Fast Policy Facts

By Paul Dufour

In collaboration with Rebecca Melville

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Happy Anniversary!

The History of S&T Strategy in Canada

As the current government is putting together Canada's official Innovation Strategy (some interesting updates here), we look back on the history of S&T Strategy in Canada and notice there are some interesting anniversaries in 2017.

2017 is the...

- 30th anniversary of the National Science and Technology Policy - the only time that Canada has had such a national policy signed by all levels of government in Vancouver. The accompanying federal strategy under the Mulroney government was called InnovAction - The Canadian Strategy for Science and Technology.

- 15th anniversary of the Chrétien government's second S&T strategy - Canada's Innovation Strategy - Investing in People, Knowledge and Opportunity (in two volumes). The first in 1996 was launched under the title Science and Technology for a New Century.

- 10th anniversary of the Harper government's first S&T strategy - Mobilizing Science and Technology to Canada's Advantage
Female Science Ministers

Since 1971, Canada has only had two female science ministers - both were appointed by Prime Minister Trudeau.

The first was Jeanne Sauvé, named Minister of State for Science and Technology by Pierre Elliot Trudeau.

The second was Kirsty Duncan, appointed Minister for Science by Justin Trudeau.
AG Science Reports

Later this year, the Auditor General of Canada will be releasing two reports on federal science facilities and federal science programs.

This is not the first time the AG has examined these subjects...

1994 The AG explored the overall management of science and technology activities as well as scientific personnel in federal research establishments.

1998 The AG reviewed the government progress in implementing commitments of the 1996 federal S&T strategy.

1999 A follow up report on management of federal S&T personnel found that challenges still remained including attracting and recruiting new talent and in retaining experience. As a result, the AG published a report on the attributes of well-managed research organizations.
The deadline approaches...

Feb 13, 2017 is the deadline to apply for Chief Science Advisor (barring any further push-backs)

While we're on the topic...

In case you missed it, 40 years ago (1977) marked the publication of the fourth and last volume of the Report of the Special Committee of the Senate on Science Policy. In the document, it was recommended that:

"Government departments and agencies with a sufficient science budget should have a science advisor acting as liaison between top management and research services.

...So let's get those applications in!

Just who was on that special committee, you ask?

- - - Chairman: Maurice LAMONTAGNE, P.C., Quebec - - -
- - - Vice-Chairman: Donald CAMERON, Alberta - - -

Martial ASSELIN, P.C., Quebec
Rheal BELISLE, Ontario
Ann Elizabeth BELL, British Columbia
Mark Lorne BONNELL, Prince Edward Island
Maurice BOURGET, P.C., Quebec
Sidney L. BUCKWOLD, Saskatchewan
Louis de Go GIGUERE, Quebec
John Morrow GODFREY, Ontario
Allister GROSART, Ontario
J. Campbell HAIG, Manitoba
Earl Adam HASTINGS, Alberta

Henry Davies HICKS, Nova Scotia
Daniel A. LANG, Ontario
Ernest Charles MANNING, P.C., Alberta
Joan NEIMAN, Ontario
Maurice RIEL, Quebec
Louis Joseph ROBICHAUD, P.C., New Brunswick
Frederick William ROWE, Newfoundland
Richard STANBURY, Ontario
Andrew THOMPSON, Ontario
Paul YUZYK, Manitoba

Tell me one more interesting thing...
A consequence of the Lamontagne report was the tabling of Bill C-26 which, among other things, proposed the creation of the Social Sciences and Humanities Research Council (SSHRC) and Natural Sciences and Engineering Research Council (NSERC).

#5: February 15, 2017

How about a couple of key moments in the history of Business-Education relations in Canada?

2015 The Business Council on National Issues launches a Business-Higher Education Roundtable comprised of leading Canadian businesses and higher education institutions to help strengthen cooperation between employers and educators.

1983 A Corporate-Higher Education Forum (C-HEF) based in Montreal (championed by Concordia and Montreal based enterprises) was established to promote mutual understanding across a number of key issues between businesses and educators. C-HEF's activities included examining the scale and scope of corporate-university cooperation in R&D; better understanding the match between university graduates and corporate employers, and defining a broader agenda of cooperation. Developing a 'windows into universities' database of the research underway was one initiative along with scoping a model research contract and providing awards to outstanding cases of collaboration.
Our True North

In 2017, as part of its 150th anniversary celebrations and after years of consultations, planning and construction, Canada will launch the Canadian High Arctic Research Station in Cambridge Bay.

It is designed to attract Canadian and international scientists to work on science and technology issues in Canada's North and provide a technology development centre, traditional knowledge centre and advanced laboratories. The station is being built by Canadians to serve the world, and engage Northerners in cutting-edge science and technology.

Meanwhile, 30 years ago...

March 1987 A landmark report on Canada and Polar Science (chaired by the remarkable Fred Roots*) is published arguing for the need to strengthen polar research and its usefulness to Canadians. Among its key recommendations were:
• creation of a Canadian Polar Commission that would report on the state of
northern and polar science in Canada

• establishment of a Canadian Polar Information System building upon existing
data and compatible with international polar-related systems

• launch of a "Polar House" in the National Capital area to give tangible visibility
to Canada's commitment to polar science and the integration of scientific
knowledge from all aspects of Canadian life, in the North and in southern
Canada

• adoption of a policy by the federal government promoting the greater
involvement of northern institutions and northerners, especially Indigenous
northerners, in the determination of national priorities for polar research and
the actual understanding of northern research in Canada

• establishment of a national polar science communications centre to provide
information about the Canadian North, polar regions and polar knowledge to
the Canadian public

* For those who don't know, Fred Root was a Canadian geologist, polar explorer, educator and public
servant extraordinaire. Besides being part of dozens of scientific expeditions in the Arctic, Antarctic,
Himalayas and Rockies; founding the Polar Continental Shelf Program; acting as science advisor to the
federal Department of the Environment; helping write the Antarctic Treaty; and being an Officer of the Order
of Canada (1987), he once completed a 189-day, unsupported dog sled journey across the continent - a
record that still stands over six decades later.
Women in Science - The Long Road

This week, in honor of International Women's Day, we're providing this retrospective on women in Canadian science, courtesy of Paul Dufour of Paulicyworks.

Minister Duncan—only the second female federal science minister in 46 years—is an activist when it comes to increasing the participation of girls and women in science and indigenous knowledge. As she said at last year's International Women's Day:

"... women continue to face significant challenges in pursuing careers in science and remain less likely than men to study STEM in school. Barriers include wilful discrimination, undue bias, lack of resources and gender stereotyping. This is something we must work to amend."

She has spoken forcefully on the issue at various conferences and events, including talks at the Actua annual conference on the role of STEM education for girls and the L'Oréal-UNESCO women in science awards along with launching a Choose Science social media campaign during the International Day of Women and Girls in Science.

The issue of gender equality is still with us....Following the 2010 political debacle of the total absence of female candidates in the first round of the Canada Excellence Research Chairs (CERC) program, the Council of Canadian Academies was asked to assess the broader issues of underrepresentation of women in science. Its report on gender in university made clear that:

*The pathway to becoming a researcher is laid before university. The use of a life course perspective is critical to understand the career trajectories of women researchers. Socialization, schemas, and stereotypes define social roles and expectations, and contribute to the lack of encouragement for girls to forge non-traditional paths.*
The report has historical roots of course; in 1982, the Science Council of Canada released a statement of concern about science education of women in Canada building on a workshop ("Who Turns the Wheel") which argued that:

"The impact of science and technology on our daily lives must be made clear to both girls and boys. Educators, researchers and policy makers must ensure that there are no barriers to girls receiving a first-class education in science, mathematics and technology. And women must insist on a thorough education in these areas."

This November, several hundred advocates of gender equality policy from science, innovation and development fields will participate in the Gender Summit North America 2017, to be held in Montréal, Canada. The event is co-hosted by the federal granting councils and Quebec's research agencies, among others. So as we celebrate the 2017 International Women's Day we should not forget the critical contributions of our pioneers along with the next generation of girls and women in shaping our knowledge-based society.

The country's knowledge leadership can and should do more to promote a fairer representation at the highest levels of our political, public and private institutions investing in science, engineering and innovation.

*Dedicated to one of Canada's great activists of science, technology and society, Ursula Franklin, and her tireless pursuit of peace, feminism, environmental protection, and science education.*
Reflecting on basic science in Canada

*With a likely release of the Naylor expert panel report on fundamental science sometime after the federal budget, it might be useful to reflect on how basic research in Canada got its accent...*

Gerhard Herzberg, the renowned NRC director and future Nobel Laureate in chemistry, made the point well in 1965 when he said:

"The other reason for support of pure science by government funds is that scientific research of the purest kind is an intellectual activity which, just like art, music, literature, archaeology, and many other fields, helps us to understand who we are, what is the nature of the world in which we live."

In 1974, building in part on an earlier suggestion from Canada’s universities association, the (Pierre Elliot) Trudeau government's Speech from the Throne announced a reorganization of the federal granting councils in order to support a balanced development of knowledge and research capabilities. It noted the government's plan to transfer the granting function of the National Research Council to a new body, the Natural Sciences and Engineering Research Council, as well as transferring the granting function of the Canada Council in support of the social sciences and humanities to a new body, the Social Sciences and Humanities Research Council, leaving the Canada Council to support the arts. The Medical
Research Council, itself a spinoff of the NRC, was left to continue support for the health sciences (later it was to become the CIHR).

The objectives of the new legislation as outlined by Hugh Faulkner, Minister of State for Science and Technology, were to:

- Encourage curiosity-driven research
- Maintain a basic capacity for research training
- Provide a base of advanced knowledge
- Assist in the selective concentration of research activities
- Seek a regional balance of scientific capability
- Encourage research with a potential for contributing to national objectives
- Encourage excellence in research

Faulkner also indicated that an Inter-Council Coordinating Committee composed of the three granting councils chaired by the secretary of the Ministry of State for Science and Technology would be established. Its mandate, among other things, was to ensure coverage of all disciplines and that needs of interdisciplinary research were met.

Indeed, the Lamontagne Senate Committee reviewing Canada’s Science Policy was to make the following recommendation in its final report of 1977:

"We suggest that government funding of basic research should emphasize quality rather than quantity, that the social sciences, multidisciplinary efforts, and projects relevant to Canadian needs should get higher priority, and that the peer system should be improved."

*History may not repeat itself, but it does rhyme at times.*
Yes! There will be growth in the spring!
(Chance Gardener, Being There, 1979)

New growth through innovation has almost always been a factor in federal budgets over the years.

Here is what two PMs (Conservative) have had to say about the need for the private sector to step up to the innovation plate- 10 and 20 years ago respectively:

For too long, our national science strategy has failed to effectively harness market forces in the pursuit of scientific progress. As a result, private sector investment in research and development has fallen well below that of most of our major international competitors. (PM Harper, Waterloo, May 5, 2007)

The private sector has to do more research and development, and take up a greater share of the national effort in science and technology. Private sector R&D spending in Canada is much lower than most of our major economic competitors. (PM Mulroney, Waterloo, March 4, 1987)

Fast forward 2017

Countless reports and budgets later, the budget of March 22 once again speaks to the importance of innovation and growth. Minister Bains has outlined his wish following the extensive (some would say too extensive) consultations for an innovation agenda:

Now is the time to act on a comprehensive approach to foster innovation for a better Canada. Innovation will lead to better jobs and opportunities for the middle class. Innovation will enable Canadians to develop the skills they need to compete globally... Canada stands at a defining moment.
The Barton Advisory Council on Economic Growth has also weighed in on the perennial weaknesses in our business sector:

Canada's corporations, on average, do not innovate nor adopt innovation as quickly as those in other developed economies. Canadian business R&D spending is persistently half the US rate, with a large variance among sectors and geographies.

Furthermore, Canada's ranking in the OECD Business Expenditure on Research and Development index fell from 12th place in 2001 to 22nd in 2015. Though R&D expenditure metrics are admittedly imperfect, they do represent an indicative proxy of the level of corporate adoption of innovation. A recent survey found that only 30 percent of Canadian firms consider any form of innovation to be extremely or very important, and just 15 per cent would assume significant financial risks in the pursuit of innovation.

The question remains: Will there be new growth this spring?
The Mandate Mantra Changes Over Time

Both Ministers Bains and Duncan have respective mandates to deliver—all under the umbrella of the newly formed Innovation, Science and Economic Development ministry. For Minister Duncan, it includes, among other tasks:

- Create a Chief Science Officer mandated to ensure that government science is fully available to the public, that scientists are able to speak freely about their work, and that scientific analyses are considered when the government makes decisions.
- Support Ministerial colleagues as they re-insert scientific considerations into the heart of decision-making and investment choices.
- Lead the establishment of new Canada Research Chairs in sustainable technologies, working with the Minister of Innovation, Science and Economic Development.
- Examine options to strengthen the recognition of, and support for, fundamental research to support new discoveries.

The granting councils are not mentioned, nor any direct policy implementation. Previous governments tended to focus on organizations and policy development in mandate responsibilities. We provide two cases in point.

In 1984, Tom Siddon, newly minted Minister of State for Science and Technology, was tasked with the following by the PM Brian Mulroney:

Play a lead role in the development and coordination of the government's science and technology decision-making and provide an overview of the activities of line Ministers without replacing the authority that Ministers necessarily have over all the activities of their departments. Success would depend on close and effective working relationships with these Ministerial colleagues.

Prepare an annual framework paper analysing the entire range of the government's S&T activities. Once approved, the framework would provide Cabinet and Treasury Board with a
context for assessing all program submissions in the area of S&T. The Chief Science Advisor was to support the Minister in the framework paper and ensure its integration into the annual planning exercise and decision-making during the year.

Clarify the Minister’s relationship with the National Research Council and NSERC, with the Chief Science Advisor to develop a proposal to clarify these relationships and consult with the heads of the agencies.

Working with the Minister, the Chief Science Advisor was to negotiate with the Dept of External Affairs an MOU to ensure that Canadian missions abroad provided the Minister with the international information and other support required. Further, the Minister, in consultation with the external affairs and international trade ministers, was to develop an approach that could lead to a strengthening of the Science Counsellor network abroad.

In 1989, William Winegard, Minister of State (Science and Technology) received his mandate letter delegated by the then Minister of Industry, Science and Technology, Harvie Andre, indicating that he was to:

Pursue positive and cooperative relationships in the S&T sectors with the appropriate federal departments and agencies.

Exercise day to day responsibility for the Science Council of Canada, NSERC and NRC.

Formulate the department's policy position in S&T including major projects; the InnovAction strategy (including granting council initiatives, centres of excellence and the Canada Scholarships Program).

Develop a proposed policy framework for the relationship with NRC.

Consult with provincial governments, educational and scientific institutions and the private sector on science policy issues.

Be responsible for appropriate awareness campaigns in the fields of S&T.

Formulate and develop proposed policies concerning S&T related to Statistics Canada, the Space Agency and CPDL.
The Chairs - And More Chairs

The announcement in the 2017 federal budget of yet another research chairs program element serves to remind that Canada is still working to attract talent, especially in the context of the US and Brexit political fallouts. In 2000, the issue was about correcting a brain drain from Canada to the US and to strengthen the country's knowledge eco-system overall (with NCEs, CIHR, CFI, Millennium Scholarships). To back up the brain drain argument, evidence showed a disconcerting flow of Canadian talent to the south and that these flows could increase substantially. Action was needed to stem this and make Canadian universities more competitive globally.

When Prime Minister Chretien made the announcement in December 2000 of the first 195 recipients of 2000 Canada Research Chairs (originally called the 21st Century Canada Chairs for Research Excellence), 15 holders were from outside of Canada. Changes to immigration regulations were made to allow both the chair scholars and their spouses to enter Canada under facilitated entry procedures. The $900M set aside in the 2000 federal budget was eventually to support 2000 chairs by 2005.

The original program was designed by a working group that included the granting council presidents, the President of the AUCC (now Universities Canada), the presidents of St Francis Xavier University, Waterloo and UBC along with the U de Montréal rector and the DM of Industry Canada. They spent some time fine-tuning the program design elements including how best to brand the government's investments in university-level R&D and discussing whether to brand simply the institutional arrangements or the person holding the appointment (e.g.; Canada Research Scholars or Canada Research Laureates).

Allocation by discipline and by tier was another debate along with the need for a strategic research plan with applications for individual chairs by universities. As the chairs were to be allocated on the basis of the past success of a university attracting eligible funds from the granting councils, an
important consideration was to ensure a constant updating of the notional allocation of chairs and a competitive allocation of 5% of all chairs so as to allow for smaller and mid-sized universities to benefit. Interestingly, at no point did the program design elements anticipate the matter of ensuring representation along the equity and diversity parameters that are used today (e.g., visible minorities, gender, indigenous peoples, persons with disabilities). Indeed, as of 2016, for example, 30% of filled chair holders were women.

The program has been periodically evaluated. Meanwhile, the lexicon has expanded with Canada Excellence Research Chairs launched in 2008; and now another element with the 25 Canada 150 Research Chairs. This of course is over and above the several hundred university and research institute-based chairs dotted across the country.
Of Naylor and the Real Benefits of Useless Knowledge

The release this past week of the Naylor report - Canada's Fundamental Science review - springs to mind other ventures of this genre from the past and a cautionary note from a well-respected historian of science and technology, Derek de Solla Price. In 1969, he wrote:

"The lying in their teeth by scientists to justify their existence to society on the grounds that they are useful to society (has) been going on since the beginning of history. Archimedes did it you know. Archimedes claimed that he would be useful to the military strength and the economy of the Kingdom, yet when he was killed by the soldier he was doing pure geometry. This was his real contribution and what he wanted to do, but he lied in his teeth when he said that he could burn fleets with mirrors and all the other stuff."

In 1971, the Science Council of Canada commissioned Professor Peeter Kruus, from Carleton University, to write up a background report on Basic Research in Canada as part of its work on national goals for science policy. The report incorporated some interesting features which (like the Naylor expert panel), involved extensive consultation. A Delphi experiment was also added to assess inputs from various experts seeking selected information on federal support for natural sciences and engineering and the social sciences.

It is worth noting that among the tools used to engage the responses were eight one-day seminars designed to obtain input and ideas from the Canadian scientific community; gauge the attitudes of the scientific community regarding the subject; and make the scientific community aware of the complexity of the subject. These were followed up by a conference for the participants to go over the views presented. Subsequently, a two-day graduate students' seminar was held to obtain the views of the next generation. Discussion papers were commissioned and essays encouraged on the subject along with requests for inputs by provincial governments and professional societies. In short, a considerable consultation took place.
The bones of contention and the issues of consensus ranged across a wide spectrum. Comments on the definition of basic vs applied or fundamental vs oriented research were provided. Although some participants felt that there should definitely be more research activity at the universities, others felt that teaching too often suffers because of an overemphasis on research. While there seemed to be general agreement that all university teachers should have the opportunity to do some research, there was a difference of opinion as to whether all need actually to do research to remain good, up-to-date teachers. Most participants, including students, seemed to feel that society has no obligation to supply employment to graduating Ph.D. s, but that it would be a waste of resources if such expensively-trained people were underutilized.

With respect to basic research in industry, numerous suggestions were made for increasing the level of research; one common suggestion was a greater amount of contracting-out of research by government. Several participants stressed that government basic research groups with proven capability should be preserved, as such groups are difficult to build up.

Some felt that basic research is one of the most important ingredients in world culture. Several participants noted that free basic research had more than a cultural role, as such "non-relevant" research is necessary to ensure competence in fields which can become very important in the future for unforeseen reasons. The idea of a type of concentration of research activity into "centres of strength" also had many proponents; fear was expressed, however, that this would unduly weaken the quality of education in universities which had not been chosen as "centres".

Although communication inside disciplines was quite satisfactory, there was much room, and need, for improvement in communication between disciplines, sectors, types of research, and scientists and the public. In particular, communication between natural and social scientists seemed nearly non-existent, even though many thought it to be increasingly important. Indeed, a question was asked about a new "field", as many participants thought studies covered by a title such as "Multidisciplinary Studies of Complex Systems" would become increasingly important in the future.

The 1971 Science Council background report on Basic Research raised many issues that the Naylor panel re-assessed in 2017-many are still with us today.
A Global Scientific Scream on Earth Day

Did you hear it?

On April 22, Mother Earth screamed. It was no timid scream-rather, it was loud and proud and intergenerational. The knowledge communities around the globe basically rose up and said, enough - we are mad as hell - and won't take it anymore. Enough with the alt-truth movements; enough with inventing your own facts; enough with the cuts and the muzzling. The March for Science gathered in over 600 locations with banners, pins, posters, and messages to say that evidence and reliable knowledge matters. It comes in the form of traditional knowledge, social sciences, health, engineering and natural sciences-and it is diverse from all walks of life.

In Canada, where a 2012 death of evidence march woke up a slumbering scientific community, messages of solidarity went out to global networks advancing the dictum that sound science and knowledge matter. On Parliament Hill, the remembrance of a dark period was evoked with lessons learned - never again will the silent science assemblies lay dormant - science will stand up and scream if provoked or threatened much as it is once again in the US and other regions led by ideologues and their mythomania.

The Hill gathering on the hallowed Algonquin grounds reminded everyone that science and traditional knowledge have a special role and place to help Mother Earth and its citizens - one that engages rigorous evidence to shape well-informed decisions and decision-making for our planet.

To be sure, Canada has had its share of ideologues and antediluvians who would eschew data and facts for political or other motivations. But at least the current federal administration has signalled that it will value and respect science and scientists in all forms; in part, as a result of the awakening of creative, passionate and vigilant minds. If that respect is not forthcoming, the elected representatives will be judged by engaged publics in the next elections as will those in other jurisdictions where democracy- not kakistocracy - counts. It was Thomas Jefferson who noted that whenever the people are well-informed they can be trusted with their own government.
Above all, though, the gatherings were about how to move forward beyond the day. As a New Scientist editorial has put it:

*It is one day aimed at making people understand how unimportant one day actually is. Rather than having a specific bill or reform in mind, participants are simply trying to drum up greater appreciation for evidence, scientific rigour, methodology and expertise. It is a march that calls attention to another march: that of slow, steady, incremental progress.*

And if you need to scream, make sure it is well-directed and heard. The March of April May well continue......
Of a Free Science Press and Why it Still Matters

It's World Press Freedom Day on May 3. As usual, there will be events, awards and celebrations around the globe.

Flipping through my *Science Forum* issues from the 1960s and 70s, I came across a small item in a 1972 issue that announced the first annual seminar of the Canadian Association of Science Writers held at Bell-Northern Research Labs on January 13-15 1972.

The article was written by Omandt Solandt, the first chair of the Science Council of Canada who had offered the Council boardroom facilities for the very first meeting of the CSWA one year earlier.

Attending that CSWA workshop- seminar of 1972, Solandt opined on the differences between scientists and reporters trying to cover the science noting that:

> There was a genuine desire on both sides to communicate effectively, and that on the whole the speakers had more to learn about the technique of communication to an unspecialized audience than the science writers did. ----- The seminar confirmed the view that many scientists are very suspicious of the press and unwilling to speak to them. I am convinced that their suspicion rests on a failure to communicate adequately rather than on any evidence that science writers deliberately distort what they hear. I think they only distort the message if they misunderstand it.

45 years later, the commentary by Solandt still resonates. It is worth remembering that the science press was quite active during the Harper era of muzzling scientists writing extensively on the subject, garnering national and global attention in the process. Indeed, the CSWA with its counterpart French-language Association des communicateurs scientifiques (ACS), were awarded the 14th annual Press Freedom Award in 2012 by the Canadian Committee for World Press
Freedom for their work in exposing government restrictions on federal scientists that prevent or delay the free communication of public science through the media.

The muzzling issue was also to provoke the Office of the Information Commissioner (OIC) of Canada in April 2013 to investigate a complaint, made by the Environmental Law Clinic of the University of Victoria and Democracy Watch.

The complaint alleged that government policies and policy instruments - including departmental policies, protocols, guidelines and directives - related to communications and media relations that restrict or prohibit government scientists from speaking with or sharing research with the media and the Canadian public, impeded the right of access to information under the Act. Four years later, that investigation is still on the OIC books, and it remains unclear if any findings will be made public.

But fortunately some things have changed - in a positive way - regarding the science community and its relationship with the media. Happy World (Science) Press Freedom Day.
On Naylor and Lamontagne - but first, there was MacDonald

When the Naylor expert panel was issued, the science minister noted that a broad external review of the federal agencies had not been done since the 1970's. She went on to say, 'More than 40 years had passed and we needed to ask is the funding system working optimally and is it meeting the needs of the research community and Canadians.' In fact, the Naylor report references the Lamontagne Senate Committee's third volume on science policy in Canada. Issued in 1973, that volume focused on reorganization of the S+T landscape and suggested various organizational models for science policy.

But there was an earlier report that preceded the latter two documents: it also caused a stir about science funding in Canada. Sponsored by the Science Council of Canada and the Canada Council, *The Role of the Federal Government in Support of Research in Canadian Universities* was chaired by John MacDonald (he was a former UBC President and professor of higher education at UToronto). Its 77 recommendations more than doubled the 35 made by the Naylor panel, with an overriding message that research in the universities is an enterprise involving three principal partners—the federal government, the provincial governments and the universities. Indeed, one issue centred on how mission-oriented departments of government or universities themselves could initiate major programs for large-scale research relevant to Canadian goals.

Among its many other recommendations, the 1969 MacDonald report flagged the need to pay attention to the full indirect costs of research; the necessity to build up university research infrastructure (they recommended a Research Facilities Fund—a precursor to CFI); the desire to have a better handle on international science projects and their costs; an Intercouncil Co-ordinating Committee to address all disciplines (in that era, university research was covered by the NRC, the Medical Research Council and the Canada Council).

Like the Naylor report, they resisted the argument of bringing together the three councils; but did recommend that the MRC's mandate be broadened to encompass all health sciences and its name changed to the Health Sciences Research Council. Likewise, they argued that the Canada Council
mandate to support research in the humanities and social sciences be terminated and that a Humanities and Social Sciences Research Council be established. As for the NRC (which the Naylor panel did not comment on) the MacDonald authors argued that its sole responsibility should be the support of scientific and engineering research in universities and related institutions (the creation of NSERC from NRC was to come later in 1978 after much debate along with the launch of SSHRC).

The NRC recommendation garnered considerable criticism with many arguing that the granting function of the NRC should not be separated from its labs. It is also interesting to note that one of the members of the panel wrote a minority view (or dissenting opinion) - something we no longer see in such expert panel reports.

*History may not repeat itself, but it often rhymes at times.*
Science academies trying to influence global public policy - the landscape is becoming populated

"We can no longer afford to sit in our ivory tower or we are running in real danger of drifting into obscurity, in modern terms we would call it alternative facts" - Gunter Stock, President, All European Academies (ALLEA), 3 May 2017

You probably missed it - on May 3 the G7 science academies presented the Italian government with three Joint Statements that focus on urgent global issues to be presented at the G7 Summit to be held in Taormina, Italy at the end of May. Canada is usually represented in this forum through the Royal Society of Canada. The subjects centred on cultural heritage-building resilience to natural disasters; aging populations and the challenge of neurodegenerative diseases; and new economic growth - the role of science, technology, innovation and infrastructure. Each is a two-three statement with a series of recommendations to the G7 based on the collective science advice surrounding the themes.

For years now, the science academies of the G7 countries (formerly G8) issue statements to their respective leaders leading into the G7 Summits. In addition, since 2005, the science academies also have various proclamations to the G20 Summit leadership. For example, this year’s statement published on March 22 under the aegis of the German science academy dealt with Improving Global Health Strategies and Tools to Combat Communicable and Non-Communicable Diseases. Six key, but generic, recommendations are offered in that statement:

1. The strengthening of healthcare and public health systems
2. Applying existing and emerging knowledge
3. Addressing the broader social and environmental determinants of health
4. Reducing serious risk factors for disease through education and promotion of healthy lifestyles
5. Ensuring access to health resources globally
6. Enhancing and extending robust strategies for surveillance and information-sharing.

Health is a perennial topic in these statements - in 2015 (Anti-microbial resistance); in 2011 (water and health); in 2010 (Health of women and children); in 2006 (avian influenza). Other favorites are in energy, gender and water.

In addition, the science ministers of these countries also congregate to discuss similar issues. For example, in 2016 the G7 science ministers met in Japan to address Global Health, Gender and Human Resource Development for STI; the Future of the Seas and Oceans; and Clean Energy. Later this year, on Sept 28-29 just after the industry ministers, the G7 science ministers will be meeting in Turin to issue another communiqué on topics related to the Italian Summit.

The fact that there are these recurring statements and meetings should be telling us something:

1. Science impregnates all Summit issues
2. Themes reoccur- it is good to go back to issues as they evolve either due to policy, geopolitics or the very nature of the progress in science
3. It may be time for a re-assessment of the impact that such statements have had on national governments and on global progress

Canada will be hosting next year's G7 Summit-perhaps it would be useful to conduct a progress report on what has worked and what needs to be improved with all of these academy statements. Are there better ways of communicating the outcomes of these communiqués or in delivering them? How can they better influence public policy and global diplomacy?

These would be some helpful questions for the Canadian host to ask.
From Massey to Naylor

So you think the Naylor report on fundamental science was highly consultative and ambitious?

From 1949-1951, something even more expansive was in play with the work of the Royal Commission on National Development in the Arts, Letters and Sciences led by the Honourable Vincent Massey, who was to become Canada's first Canadian-born Governor General. The two-year commission examined all aspects of the arts, letters and sciences and made 146 recommendations, under eight principal headings: Broadcasting (Radio Broadcasting and Television; National Film Board); Other Federal Institutions (The National Gallery, National Museums, Federal Libraries, Public Records And Archives, Historic Sites And Monuments); Aid to Universities; National Scholarships; Scientific Research under the Federal Government; Information Abroad; a Council for the Arts, Letters, Humanities and Social Sciences.

During the course of its two-year inquiry, the Commission:

- held 114 public hearings throughout Canada
- heard some twelve hundred witnesses
- received 462 formal submissions
- collected many hundreds of letters from Canadian citizens

As the Minister of Science prepares to deliver her response to the Naylor Expert Panel, it is worth extracting one of the sections from the Massey report addressing the sciences - it resonates still today:

It is however important to state here that scientists who are often accused of material and mechanistic inclinations agree that although money is an obvious and prime necessity, it will not of itself provide the answer. Money is required for research professorships, for scholarships at all levels, for equipment, for scientific libraries, for publications, for travel, and so on. In all these helpful suggestions, however, we observed a consciousness that the first need is for brilliant and imaginative leadership, an unknown quantity still awaiting analysis. More than one person has mentioned the influence which Sir Frederick Banting and his colleagues exercised and still exercise over the whole field of Canadian medicine.
There has been insistence on the need for proper facilities in leisure, equipment, and technical assistance, but always we were reminded that these alone cannot guarantee results.

"...the results of fundamental research cannot be bought with money. Great sums spent on mediocre research will produce little of fundamental nature, while small sums expended on first-class research may revolutionize a scientific field."

It is important to realize that the person is the all-important factor in fundamental research . . . A (person) of first-class research abilities may produce much with very little outlay, provided that the cost of his training is not computed. But . . . the results of fundamental research cannot be bought with money. Great sums spent on mediocre research will produce little of fundamental nature, while small sums expended on first-class research may revolutionize a scientific field.

"The future depends not only on the continued liberality of governmental agencies but on the number and quality of the people induced to work at research."

The conclusion presented to us, then, is that the great need is for first-class (people) to give leadership and inspiration through their own brilliant, original discoveries. The future depends not only on the continued liberality of governmental agencies but on the number and quality of the people induced to work at research. The greatest need is to discover and train them and then to make sure that they are provided with research facilities and opportunities to enable them to render the services of which they are capable.

Enhancing Collaboration?

With Minister Duncan once again hosting the Science DMs at a retreat in the coming weeks about key issues around the federal government's investments and coordination on big cross-cutting policy issues, the following editorial from the R$ archives is prescient and relevant:

R$ Editorial
Vol19#15, 3 October 2005

By Mark Henderson, Managing Editor

It's encouraging to learn that there are renewed efforts to increase the collaborative capacity of science-based federal departments and agencies, and bolster their aging infrastructure. Informally dubbed FINE III after the Federal Innovation Networks of Excellence (FINE) proposal, the latest initiative is in the early stages of development but it appears to have legs.

The fact that both the national science advisor and Treasury Board are actively involved indicates that the federal government may finally be convinced that action is urgently required to revive this long-neglected but critical component of the emerging national system of innovation.

The decentralized nature federal S&T means that an initiative that enhances collaboration both within and external to government should generate benefits from coast to coast to coast. Bringing all federal labs into the 21st century will ensure that their contribution to the social and economic well-being is commensurate with the growing need, regardless of location.

From Arctic research and related sovereignty issues to global health threats and water quality, the need for top-notch federal S&T infrastructure and an innovative funding mechanism has never been greater. And that need is certain to escalate and grow more complex.
When it comes to S&T, Ottawa has an unfortunate tendency to delay funding decisions until critical situations are teetering towards disaster. Let's hope that such callous behaviour is not repeated, and that federal S&T is finally given adequate resources to flourish.

You can read the original Editorial here.
States of Science in Canada

The opening paragraph of a 1939 book on the history of science in Canada (Ryerson Press) begins by stating:

That Canada has achieved a respectable place in the world of Science, both pure and applied, I am sure no one acquainted with the facts will deny. What is not so well understood is the manner in which this was brought about. Neither is it recognized that behind most of the development of Science as applied in industry lies some discovery made as a result of some mind possessed of more than ordinary curiosity delving into the unknown.

The former NRC President, H.M Tory, wrote these introductory words in his edited book published for the meeting of the AAAS in Ottawa in June 1938. (Yes, the AAAS held several of its annual meetings in Canada.)

Almost 80 years later, Canada is still striving for "its respectful place" in the world of science and seeking the right balance between pure or discovery research and its applied ends. The Naylor report has identified many of the challenges that science still faces - previous reports have gone over the same ground with lesser detail (the four volume Lamontagne Senate Committee study excepted).

The 1939 book gives an overview of where Canada stood in terms of geology, chemistry, botany, zoology, medicine, astronomy, mathematics and physics. More than two decades later, the Science Council of Canada began a similar overview with its "inventory studies" in the 1960s and early 70s exploring these and other sectors or disciplines in more detail. Another couple of decades later NSERC instituted state of the science reviews in the 90s. Quebec also publishes annual 'rapports de conjuncture' that were developed by the former Conseil de la science et de la technologie (for example, see Rapport - Innovation et mondialisation. Rapport de conjoncture 2008). Today, the Canadian Council of Academies is deploying several methodologies to inspect some of the broader fabric and examine the weave of science through its own state of STI reports aided by StatsCan and other surveys and sources. An updated report is due to be released in the Fall of 2017.

Such state of science and innovation reports are always useful as guideposts to the future direction or trends for policy makers, students and researchers alike. We can expect these assessments to continue as the very nature of science and knowledge is evolving.
Audit This!

With the preoccupation these days on when the government will respond to the Naylor expert panel report, little noticed is the ongoing work centred on another aspect of Canada's public science ecosystem -- the government research facilities.

NRC is pulling together its integrated plan after extensive consultations and surveys designed to respond to re-balancing its own extensive research portfolio. Government departments are retooling their capacities and capabilities focusing on cross-cutting issues such as Arctic, AI, climate change and water management.

... And the Auditor General is coming out this Fall with a review of federal scientific facilities.

This Is No New Thing

Indeed, the AG has been active over the years in examining if the research portfolio within government has been delivering results.

1994 ---> The 1994 report assessed overall management of federal science and technology activities -- including their management as well as scientific personnel. Notable among its main points was that the government needed a framework and indicators to monitor Canada's overall performance in S&T. Successful implementation would require joint efforts of federal departments, provinces, industry, higher education and leadership by Cabinet -- not to mention an important function by Parliamentarians to ensure an appropriate, balanced and workable S&T strategy.

The 1994 audit also outlined the features of an innovative society -- indeed, a concluding point was that:
Canada has the potential to be particularly innovative as a society because of the cultural diversity of its people. If it could continue to establish and maintain the interconnection that is the basis for societal innovation, it might well become known as "Canada, the innovative country."

+ Read the full 1994 AG report

1996 ---> A follow-up September 1996 AG report commented on federal science and technology activities. That report looked at the progress made with the release of the federal government's Science and Technology for the New Century strategy of March 1996. The AG noted that some promising steps had been made in responding to the 1994 audit and outlined several operating principles for S&T policies and programs of the federal government.

+ Read a digitized portion of the Science and Technology for the New Century report (the Agriculture and Agri-Food Canada's Action Plan)

1999 ---> In 1999, the AG was at it again -- this time looking at innovation and in particular the results and impact of four programs, including NRC's IRAP, NSERC's Research Partnership Program and NCEs. Among other observations, the AG concluded that: it seems...clear that spending on research and development is not the only determinant of the Canadian economy's rate of productivity growth, and may not be the most important one.

That observation still holds today. As a bonus, the AG also released a short chapter that dealt with attributes of well-managed research organizations which included a focus on people, leadership, organizational performance and managing research to ensure excellence and results.

More to come

Stay tuned for another look at some of these observations later this Fall from the Auditor General as it weighs in on federal scientific facilities...
A Quiz!

The PaulicyWorks summer science ministry quiz

Yep - it's that time of year when Cabinet shuffles are not uncommon. Science ministers are not exempted of course. Looking back, it is interesting to see how such ministers and their ministries have changed, not to mention how long they have remained in post. Since 1971, the federal government has had ministers responsible for science and technology (innovation was thrown in as well) of varying status.

Secretaries or Ministers of State have been the preferred choice, but at times, full Cabinet Ministers were also appointed. That said, science has largely been a junior post reporting to a more senior Minister and not unusually, the post has been combined with some other mandate as well.

So have at it!

Responses will be in next week's FPF.

1. He was appointed by the short-lived Campbell government as Minister of Industry, Science and Technology:

   Hint - a former Premier

   a. Benoît Bouchard
   b. Jean Charest
   c. René Levesque
   d. Marc Garneau
   e. Rob Nicholson
2. She was the first female science minister:
   a. Jeanne Benoit
   b. Jeanne Sauvé
   c. Julie Payette
   d. Ursula Franklin
   e. Barbara McDougall

3. He is the longest serving science minister:
   **Hint - and where is he now?**
   a. Bud Drury
   b. Gary Goodyear
   c. Bill Winegard
   d. Gilbert Normand
   e. John Roberts

4. He was also President of the Treasury Board before being named science minister:
   a. Hugh Faulkner
   b. Bud Drury
   c. Alistair Gillespie
   d. Tom Hockin
   e. Jon Gerrard

5. Only one science minister represented a Western Canada riding and was responsible for that regional development agency as well:
   **Hint - later named to the Senate**
   a. Ed Lumley
   b. Ron Duhamel
   c. Greg Rickford
   d. Heward Grafter
   e. Judd Buchanan

6. He also was Minister of Forestry and was acting Minister of the Environment for only one day on May 22, 1990:
   a. Tom Siddon
   b. Frank Oberle
   c. Benoit Bouchard
   d. David Emerson
7. He was Minister of Industry, Science and Technology and Minister for International Trade:
   a. Michael Wilson
   b. Sergio Marchi
   c. James Kelleher
   d. Peter Kent
   e. Maxim Bernier

8. He was also Deputy Prime Minister and Minister of Infrastructure:
   a. Lucien Bouchard
   b. Robert de Cotret
   c. John Manley
   d. Brian Tobin
   e. Alan Rock

9. He was Minister of State for Science and Technology for exactly one year:
   Hint - very recent
   a. James Judd Buchanan
   b. James Hugh Faulkner
   c. Greg Rickford
   d. John Roberts
   e. Bud Drury

10. The only pediatrician ever to be named Minister for Science - an expert on bald eagles (or raptors if you prefer):
    a. Jon Gerrard
    b. William Winegard
    c. Gilbert Normand
    d. Frank Oberle
    e. Gary Goodyear
The answers have arrived.

How did you do on the PaulicyWorks summer science ministry quiz? Let us know!

1. He was appointed by the short-lived Campbell government as Minister of Industry, Science and Technology:

   *Hint - a former Premier*
   a. Benoit Bouchard
   b. Jean Charest
   c. René Levesque
   d. Marc Garneau
   e. Rob Nicholson

   **Answer: b**
   Indeed, Jean Charest was once a federal minister, but he has had a storied political career since then in Quebec...

2. She was the first female science minister:

   a. Jeanne Benoit
   b. Jeanne Sauvé
   c. Julie Payette
   d. Ursula Franklin
   e. Barbara McDougall

   **Answer (a give-away!): b**
   Jeanne Sauvé was appointed under Trudeau père in 1972-1974 and then went on as Minister for Communications; later, she was named Canada's Governor General. Trudeau fils appointed Canada's second female science minister (Kirsty Duncan) - well, because it was 2015!
3. He is the longest serving science minister:

*Hint - and where is he now?*

a. Bud Drury  
b. Gary Goodyear  
c. Bill Winegard  
d. Gilbert Normand  
e. John Roberts

**Answer (hard to fathom that he stayed on so long, but...): b**

Gary Goodyear, the chiropractor, has the record under the Harper administration. I have no clue where he is now - but he will always be remembered for his views on evolution.

4. He was also President of the Treasury Board before being named science minister:

a. Hugh Faulkner  
b. Bud Drury  
c. Alistair Gillespie  
d. Tom Hockin  
e. Jon Gerrard

**Answer:** b  
From 1968 to 1974, Charles Mills (Bud) Drury was Treasury Board President before assuming the position of Minister of State for Science and Technology from Aug 1974 to Sept 1976.

5. Only one science minister represented a Western Canada riding and was responsible for that regional development agency as well:

*Hint - later named to the Senate*

a. Ed Lumley  
b. Ron Duhamel  
c. Greg Rickford  
d. Heward Grafter  
e. Judd Buchanan

**Answer:** b  
Ron Duhamel was Secretary of State, Science and Technology; PhD.; a truly cultured man from St Boniface. He died far too young at age 64.

6. He also was Minister of Forestry and was acting Minister of the Environment for only one day on May 22, 1990:

a. Tom Siddon  
b. Frank Oberle  
c. Benoit Bouchard  
d. David Emerson

**Answer:** b  
Frank Oberle Sr. came to Canada in the 50s from Germany and was to serve ultimately as Minister of State (S&T) under the Mulroney administration from August 1987 to 1990. He was the first ever German-born federal Canadian Cabinet minister.
7. He was Minister of Industry, Science and Technology and Minister for International Trade:
   a. Michael Wilson
   b. Sergio Marchi
   c. James Kelleher
   d. Peter Kent
   e. Maxim Bernier

   **Answer: a**
   Today, Michael Wilson is a strong supporter of mental health research.

8. He was also Deputy Prime Minister and Minister of Infrastructure:
   a. Lucien Bouchard
   b. Robert de Cotret
   c. John Manley
   d. Brian Tobin
   e. Alan Rock

   **Answer: c**
   John Manley had so many portfolios under the Jean Chretien years, it was hard to keep track - among other positions he was Minister of Science, Technology and Innovation from Nov 1993 - March 1995. He is now enjoying the presidency of the Business Council of Canada (formerly the Canadian Council of Chief Executives).

9. He was Minister of State for Science and Technology for exactly one year:
   *Hint - very recent*
   a. James Judd Buchanan
   b. James Hugh Faulkner
   c. Greg Rickford
   d. John Roberts
   e. Bud Drury

   **Answer: b**
   James Faulkner was science minister for one year from September 1976 before moving on to the post of Minister of Indian Affairs and Northern Development in September 1977. After leaving politics, he worked for Alcan and then joined Swiss industrialist Stephan Schmiheiny to form the Business Council for Sustainable Development, in Geneva.

10. The only pediatrician ever to be named Minister for Science - an expert on bald eagles (or raptors if you prefer):
   a. Jon Gerrard
   b. William Winegard
   c. Gilbert Normand
   d. Frank Oberle
   e. Gary Goodyear

   **Answer: a**
   Dr. Jon Gerrard is quite the expert on raptors - see his book *The Bald Eagle: Haunts and Habits of a Wilderness Monarch* published in 1988. Gerrard was the leader of the Manitoba Liberal Party until 2013 -- and is now an MLA in Manitoba.
Guests at the announcement that Canada will host the 2018 G7 Summit at the iconic Manoir Richelieu in Charlevoix, Quebec (in the background) Photo: Government of Canada

Science Academies and the G7

Since 2005, the national science academies of G8/G7 and other countries have met annually to develop science-based policy recommendations to be delivered to the leaders of each country.

The policy recommendations are finalized by the G-Science academies and submitted to national leaders in the form of joint statements ahead of the G8/G7 Summit. The statements tend to repeat - for a global policy world that operates in short cycles, this is probably a good thing since it allows science academies to fine-tune and return to issues that undergo a new political context while bringing to bear new advances in knowledge.

For example, topics such as climate change, energy transitions, infectious diseases, and water security figure prominently as recurring statements.
For Canada, the G7 science academy that signs off on these statements has traditionally been the Royal Society of Canada.

**Canada will be hosting the next G7 Summit in 2018.**

Given this imminent event, we thought it would be worth reviewing some of the topics and recommendations that were covered by previous G7/G8 statements. Look for our coverage from the last time Canada hosted, as well as the previous two summits in 2017 (the G7 Summit in Italy and G20 in Germany) over the next few weeks.

It is difficult to precisely comment on the impact or quality of these statements, but suffice to say that while their input is often welcome, it is unclear how seriously Summit leaders take them...

**How many do you think have impacted public policy both nationally and globally?**

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**FAST CANADA G7 FACTS**

**===>** Canada has hosted five G7 summits to date, including:

- Muskoka, Ontario (2010)
- Kananaskis, Alberta (2002)
- Toronto, Ontario (1988)
- Ottawa-Montebello, Ontario-Quebec (1981)

**===>** Canada was asked to join the G7 in 1976 on invitation from the President of the United States (the other members at the time were Italy, France, West Germany, Japan, the United Kingdom and the United States)

**===>** The role of chairing the G7 rotates each calendar year among the member countries in the following order: France, United States, United Kingdom, Germany, Japan, Italy and Canada
A $2 home birth kit from ayzh, containing all essential tools for a safe and sterile environment during a home birth. The kit was one of eight innovations targeted at improving health in developing countries granted funding by Grand Challenges Canada in September 2016. Photo: Grand Challenges Canada

Science Academies and the G7… continued

Since 2005, the national science academies of G8/G7 and other countries have met annually to develop science-based policy recommendations to be delivered to the leaders of each country.

Canada will be hosting the next G7 Summit in 2018.

Given this imminent event, we thought it would be worth reviewing some of the topics and recommendations that were covered by previous G7/G8 statements.

Let's recall the last time the G8 Summit was held in Canada. Ahead of the G8 Muskoka Summit of June 25-26, 2010, the science academies of the G8 member countries finalized joint statements on "Health of Women and Children" and "Innovation for Development" to deliver to the leaders of the G8 Summit countries.
1) Health of Women and Children

Two recommendations are worth noting here:

==> Health facilities and staffing need strengthening.

Increased access to prenatal, midwifery, essential obstetric and newborn care must remain the cornerstone of safer motherhood programs. Skilled emergency obstetric care must be accessible to all women who experience complications; research into most effective methods of delivering such care is needed. Support for community facilities should emphasize maternal and child health and also nutrition.

==> Maternal and child health research needs strengthening, especially in knowledge translation.

There is a lack of research into how interventions or programs including translational and communication strategies can be successfully implemented, and then successfully transferred to other areas. Capacity building including interdisciplinary centres of health science and innovation should be encouraged in all regions. Health information and education programs are needed to disseminate acquired knowledge; this will require enhanced organizational infrastructure.

Our Response?

Canada responded ahead of that Summit with the announcement of Grand Challenges Canada to address some of the global health issues outlined under the "Health of Women and Children" recommendations.

2) Innovation for Development

The G8 academies argued for greater attention to building innovation capacity in Africa and other regions of the developing world. The academies argued that countries should:

==> Align their own cooperative and development assistance programs to build capacities of individuals and institutions in developing countries. Of particular importance is building local capacity for making and implementing informed decisions, and for managing the diverse contributions of official and non-governmental international assistance;

==> Support the strengthening of universities and establishing centres of excellence in basic and applied science, engineering, and in areas of high priority for national innovation systems of developing countries

Our Response?

Canada responded with various suggestions for research chairs and exchanges between Canadian and African universities-- some of which were implemented through IDRC’s other partners.

Next week, we’ll take a look at this year's G7 summit at Taormina, Italy.
Alzheimer's Disease was estimated to have affected 40 million people in 2015. That number is expected to rise to 135 million by 2050. It is one of the conditions discussed in the national science academies joint statement on neurodegenerative diseases to the G7 in 2017. (source: The challenge of neurodegenerative diseases in an aging population)

Science Academies and the G7... the final chapter

Since 2005, the national science academies of G8/G7 and other countries have met annually to develop science-based policy recommendations to be delivered to the leaders of each country.

Canada will be hosting the next G7 Summit in 2018.

Given this imminent event, we thought it would be worth reviewing some of the topics and recommendations that were covered by previous G7/G8 statements.

Most recently in 2017...
In March this year for the G20 Summit, the science academies handed over selected recommendations on global health to the German host, Federal Chancellor Angela Merkel, as follows:

==> Improving Global Health: Strategies and Tools to Combat Communicable and Non-Communicable Diseases

And ahead of this year's G7 summit at Taormina, Italy during May 26-27, 2017, the national science academies of the G7 countries issued joint statements on:

==> Cultural heritage: building resilience to natural disasters

==> The challenge of neurodegenerative diseases in an aging population

==> New economic growth: the role of science, technology, innovation and infrastructure

The science academies will no doubt be at it again in 2018 when Canada hosts the G7 Summit -- at some point, it would be useful if some assessment were done to see how these numerous recommendations over the years have affected public policy both nationally and globally. Any takers??
As Science Literacy Week Approaches…

As we look forward to science literacy week here in Canada on Sept 18-24 (building on its many progenitors such as the former National Science and Technology Week), it is good to remind ourselves how the PM could play a strong role in signalling its importance to Canadians.

In the US, for example, from 2010 to 2016, President Obama began a tradition of an annual science fair held at the White House for young people to promote STEM education. He maintained that it was always his favourite event, arguing that if he could invite Super Bowl winners to the White House, why not the future generation that can make a real difference. Perhaps its time our PM and new GG look at this possibility for young Canadians as an expanded version of the PM Teachers' Awards on STEM education is launched later in 2018.
Prime Minister's Awards for Teaching Excellence ==> FAST FACTS

• Started in 1993

• Launched to honour outstanding and innovative elementary and secondary school teachers in all disciplines who instil in their students a love of learning and who utilize information and communications technologies to better equip their students with the knowledge and skills needed to excel in a 21st century society and economy

• Running in parallel since 2002, the PMA for Excellence in Childhood Education honour outstanding and innovative early childhood educators who excel at fostering the early development and socialization of the children in their care, and at helping build the foundation children need to make the best possible start in life

• Since the creation of the Program, over 1,600 teachers and educators have been honoured and more than 1,200 schools and centres have been recognized

• Budget 2017 proposed to invest $1.5 million over five years, starting in 2017-18, to expand the PMA to include 17 new STEM-themed awards

National Science and Technology Week ==> FAST FACTS

• Started in 1990

• Actually a 10-day event

• Designed to celebrate science and technology in everyday life

• Made up of a loosely structured series of activities organized by various groups such as libraries, schools, and museums across the country

• Evolved into "Science Odyssey" in 2016

• Science Odyssey is a collaborative event led by NSERC in collaboration with other federal departments and agencies and community organizations
The members of the Rowell-Sirois Commission in 1938 (following Newton Rowell's resignation as co-chair after suffering a stroke). Judge Joseph Sirois is in the front row, third from the left. *(Photo: Library and Archives Canada, C-034706)*

**NRC and the History of SSHRC**

Founded in 1916, the NRC has been the subject of many inquiries, commissions, and hearings -- over 100 years later, it is still around and remains vital to the Canadian science and innovation ecosystem, including of course, in the development of talent and skills for Canadian society and industry.

Almost eighty years ago, in March 1938, the NRC provided an overview of the organization of research in Canada as a submission to the Royal Commission on Dominion-Provincial Relations (known as the Rowell-Sirois Commission). The NRC mapped out the state of research in industry, universities and provinces, concluding in part that *exceedingly valuable research work is being done in Canada by many different bodies, and the NRC believes that the formation of additional organizations having special fields of research should be encouraged and assisted.*
In its summary conclusions, the Royal Commission report seized on NRC’s suggestion of creating additional, field-specific institutions and, among other things, pointed out the need for social science and humanities to be one of those areas. It noted that:

*Among the activities of the Dominion government which possess an educational character is the organization of scientific research in the physical sciences under the National Research Council. It is unnecessary to expatiate on the excellent work which the Council has been doing in close co-operation with Canadian universities upon whom it is largely dependent for its personnel. It has been represented to us that analogous research work in the social sciences might be organized, and that, in addition to the Dominion Bureau of Statistics, we might have a Social Science Research Council which would co-ordinate and in some degree direct the research work in these sciences which is being done in Canadian universities and elsewhere. There is a real need for some such institution in Canada and it could serve a most useful purpose in analysing the social problems with which current legislation is designed to deal.*

**But my word, do these things take time!**

In subsequent years, NRC has been responsible for a large array of spin-off institutions such as:

**Atomic Energy Canada Limited (AECL)**

- Founded 1952
- Roots go back to 1942, when the Montreal Laboratory (a joint Canadian-British nuclear research laboratory) was established under the NRC to develop a design for a nuclear reactor

**Medical Research Council of Canada (MRC)**

- Began as the Associate Committee of Medical Research in 1936
- Became the NRC Division of Medical Research in 1956 and then an autonomous body of NRC in 1960
- Evolved into the Canadian (CIHR) in 2000

**Natural Sciences and Engineering Research Council of Canada (NSERC)**

- Came into existence in 1978
- Original budget was $112 million (now grown to $1.1 billion)

At the same time that NSERC was created, the **Social Sciences and Humanities Research Council of Canada** (SSHRC) was also born, reflecting the original commission's call for emphasis on the social sciences. Last week, the Governor General of Canada brought this full circle when he provided SSHRC's Impact Awards to the latest recipients --

*In truth, all innovation is inherently social, which means the social sciences and humanities are especially important in this time of rapid change. Each change in our technology has a ripple effect upon our lives and society. We're living at a hinge point in our history, and we*
need outstanding research that studies human behaviour, needs and wants to ensure our innovations serve people and communities first.
The Avro Arrow is not the only research prototype lying at the bottom of a lake...

The Story of the Habakkuk Project

"...be utterly amazed, for I am going to do something in your days that you would not believe, even if you were told." (Habakkuk 1:5, NIV)

An ice platform for aircraft lies at the bottom of a lake in Alberta near Jasper. How did it get there?

For this story, we go all the way back to WWII, when eccentric inventor Magnus Pyke had the idea to design a massive, inexpensive, floating airstrip out of ice and wood pulp. The experiment, codenamed Project Habakkuk, was to be designed by the NRC with British assistance.
Pyke began by suggesting a large piece of arctic iceberg simply be sliced off to serve as a landing platform for aircraft. Pyke had the ear of Lord Mountbatten and Winston Churchill, and Churchill reportedly became fixated by the concept. NRC’s President, Chalmers Jack Mackenzie, recounted it in his diary that Churchill "harped on the possibility of cutting out a lozenge of ice from a seven foot ice field in the Arctic --- and did not want to believe that it was impossible."

Lord Mountbatten subsequently briefed Mackenzie and the NRC President went on to argue that -- as much as we appreciate the great need for it, it was impossible for us to do what the Prime Minister asked for. I told him that there was no place where one could get a seven- or eight-foot thick ice field and that you could not possibly freeze eight or ten feet of ice a day.

Nonetheless, Churchill asked Prime Minister Mackenzie King if Canada could undertake such a project and a mission was subsequently sent in 1943, led by Pyke and J.D. Bernal (a leading crystallographer in the UK). Several designs were constructed and a prototype was eventually built. Mackenzie's diary summarizes the situation:

The constructional aspects are almost overwhelming. The rates of freezing are, I think, much below what the United Kingdom scientists hoped for and I am of the positive opinion that the present time schedule certainly cannot be lived up to and it is even possible that the thing can never be built...

He was prophetic. The Habakkuk prototype lies at the bottom of Patricia Lake today in Jasper National Park. An underwater plaque at the site notes its part in World War II history.

(quotes are sourced from Highlights from the C.J. Mackenzie Diary -- Selected and Edited by Paul A. Herzberg, 2017)

Learn more about Project Habakkuk, the "secret ship made of ice"
Herzbergs, Polanyis and McDonalds - Oh My! …

It's Nobel Week!

The 2017 Nobel Week has come and gone for science. You may have noticed that 2015 Nobel Physics Laureate Art McDonald was an honoured guest two weeks ago for both the announcement of the federal government's new Chief Science Advisor and the science fair for young students hosted by the PM. While Dr McDonald has been Canada's latest Nobel recipient, we have had others of course. Depending on the source, the numbers vary. For example, the Nobel Foundation lists science laureates by country of birth --

12 Canadians awarded in physiology and medicine, physics and chemistry. (https://www.nobelprize.org/)
But some obvious laureates are missing who, while born elsewhere, have had a strong Canadian connection. Hence Gerhard Herzberg (Germany) and John Polanyi (Germany) do not show up as Canadians on the Nobel site -- but we know better.

And then there are Nobel laureates who spent some time working in Canada and went on to other places with their research such as Ernest Rutherford (New Zealand) and Frederick Soddy (UK) both at McGill, and George Olah (US) who, after leaving Hungary, worked initially at Dow Chemical Labs in Sarnia, Ontario before moving to the US.

Less well known are other laureates:

- The Pugwash Conferences on Science and World Affairs (financed in 1957 by Canadian businessman Cyrus Eaton) held its first international conference of independent scientists in his hometown of Pugwash. The conferences received the Nobel Peace prize in 1995.

- Arthur Schawlow, a US citizen born of a Canadian mother and educated at U of Toronto went on to Stanford where he received the physics award in 1981.

- Henry Kroto, born in the UK, was a post-doc at NRC under Gerhard Herzberg, and was awarded the chemistry Nobel in 1996.

- H.G. Khorana, the 1968 medicine laureate, was Indian by birth, but worked at the BC Research Council and supervised a future Canadian Nobelist, Michael Smith, who won the Chemistry Prize in 1993.

Heck, if one were to include such linkages, recipients with a Canadian connection are double the Nobel Foundation count!

At the end of the day, Nobel laureates can give a country with which they are affiliated some inspiration -- and they, like astronauts, are great role models for young scientists and budding researchers.

However, one wonders if nationality in science is increasingly becoming somewhat secondary. After all, according to Alfred Nobel’s will, the prizes are not tied to the boundaries of our nations - but rather meant to be bestowed "to those who, during the preceding year, shall have conferred the greatest benefit to mankind."

For more of this history, see Notes and Biographical Sketches of Nobel Laureates in Science having a Canadian Connection, Ashok Vijh and Paul Dufour, Canadian Chemical News, October 1999
Thirty-years ago, a National S&T Policy was signed by all science ministers of federal, provincial and territorial governments in Vancouver.

The 1987 policy was designed to "bring science and technology fully to bear on the economic, social, cultural and regional development of our country by encouraging cooperation among governments, and between the public, quasi-public and private sectors." It remains the last time the country had such a truly pan-Canadian approach with leadership from a national Council of Science and Technology Ministers established to implement its objectives.

Following the national policy, a major national conference on technology and innovation was held in Toronto presided over by the prime minister, which laid out the platform of the government's "InnovAction". The then Minister of State for Science and Technology gave an address to the House.
The science minister’s address underscored a renewed focus on science culture and pan-Canadian cooperation along with substantively funded joint federal-provincial S&T agreements. He argued:

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*Canadians are coming to understand that our ability to use research and development (R&D) effectively, without delay, has a determining impact on the number of jobs open to us, on Canada’s access to international markets, and on the competitiveness of Canadian industries and Canadian products. We can see new possibilities open to us in realizing national goals with the use of S&T to protect and conserve our environment, to develop a new workplace in which men and women can play equal and important roles, to bridge distances … to unite our vast and diverse land.*

*The provincial and federal governments must work together to forge a coordinated national policy. S&T must move to the centre of government decision-making. The consensus which has emerged identified critical issues which must be addressed immediately. The first has to do with creating a culture in Canada which appreciates and instills pride and celebrates Canada’s scientists, engineers and innovators; which promotes a strong awareness of the importance of Canada today; and in the decades ahead, of astute application of S&T which utilizes the talents of Canadian women in science careers. There is a national consensus that we must urgently develop and use new strategic or … 'enabling' technologies which underpin our industrial capabilities.*

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*I can’t recall another such wide-ranging statement on science and innovation. And action followed.*

The speech presaged a number of initiatives, including:

- a new Canadian Space Agency
- a micro-electronics strategy
- the Networks of Centres of Excellence Program
- a Parliamentary Committee for Research, Science and Technology
- other key programs including a national Public Awareness of S&T Program

The PM would also chair a new National Advisory Board on Science and Technology -- a group of eminent Canadians asked to assess national S&T goals. This board published all of its advice, allowing for an open national debate.

With two federal ministers just returned from the G7 Innovation Week in Italy promoting Canada’s assets and knowledge brand, a short list of regionally-based supercluster candidates, and a newly appointed federal Chief Science Advisor, perhaps a window has now opened to re-engage in national science and innovation leadership at all levels.
Celebrating Canada's 150th with Students on Ice

This week marks the end of a remarkable journey through Canada on an icebreaker.

The Students on Ice C3 (Coast-to Coast-to Coast) expedition of 150 days exploring Canada's diversity, reconciliation, youth engagement and the environment ends in Victoria on Oct 28 after having left Toronto harbour on June 1. For each of the 15 legs of the trip, the Polar Prince has been the home for an ever changing array of musicians, media personalities, researchers, politicians, young ambassadors, and Indigenous elders.

Media coverage has been extensive on each of the legs of the journey exploring the history and development of many of Canada's regions. Blogs and social media feeds have also been available for educators to track the various stopovers, to learn about the country's vast diversity and geography, and to hear some of the powerful stories of the participants.

Experiments on board (with wet and dry labs) have allowed for citizen science to take place on such issues as:

- microplastics along Canadian shores
• barcoding Canada’s **arthropods**
• **algae** diversity and biogeography
• early detection of **marine invaders**
• marine bird and mammal **diversity**

... just to name a few! [Check out all the experiments here.](#)

The expedition visited many communities and traversed the Northwest Passage. On Beechey Island (Iluvilik), in Nunavut, where the Franklin Expedition had overwintered in 1845-46, one of the Inuk Youth Ambassador on the Polar Prince noted that:

"In a way, I understand how important this visit is, because it's showing important history and how significant Inuit are to surviving in the Arctic. **The reason the Franklin Expedition failed was because Franklin didn't use the Inuit knowledge.** He refused to get help from Inuit. Ultimately, this led to their perish... It feels ironic to be here, because it feels like a memorialization to a man who failed. Especially, a man who didn't use the help of Inuit that would have definitely been offered."

At the end of the day, the expedition has been about showing Canadians how their country is evolving and connecting with communities (the other 2 Cs of the C3 expedition).

**Congratulations to Students on Ice!!**

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Did you know?

You may have heard the remains of the Franklin expedition were recovered - HMS Erebus in September 2014 by Parks Canada, and HMS Terror in September 2016 by the Arctic Research Foundation (with the assistance of Indigenous knowledge) - but did you know that the [UK government recently officially donated the remains to Canada](#)? Previously, the wrecks were the property of the UK although Canada maintained custody and control.

**Want to learn more about the C3 expedition? Check out the story in the most recent Canadian Innovation News** (or see below article).
Gender Equity in Science Comes to Montreal -- But Gaps Remain

This week, the North American Gender Summit sponsored by NSERC and Quebec's Fonds de Recherche took place amid a growing renaissance on the gender and science policy issue.

L'Oréal Canada Canada and UNESCO hosted the 15th ceremony honouring research efforts of women in science from Quebec and Ontario. Since they were launched, **65 women from Canada have been recipients of this prestigious award**, which also has a large international component. Canada's science minister was there along with other guests including the new French Ambassador to Canada, the president of the Canadian Commission to UNESCO's Natural, Social and Human Sciences Sectoral Commission and the federal government's Chief Science Advisor -- all women.

In her remarks, Minister Duncan underscored her activism when it comes to increasing the participation of girls and women in science and Indigenous knowledge. And she mentioned some encouraging signs on the equity front for Canada Research Chairs.

Yet... the message has not translated fully within the country's education and knowledge leadership. Some illustrative examples:
• In the history of the Nobel awards since 1901, there have been **no Canadian female Nobel Laureates in the sciences**

• Just **29.6%** of individuals with post-secondary STEM credentials and **26.9%** of those employed in STEM-intensive occupations in Canada are women

• Women hold only **8.5%** of the highest-paid CEO positions in Canada's top 100 listed companies

• In North America, women only receive **4%** of venture capital funding; this number drops to **0.2%** for women of colour

All hope is not lost. There are a number of organizations promoting and empowering women in knowledge sectors, and women themselves are breaking through barriers everyday. Women are starting businesses at **1.5 times** the pace of men, and a recent McKinsey Global Institute report found that **$12 trillion** could be added to global GDP by 2025 by advancing women's equality. Science blogging and journalism about and by women are on the increase as are narratives detailing the power and passion of the sciences and research (in all disciplines) that are making a difference.

**Let's keep pushing forward.**

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*Editor's Note: This is an abridged version of this week's Fast Policy Facts. Read Paul's full opinion piece here.*
The Innovation Summit

**The Date:** November 18, 2002  
**The Place:** Toronto  
**The Event:** National Summit on Innovation and Learning  
**The Players:** 500 leaders in science, education and innovation headed up by Allan Rock, Minister of Industry and Jane Stewart, Minister of Human Resources Development  
**The Keynote:** Jean Chrétien, Prime Minister

Almost exactly 15 years ago, this Summit laid the groundwork for the Liberal approach to innovation and skills development. It still resonates today. In his keynote the then PM laid out a five-point action plan:

1. **Make Canada a learning society and develop a Canadian Learning Institute**
2. **Become a knowledge society that invests in ideas**
3. **Improve how ideas are brought to market, and create clusters that link those who produce and those who apply knowledge**
4. **Work together on smart regulations to spur innovation**

5. **Draw on Canada's diversity of talent, and implement an urban strategy to help create a quality of life in communities to ensure Canada becomes a magnet for talent and investment from all over the globe**

The two industry and human resources ministers added several other initiatives including renewing the Advisory Council on Science and Technology, as well as an emphasis on an inclusive workforce with attention to more skilled trades and apprenticeships training and increasing Aboriginal participation in the labour force.

These initiatives built on the February 2002 release of Canada's Innovation and Achieving Excellence skills strategies with participation of and consultation with over 10,000 Canadians who attended regional and sectoral meetings, and expert roundtables and workshops.

**The beat goes on...**

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Want to investigate further?

Read the summary of the November 2002 National Summit on Innovation and Learning or check out the original 2002 Innovation Strategy, presented in two papers:

1. **Achieving Excellence: Investing in People, Knowledge and Opportunity**, which recognized the need to consider knowledge as a strategic national asset and focused on how to strengthen Canada’s science and research capacity while ensuring that this knowledge contributed to building an innovative economy.

2. **Knowledge Matters: Skills and Learning for Canadians** sought to recognize that a country's greatest resource in the knowledge society is its people. It examined Canada could do to strengthen learning, develop people's talent and to provide opportunity for all to contribute to and benefit from the new economy.
Of Aibo, AI and Automation

There is a new buzz on the science, technology and innovation policy scene. At least, it has that smell. But of course, the latest trend to examine and invest in AI and automation has many antecedents both here and abroad.

In Canada, much of what we are seeing today in this arena emerged in the early 80s when think tanks like the Science Council and Economic Council of Canada were assessing impacts of emerging technologies - especially computers and automation - on the labour force, the industry sectors, education and the production of new talent.

1982 ==> The SCC's report Planning Now for an Information Society laid out a host of recommendations aimed at preparing Canadians for the next big thing. Predictions to 2000 included:

- **smart highways for semi-automated driving** (still working on that one!)
- **most homes having computers** (good guess!)
- **computer-assisted medicine extending to the home** (not quite!)
- **robots and automated systems producing half of all manufactured goods** (well on course!)
1986 ==> A large-scale National Consultation on Emerging Technologies looked at Canada's strengths and leaders in these disruptive technologies and identified AI, fiber optics, advanced polymers, among others, where the country was under threat from brain drain or global competition. Issues of privacy and computer-aided learning in schools were also raised (sound familiar?).

1987 ==> Meanwhile, the Economic Council was exploring a series of issues centred on automation and workforce adjustments. Informed by a large survey of automation in Canada, its 1987 Making Technology Work statement explored several issues, including the impact of new technology on women and the workforce arguing that for technological change to be successful, Canadian must innovate on two fronts. Success depends as much on innovations in organizations and the development of human resources as it does on technical expertise.

A revival of these issues is taking on a new meaning in a pan-Canadian context with much at stake for Canadians as our culture, education, society and industry face new challenges mediated by a fast-paced technological and globally connected world. Policy is having a hard time catching up.

There is a definite need for an over-the-horizon, anticipatory approach to this through new networks of research excellence - social as well as technological.
How STIC May Become Unstuck

10 years ago, the Harper regime appointed an advisory council... the Science, Technology and Innovation Council, often referred to as STIC.

It was tasked to provide the government with confidential, timely and evidence-based advice on STI policy issues that advance Canada's economic development and societal well-being.

Despite the occasional report on the state of science and innovation, the council essentially operated in secret; the Canadian public knew nothing of its advice nor of its influence. As is often the case with such bodies, there has been no evaluation made public. The STIC web-site - on the ISED link with two-year-old information - still lists its membership. What the STIC is doing remains opaque.

The 2017 expert panel on Canada's Fundamental Science Review has recommended that STIC be replaced with a National Advisory Council on Research and Innovation. The council would be comprised (like STIC) of distinguished individuals from a broad cross-section of the
country's academe, society and economy, with the newly minted Chief Science Advisor serving as Vice-Chair.

The Council would:

- advise the PM and Cabinet on federal spending
- provide broad goals and priorities for research and innovation

Some other responsibilities could include:

- public reporting and outreach on matters determined by the Council
- a foresight function
- liaison with parallel global, provincial and territorial bodies as appropriate

It is the nature of new governments to appoint their own advisory councils, so we should not be surprised if the Trudeau administration names such a body with a different acronym. Perhaps it will re-appoint members from the old STIC, and keep the same Secretariat in ISED. Maybe the Council will be asked to undertake special requests from the PM or other Ministers in the Cabinet.

Nonetheless, it would prove more helpful to Canadians if an assessment were provided of the old STIC along with an overview of the success and/or failure of previous such bodies. Given the government's mantra of using evidence to inform decisions and its rhetoric surrounding "deliverology", taxpayers have a right to know more about what has worked and what has been learned before launching into yet another advisory council with eyes wide shut.

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FAST STIC FACTS

- Started in 2007
- Formed through the collapsing of the Advisory Council on S&T (ACST), the Council of S&T Advisors (CSTA) and the Canadian Biotechnology Advisory Committee (CBAC) into one council
- Originally reported to the then Ministry of Industry
- Was intended to consolidate roles and responsibilities for S&T advice
- Included multiple sector participation including academia, private sector and government

What to Dive Deeper?

Learn more about the formation of STIC in RE$EARCH MONEY:

Plan aims to bring alignment, coherency and business perspective to S&T spending (R$ Vol21#9, May 31 2007)

Howard Alper tagged to lead new Science, Technology and Innovation Council (R$ Vol21#10, June 18 2007)

New advisory council membership has regional and sectoral diversity (R$ Vol21#16, October 29 2007)
In 1978, Wilfred Eggleston published *National Research in Canada: The NRC 1916-1966* - a must read for those interested in the history of the organization in Canada. Previously, he was secretariat for the 1937 Rowell-Sirois Commission, before becoming Chief Censor of the nation in 1942 to combat negative coverage of Canada's role in WWII at home and overseas. He resigned from government work in 1944, deciding to focus instead on academia, eventually establishing the Carleton School of Journalism.

**Tracking Science Policy Over the Decades as 2018 Beckons**

As we look forward to 2018, it is perhaps time to remind ourselves what has transpired over the last 50 years in Canada's S&T Policy landscape. Let's take a trip down memory lane...

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*1968*

- Lamontagne Senate Committee on Science Policy begins its work (four volumes to be published over 9 years)

- The Science Council of Canada produces its 4th report -- *Towards a National Science Policy for Canada*
- - - - - - - ----> 1978

- Wilfrid Eggleston publishes a 470 page history of the NRC (1916-1966)

- Raymond Duchesne publishes *La Science et le Pouvoir au Quebec* (1920-1965)

- The federal government releases a seven-point science policy -- *Measures to Strengthen and Encourage Research and Development in Canada* (one unrealized measure? That Canada aim for a target of 1.5% of GERD-GDP by 1983)

- A Federal-Provincial Conference of Ministers on Industrial R&D is held in Toronto

- Establishment of NSERC and SSHRC

- - - - - - - ----> 1988

- OECD publishes *Innovation Policy on Western Provinces of Canada*

- PM Mulroney hosts the National Conference on Technology and Innovation in Toronto

- *Networks of Centres of Excellence* (NCE) program launched

- - - - - - - ----> 1998

- The *Canadian Biotechnology Strategy* ([summary here](#)) re-launched from the 1983 version, accompanied by the creation of a new *Canadian Biotechnology Advisory Committee* (CBAC)

- *Mitacs* established as an NCE

- *CIHR* and *Genome Canada* emerge through respective task forces

- - - - - - - ----> 2008

- *Office of the National Science Advisor* eliminated along with Council of S&T Advisors and CBAC

This selective chronology is only a snapshot of what has been explored and developed -- no doubt, there is a lesson or two to learn here.
The 2017 SciPolicy Quiz

2017 was quite the eventful year! From a policy perspective, there is a lot to consider.... Evidence is back on the agenda and science advice is now considered an industry, but our government's capacity is still in question.

Branding is somehow back and, of course, selfies matter. Inclusive innovation and gender equity are growing priorities. The Arctic is ever important, and now so is weed. And if you hadn't heard, traditional knowledge counts. If we had to sum it up we'd say 'complicity' is the word of the year -- though 'fractured' might be a better one.

Hard to trump all of this. But take a stab at the 2017 quiz!!
The now iconic cover of Action Comics #1, the first appearance of Superman, created by the US-Canadian team of Toronto-born Joe Schuster and American writer Jerry Siegel

Before "Innovation": A retrospective on Canada's approach to improving our knowledge economy

Happy New Year to all our friends in the Canadian innovation community and elsewhere. With the federal government's Innovation and Skills Plan moving into high gear and a new federal budget just over the horizon, all of us are ready to tackle the next 12 months with gusto. While we gear up, we thought it would be fun to take a look the other way. Over the next several weeks we will be looking into the past of STI policy in this great country, decade by decade.

Let's look together at where we were to see how far we've come.
We start in 1938…

1937-1938: The Royal Commission on Dominion-Provincial Relations examines the state of the Canadian economy and federal-provincial relations, including the organization of research in Canada.

19 March 1938: The National Research Council of Canada presents a paper to Chair of the Commission, W.D. Euler, (also Chair of the Privy Council Committee on Scientific and Industrial Research) which concluded by saying:

• The need for research in Canada is so great that there is ample scope for all that can be done by national and provincial bodies, the universities and industry
• The systematic organization of research on a large scale requires as a basis a survey of natural resources, industries and research facilities, and a study of national economy in relation to the world situation
• Fundamental scientific research is the basis of industrial research, and the chief responsibility for it rests on the universities and national research organizations
• The selection and training of research workers is a continuing task of the first importance

Even now, eighty years later, fundamental scientific research is as important a topic as ever:

Pressure grows to increase support for fundamental research, tie funding levels to demand (R$, Vol 31 #4, April 19, 2017)

Basic science needs better oversight and coordination, and more money (R$, Vol 31 #4, April 19, 2017)

27 June-2 July 1938: The American Association for the Advancement of Science held its annual meeting in Ottawa for the first time and last time. During the conference, which was in its 102nd year, 466 papers were read and 1104 eminent scientists were in attendance. A special symposium was organized on the history of science in Canada with a book edited by H.M. Tory (as Chair of the AAAS History of Science Section).

July 29, 1938: The July 29th, 1938 issue of Science magazine opines of the AAAS meeting:

... that the association is American in the broad sense of the word could not be better illustrated than it was in Ottawa. The meeting was not international; it was simply American. The science was not Canadian or United Statesian; it was just science, even though the subject was some geological or biological problem of one or the other of the countries

The issue makes for an interesting read. Check out the original copy of the 1938 Science magazine here.
So… what else happened in 1938, you ask?

- Orson Welles's radio adaptation of *The War of the Worlds* is broadcast, causing mass panic in the eastern United States.

- Enrico Fermi is awarded the Nobel Prize in Physics for the discovery of new elements related to the yet unidentified fission process.

- The Man of Steel, Superman, makes his debut into the public consciousness in Action Comics #1... and one of the creators is Toronto-born Joe Schuster (Canada Post released a stamp a few years ago for the 75th anniversary)

- The March of Dimes, a non profit organization in the United States dedicated to fighting polio is established. The organization would go on to be instrumental, appointing Dr. Jonas Salk in 1949, to develop the polio vaccine and saving millions of lives.
The first Polaroid Camera, invented by Edwin Land, came to market in 1948. The Polaroid camera was instrumental in making photography accessible to the masses and eventually leading to the camera-phone filled world we live in now.

Before "Innovation": A retrospective on Canada's approach to improving our knowledge economy Part Two

Over the next several weeks we will be looking into the past of STI policy in this great country, decade by decade. Let's look together at where we were to see how far we've come.

We move forward now to 1948...

NRC Prairie Regional Laboratory: The NRC Prairie Regional Laboratory is established in Saskatoon to develop alternative uses for Western Canadian crops in an effort to minimize waste and to increase profits.

The Laboratory, in collaboration with Agriculture and Agri-Food Canada, helped revolutionize the usage of a minor crop (rapeseed), turning it into edible canola - now a household staple and one of the jewels in Canada's innovation crown. Previously, the plant was not considered particularly valuable by farmers, its primary usage being for industrial lubricant.

Today, the canola industry contributes more than $11 billion a year to the Canadian economy, second only to Canadian wheat.

Check out this news release for more of NRC's Ag-Biotech history
Find out how Canadian researchers continue to innovate in canola (R$ Vol 29.4, March 13, 2015)

**A new Minister of Trade and Commerce:** Clarence Decatur Howe is appointed the Minister of Trade and Commerce by then acting Prime Minister Mackenzie King. Howe jumps at the opportunity after a tenure at the Ministry of Reconstruction and Supply, which he did not enjoy. The account is detailed in the book *Canadian Science, Technology and Innovation Policy: The Innovation Economy and Society Nexus* by Doern, Castle and Philips (2016).

The Prime Minister was urged by many of his staff to transfer Howe and after much prodding, he finally acquiesced. James Angus MacKinnon, then the Minister of Trade and Commerce, was moved so that Howe could occupy his place. Howe declared that he would not stand for the leadership and offered his support to St. Laurent.

St. Laurent would go on to lead the Liberal Party in August. Mackenzie King resigned officially on November 15th, 1948.

**August 1948:** Gerhard Herzberg arrives from the University of Chicago Yerkes Observatory and reports for duty at NRC. NRC President C.J. Mackenzie wrote in his diary (selected and edited by Paul A. Herzberg, 2017):

*Dr Herzberg was in. He had arrived on August 9 with his wife and family. He is settling down nicely and should be a great asset to the NRC.*

Herzberg went on to win the Nobel Prize for chemistry in 1971. Not bad!

**So... what else happened in 1948, you ask?**

- The First Polaroid Camera goes on sale at the Boston Jordan Marsh department store for $89.75. Today, that would be equivalent to almost $900.
- The World Health Organization is established on April 7th, 1948.
- The United Nations General Assembly adopts the Universal Declaration of Human Rights on December 10th in Paris.
- The game of Scrabble is introduced by James Brunot, a resident of Newtown, Connecticut. The game was invented a decade earlier by architect Alfred Mosher Butts but it is Brunot and his colleagues who purchased the rights to the game and made it a household name.
- P.M.S Blackett of the UK receives the 1948 Nobel award in physics for the development of the Wilson cloud chamber method.

In his Nobel Prize acceptance speech of Dec 10 in Stockholm, he notes that:

*"It is impossible to put the clock back - Machiavelli in his day could not stop the technological development which produced fire-arms - nor could Alfred Nobel stop those that followed his discovery of dynamite - nor can we stop the development of atomic energy. Technological progress and pure science are but different facets of the same growing mastery by man over the force of*
nature. It is our task as scientists and citizens to ensure that these forces are used for the good of man and not for their destruction."