1963 et 1975 : genèse et déclin d’une prééminence factice

Vincent Larivière

En 1963, un groupe de chercheurs du département de physique de

l’Université Laval fonde le Laboratoire d’astrophysique de l’Université Laval (LAUL). Dirigé par Albéric Boivin, bien connu à l’époque pour ses travaux en optique physique, ce laboratoire marque le début des travaux en astronomie et en astrophysique dans cette institution. Le LAUL est unique dans la province. Même si l’Université de Montréal effectue depuis 1956 certains travaux en astrophysique théorique, aucune université québécoise n’occupe le champ de



Mount Mégantic Astronomical Observatory
Observatoire du mont Mégantic

l’astronomie d’observation. Le LAUL décide donc de se consacrer à cette spécialité, et entreprend dès lors des travaux pour construire un observatoire : l’Observatoire astronomique de St-Elzéar. Le développement de ce laboratoire et de son observatoire n’a pas eu le succès escompté, si bien qu’en 1975, c’est plutôt l’Université de Montréal qui assume le leadership de la spécialité dans la province, à travers l’Observatoire du Mont Mégantic nouvellement mis sur pied. Cette présentation vise à expliquer l’incapacité de l’Université Laval à se positionner comme joueur dominant dans le champ de l’astronomie au Québec. Nous y exposerons dans un premier temps les principales étapes du développement de l’astrophysique à Laval. Sera ensuite brièvement comparé, à l’aide de données empiriques, l’état de l’astronomie dans chacun des deux établissements, ce qui nous permettra de soulever certains facteurs ayant défavorisé l’institution de Québec par rapport

à celle de Montréal. En somme, cet épisode fait partie d’un projet plus global visant à retracer le développement de l’astronomie au Québec. ☞

General Assembly Assemblée générale

[16:15-17:45 Plenary Session / Séance plénière]

Suzanne Zeller, chair /
présidente

Banquet [18:00]

Sunday, October 19th, 2003
Dimanche, 19 octobre 2003

Place and Technology Les dimensions spatiales de la technologie

[9:00-10:45 Session / Atelier D1]

George Richardson, chair /
président

Aesthetics and Ice, Design and Engineering: The Canadian Niagara Power Company Rankine Generating Station

Norman R. Ball

The Rankine Generating Station stands on the Canadian side of the Niagara River above the falls. It started generating power in 1905. The charter had been granted to the Canadian Niagara Power Company in 1892 at a time of intense controversy over the future of the land on both sides of the Niagara River. Niagara Falls had long been known for its combination of natural splendour and dubious taste. Many who felt the

latter was winning wanted to halt all development. This paper demonstrates how the Rankine station successfully met engineering and aesthetic needs. ☺

Aviation and the Opening of the Canadian North: Bush Flying in the Mackenzie Valley, 1929-1945

Marionne Cronin

This presentation will review my dissertation research into the role of aviation in the opening of the Canadian North, specifically the role of bush flying in the Mackenzie Valley between 1929 and 1945. Because of the area's isolation from established rail and road transport systems, aviation played an essential role in enabling the economic exploitation of the area's mineral resources, a process that catalyzed a dramatic transformation of the North. The Mackenzie Valley provides an interesting case study, highlighting the intersection of a number of historical threads within a limited geographical area. In particular, in this valley one can see the intimate connection between mining and aviation, the importance of technical design developments to the growth of northern aviation, and the connection between aviation and Canadian expansion. This presentation will provide an overview of the subject and a brief review of my work with the Western Canadian Aviation Museum and the Richardson Collection at the Manitoba Provincial Archives. ☺

Systèmes techniques de la construction navale au lac Saint-Paul

Martin Gauthier

Dès la fin de la décennie 1750, quelques familles expulsées d'Aca-

die vinrent s'établir au lac Saint-Paul, situé sur la rive sud du fleuve Saint-Laurent vis-à-vis Trois-Rivières. Durant plus d'un siècle, plusieurs habitants de cette Cadie profitèrent des ressources disponibles pour construire des goélettes, des bateaux et des barges. Afin de saisir l'importance de cette activité et d'en tracer un portrait valable, il convient d'en analyser plusieurs aspects. L'étude des systèmes techniques inhérents à cette construction navale apparaît sans doute comme l'aspect le plus tangible d'une compréhension globale. La batellerie issue du lac Saint-Paul entre 1777 et 1832 se composait principalement de goélettes, de bateaux et de barges. Chacun de ces types architecturaux présentait des caractéristiques propres aux utilisations et aux conditions de navigation anticipées. La complexité et le savoir-faire relatifs à chacune de ces architectures variaient considérablement. Aussi, l'interprétation du vocabulaire utilisé dans les contrats de construction, quant aux pièces de charpente, au choix des matériaux et aux exigences particulières, peut révéler beaucoup sur l'architecture du bâtiment ou du bateau, sur le savoir-faire que l'on suppose chez le constructeur, ainsi que sur certaines préoccupations de l'acheteur. ☺

Aircraft and Agriculture in Canada

Ralph Estey

A brief historical review of the uses of aircraft in Canadian agriculture. Their earliest use in this regard was in agricultural research, then as tools for use in photography, and, more recently, in the control of insect infestations and plant diseases. By 1923, so many individuals within the federal Department of Agriculture were making such heavy demands upon the limited number of aircraft that

an Interdepartmental Committee on Air Operations was set up to coordinate their activity. In the 1940s, helicopters began to be used in photographic surveys, and in aerial application work, and for frost flying over crops threatened with frost damage. The Canadian Aerial Applicators Association was formed in 1986 to promote professionalism among aerial applicators and others associated with aerial application. There are Canadian Chapters of the International Flying Farmers Association in several Canadian Provinces. These Flying Farmers maintain that their Cessnas, Beechcrafts, and Piper aeroplanes are no different from their combines, tractors, or pickup trucks. ☺

The Politics of Natural Environments

La politique des environnements naturels

[9:00-10:45 Session / Atelier D2]

Stéphane Castonguay, chair / président

On the Fringe: Examining the History of Canadian Urban Environmental Science

Stephen Bocking

Ecologists have traditionally preferred to study pristine environments. As a result, even though they are usually based in urban universities, they usually travel further afield for their research. At the same time, however, urban planning and management require various forms of environmental knowledge. This presents, therefore, a tension: between the preferences of scientists, and the practical needs of local governments and developers. I examine the histori-

cal development of this tension, and its implications for the evolution of urban environmental research, through a case study of the history of research on the Oak Ridges Moraine, located north of Toronto. ☪

*Dams or Brown Outs?
The Politics of River Mobilization in Wartime British Columbia, 1939-1945*

Matthew Evenden

Across Canada during the Second World War, rivers were mobilized to supply hydro-electricity for an expanding economy. In six years after 1939, Canada's electrical energy output increased by one-quarter. Before the war, depressed economic activity had caused surplus electricity supplies in several parts of the country. With the outbreak of war, Canadian and allied demand for raw and semi-processed resources, and finished goods like munitions, drove up the entire electrical demand curve. To meet emerging needs, rivers across the country were quickly developed. The pattern of development was highly regionalized with the majority of activity in Quebec and Ontario compared to project cancellations in the Maritimes, the Prairie provinces and British Columbia. This paper examines the debates over river mobilization in wartime British Columbia and seeks to understand what made some rivers strategic and others not. ☪

'Here We Fight the Coldest War': Environmental Science and Feminist Autobiography on the DEW Line

Heather Ducharme

In 1989, the Canadian Department of National Defence and the United States Air Force began a



Distant Early Warning Line station
Station de la ligne Distant Early Warning

series of environmental impact studies across the Canadian arctic, of the Cold War-era Distant Early Warning (DEW) Line radar sites. These studies have developed into a \$500 million clean-up project that will continue well into the 21st century. Through an examination of texts produced about the DEW Line from its construction to its remediation, and through reflection on current science practice within the clean-up, I articulate some historical, political, and personal dimensions of contemporary Canadian environmental science. Furthermore, I argue that a nuanced consideration of such dimensions is crucial to good empirical accounts, as well as to ongoing environmental practices. ☪

Natural History and Colonialism
Histoire naturelle et colonialisme

[9:00-10:45 Session / Atelier D3]

Edward Jones-Imhotep, chair / président

Early Doctorates earned by Geologists born in Canada

Gerard V. Middleton

Early Canadian geologists (e.g., Logan, Dawson) had very few

academic qualifications. The need for professional training was recognized first in Europe (Freiberg Bergakademie; Paris Ecole des Mines; Royal School of Mines, London) and then in the United States (Sheffield Scientific School, Yale, established 1854). The Sheffield school was the main model for the McGill Department of Practical Science, established in 1871 by Dawson: its first appointment was Bernard J. Harrington (1848-1907), a graduate of McGill who obtained his doctorate in the Sheffield School (and a prize in mineralogy) in 1871. Harrington obtained one of the first two doctorates awarded in geology at the Sheffield School. Other early doctorates were awarded to Joseph Winthrop Spencer (1851-1921; B. A.Sc., McGill; Ph.D., Göttingen, 1877); Arthur Philemon Coleman (1852-1939; B.A., Victoria College; Ph.D., Breslau, 1881); Andrew Cooper Lawson (1861-1952; B.A. Toronto; Ph.D., Johns Hopkins, 1888); Frank Dawson Adams (1859-1942; B.A. Sc., McGill, Ph. D., Heidelberg, ~1890). ☪

Colonial Science Lessons from the Backwoods : Catherine Parr Traill, 1802-1899

Marianne Gosztonyi Ainley

This paper is part of my larger historical project that will examine gender, environments, and the transmission of knowledge in 19th and 20th century Canada and Australia. More specifically, I will explore the life and work of Catharine Parr Traill, a 19th century settler in Upper Canada. Between 1832 and 1895, this English-born writer-naturalist published popular works about colonial society, and the natural history, particularly botany, of the Canadian Shield. *The Backwoods of Canada* (1836) and the *Canadian Settler's Guide* (1855) provided explicit colonial lessons to prospective immigrants that



Catherine Parr Trail (standing) author of *The Backwoods of Canada* (1836)

included information on plants, animals, the climate, and food chemistry. In *Canadian Wild Flowers* (1868), *Studies of Plant Life* (1885), and numerous journal articles on plants, Catharine Parr Traill combines her own observations with indigenous environmental knowledge and, occasionally challenged the writings of male experts. During a sixty-five year period, she provided popular science education for North American naturalists and prospective settlers and was the first Canadian science writer to eke out a living from writing. Because women, indigenous people and their knowledge had, for a long time, been written out of mainstream histories of science and education, my work will contribute to a re-assessment of gender, science and environmental knowledge in 19th century Canada and raise questions regarding Western and non-Western knowledge traditions. ☪

*Collecting for William Hooker:
4 Floras in Search of Canadian
Plants*

Ann B. Shteir

During the opening decades of the 19th century, four women collected indigenous plants and compiled botanical information for William Jackson Hooker's *Flora Boreali-Americana* (1829-40), a founda-

tional reference work on "the Botany of the Northern Parts of British America." Hooker, an institution-builder of British botany, was a major networker within colonial science, and his project benefited from social connections of many kinds. This paper contextualizes the assistance provided to Hooker's Canadian flora by Lady Dalhousie, Harriet Sheppard, Anne Mary Perceval, and Mary Brenton,—three wives and one daughter of government officials in Nova Scotia, Quebec, and Newfoundland. Reading magazines, drawing plants, attending sessions of local scientific societies, collecting with their children, these four women participated in various forms of public and private botany, and made the traffic in knowledge between old world and "new" a resource for themselves. Their letters to Hooker (in the Archives, Royal Botanic Gardens, Kew) give texture to the history of women—"Flora's daughters"—as audience and agents in Canadian botanical culture. ☪

Break / Pause [10:45-11:15]

The Canadian Science and Engineering Hall of Fame

Le panthéon canadien des sciences et du génie

[11:15-12:30 Plenary session / séance plénière]

Richard Jarrell, chair / président

The Origins, Purpose and Operation of the Canadian Science and Engineering Hall of Fame

Helen P Graves Smith and Randall C Brooks

There are currently thirty-one Canadian scientists, engineers and innovators recognized in the Canadian Science and Engineering Hall of Fame. According the Hall of Fame's web page, reached from the home page of the Canada Science and Technology Museum, "The achievements of these individuals have been so remarkable and their contributions to society so great that the Museum hopes one day all Canadians will be aware of their accomplishments." One might wonder whether or not this is a realistic goal! The Canadian Science and Engineering Hall of Fame was originally established in 1991 as a partnership of the National Research Council of Canada (NRC), the Canada Science and Technology Museum, Industry Canada, and the Association of Partners in Education to mark NRC's 75th anniversary. Now the Canada Science and Technology Museum looks after the Hall of Fame: receiving the nominations, coordinating the selection process, hosting the induction event. The Hall of Fame is old enough now that it is a good time to review the criteria for selection, the nomination process, and the membership of the pre-selection and selection committees. Should we be placing more emphasis on identifying living people for inclusion? How many people should be inducted each year? Are there particular fields that are not represented, but should be? The Hall of Fame's goals include both honouring worthy Canadians and inspiring today's youth. Is this happening? The Canadian Science and Engineering Hall of Fame is dedicated to the recognition of individuals who have made exceptional contributions to the fields of science or engineering. The means to achieve this need not be the same forever, but how might they be changed? ☪

Lunch / Diner [12:30-14:00]

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