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IEEE Canadian Review

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Mailing address:
7061 Yonge Street
Thornhill, Ontario
L3T 2A6
Canada

Telephone: (416) 881-1930
Fax: (416) 881-2057

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The *IEEE Canadian Review* is published three times per year -Spring, Fall and Winter. The *IEEE Canadian Review's* principal objective is to project an **image** of the Canadian electrical, electronics, communications and computer engineering professions and their associated academic and business communities to :

(i) Canadian members of IEEE;

(ii) Canadian members of the profession and community who are non-members of IEEE;

(iii) the associated academic (i.e. universities, colleges, secondary schools), government and business communities in Canada.

In this context, the *IEEE Canadian Review* serves as a forum to express views on issues of broad interest to its targeted audience. These issues, while not necessarily technologically-oriented, are chosen on the basis of their anticipated impact on engineers, their profession, the academic, business and industrial community, or society in general.

To ensure that the *IEEE Canadian Review* has the desired breadth and depth, Associate Editors are responsible for identifying issues and screening articles submitted to the *IEEE Canadian Review* according to the following general themes:

1- National Affairs
2- International Affairs
3- Industry
4- Education
5- Power
6- Communications
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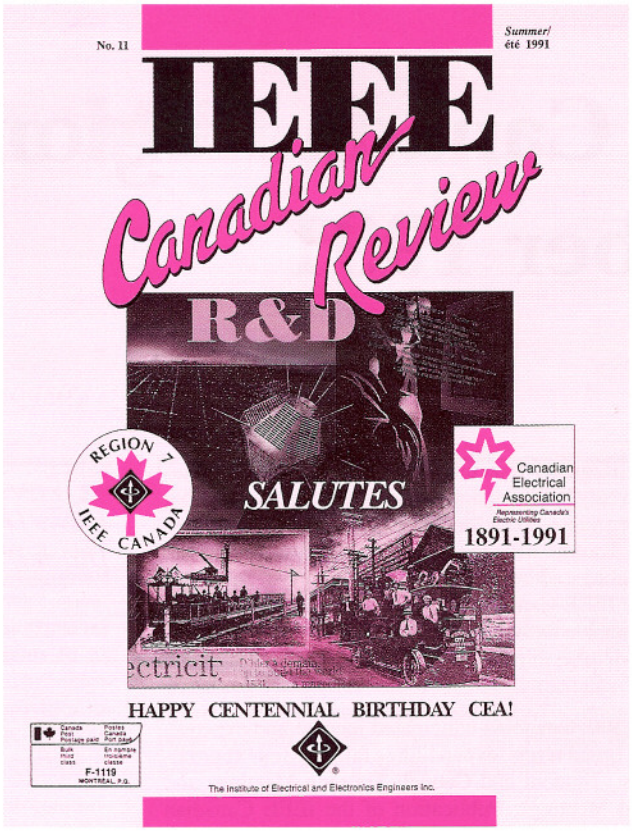

Happy centennial birthday CEA!

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IEEE Canada Regional Meeting, October 1991

by Dr. Tony R. Eastham
Director, IEEE Canada

Each year, the Region 7 Executive Committee and representatives of the twenty IEEE Sections across Canada come together for Executive and Regional Meetings. This year, the meetings were held in Toronto over the October 18-20 weekend. The business meetings addressed the budget for 1992, reviewed plans for the IEEE Canadian Review, and discussed reports from Chairpersons responsible for Awards and Recognition, Conferences, Educational Activities, Membership Development, Student Activities and the three Councils.

A 1992 budget of $239,500, balancing anticipated income and expenditures, was approved. In broad terms, expenditures fall into four approximately equal categories: Student and Council Training Meetings and Executive and Regional Meetings; Publication of the IEEE Canadian Review; Office Administration and Awards; and Office Salaries. As growth in membership in IEEE Canada is currently around 3% per annum, our income (which depends to a large extent on the number of IEEE members in Canada) is unlikely to increase sufficiently to cover inflation. We must therefore manage our resources carefully next year. Noting that the Region 7 assessment will have remained constant at $12 for three years, the Regional Committee voted to increase our assessment to $15 for 1993.

The IEEE Canadian Review was the subject of much discussion. Under the Managing Editorship of Theodore Wildi, it is resolved to publish three quality issues in 1992 on a schedule that should allow part of the publication costs to be recovered from advertising revenue.

In addition to conducting the formal business of IEEE Canada, the Regional Meeting always provides an opportunity for attendees to share ideas. An informal workshop was held to address two questions:

1. What is IEEE to electrical engineers in Canada in 1991 (i.e. why did we join, why do we stay members and why are many of us active volunteers?)

2. What programs, services and infrastructure will be needed for electrical engineers and their profession in Canada in 2001?

The first question was considered by a brainstorming process that Ray Findlay (Hamilton, and the current IEEE Student Activities Chairman) has developed for IEEE problem solving. This process rapidly develops a wide range of ideas, which are then prioritized by consensus of the plenary group. It was agreed that we joined and stay members for the following reasons:

- for access to information in order to keep up-to-date technically in areas related to job responsibilities (i.e. avoid stagnation and gain competitive advantage)
- to gain a broad perspective on evolving electrotechnologies
- to gain access to continuing education opportunities and to get to know members of the local electrical engineering community (networking)
- to help promote electric, electronic and computer technologies for the benefit of society.

We volunteer to participate in IEEE activities:

- to acquire and develop administrative, management and leadership skills
- to be an active part of and to make a contribution to a prestigious technical and professional organization.

No surprises here perhaps! But how about the second question? I asked attendees at the Regional Meeting to take this question back to their Sections and to seek an answer from the local perspective. The question was deliberately framed in the most general terms, without mentioning IEEE. What will we, electrical engineers in Canada, need for ourselves and our profession in 2001? If you, the current membership of IEEE Region 7 have any thoughts, I invite you to communicate them to your Section Chairperson or to myself. We hope to hear from you.

As a footnote, this is my final PERSPECTIVE as Director of Region 7. It's been a busy, interesting and enjoyable two years. I've met and received help from a lot of people - many thanks and best wishes to you all. Vijay Bhargava takes over in the new year - over to you, Vijay!

Charlie Charlie Mike Charlie

New Centre Targets the Marine Telecomm Industry

by Brian G. Whitehouse, Ph.D.
Ronald V. Newhook, P. Eng.,
Canadian Centre for
Marine Communications, St. John's, Newfoundland

The Canadian Centre for Marine Communications (CCMC) develops marine communications products and services. Established in 1989 as a nonprofit Corporation, CCMC, which is CHARLIE CHARLIE MIKE CHARLIE to the marine radio operator, is positioned between the pure research institutions and private industry. The Centre interacts with private companies, post secondary institutions and federal laboratories to develop marine communications technology. It then transfers the developments to its members in private industry for subsequent manufacturing, distribution and sales. In addition to engineering resources, the Centre provides its members with technical, regulatory and marketing information, and with training in various aspects of communications technology and marketing.

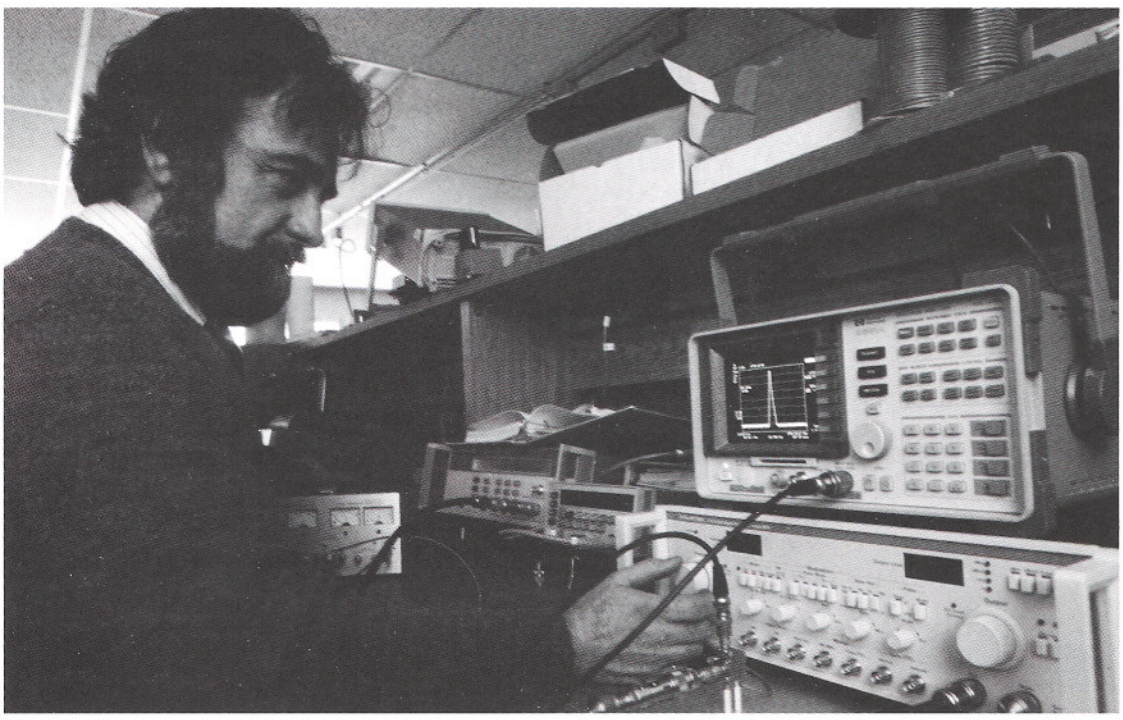
The idea of establishing a Centre to strengthen Canada's marine communications industry was launched with a combined 5 year grant from the Atlantic Canada Opportunities Agency (ACOA), the Federal Department of Communications and the Marine Institute.

Although the Centre itself is located in St. John's Nfld., in recent months CCMC has taken steps to fulfil its national mandate by launching projects in the Maritime provinces and in BC. The present 46 members, which are located coast to coast, comprise 38 private companies, 3 post secondary institutions and 5 agencies of the federal government. Membership has expanded rapidly since the first member signed up in July 1990.

CCMC has 15 employees including 5 engineers, 5 technologists, a computer systems specialist and 2 business development officers. These staff specialize in telecommunications, satellite antenna design, electromagnetics, hydroacoustics, installation of shipboard communications systems, computer systems, marine systems and product development. Additional expertise is obtained on an 'as required' basis through contracts with private firms.

Engineering Resources: People & Facilities

Offering engineering resources to Canadian companies is CCMC's predominant, and most challenging task. The Centre chooses development projects that lead to commercially viable products and services, yet do not compete with Canadian commercial enterprises. To accomplish this goal, CCMC requires an industrial partner, business plan and market analysis before accepting a development project. Competition with private industry is avoided by not bidding on contracts that Canadian companies bid on, and by ensuring that at least 50% of CCMC's Board of Directors are representatives of private companies.



The CCMC Applications Laboratory

Present engineering projects include development of a low cost voice privacy device for voice communications over HF radio, promotion of a low cost marine Group III Facsimile service, analysis of MSAT coverage in various marine regions, and development of a Canadian industrial capability to produce marine telecommunications & informatics based products and services for integrated ship management.

The voice privacy system, which is based upon technology developed by the Communications Research Centre (CRC), Ottawa, disassembles analog voice signals into 30 millisecond segments that are subsequently converted to a digital configuration. The segments are then reassembled in random order ensuring an encoded algorithm known only by the sending and receiving parties, and transmitted along with a

FSK carrier over the radio link. CCMC is performing field trials in terrestrial and marine environments.

The Group III Facsimile incorporates technology developed by CRC and R.A.C.E. Technologies Inc. of Vancouver. Marine fleets have limited access to facsimile service due to the inherent difficulties of HF radio signal quality and the high cost of existing satellite based systems. The service being tested by CCMC will provide low cost, error-free Group III facsimile over HF radio using commercially available facsimile equipment, personal computers and HF radios. The system is being field tested and will be ready in 1991.

Information Services: Technical, Regulatory & Marketing

In addition to engineering resources the Centre provides its members with information services. CCMC collects technical, regulatory and marketing information from around the world and provides it to members free of charge. The purpose of this service is to improve the member's ability to respond to new product and service requirements as soon as possible and with advanced technical solutions.

Information is collected through memberships in various national and international organizations, such as the Canadian Marine Advisory Council (CMAC), the Radio Advisory Board of Canada (RABC) and the USA based Radio Technical Commission for Maritime Services (RTCM). Relevant information is also obtained from a variety of marine, telecommunications and engineering publications to which CCMC is a subscriber, and through direct communications with relevant organizations, such as the Canadian Coast Guard, the Department of Communications, INMARSAT and the International Maritime Organization.

Training: Technology & Marketing

CCMC sponsors short term, intensive workshops and seminars designed to provide training in telecommunications technology and marketing. This service is offered to members at a rate subsidized by the Centre, and to nonmembers at cost. To date CCMC has sponsored courses in satellite communications, the Global Positioning System, high definition television, and international marketing. It also held a one day seminar on voice encryption. Initially these training sessions were only held in St.John's, but CCMC recently expanded its training initiatives to the cities of Halifax and Vancouver.

A calibration hydrophone positioned near a viewing port of the test tank in the acoustics applications laboratory.

CCMC initiates and organizes its training sessions, but prefers to hire instructors from outside organizations that are recognized experts in their fields and which employ professional instructors.

Membership

Any Canadian organization that is a user, carrier or developer of communications technology is eligible for membership in CCMC. Further information can be obtained by contacting the Centre by telephone at (709) 579-4872 or by facsimile at (709) 579-0495.

COLOR BOOK UPDATE

Red Book Std. 141 - new edition early 1992
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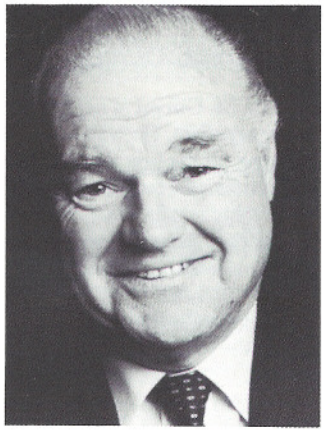
The Birth of an Association

by Wallace S. Read
President, Canadian Electrical Association



The sun had just retreated from the wintry skies and a quietness settled over the streets of downtown Toronto. A short, stocky, distinguished looking gentleman, muffled against the cold, made his way along King Street East to the offices of Toronto Electric Light Company. His ample moustache carried the weight of frozen condensation and his fingers were numb as they groped for the ring of keys from his waistcoat pocket. He let himself in to the empty offices of the utility. It was 7:30 p.m., Friday, February 20, 1891.

Climbing the wooden stairs to the executive offices on the second floor, he moved quickly to a glass panelled door with black letters enamelled on the frosted glass. Removing his gloves, he allowed his skilled fingers to trace fondly the words "J.J. Wright - Manager". To J.J. that said it all. He half smiled as the thought crossed his mind it would make a suitable epitaph as well. Doffing his overcoat, he crossed the room and slumped into an overstuffed leather chair, the one luxury he had allowed himself in this otherwise sparsely furnished office.

It had been a rough week. Apart from the usual problems at the generating station, Mother Nature dealt the distribution system a terrible blow. An ice storm accompanied by strong winds blew into the area from New York state and the crew had its hands full restoring service to an irate group of customers. Thank God it's Friday he whispered to himself.

J.J. always reserved the late hours of Friday to do some creative thinking about the industry he served and the impact it was having on society. It was a welcome respite from the purely technical problems that occupied his work week. As he sank deeper into his chair, the upholstery enveloped him as if to shield him from the worries of the day. The chair seemed to have a magical way of transforming his bone-tired frame and brain into a state of renewed strength and vigour.

The newspaper lay open on his desk and a furtive glance caught the headline "Toronto in Grips of Winter Storm - Traffic Suspended, Wires All Down" Another read "It Will Mean Ruination - Unrestricted Reciprocity with the United States Will Curtail Industry, Reduce Wages and Depress

Fifth annual CEA convention in Ottawa, September 1895
Front row, 3rd from left: F.J. Dunstan, President CEA and Manager Bell Telephone in Toronto. 5th from left: C.H. Mortimer, Secretary CEA and Publisher of Canadian Electrical News. Extreme right: J.J. Wright, first President CEA and Manager, Toronto Electric Light Company

Business All Round". J.J. turned his eyes away resenting the intrusion. These were his private hours, reserved for greater thoughts and he refused to be distracted.

Leaning back once again, he thought about his favourite subject - the future for this budding new electricity industry. He recalled a visit earlier in the week from his good friend C.H. Mortimer, publisher of the Canadian Electrical News, who was excited about organizing a national industry association. Mortimer's manner was persuasive but J.J. was cautious and had some reservations.

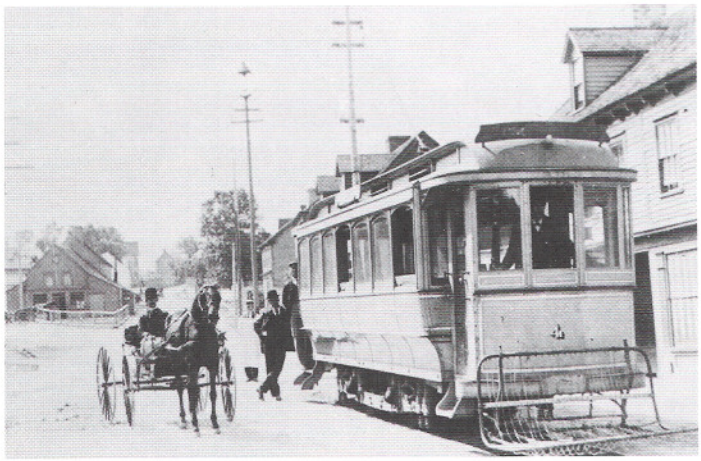
Was it practical to think, in a country as big as Canada, of a national association? Would utilities and manufacturers share proprietary information? Such a venture would require a commitment of employee time. Would this be an obstacle? The concept was bold enough but was it achievable?

Slowly fatigue caught up with his tired body and his eyes glazed over as he drifted into a state of relaxation. Visions of the past appeared. All the great people he had read about and the faces of his colleagues paraded through his mind. It was as if they were trying to tell him that information linkages do work and they are important to exploit if the world is going to benefit from these electrotechnologies.

J.J. saw Dr. Gilbert at his desk in 1600 penning his theories on electricity and magnetism. He watched Ben Franklin flying kites in 1753 and Volta showing off the first storage battery in 1800. All were sharing knowledge and building the foundation for the practical application of electricity to the telegraphic and communications industry. He observed Samuel Morse as he breached the gap between the theoretical and the practical, Gisborne as he constructed the physical links for Morse's transmissions, Alexander Graham Bell as he experimented to give us the telephone. Even the face of Dr. Henry Mills flashed across his mind. He recognized him as the medical practitioner who had set up shop at 276 Jarvis Street in 1876 as the Toronto Electric - Therapeutic Institution. The Institute advertised the "scientific application of galvanism, magnetism and other modifications of electricity" for the cure of some 102 diseases, ranging from asthma and ague to weak eyes and whooping cough.

But greater things were yet to come and the faces of Edison and Tesla and many great minds of the old world and the new flashed before him. These were the inventors of ways to have electricity replace "muscle" power. J.J. had heard Tesla introduce his bold new concept of alternating current and had witnessed the fascinating battle over which system would prevail for electricity distribution in the future: d.c. or a.c.

Watching this parade of faces caused J.J. to think more deeply. It all seemed so orderly - the progression from theory to practice, from communications to power. How had it all been achieved in so short a time? For sure it required the focus of many brilliant minds, but it needed more than that. There had to be a willingness to co-operate and a process whereby information exchange was facilitated. People needed to rub shoulders with



"Two ways of getting there"
Electric streetcar competes with horse and buggy in St. John's, Newfoundland - 1900

"Up she Goes"
Toronto Niagara power crew erect new high voltage (12 Kv) transmission line - 1907

other people, great minds needed the stimulation of other great minds. He had personally experienced that at the Centennial Exposition of 1876 where his meeting with Elihu Thomson and Edmund Houston led to his own involvement in firsts for the industry.

If that was important in the past, how much more important would it be for the future? A future which would allow other great minds to flourish, people he already knew as promising comers in the profession - Marconi, Fessenden, Steinmetz, and some yet to be recognized - Armstrong, McNaughton, Rogers, DeForest, Ahearn, Burton, Stephenson and Hopps, many of them Canadians. For it was not like J.J. to agree with Charles Duell of the U.S. Patent Office when he said "Everything that can be invented has been invented".

Still deep in thought, J.J. also remembered his own strong views on nationalism and the capability of Canadians to contribute to the advance of our electrotechnologies. He chided a local audience one time with "If we are to adopt nothing but American ideas or Chinese ideas or antediluvian ideas, we may as well cease to exist and let other people do our thinking for us".

That was enough. With a shake of his head, J.J. rose from his office chair with his mind made up. Mortimer had been right. They must provide a vehicle which the utility and manufacturing industries in Canada could use to share knowledge and develop Canadian expertise.

The rest is history - an invitation went out to the "owners of central stations and other electric men" proposing a meeting to discuss the formation of an industry association. The response was rapid and enthusiastic. On November 26, 1891, the constitution and by-laws were in place and the Canadian Electrical Association was born.

Were he living today at the ripe old age of one hundred and forty-three, J.J. would be proud that those who followed him held the torch high and met the challenge he set for the Association.

Happy birthday CEA.

Le progrès technique, l'informatisation et la croissance économique du Canada

par Hadj BENYAHIA
Professeur, Département de mathématiques et d'informatique
Université du Québec à Montréal

Using Denison's model of economic growth, this article shows an important decline in the contribution of technical progress to Canadian economic growth. Indeed, this contribution has dropped from 46% in 1969-73 to only 19% in 1982-87.
Another result is the intensification of the informational orientation of the Canadian economy:the informational sector which represented 35% of the Canadian GNP in 1971 has seen its relative part grow to 47% in 1982 and 58% in 1990. But , if we consider only the Canadian computerized sector (a sub-sector of the informational sector), its contribution to Canadian GNP would be approximately 5.7%, which is very low. This result is explained by the important gap between potential productivity gains and effective gains coming from current low utilization of the computerization process.
(An English version of this article may be obtained by writing to the author)

En utilisant le modèle de Denison d'évaluation des sources de la croissance économique, cet article montre un déclin important dans la contribution du progrès technique à la croissance économique canadienne. En effet, cette contribution est passée de 46% en 1969-74 à seulement 19% en 1982-87.
Un autre résultat est l'intensification du contenu informationnel de l'économie canadienne puisque le secteur de l'information qui contribuait à 35% du PNB canadien in 1971 a vu sa part relative s'accroître à 47% en 1982 et 58% en 1990. Cependant, si l'on ne considère que le secteur informatisé (qui est un sous-secteur du secteur informationnel), sa contribution au PNB canadien ne serait que de 5,7% seulement. Ce faible apport est expliqué par l'écart important entre les gains potentiels de croissance et de productivité attendus du processus d'informatisation et ses gains effectifs provenant d'une faible utilisation de ce processus dans les industries canadiennes.

Cet article est consacré à l'examen d'une problématique qui repose sur le paradoxe suivant:

D'une part, durant toute une décennie (1973-82), les économies occidentales ont été fortement affectées par une crise de croissance que plusieurs analystes ont entrevu comme une crise de productivité [1]. Même avec la reprise économique (1983-1990), le taux de croissance de la productivité totale des facteurs n'a pas retrouvé son niveau antérieur à la crise de 1973.

D'autre part, durant les deux dernières décennies, ces économies ont amorcé un virage technologique basé sur un processus d'informatisation qui pénétrait l'ensemble de leurs secteurs économiques et dont des gains substantiels de productivité étaient attendus.

Dans l'examen de cette problématique, la référence à l'économie canadienne a semblé intéressante à un double point de vue:

- Cette économie a été un des "points chauds" de cette crise de productivité si l'on considère l'amplitude et la longévité de cette crise sur le continent nord-américain [2].
- La part des dépenses en recherche et développement dans l'ensemble de la dépense intérieure brute a été, et reste encore aujourd'hui, l'une des plus faibles parmi les pays industrialisés [3].

Dans cet article, deux types d'évaluation sont présentés, pour la première fois, pour répondre à cette problématique:

- L'apport du progrès technique à la croissance canadienne.
- L'apport de l'informatisation à la croissance canadienne.

La contribution du progrès technique

Selon le modèle de Denison[1], cette contribution s'établit à partir de l'équation suivante:

$$\frac{dA}{A} = \frac{dY}{Y} - \left\{ \alpha \frac{dK}{K} + \beta \frac{dL}{L} \right\}$$

Autrement dit, la contribution du progrès technique est mesurée par le taux de croissance (dA/A) de la productivité totale des facteurs et ce taux correspond à la différence entre le taux de croissance du revenu national (dY/Y) et celui de l'input global des facteurs de production qui sont le capital (K) et le travail (L). Les coefficients α et β correspondent respectivement à la part du capital (environ 20%) et du travail (environ 80%) dans le revenu national.

Pour le Canada, l'application de cette équation aboutit aux résultats donnés au Tableau 1.

Ces résultats montrent un déclin majeur de l'apport du progrès technique à la croissance de l'économie canadienne de 1969-73 à 1973-82 puis une amélioration de cet apport de 1982 à 1987 mais sans jamais atteindre sa contribution antérieure à la crise de 1973. En effet, le Tableau 1 indique que la contribution du progrès technique à la croissance de l'économie canadienne a été respectivement de 46,6% en 1969-73 puis 14,4% en 1973-82 et 19% en 1982-87. Autrement dit, alors que le progrès technique représentait un apport de près de la moitié de la richesse nationale au Canada avant 1973, cet apport correspond à moins de 20% dans les années '80.

TABLEAU 1
Contribution du progrès technique au taux de croissance annuel moyen de l'économie canadienne (en %)

Taux de croissance	1969 à 1973	1973 à 1982	1982 à 1987
Revenu national dY/Y	5,92	2,98	4,36
Contribution du travail ßdL/L	2,31	1,72	2,95
Contribution du capital αdK/K	0,85	0,83	0,58
Progrès technique	2,76	0,43	0,83
Progrès technique/ Revenu national	46,6	14,4	19

Source: H. Benyahia: "Évaluation des sources de la croissance économique au Canada". Thèse de Doctorat d'État (Université de Paris X) éditée par Gaëtan Morin (P. Québec),1991.

La contribution de l'informatisation

L'informatisation est une composante potentiellement importante du progrès technique, au même titre que, par exemple, les économies d'échelle ou la mobilité du travail et du capital. Pour estimer l'apport spécifique de l'informatisation à la croissance économique canadienne, deux sources de références préalables sont nécessaires. Il s'agit de connaître, d'une part, la part du secteur informationnel (informatisé et non informatisé) dans le produit intérieur brut (P.I.B.) canadien et, d'autre part, les taux de pénétration et d'utilisation de l'informatique dans les industries canadiennes.

Physionomie de l'économie informationnelle au Canada

Une application des travaux de l'Organisation pour la coopération et le développement économique [4], en économie de l'information, a été entreprise pour le Canada par un groupe de consultants [5] dont les principaux résultats de leur étude sont les suivants:

- L'orientation informationnelle de l'économie canadienne s'est renforcée de 1971 à 1981. En effet, le secteur informationnel qui représentait 35% du PIB canadien en 1971 a vu sa part relative passer à 47% en 1982, soit près de la moitié des biens et services produits au Canada. Si l'on extrapolait cette tendance à la période 1982-1990, alors cette proportion s'établirait à 58% du P.I.B.

- En décomposant le secteur informationnel en ses deux principales composantes, on note que le secteur primaire de l'information (secteur producteur) a vu sa part relative passer de 23% du PIB en 1971 à 27% en 1981. L'apport du secteur secondaire de l'information (secteur utilisateur) est passé de 12% du PIB en 1971 à 20% en 1982.

- En terme de rythme de croissance, on remarque que, d'une part, durant toute la décennie 1971-1981, la croissance du secteur primaire de l'information a été environ le double de celle de l'ensemble de l'économie et, d'autre part, la croissance du secteur secondaire de l'information a été plus rapide que celle du secteur primaire de l'information. Ceci confirme une propension de plus en plus élevée dans l'utilisation des biens et services informationnels dans l'ensemble de l'économie. En effet, sur la base 100 en 1971, l'indice du PIB de l'économie canadienne est passé à 139 en 1981, celui du secteur primaire de l'information à 167, celui du secteur secondaire de l'information à 231 et celui de l'ensemble du secteur informationnel à 189.

Taux de pénétration et taux d'utilisation de l'informatique dans l'économie canadienne

Ces deux informations figurent dans les résultats d'une vaste enquête entreprise en 1987 par le Conseil économique du Canada [6] auprès de 1000 établissements industriels. Le Tableau 2 présente ces taux.

Contribution de l'informatisation à l'économie canadienne

Au moyen des informations recueillies précédemment, on peut retenir trois principaux résultats:

1) La part du secteur de l'information dans le PIB canadien est de 47%.

2) Le pourcentage des établissements ayant adopté des techniques informatiques est de 75,5%.

3) Le pourcentage des travailleurs utilisant un ordinateur est de 16,1%.

À partir de ces trois indicateurs, il est maintenant possible d'établir un indice composite *I* qui serait le produit de ces trois indicateurs et qui permettrait de fournir un ordre de grandeur de la contribution de l'informatisation au P.I.B. canadien. Cet indice composite serait alors égale à:

$$I = 47\% \times 75{,}5\% \times 16{,}1\% = 5{,}7\%$$

A priori, cette contribution peut paraître modeste. En fait, elle ne fait que traduire la faible utilisation actuelle des techniques informatiques dans l'appareil économique. Il en résulte alors un écart considérable entre les gains potentiels de croissance et de productivité attendus de ce processus d'informatisation et les gains effectifs dérivant de son utilisation actuelle.

TABLEAU 2

Mesure du niveau de technicité selon l'industrie: 1980-1985

	% des établissements ayant adopté des techniques informatiques	% des travailleurs utilisant un ordinateur en 1985	Ratiodes dépenses informatiques sur les ventes de l'entreprise
Industrie primaires	76,3	8,1	0,14
Industries manufacturières	76,1	13,9	0,73
Transport, entreposage	60,0	16,8	0,26
Connunications, services	87,5	23,4	0,46
Commerce de gros	91,1	22,6	0,31
Commerce de détail	74,4	25,3	0,34
Finances, assurances	79,2	25,2	0,31
Services commerciaux	81,7	23,3	0,57
Services Médicaux et sociaux	75,8	6,5	0,30
Hébergement, restauration	60,7	12,6	0,23
Autres services	62,5	10,8	0,21
Ensemble des industires	75,5	16,1	0,55

Source: Innovations, emplois, adaptations, CEC, 1987

Ce résultat ne surprend pas si l'on considère que l'informatisation est un processus relativement récent dont la diffusion n'a commencé à se généraliser qu'à la fin des années 70 et au début des années 80. Lorsqu'on sait que les structures industrielles prennent des périodes relativement longues, parfois de plusieurs décennies, pour se restructurer dans un contexte de recentrage technologique, on peut penser que la contribution de l'informatisation à croissance deviendra plus tangible au cours des années 90 et ne sera substantielle qu'au début du siècle prochain.

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À propos de l'auteur

HADJ BENYAHIA est professeur au Département de mathématiques et d'informatique de l'Université du Québec à Montréal. Il possède in doctorat d'État (Université de Paris X) et un diplôme de 3e cycle de l'Institut d'informatique et de mathématiques de l'Université de Grenoble. Ses recherches portent sur l'évaluation des systèmes d'information, les métriques et modèles en génie logiciel et l'économie de l'information.

1891-1991: A Century of Brown Boveri

This year marks the centennial year of Brown Boveri & Co., Switzerland. Established in 1891, the company has evolved from a small Swiss-based entity into a worldwide leader in electrical engineering technology. Now a constituent part of Asea Brown Boveri, BBC looks back on 100 years of leadership and achievement.

by R.J. (Dick) Carryer
Executive Vice President
Asea Brown Boveri Inc.

Charles Eugen Lancelot Brown
(1863-1924)

Walter Boveri
(1865-1924)

La compagnie Brown Boveri a été fondée le 2 octobre 1891 à Baden, en Suisse, par un ingénieur, Charles Brown, et un homme d'affaires, Walter Boveri, dans le but de fournir de l'équipement à l'industrie hydro-électrique alors naissante. En 1900, la compagnie construisit la première turbine à vapeur de l'Europe, un exploit qui a fait sa renommée jusqu'à nos jours.
C'est le boum économique de l'après-guerre qui lui a permis de se hisser au rang de multinationale.
En 1933, la compagnie s'est établie au Canada et a pris une expansion significative dans les années 50. Par la suite, cette croissance s'est poursuivie dans toutes les provinces avec une dominante au Québec, où BBC a surtout été associée aux méga-projets de production hydro-électrique.
Cependant, les changements structurels dans l'industrie électrique au cours des années 80 l'ont conduit à s'associer à parts égales avec son concurrent suédois, ASEA, pour devenir, en août 1987, ABB Asea Brown Boveri inc. À la suite de cette fusion, la croissance s'est encore accentuée et la compagnie est devenue la plus grande firme électrotechnique au Canada.

The Early Years

Founded in Baden, Switzerland on October 2, 1891, Brown Boveri & Cie was the brainchild of engineer Charles Brown and businessman Walter Boveri. Induced to establish a factory in Baden by virtue of cheap land and available labour, Brown Boveri also benefited from being able to supply machinery for Baden's river hydro plant, thus having ready access to electricity for its factory.

Production commenced in 1892, and BBC was able to capitalize rapidly on Switzerland's water resources as they were harnessed for electrical generation in the 1890's. By the late 1890's Brown Boveri was also supplying electric railway and streetcar equipment to various Swiss cities.

In 1900, Brown Boveri manufactured the first steam turbine built in Europe, a product that the company is still best known for today. Turbo chargers, compressors and gas turbines were added by 1920. The company engineered a number of "firsts" during this period, including the first cylindrical rotor for turbo alternators, the world's first deflagration gas turbine, the first supercharged diesel engine and the first steam boiler with pressure supercharging.

By 1985, employment worldwide exceeded 100,000 people and "technical firsts" continued at a rapid pace in diverse fields, including the first nuclear electron accelerator (betatron), the first gearless cement mill drive, the world's largest steam turbine generating set (1300MW), the first HVDC transmission system using water-cooled thyristors, and the world's most powerful short wave radio transmitter.

Brown Boveri in Canada

Brown Boveri began selling products in Canada in the early 1900's. The early product offering included steam turbomachinery, blowers and compressors. In 1929, INCO in Copper Cliff, Ontario bought seven compressors and blowers, the first of fifty such units to be supplied over the next four decades.

In 1933, the first BBC company, the Swiss Electrical Company of Canada, was incorporated in Canada. Sidney Brown, brother of Charles Brown, was the company's first president. It was not until 1945 that the company's name was changed to Brown Boveri (Canada) Ltd.

In the 1950's, BBC began a significant expansion in Canada. In 1952, a distribution transformer and power transformer factory was opened in St. Jean, Quebec. Canadian Utilities (Alberta Power) of Edmonton took delivery of a gas turbine for Vermillion and in 1956, B.C. Electric (now B.C. Hydro), ordered what was then the largest gas turbine installation in the world at Port Mann, B.C. (4 x 27 MW).

BBC expanded primarily in Quebec in the 1960's. This included supply of the first 765 kV circuit breakers, shunt reactors and current transformers to Hydro Quebec. A factory in Pointe Claire, Quebec was opened with power line carrier equipment being a key product. During the next 25 years, over 2000 power line carrier terminals would be built, both for domestic and export requirements.

The 1970's saw BBC extremely active in the Canadian utilities' major expansion projects in both transmission and generation. The first 765 kV static var compensator for Hydro Quebec was ordered, as was the 500 kV Nelson River Bipole-2 HVDC System in Manitoba (2000MW). Thunder

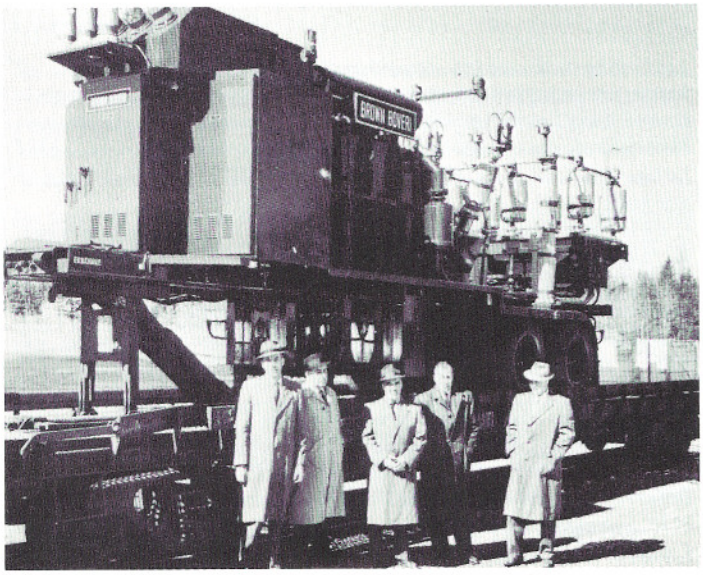
Bay, Atikokan and Darlington turbine generators were also odrered in the 1970's.

Growth continued in the 1980's, particularly with the large power projects in Quebec. Static power converter equipment increased in importance for the company, as evidenced by significant orders for static excitation systems (eg. LG3 at James Bay), high current power supplies of the IREQ Tokamak, and the HVDC converter station at Chateauguay.

BBC has supplied several "firsts" for its Canadian customers, including the first water-cooled, air insulated thyristor valves for HVDC transmission, the first SF_6 circuit breakers certified at -55°C and the first 765 kV static var compensators.

ABB Asea Brown Boveri

In August 1987, Brown Boveri was transformed forever by the announcement of the merger with its Swedish competitor ASEA. On January 1, 1988, ABB Asea Brown Boveri Inc. commenced operations. ABB is owned equally by Asea and Brown Boveri. The impact of this merger has been dramatic. Management has been decentralized and the profitability of operations improved. Restructuring on both a national and worldwide basis has eliminated duplication and concentrated on core business from both a technological viewpoint as well as an operational viewpoint.



New Brunswick Power's first mobile substation, a Brown Boveri 5000 kVA unit (May 1961).

With the merging of Asea and Brown Boveri in Canada, as around the world, the pace of restructuring has been fast. In Canada, the head offices were merged and functions were relocated to the manufacturing locations, consistent with a strong decentralized management philosophy. In 1988, ABB acquired the Transmission and Distribution Division of Westinghouse. This added an additional six manufacturing centres and 1300 employees to ABB in Canada. In 1989 ABB acquired Combustion Engineering with an additional 2000 employees, located throughout Canada.

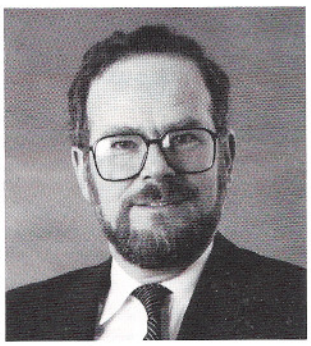
ABB has grown to be Canada's largest electrotechnical company, operating in the fields of power plants, transmission, distribution, industry and process automation, environmental technology and field services. Its corporate headquarters are located in Montreal (St. Laurent), Quebec with offices and factories in over 58 locations across the country.

New plants include Quebec City, and St. Jean sur Richelieu in Quebec, and Burlington and Milton in Ontario. Today, as the acquisitions and mergers abate, ABB Canada emerges as a proud and committed Canadian company dedicated to serving its Canadian customers with the best technology, products and services from a strong domestic base.

Conclusion

The 100th Anniversary of BBC coincided with the 700th Anniversary of Swiss Confederacy in 1991. A large unused turbine manufacturing hall in Baden was converted into a technology museum this past summer and opened to the public. Visitors from around the world have had the opportunity to look back over a century of technological progress as well as looking ahead in a futuristic portion of the display. The displays only confirm that change, in all its forms, will be the hallmark of tomorrow.

About the author



R.J. (Dick) Carryer is Executive Vice President of Asea Brown Boveri Inc. and President of ABB's Power Distribution Segment. Educated at Montreal's Sir George William's University, Mr. Carryer joined BBC in 1981. He is a registered professional engineer in the provinces of Québec, Ontario and Alberta. He is a member of the Canadian Electrical Association and the IEEE, as well as a director of the Canadian Nuclear Association.

The Great Northern Concrete Toboggan Race

On January 30 - February 1 1992 students from universities across the country will compete in the 18th Great Northern Concrete Toboggan Race to be held in Montreal.

Students from École de Technologie Superieure (ETS) won the 1991 event and as winners will now host this upcoming event in 1992. 37 teams competed last year and the winning toboggan was 7 ft long, 18 inches wide and weighed in at 287 lbs...its name "EnTrepriSe 91". The basis of the toboggan design is Portland concrete, and speeds of up to 45 km/h have been recorded, with the ability to stop within 10 metres. The runway is 200 meters long and 6 meters wide.

The 1992 event is somewhat special in that students from ETS are scheduled to transmit the race across Canada to participating universities via satellite. Spearheaded by Jean-Denis Hurtubise, IEEE Student Member from ETS, this event will be run as one of the activities of the "Fête des Neiges de Montréal". For more information on the satellite link of this race, please contact:

Jean-Denis Hurtubise
Communications satellite
École de technologie supérieure
4750 avenue Henri-Julien
Montréal, Québec H2T 2C8
Tél: (514) 289-8800
Fax: (514) 289-8950

1991 McNaughton Gold Medallist

William J. M. Moore was presented with the 1991 McNaughton Gold Medal on September 26, 1991 at the Banquet of the Canadian Conference on Electrical and Computer Engineering held at the Quebec Hilton Hotel.

The medal, certificate and three-volume biography of General A.G.L.McNaughton were presented by Dr. Tony Eastham, Region 7 Director. A slide presentation was also made at the award ceremony and Theodore Wildi, the 1987 McNaughton Medallist and Managing Editor of IEEE Canadian Review, was also present.

The citation for the award was for contributions to precise current comparators and their application to industrial measurements.

William J. M. Moore (M49, SM57, F76 and LF90) obtained his BASc with first class honours in 1946 at the University of British Columbia, followed by his Masters Degree in 1948 at McGill University.

His career started as a summer student in Radio and Electrical Engineering at the National Research Council, Ottawa in 1947 and for the next three years Dr. Moore worked as a Research Officer in the same Division. During 1951-55 Dr. Moore was on loan to the Guided Missile Project at the Canadian Armament Research and Development Establishment at Valcartier (now the Defence Research Establishment Valcartier).

Tony Eastham, presenting McNaughton Gold Medal to Dr. Moore.

Continuing his career at NRC, William (Bill) Moore became Head of the Precision Measurement Group in 1972 and Head of the Power Engineering Section in 1988. Bill officially retired in 1990 but continues his association with NRC as a guest worker and consultant to the Electrical Power Measurements Group, Institute for National Measurement Standards, National Research Council, Ottawa.

Dr. Moore became a Fellow of IEEE in 1976 for work related to precise current comparators. He was Section Chairman of Ottawa in 1966-67, Chairman of the Electrical and Electronic Measurement & Test Instrument Conference in 1969, President of the IEEE Instrumentation and Measurement Society in 1974, Chairman of the Power System Instrumentation and Measurement Committee of the Power Engineering Society in 1981-82 and is currently a member of the Executive Committee of the Precision Electromagnetic Measurements Conference. In 1987 Dr. Moore was the recipient of the Morris E. Leeds Award, the highest recognition given by the IEEE in the instrumentation and measurement field. William Moore is also a member of the Metering Section, Engineering and Operation Division of the Canadian Electrical Association.

William Moore's publication record of 44 refereed papers, 1 book and a section of an Encyclopaedia of Science and Technology, 12 patents and more than 150 calibration reports, highlight the significance of his work. He has had a major impact on electrical measurements not only in Canada but also on the international scene. It is in large measure thanks to him that the National Research Council of Canada is recognized as a major centre for precision electrical measurements.

As General McNaughton himself was President of NRC in 1935 until World War II, it is very apt that a member of NRC should be awarded this medal. Congratulations to Dr. Moore.

GE Canada - 100 years in Peterborough

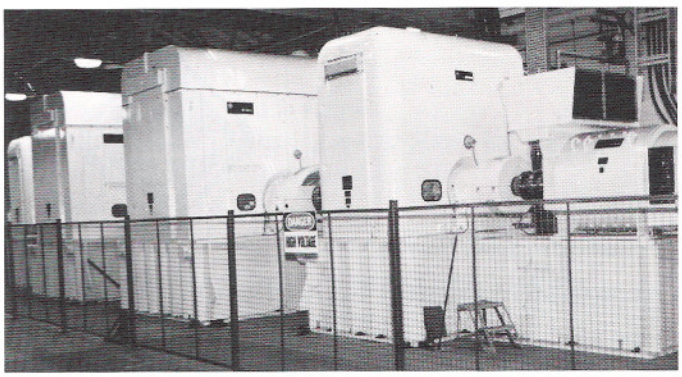
From incandescent lamp to high technology

On April 20, in 1891, a celebration and ball, attended by over 2000 people, marked the opening of the Peterborough Plant. A year later, following a number of mergers, the new enterprise was named Canadian General Electric Company. The company employed fewer than 500 people located in tiny leased offices in five Canadian cities, and a small workforce in Peterborough.

The Peterborough Plant produced meters, incandescent lamps, insulated wire, streetcars, and railway equipment. The famous Engineering Test program was initiated in the 1890's and over the years, hundreds of electrical engineers retained gratifying memories of this important episode of their professional lives.

Beginning in the mid-1950's, the Peterborough Plant played a significant role in the design and construction of Canada's first nuclear power plant. The Civilian Atomic Power Department was formed here, to work in partnership with Ontario Hydro and Atomic Energy of Canada Limited. Ever since that first nuclear station produced power in 1962, the Nuclear Products component of the company has participated in all major nuclear projects in this country, as well as in projects in other countries, including Pakistan, Argentina and Korea. The products include nuclear fuel for the Candu system, as well as the control equipment required to handle the fuel bundles in the reactors.

Today, approximately 20 percent of GE Canada's 10 000 employees are employed in the Peterborough Plant, the company's largest manufacturing facility. Most of them work in the Industrial Motor Business, producing motors ranging from fractional horsepower through to 50 000 horsepower. These include large synchronous, induction and DC motors, nuclear heat pump motors and synchronous generators. The made-in-Peterborough GE Canada motors can be found operating in over 50 countries throughout the world.



This Peterborough power supply, used for testing large motors and generators, has a total capacity of over 80 000 horsepower.

The world-class facilities include modern, numerically-controlled machine tools, state-of-the-art computers, and an extensive research and development operation, all supported by the technological resources of the parent General Electric Company in the United States.

From its humble beginnings, the Peterborough Plant has maintained a leadership position in the heavy electrical industry in Canada. It has endeavored to provide products and processes of technical integrity, superior quality and performance, factors necessary for success in today's competitive markets. Congratulations GE Canada!

A Tradition That Must Continue

The annual Canadian Conference on Electrical and Computer Engineering

The Fourth Annual Canadian Conference on Electrical and Computer Engineering took place in Quebec City at the end of September. Some 450 participants gathered at this 3-day scientific conference. They were offered a choice between eight parallel sessions devoted to scientific papers covering the main fields of electrical and computer engineering. The conference also provided an opportunity for the presentation of the **Ross Medal** and of the **Julian C. Smith Award,** both conferred by CCECE, and of the **McNaughton Gold Medal** awarded by IEEE. A discussion forum involving six panelists, drawn from industry and universities, was also organized to examine the state and future of electrical power engineering education in Quebec.

In addition, there were two plenary sessions, and lunch and banquet speeches from international and canadian guests, dealing in differents ways with the general theme of this year's conference: **Canada in the International Competition Era**. Speakers on this general theme included Maurice Huppé, executive vice-president, Hydro-Quebec, Jacques Lyrette, assistant deputy minister for Quebec at the Department of Communications, and Emile Gratton, vice-president marketing, Northern Telecom Canada. Speakers for the plenary sessions were Mr. M. Macioti, chief advisor in science and technology at the European Community Commission, Mr. B. S. Murty, ex-member (production) at the Telecom Board of the Government of India, and Mr. W. Andresen, vice-president marketing, Dataradio, Montreal, addressing the viewpoint of small and medium-size Canadian enterprises.

Why a major annual Canadian conference?

This year's conference followed the footsteps of conferences organized in Vancouver, Montreal and Ottawa from 1988 to 1990. Many will also remember the bi-annual major conferences which were organized by IEEE in Montreal and Toronto in previous years.

The 1992 conference will be held in Toronto from September 13 to 15, and future annual conferences up to 1995 have been announced in Vancouver, Halifax and Montreal.

Why organize a major scientific Canadian conference when there are so many similar conferences held every year, every week, perhaps every day around the world? Why should we spend so much time and energy on a "domestic" gathering, instead of investing the same effort on more specialized international events, where we can meet the scientific stars and brains of this world in our field of interest, while developing useful international relations and making a name for ourselves and for Canada?

Apart from the purely scientific goals of the conference, which are important in themselves, there is a very strong socio-economic motivation.

By Michel Lecours and Gilles-Y. Delisle
Department of Electrical Engineering
Laval University, Québec

Le quatrième congrès en génie électrique et informatique, organisé par la Société canadienne de génie électrique et informatique avec la collaboration de IEEE Canada, qui s'est tenue à Québec du 25 au 27 septembre a été cette année encore un franc succès. Le prochain congrès organisé conjointement par les deux sociétés se tiendra à Toronto en septembre 1992.

Pourquoi organiser annuellement un congrès majeur au Canada? Quelles sont les conditions à rencontrer pour que ce succès se poursuive?

Conferences foster interaction and networking in the electrical and computer engineering community concerned with R&D, and include in this network a broad spectrum of people coming from Canadian industries, governments and universities. Because R&D activities in Canada are diverse, and because organizations and individuals are often called upon to take new orientations and to adapt to new technologies, new trends and a fluid market place, a major conference is a good means to foster this interaction.

In addition, let us not forget that such a conference is also, in a very real way, a "political" platform for leaders, thinkers and decision makers in industry and government, who are asked to address plenary sessions or are invited as dinner speakers. By participating in these activities, they too contribute to the shaping of ideas and the formulation of new policies, and thereby enhance and influence the technological network.

Why not restrict ourselves to smaller meetings and workshops in Canada? Workshops have an important role to play in that they attract specialists in a given field to focus on a subject of interest. They do not require so much organisation, but they also do not benefit from the same publicity, audience and permanence from year to year as does a major annual conference. Indeed, it may be useful at times to use an annual conference to organize a workshop, as was done this year for a discussion forum on electrical power engineering education.

Is there a recipe for success?

The history of the Canadian Conference on Electrical and Computer Engineering has clearly demonstrated the need for such an event. What are the ingredients for success?

Certainly, determination, hard work, and papers of a high scientific level are essential. Furthermore, there is no way to organize a conference that pays for itself without a high degree of voluntary involvement. It is obvious that university staffs bear a definite responsibility here, considering their broad mandate to foster education and research. But in order to

reach a large enough audience, and to make sure the conference themes and activities expand beyond the narrow confines of academic research, an active participation of the engineering community as a whole is essential.

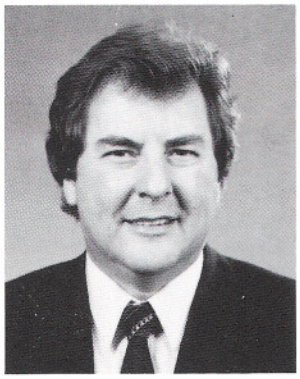
Past experience indicates that it is doubtful that Canada could successfully support more than one major conference per year. While encouraging a diversified spectrum of electrical and computer engineering activities in Canada, it is imperative to concentrate these activities in a single Canadian conference. Researchers and scientific groups should be encouraged either to use the CCECE as a means to organize meetings, seminars, workshops, tutorials, exhibitions, or to coordinate their events with CCECE.

With IEEE Canada co-sponsoring the 1992 Conference, this annual event should continue to be a success in the years to come.

Michel Lecours, Conference Chairman, CCECE-91

Michel Lecours is professor of electrical engineering at Laval University since 1967. He was head of the department from 1975 to 1977 and vice-dean of the Faculty of Science and Engineering from 1977 to 1985. In 1987, he was awarded the Annual Merit Award from the École Polytechnique of Montreal Alumni Association in recognition for his services to engineering and engineering education. He is a senior member of IEEE and Fellow of the Engineering Institute of Canada.

Gilles-Y. Delisle, Technical Program Chairman, CCECE-91



Gilles-Y. Delisle is professor of electrical engineering at Laval University since 1973. He was head of the department from 1977 to 1983 and vice-dean for technological transfer and development of the Faculty of Science and Engineering from 1989 to 1991. He is a senior member of IEEE. In 1986, he was awarded the J. Armand Bombardier prize for outstanding technical innovation from ACFAS, the Association Canadienne Française pour l'Avancement des Sciences, of which he is now president.

The McNaughton Building

Building M-50 at the National Research Council in Ottawa was officially designated as the **A.G.L.McNaughton Building** on October 3, 1991. The ceremony marking the 75th Anniversary of NRC, took place at the main entrance of the Division of Electrical Engineering. Members of the McNaughton Family were in attendance.

The Canadian Conference on Electrical and Computer Engineering

Call for papers

SEPTEMBER 13-16, 1992
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Procedures

Prospective authors are invited to propose papers in any of the technical areas listed below. Submission of a proposal implies a commitment to present a paper, if accepted. Conference proceedings will be published.

Paper categories

1. Artificial Intelligence and Knowledge Based Systems
2. Biomedical Engineering
3. Communications
4. Communication Networks
5. Computers
6. Computer Vision, and Robotics
7. Electronics
8. Energy, Environment
9. Fiber and Laser Technologies
10. General Techniques for Information Technology
11. Industrial Materials, Inspection and Processes
12. Neural Networks and Applications
13. Parallel Processing
14. Systems Control
15. Power Devices and Systems
16. Signal/Image Processing and Applications
17. Very Large Scale Integration (VLSI)
18. Wave Sciences

Please submit *three copies* of a 400–500 word summary by *March 15, 1992* to the Technical Program Chairperson shown below.

PROF. ANASTASIOS N. VENETSANOPOULOS
Department of Electrical Engineering, University of Toronto
10 King's College Road Toronto, Ontario CANADA M5S 1A4
Tel:(416)978-8670 Fax:(416)978-7423
E-mail:zhou@dsp.comm.toronto.edu

Notification of acceptance/rejection will be sent by May 15, 1992. Accepted papers will be published in the Conference Proceedings. A camera-ready version of the paper must be received by *June 30, 1992.*

To receive further information on the conference (including conference program), Please write to the Conference Registrar: *Kathy Mahoney,* OCRI, Ottawa Carleton Research Institute, 340 March Road, 4th Floor, Kanata, Ontario, Canada K2K 2E4. Tel: (613) 592-9211, Fax: (613) 592-8163. The General Conference Chairperson is:

CELIA L. DESMOND, TELECOM CANADA
800 Bay Street, Toronto, Ontario M5G 2E1,
Tel:(416)353-4080, Fax: (416) 920-6689
ENVOY:C.L.DESMOND

The International Conference on Selected Topics in Wireless Communications:

Call for papers

June 25-26, 1992, Delta Pacific Resort, Vancouver, Canada

Sponsored by: IEEE Canada

In Cooperation with: IEEE Vancouver Section, BC Advanced Systems Institute and National Wireless Communications Research Foundation

This conference will focus on new or less publicised applications of wireless communications. Papers on (but not limited to) the following topics are solicited:

• Rural Radio Systems • Private Land Mobile Radio • Aeronautical Communications • Mobile Data • MSAT • Emergency Location Technology • Marine Communications • Wireless LANs • Industrial Wireless Applications • Third Generation Wireless Systems • Standards issues affecting new services • Wireless Solutions for Developing Countries • Free Space Optical Communications • Speech Processing

Please submit three copies of a 400-500 word summary by *January 31, 1992* to the *Technical Program Committee*. To receive further information on the conference please write to the *Conference Chairman*.

Technical Program Commitee
c/o Dr. Vijay K. Bhargava
Dept. of Elec. and Comp. Eng.
University of Victoria, P.O. Box 3055
Victoria, BC, Can. V8W 3P6
Tel.: 1-604-721-8617
Fax: 1-604-721-6048

Dr. Norman Toms
Conference Chairman
MPR Teltech Ltd.
8999 Nelson Way
Burnaby, BC, Can. V5A 4B5
Tel.: 1-604-293-5787
Fax: 1-604-293-5787

IEEE Canada Awards

We are pleased to announce the winners of the Council Merit Awards as follows:

EASTERN CANADA COUNCIL MERIT AWARD

Kenneth A. Butt, for continuing support of IEEE Newfoundland and Labrador Section, from its inception as a Section in 1977 to the present, and for being a leader in technological and instrument development in Newfoundland since 1976.

WESTERN CANADA COUNCIL MERIT AWARD

D. Hugh J. Kay, for major contributions to the founding and continuous support of the Vancouver Section of the IEEE, and to the development of the electrical/electronics industry in Western Canada.

We hope to present the two silver medals in the Spring of 1992 at the Eastern and Western Canada Council Training Meetings to be held in Trois-Rivieres and Calgary, respectively.

McNaughton Learning Resource Centre

The official opening of the University of Waterloo McNaughton Learning Resource Centre took place on Saturday, September 14, 1991 as part of the Central Canada Council IEEE Student Branch Training Meeting. Forty five students and faculty members from colleges and universities in Ontario gathered outside Room 3359 in the Engineering Building while Tony Eastham officially cut the ribbon.

At the dinner in the evening, Philip Scoones was presented with the Region 7 Outstanding Student Branch Counsellor award. Members of the Executive of the IEEE Student Branch nominated Philip for the Award in February after he had been the Student Branch Counsellor of Niagara College for five years.

Philip Scoones, left, accepted the award for outstanding student counsellor of the Institute of Electrical and Electronics Engineers from Tony Eastham, IEEE director of Region 7, at Waterloo University.

Dr. Tony Eastham cuts the ribbon, officially opening the McNaughton Research Centre.

Care, not speed

by Peter D. Taylor, Ph.D.
Professor of Mathematics,
Queen's University,
Kingston, Ont.

One day last spring my daughter came home from school in a precarious mood. "I blew it, I failed, I couldn't possibly have passed, I didn't even answer half the questions, I never even got to the multiple choice. I am so mad I could scream!"

And, to her credit, she did.

"That does it: I'm gonna drop the course. Tomorrow I'm going in, and first thing I'm going to drop that course. I don't need it anyway. I'm not doing science I'm doing art, so I don't need it and I'm gonna drop it. Okay!?"

If that was a question to me, I wasn't given the chance to answer.

"What makes me so mad is that I know I can do the problems. I could do every one of them. I'm even good at them, I have good solutions, and I often think of really neat ways to attack a problem, you've told me that yourself".

She's right, I have.

"But when it comes to the test I'm hopeless. I can't begin to finish it. I can't even pass. I don't need this; I really don't. I'm dropping the course. A bunch of the girls say they're dropping too. It's stupid to hang in. Who needs a low mark?"

Well, I made soothing sounds, and I told her that exams were the pits but that we really didn't have a better way, and that I, her devoted father, knew she was good, so she shouldn't lose confidence just because of some stupid old test, but she was not to be consoled. At least I persuaded her not to drop the course until I had a chance to look at the test and maybe see what sorts of things we might work on. Anyway, I said, physics is important. What you're learning is good stuff. Just try to hang in a while longer.

This afternoon, I was just home and putting the kettle on, when she came in with the test. She had passed after all with a mark of 58%. But when the local university requires an average of 80 just to get in, 58 doesn't look so great. I settled down with my tea and toasted muffin, pen and pad of paper, and tried to put myself back 30 years to my grade 13 physics days. How long am I supposed to take? Seventy minutes. I set the minute minder on the microwave. Right. "Go!"

As I began the test, I was seized by all that old exam tension I had left behind years ago. "Read the question again; don't shoot from the hip, there might be a way to save some time, but don't ponder for too long; double check the tricky steps; keep it moving; don't get stalled."

The tea got cold, I hardly noticed the other kids come home from school, and before I knew it, the buzzer sounded. "Holy cow." Barely half done.

But it was fun; and some of the questions were really nice. (Tests are wonderful when they're not tests.) So I zapped the tea, grabbed a peanut butter cookie, and went upstairs to finish it off. It took me another seventy minutes. When I finished I had a new respect for my daughter. I don't think I had a 58 by half time.

I think I'd like to let you see the test. Don't they say you should occasionally sit down and watch what your kid is watching on TV? Well, maybe, just maybe, you ought to sit down now and then and find out what your kid is doing in her physics class. So here it is folks: grab your pencils and Do-si-do.

OAC Physics Test — Seventy minutes.

1. A dart is thrown horizontally directly towards the bullseye with a speed of 20 m/s. It hits the dart board 0.1 s later. How far below the bullseye does it hit?
2. A train starts from rest with constant acceleration, and reaches a speed of 20 m/s in 5 minutes. How far did it travel in the last minute?
3. A quarterback throws a ball due north at 12 m/s for an intended receiver running at 6 m/s west along a path 24 m from the quarterback. A wind of 1 m/s east is blowing which affects the football's flight. How far east of the quarterback should the receiver be when the ball is released?
4. A woman standing on top of a high cliff throws three balls: one straight up at 10 m/s, one straight down at 10 m/s, and one horizontally at 10 m/s. Which ball will hit the ground with the greatest speed? Neglect air resistance.
5. An object falls from a bridge that is 45 m above the water, and lands in a boat moving with constant velocity. If the boat was 12 m from the point of impact when the object was released, find the speed of the boat.
6. A parachute is released from an aircraft and at a given time is 300 m above the sea and 400 m north of a harbour. The chute is dropping at a constant speed of 15 km/h, and there is a 15 km/h wind blowing towards the northeast. A launch sets out from the harbour at this time to meet the chute as soon as it reaches the water. What is the direction and required velocity of the launch with respect to the water? (Neglect the effect of the wind on the launch and assume the water is at rest.)
7. An object is fired vertically upwards at "u"m/s. When it has reached 4/5 of its maximum height, its velocity is 20 m/s.

   (a) How high did it go?

   (b) What was its initial velocity "u"?

   (c) How long was it in the air?
8. A projectile is fired from a height of 20 m above the ground at an elevation angle of 40 degrees, and strikes the ground at a horizontal distance of 4000 m. How high was it at a horizontal distance of 3800 m?

9. A shell is fired from a height of 20 m above the ground at a speed of 100 m/s and at an elevation angle of 60 degrees.

   (a) At what horizontal distance does it strike the ground?

   (b) A rectangular mesa of height 380 m (above ground level) sits directly in the path of the shell. Suppose the shell just clears the edge of the mesa on its way up and again on its way down. How wide is the mesa?

10. A target missile is fired due north from ground level at a point A, with a speed of 600 m/s and an elevation angle of 30 degrees. Moments later, an intercepting missile is fired from ground level at a point B 4.5 km north of A, with a speed of "u"m/s and an elevation angle of 54 degrees.

    Calculate

    (a) the time of interception

    (b) the height of interception

    (c) the horizontal position of interception

    (d) the initial speed "u"of the second missile.

11. Two friends A and B are directly opposite one another on opposite banks of a 200 m wide river which flows at a uniform speed of 3 km/h. A, who has a boat and who can row at a speed of 4 km/h (in still water), set out to cross the stream at the same instant as B begins to walk along the bank in the downstream direction at a steady speed of 6 km/h.

    (a) At what constant angle to the bank must A head his boat so he meets B just as he arrives at the bank.

    (b) When do they meet?

    (c) How far does A travel relative to the bank?

12. Base B is 400 km N30E of base A. Plane B takes off from base B and heads due south at 250 km/h. At the same moment, plane A takes off from base A at a speed of 400 km/h, to intercept plane B. If the wind is from the east at 80 km/h, where and when does the interception take place?

(PLUS: Ten multiple-choice questions)

Nice questions eh? Some are fairly straightforward, but others, like 8, 9 and 10, require the solving of complicated equations. All the problems seem to need a few moments of reflection time just to set things up properly, and problems like 2 and 4 are quite discriminating in that some preliminary thought can lead to quite an elegant solution. So it's not a simple test, even if you have the equations of motion at your fingertips. My daughter tells me there were a couple of young men who got above 90. I find that quite impressive.

My purpose is not actually to talk about the test itself, but about a generally held view of science that this test epitomizes so well. But I should say first that I have absolutely no quarrel with the teacher who set it. It is certainly too long for most of the students in his class, but all teachers, and I am as guilty as anyone, set such tests from time to time. And, especially in the final year of high school, the teacher surely has a duty to prepare the students properly for future studies. My nephew has just finished his second-year in Engineering Physics at Queen's, and he assures me that his physics exams require a high level of rapid problem-solving ability.

What I do want to talk about is the discouraging effect that this test, and a whole history of others like it, have had on my daughter. She possesses a good mind, and over the years, I have observed that she has a real talent for problem-solving. But she is now, at the end of her high school career, convinced that there is no real place for her in the scientific community, and, in any event, that it would be sheer folly for her to study science in university, because she simply couldn't pass the exams. In fact I am not unhappy with her current desire to study fine arts, though I do think she would make a good scientist. What worries me is that there may be a large number of students like her, who really do want to pursue a career in science or engineering, but who are discouraged from doing so by current educational attitudes and practices.

Here's the point:

The way we teach and examine science both in school and in university puts a huge premium on the ability to solve problems quickly, and I don't think that's really such an important part of being a scientist/engineer. Indeed, more than ever, I think we need to be producing scientists who are more thorough, more careful, and more caring about what they do and how they do it.

In school today, in physics and in math, it's not how well you do your work but how quickly you do it that counts. This is certainly true when it comes to the exam, which is, of course, the bottom line of our evaluation process. But I think it's also true during the school year, when there might appear to be lots of time for an emphasis on high-quality work. Students seem to have a bewildering collection of jobs and social encounters to negotiate, curricula are more packed than ever with apparently important technical skills, and under semestering, a new idea comes relentlessly every single day. A student who works slowly, who needs (craves?) the time to savour one concept before moving on to the next will simply not get the work done, will fall behind, and eventually, will fall away.

The reason that there is not an enormous concern about this problem in the academic community is, I think, that a considerable number of those students who take pride in the quality of their work, also respond in a very positive way to the challenge of doing it quickly. There are enough such students around that they are a visible presence in any classroom, and the teachers and the other students notice them, and conclude that they are the obvious ones to become the scientists/engineers of the future. But I'm sure there is also a substantial group of students whose quality of work and standards of excellence are just as high, and who respond very negatively to the challenge offered by this test, who are in fact—though they may not have the wisdom to acknowledge this—insulted by it. And that's the reason I wanted to reproduce the test here. I want you to at least look at it and think about what it might feel like to have to sit down and write it. There really are two ways to respond. One is to feel challenged, as I and most of the scientists/engineers of my generation were when we were in school, and to rise to the occasion. The other is to feel cheated, subverted by a game you don't really want to play, whose importance, deep down, you may seriously question.

The tragedy of this is that not only might these "other" students become good scientists or engineers, they might just become, for the real needs of tomorrow's society, the best scientists we have; indeed, a measured careful pace, an attention to detail, and a consideration of the greater implications of a project, is perhaps needed now more than ever. In the final analysis, how fast you manage to do things doesn't matter in science one bit. Quite the reverse: those who manage to grasp the right piece of the puzzle are those who are able to slow themselves down at just those crucial points where everyone else has always gone whizzing round the corner.

And I also can't help but wonder whether there might be more women in this slow-and-careful category than men. Certainly I think that science today really needs the woman's particular way of understanding the world. And those in high places must think that too, because at the moment they are spending great sums of money trying to encourage more women to study science. A good place for them to start looking might be this test.

Peter D. Taylor, Ph.D. is a Professor of Mathematics at Queen's University, Kingston, Ontario. This article was first published in the Kingston Whig-Standard.

Spring Meeting

Tom East (SM'57, LS'91) receives the Centre Canada Council (CCC) award from Tony Eastham, Director of IEEE Canada, in recognition of his contributions to the IEEE in the Kitchener-Waterloo Section. The award was presented at the CCC spring meeting at the Skyline Triumph Hotel in Toronto in April 1991.

Members and guests of Centre Canada Council at the spring meeting in Toronto.

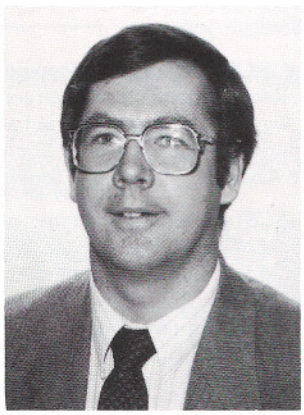
IEEE Canada - Our Council Chairmen

New Council Chairmen were elected by the Sections of Eastern, Centre and Western Canada Councils in 1990. Our Council Chairmen took office at the beginning of the year for a period of two years. Introducing:

Russ McDowell (S'75, M'76, SM'90)

Chairman of the Ottawa Section during 1988-89, Region 7 Public Awareness Coordinator 1989-91, he has taken on the challenge of the Chairmanships of Eastern Canada Council for 1991-1993.

Russ has worked on several IEEE Standards activities including writing graphic definitions for the P610 Computer Dictionary project, and reviewing the IEEE Software Engineering Standards. Other activities within the Ottawa Section have included serving as Chairman of the IEEE Ottawa Conference Board Inc., and acting as Section co-ordinator to the Canadian High Technology Show.



Russ is a member of the Association of Computing Machinery and is currently working as Manager of Product Development at PRIOR Data Sciences, a software company based in Kanata, Ont. specializing in real-time software systems. The products within his mandate included InterMAPhics, a command and control type mapping package and PRIOR GKS, an implementation of the ISO Standard.

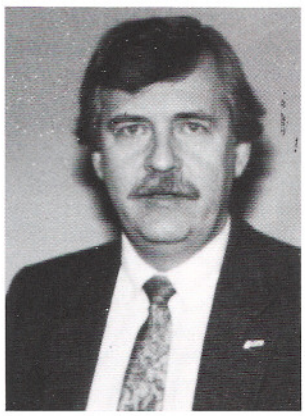
Extracting from notes on the direction of IEEE in the future, "there are a number of issues that will have to be addressed within the Region over the next few years. As expressed at the October 1990 Toronto based "Sections Congress 90" we must be concerned with such areas as member retention (both full member and graduating student), how we can attract more members, and how we can show companies the benefits of having their people be member of the Institute. In general we have to ensure that we provide the kind of organization people believe is worth joining."

John Cortes, P. Eng. (M'83, SM'91)

London Section Meetings Chairman from 1983-88, London Section Chairman 1988-90, CC Vice Chairman 1989, London Section Power Chapter Chairman during 1990, he began his term of office as Chairman, Central Canada Council January 1991.

John is an advanced electrical project engineer at 3M Canada Inc., based in London, Ontario.

His concerns: "Why are there so few members? What can you do about it?"



Bill Kennedy (M'70, SM'81)

Let me introduce myself - my name is Bill Kennedy and I have been an IEEE member for over 20 years. I joined the IEEE within a year of graduating from the University of New Brunswick because I had a need to stay technically abreast of happenings in the power engineering field. Today, as Manager, Transmission and Interconnection Planning, SaskPower, Regina, I still have this need.

I believe that the IEEE has done and continues to do a good job in getting technical information to its members. I also believe that the time has come when I can give something back and that is the primary reason why I accepted the invitation to put my name forward for the Chairmanship of the Western Canada Council.

The IEEE is a good product and this product will sell itself. The local Sections of IEEE have to create the atmosphere wherein the IEEE can and will sell itself. The key to this atmosphere is strong local programming and for the next two years I plan to make this my primary focus.

The role of RAB

by Dr. Robert T.H. Alden
IEEE Vice President for Regional Activities
1990-1991

Almost two years ago, my previous article in this magazine (my last as your Director) was entitled "Changing Times - Exciting Times!" I could have used the same title here. For a year and a half, I have chaired the Regional Activities Board (RAB). RAB and its staff service department Field Services (FS) are rapidly changing in a direction that will result in better service for members in general and eliminate a number of inequities for non - U.S. members. Let me explain.

RAB is a major IEEE Board comprised of the 10 Regional Directors, 6 Operating Committee chairs, the Transnational Comittee (TC) chair, the Staff Director of Field Services, a past VP, and the current Vice President. (See figure 1 below). The increased use of electronic mail, less face-to-face meetings, more subcommittees but a smaller Board has improved cost effectiveness while enabling more useful work to be done.

With over 10,000 volunteers and a central support staff of 40, effective interaction within this group is essential, as is the introduction of modern computer usage for information collection, processing, and distribution. The new computer systems currently being installed will benefit all of IEEE, but are crucial to the areas of membership processing and member services.

The RAB/FS team of volunteers and staff exists to provide services to both individual members and local entities such as Section, Chapters, and Student Branches so that they in turn can provide local services.

The RAB operating committees are:

The **Admission & Advancement Committee** (A&A) oversees the staff processing of applications for IEEE membership and member grade advancement. It also reviews all cases requiring special attention. A key to rapid and equitable admission for qualified applicants is the existence of the so called "Recognized Educational Programs" list. One requirement for Member grade is based on formal education. If your school program is on the list, your application is processed more easily. Many non-U.S. programs were not listed. We now have volunteers in all non-U.S. regions providing information to update this list. With the new computer systems being installed, we should be able to improve accuracy and response time, and offer local membership services in Canada in Canadian dollars. For assistance, contact the Manager, Member Services.

The **Membership Development Committee** (MDC) is responsible for attracting new potential members and promoting advancement and retention of existing members through support of local Section, Chapter and Conference organizers who conduct membership drives. The committee also oversees Direct Mail and Telemarketing campaigns. A recent activity is to foster the corporate support of employers in encouraging and supporting IEEE membership and activities. For more information contact the Manager, Membership Development.

The **Awards and recognition committee** (ARC) develops and supports awards to recognize excellence in the technical, professional, student and volunteer activities of IEEE members. A new initiative is the development of recognition programs to identify and honour individuals and companies who have visibly demonstrated a high level of support for IEEE. For more information contact the Administrative Assistant for Regional Activities.

The **Student activities committee** (SAC) supports the operation of the 720 Student Branches and 180 Student Branch Chapters. Their current objective is to encourage the involvement of student members in the world of technical and professional activities that are the heart of IEEE and other technical societies. A new initiative is to bring students and recently graduated engineers more closely together. A related activity is the publication of "Potentials", the magazine for young engineers. For more information contact the Coordinator, Student Services.

The **Regional conferences committee** (RCC) supports the operation of Section and Region based conferences. Recently restructured with conference experts, this group is examining ways to assist members in having better access to state of the art information through local venues. For more information contact the Administrative Assistant for Regional activities.

Section/Chapter support committee (SCS) supports the operation of the 278 Sections and 853 Chapters. Its current objective is to provide modern communication and management tools to Section/Chapter volunteers to help them provide better local service to members. This is a new committee this year and is involved with the triennial Sections Congress; Officer Training; Use of electronic mail, spread sheet, data base, and desktop publishing software, For more information contact the Manager, Section/ Chapter Services.

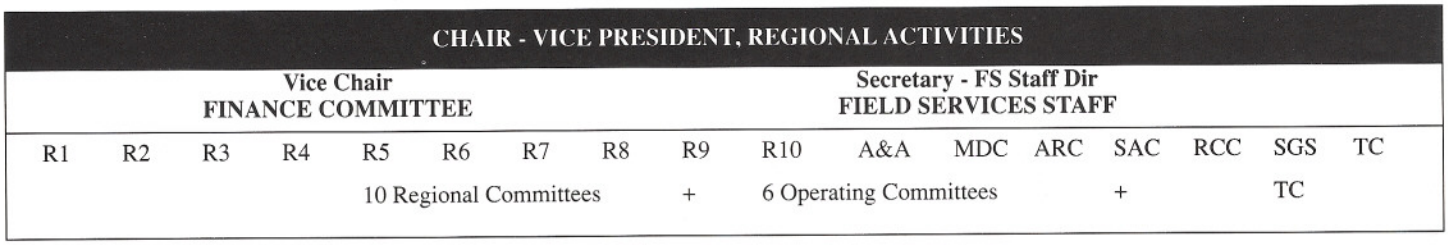


Fig. 1: Regional Activities Board

The Transnational Committee is a joint committee of RAB and TAB (Technical Activities) that focuses on problems that arise in an organization with members in over 130 countries but where 70% of the membership and almost all of the staff live in the U.S.

A toll-free number (800-678-IEEE) is available (in Canada and the U.S.) for membership inquiries. All of the above staff are located in the Field Services Department. IEEE Inc. 445 Hoes Lane, Piscataway, N.J. U.S.A. 08855-1331 Tel: 908-562-5501 Fax: 908-463-3657

New McNaughton Centre

We are pleased to announce the official opening of the McNaughton Learning Resource Centre at the University of Saskatchewan on February 26, 1991. The facility includes a library of technical books and journals, a computer system, a data centre for IEEE standards for design and technical purposes, as well as a miscellany of other equipment such as integrated circuits, protoboards, etc.

The opening ceremonies included the presentation of a framed photograph of Gen. A. G. L. McNaughton, and a copy of his Speech to Students. A copy of the IEEE Code of Ethics was also presented together with the book "Electricity, the Magic Medium".

Left to right: Leo Niekamp (V. Chair, N. Sask. Section), Richard Moorman (Chairman, IEEE Student Branch at University of Saskatchewan), Dave Dodds (Sec-treasurer, N. Sask. Section), Safa Kasap (Student Br. Counsellor), Dave Cargill (McNaughton Centre Supervisor), Hugh Wood (Chairman, N. Sask. Section), Mark Moore (Membership Chairman) and Bob Benneweis (Past Chairman, N. Sask. Section).

Letters to the editor / Lettres à l'éditeur

Dear Editor,

The fascinating history of General McNaughton is the most interesting thing you have published to date. McNaughton's life was shaped by values that have all but vanished: truth, patriotism, public service and the pioneering spirit. Thank you for this uplifting article!

The article mentioned that Kipling created the Iron Ring ceremony, basing it in part on the New Testament. Ironically (no pun intended) those who believe the New Testament cannot take part in this ceremony. Jesus Christ prohibited His followers from swearing oaths, because God recognizes only one standard of truth whether we are "under oath" or not. Although Canada allowed me to become a citizen by "declaring" rather than "swearing" my loyalty, no such concession was available for obtaining an Iron Ring. That's why I don't wear one.

A couple of other points:

a. Martha was the sister of Mary (not May), and this was *not* the Virgin Mary.

b. "Luce" in the New Testament is usually called "Luke", and a careful reading of Chapter 10, in context, does not support the idea that the Lord there designated Martha to serve mankind.

c. While North America seem to credit Edison with inventing the electric light, England gives this honour to Joseph Swan. According to Britannica's Micropaedia, Swan (who also pioneered in photography and synthetic textiles) produced the first electric light in 1860, 20 years before Edison, who used the same design. Swan's 1860 electric light burned out too quickly to be practical, but this only required a better internal vacuum and a more stable electrical supply, refinements which both Swan and Edison perfected in the same year.

Sincerely,

Alan T. Chattaway, P. Eng.

Editor's note

Several readers have commented that they enjoyed the two articles on General McNaughton. We would be happy to receive suggestions (and contributions!) for future articles on eminent Canadian engineers. We regret the typographical errors that resulted in "May" and "Luce" instead of Mary and Luke.

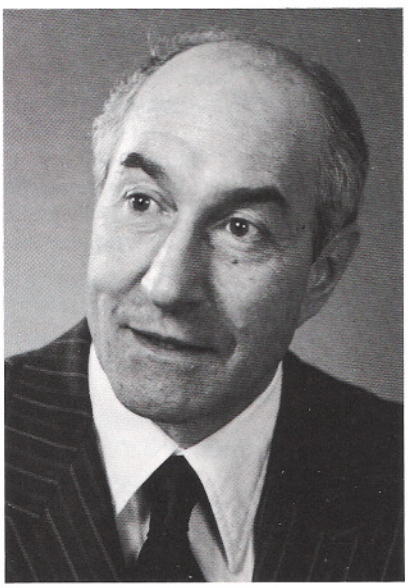
Introducing a new Managing Editor

Theodore Wildi will take over as Managing Editor of the *IEEE Canadian Review* effective with the 1992 Winter edition.

Theodore Wildi, B.Sc., M.A., P. Eng., was born in Switzerland on June 15, 1922 and graduated from McGill University in Electrical Engineering in 1944. He began a career in Montreal, testing and manufacturing electric motors and in 1948 started lecturing at Laval University. His association with Laval continued throughout his career, culminating in his nomination as Professor Emeritus in 1983. Ted (or Theo) also holds a Master's degree in Economics.

In 1951 he was founder and President of L'École d'électricité industrielle, an institution devoted to the training of technicians in electricity, electronics and communications.

In 1959 he founded Gen-Tec Inc., a company specializing in the repair and maintenance of electrical and electronic apparatus, as well as the manufacture of educational equipment and peak demand controllers.



In 1963 their Peak Load Controller was recognised as the "Most Outstanding Canadian Product" at the IEEE Canadian Region Conference in Toronto. He remained President of that company until 1969.

His career continued as Vice President and consultant with Lab-Volt Ltd, whose educational systems are used throughout the world.

Ted became a member of IEEE in 1957, achieved Senior Member status in 1971 and served on the Education Activities Board from 1980 to 1982. In 1984 he was awarded the IEEE Centennial Medal and in 1987 was the recipient of the Canadian McNaughton Award. He is a member of the Order of Engineers of Quebec and is Chairman of the Canadian Standards Association Technical Committee on Metric Practice.

As the holder of 11 patents and author of several books, our new managing editor has already made an outstanding contribution to Canada and we look forward to continued success in his new role.

Women in engineering

Even though December 11, 1990 was Monique Frize's first anniversary as holder of the Northern Telecom-NSERC Women in Engineering Chair at the University of New Brunswick's Fredericton campus, she did not celebrate on that day. That's because her first day on the job in 1989 was one of the saddest of her life. Dr. Frize spent the day representing UNB at the funeral of female engineering students massacred at École Polytechnique in Montréal and speaking at a vigil at UNB.

The tragic coincidence of that anniversary does not mean Dr. Frize has nothing to celebrate. Since last December, she has crossed Canada to spread this message: "Yes, women are and can become competent engineers."

There are signs that her message is being heard. At UNB, female engineering students have increased from 11 per cent overall in 1989-90 to 18 per cent of new students this year. Twenty per cent of engineering students on the Saint John campus are female. Several other universities are experiencing similar increases, including École Polytechnique where females made up 19.6 per cent of all engineering students last year and count for 24.5 per cent of all students this year.

The increases do not surprise Dr. Frize. "The massacre has made Canadians aware, some for the first time, that engineering is not just for men."

Dr. Frize's message to young women, their parents, guidance counsellors, teachers and friends, is reinforced by the fact that she is a role model: a woman, and a successful biomedical engineer who now teaches and does research, and who has a husband and family.

"Girls and young women see female lawyers and doctors on television all the time. They don't see female engineers, so it's not a career they are aware of," Dr. Frize says. "What we need are television shows like 'Magnum P. Eng.' or 'L.A. Engineer'.

Since her appointment, she has told over 1 600 students in 17 New Brunswick schools about her career in particular and about engineering careers in general. Seventy per cent of those students were female.

Beyond the classroom, she has addressed guidance counsellors in New Brunswick, French guidance counsellors in the Maritimes, and participated in workshops for teachers on the importance of science education. This fall, she addressed 1 000 francophone science teachers in Québec.

Last June, she spoke to academics at the Royal Society meeting in Victoria, B.C., to employers of engineers at the Engineering Manpower Conference in Ottawa, and to deans at the annual meeting of the National Committee of Deans of Engineering and Applied Science.

Since her address to the engineering deans, she has been asked to speak to students and faculty at several universities, including Ottawa, Queen's, Manitoba, Lakehead, Windsor, Simon Fraser, Carleton, Victoria and Cape Breton.

This hectic schedule of travel and speeches is balanced with academic work: teaching electrical engineering courses and initiating research on biomedical instrumentation for use in critical care medicine.

Dr. Frize's voice is being amplified by the Canadian Committee on Women in Engineering of which she is chairperson. With representation from the Association of Colleges and Universities of Canada, the Canadian Council of Professional Engineers, the Association of Consulting Engineers and the Canadian Manufacturer's Association, the committee is spending the next 18 months investigating the participation of and environment for women in engineering.

Dr. Frize will chair six public forums from Vancouver to Halifax. At these forums, engineering students, female engineers, employers, educators, researchers and others will be able to express their views on the representation of women in the engineering profession. The committee is also carrying out research, the results of which were presented at a national conference at UNB from May 21 to 23, 1991.

Dr. Frize is also spreading her message within the UNB faculty of engineering. Since September, she has started a peer counselling program for first-year female students and initiated monthly informal meetings for female students. She has begun a role model registry of female engineers in New Brunswick who are willing to speak to students, and she helped initiate the formation of a New Brunswick chapter of WISE (Women in Science and Engineering).

In the future, Dr. Frize would like to see gender issues, racism and homophobia included in the ethics course which is compulsory for all UNB engineering students. She also encourages engineering students to take women's studies courses as complementary studies and supports the development of programs in environmental and biomedical engineering because they would appeal to female students.

The First Annual BEAM Robot Olympics and Micromouse Competition

The BEAM Robot Olympics is not so much a series of technological competitions as a chance for robot enthusiasts to present their designs to each other, the press, and the public. It is also an open forum for anyone who wants to get started in the field to compete and compare. Any and every robot will be considered so long as it does not come from a kit or store. Robots of similar ability will be pitted against each other in simple competitions, but generally robots will be judged on sophistication of behaviour, novelty of design and quality of hardware.

Basically, if you built it, we'd like to see it.

One of the main aims of the Olympics is to get more people interested in practical robotics (rather than computer simulations). Thus BEAM, which stands for Biology, Electronics, Art and Mechanics is a system founded at the University of Waterloo which allows first time enthusiasts to get started in all these disciplines. By building one or more self-contained creatures, anyone can gain the confidence and ability to build a wider rage of robotic devices. There will be BEAM demonstration creatures for each of the following events:

Solaroller	Self starting robot dragster race
Photovore	Robots face a closed "world" and each other
High jump	Robot creature leaps, lands on feet
Rope Climbing	First up, first down, self-starting
Legged race	Walking creatures run for the money
Innovation machines	Electronic chopsticks, for example
Roboart	Mechanical/electronic aesthetics that move.
Best modified toy	Build brains into your Barbie
Robot sumo	Push an opponent out of a ring
Nanomouse	A smaller and simpler form of the ...
Micromouse	Where metal mice race for aluminum cheese

Rules and Guidelines are available now at a cost of $5.00 for cost of copying and postage. Competitors will be asked to fill out a "behaviour sheet" ahead of time and competitions will be determined based on the number of competitors. Those in a class by themselves will be given honourable mention and everybody will be included in the BEAM Olympic portfolio.

The purpose of these Olympics is to stress innovation rather than competition. We don't want solutions to be engineered, rather we want to test how your robot(s) will perform in a general environment. This is in contrast to something like the micromouse competition where the mice perform in a very constrained situation and under strict rules. All venues are open to the interested, so grab your soldering iron, raid the junk pile, and we'll see you there.

For more information on the BEAM Olympics, contact:
Mark Tilden
MFCF, University of Waterloo
Ontario, Canada N2L 3G1
(619) 885-1211 ext. 2454

McNaughton Scholars - 1991

Gregory King	University of Saskatchewan
Darby Wong	University of British Columbia
Trevor Blackwell	Carleton University
Douglas Martens	University of Manitoba
Dorothy Pavlidis	University of Toronto
Brent Robertson	McMaster University
Robert Cline	University of Regina
François Germain	Université Laval
Andrew Reeves-Hall	University of Waterloo
Angelos Kotsambasis	Conestoga College

Ron Blicq at the 1991 International Colloquium on New Information Technology

Ron Blicq will be attending the 1991 International Colloquium on New Information Technology to be held in Moscow October 8 to 10, 1991, an event organized by the Professional Communication Group of the A.S. Popov Society, USSR, the International Center for Scientific and Technical Information, Moscow and the IEEE Professional Communication Society. Mr. Blicq is the only Canadian representative to this event. Approximately 55 papers will be presented (approx. 15 from IEEE PCS and 40 from the USSR). A greeting message from Region 7 has been prepared in Russian for display by Mr. Blicq a member of the Winnipeg Section of IEEE Canada.

Featured in upcoming Winter Edition 1992

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Women in Technology — Where Are they?

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phone: (1-613) 788-3984

Program Co-Chairs & Editors of the Proceedings:

Dr. Shirley Mills
Dept. of Math. & Statistics
Carleton University
Ottawa, Ont. K1S 5B6 Canada
e-mail:shirley_mills@carleton.ca
fax: (1-613) 788-2148

Dr. Tuncer I. Ören
Dept. of Computer Science
University of Ottawa
Ottawa, Ont. K1N 6N5 Canada
e-mail: oren@csi.uottawa.ca
fax: (1-613) 564-7089

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