

## **GOVERNING IN THE DARK: EVIDENCE, ACCOUNTABILITY AND THE FUTURE OF CANADIAN SCIENCE**

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It is a great pleasure to be here tonight at the invitation of Situating Science as part of the “Lives of Evidence” series, to say what I am sure you all hope will be only a few words about evidence, accountability and the future state of Canadian science and democracy. An ambitious canvas, certainly. And because I am an indifferent artist, I am afraid you will have to be content with a couple of tentative, and manifestly amateurish, daubs.

I will begin by putting several cards on the table. I’ll begin with the science card.

I am a scientist. Why? Three reasons. The first is rather selfish: science is, perhaps, the ultimate intellectual challenge. Convincing Nature to reveal her most intimate secrets is a hugely seductive enterprise. The Eureka moment in science is (I have it on good authority) intellectually orgasmic. Perhaps this is the reason so many of us are so bewitched by our craft.

The second reason is less organic, but equally compelling. Just like everyone else, scientists embrace a wide range of values like good health, economic prosperity, clean water and air, and social justice and equity. As Francis Crick noted, science is indeed a mad pursuit, but it is a pursuit of the knowledge that is necessary to sustain these values.

But the most important reason why I am scientist is attitudinal. Science teaches us – or rather, ought to teach us - to be skeptical – even about our own science. It teaches us to ask: what is the evidence to support that claim or, in the vernacular of science, that hypothesis? For scientists what matters is not talk, but evidence.

Let me put another card on the table.

I believe in science-informed decision-making. In fact, so do all of you. Every conscious action you take is based, in part, on your expectations of the consequences of the action. In science, these expectations – what we call predictions - are simply what we expect to observe if our explanations – our causal hypotheses – are correct.

For example, suppose I get up at night to use the bathroom, flick the light switch and nothing happens. Being a scientist, I am immediately led to wonder why the light doesn’t work. One possible explanation is that the bulb is burnt out. I can test this hypothesis by doing a simple

experiment: I replace the old bulb with a new one. If the hypothesis is true, the light should now work.

All of you have done precisely this experiment, probably dozens of times. In doing so, you are doing science. Indeed, as pointed out almost a century and a half ago by Thomas Henry Huxley there is nothing exalted about the scientific method – it is, in fact, merely the normal working of the human mind. We are all of us practicing scientists, whether we recognize it or not.

Let me put a third card on the table.

I believe that the goal of “Peace, order and good government” enshrined in Canada’s constitution depends critically on the gathering, careful evaluation, and appropriate use of evidence by government.

Laws, regulations and policies are attempts to manage human behavior to achieve some goal consistent, one hopes, with the public interest, in the same way that physicians attempt to manage disease so as to improve patient well-being. Clinical treatments are founded on scientific hypotheses about the causes of disease. Effective disease management depends critically on the validity of the hypothesis about what caused the disease in the first place, that is, on the proper diagnosis. If the diagnosis is wrong, the treatment usually fails.

So it is with policies and laws. All such instruments are based on – usually implicit – hypotheses about the factors determining human behaviour or its consequences. Suppose, for example, I want to reduce drug-related crime. I might believe that people commit drug-related crimes because, in part, existing punishments are insufficiently severe to deter them from so doing. If this hypothesis is correct, then stiffening punishment by, for example, introducing minimum mandatory sentences, should result in reduced rates of drug-related crime. On the other hand, if the hypothesis is false, it won’t.

So if laws and policies are, fundamentally, based on causal hypotheses, there at least two obvious questions that should be asked. First, what is the scientific evidence that these hypotheses are indeed true? Second, insofar as their success depends on these hypotheses being true, should we not perhaps give some thought to the consequences if they are *not* true? After all, as Lord Bolingbroke observed, while truth may indeed lie within a narrow and certain compass, error most certainly does not.

Many share this view. In a 2011 article published in the Toronto Star, Allen Gregg, former Conservative polster and chair of Harris/Decima, noted:

“More than anything else, societal progress has been advanced by enlightened public policy that marshals our collective resources toward a larger public good. Over time, we discovered that effective solutions can only be generated when they correspond to an accurate understanding of the problems they are designed to solve. Evidence, facts and reason form the *sine qua non* of not only good policy, but good government.”

Mr. Gregg’s rationale is straightforward. Decisions that are supposed to help resolve a problem are more likely to be successful if they are informed by evidence about the nature of the problem and the likelihood of success of alternative solutions, than if they are not. How could it be otherwise?

Let me put still another card on the table.

Thomas Jefferson believed that democracy demanded an educated and informed electorate. So do I. Jefferson is as right today as he was in 1776 – arguably even more so. Uninformed opinion is, as Harlan Ellison noted, the scourge of democracy. Even in these troubling times of a pervasive and corrosive sense of entitlement, nobody is entitled to be ignorant.

There is a political mindset, dating back at least to Disraeli, that politicians ought not to retract, apologize or explain. Science may have little to say about apologies, but the notion that one ought not to explain is, from a scientist’s perspective, nonsense.

In fact, it should be nonsense to everyone. Democracy is rooted in the twin principles of transparency and accountability. I would argue that both demand that government decisions, and their justification, be made explicit. Justification means bringing forward evidence that the decision is likely to achieve stated goals, or at least unlikely to lead to undesired consequences. While Canadians may disagree on what goals are desirable, informed opinion demands that all available scientific evidence relevant to the full range of Canadian values, however unpalatable, be presented in unfiltered form, carefully scrutinized and publicly debated. To do otherwise breeds credulity: that way, as William Kingdon Clifford pointed out, not only savagery lies, but madness.

And here, finally, we have arrived at my central thesis. To repudiate evidence-informed decision-making is to govern in the dark. Indeed, there are two darknesses: that of the governors, and that of the governed.

Those who would govern without being appropriately informed by evidence have, perhaps, a path they can feel their way along by virtue of some collective sense or sensibility. Perhaps it is an ideological path. Or perhaps it is a path of political values. But whatever else it is, it is not a path illuminated by the light of evidence.

What about the governed? If they possess this same sense – or sensibility – they too can follow the path. But what if they don't? These poor unfortunates – the ideologically or politically challenged, say - are like the proverbial blind man in a darkened room searching desperately for a black cat that isn't there. If they wish to move other than blindly, they can do so only by clutching at the hands – or the hem, perhaps – of the governors. They cannot see what path they travel, or even whither it leads. To move is an act of blind faith.

Here, then, is the final card that I will put on the table this evening. It is the trust card. But not the blind trust card. Blind faith in government is not only unscientific, it is dangerous. We have seen this movie many times over the course of human history, and the ending is never happy.

What precisely is the trust card, and why it is so important? I will leave this question aside for the moment, and turn to the issues of science and evidence.

Many of us in the scientific community – and indeed elsewhere - are concerned by what appears to be a retreat from the use of evidence in decision-making by the federal government. This trend goes hand in hand with what appears to be a decline in the health of public interest science through minimally benign, and arguably wilful, neglect. This in an institution which is not only one of the principal engines of social progress but, I believe, the taproot of enlightened democracy.

What is the evidence for the declining health of public interest science?

Let's begin with the science done by government. Science capacity is crucial if governments are to adequately discharge those statutory, regulatory or fiduciary responsibilities that depend on scientific information, including environmental protection, the protection of individual rights and freedoms, the construction and maintenance of transportation infrastructure, protection of public health, and the provisioning of effective social services, to name but a few.

Yet the public interest science capacity of the federal government is being eroded. This has taken the form of a long list of federal science-related institutions and programs that have been cut, shuttered or terminated, including the position of the National Science Advisor, the demise of the long-form census, the Polar Environment Atmospheric Research Laboratory, the Ocean Contaminants & Marine Toxicology Program, the Experimental Lakes Area, the National Round Table on the Environment and Economy, the National Council of Welfare and the First Nations Statistical Institute -- the list goes on and on.

Moreover, recent data from Statistics Canada indicate that in fiscal 2012-2013, for the fourth year in a row, federal science and technology funding declined with most science-based

departments and agencies experiencing cuts. Federal intramural research and development spending continues to fall, dropping 3% in fiscal year 2013-2014, contributing to a 13.9% decline over the past four years<sup>1</sup>. Recent estimates suggest that over the past five years, more than 2000 scientist positions have been lost from the federal government, and more are expected as the Minister of Finance attempts to balance the budget by 2015.

The federal government is firmly committed to the perfectly laudable goal of deficit reduction. As such, one might expect that intramural science budgets will decline in line with cost-cutting measures elsewhere. The question is: at what price? Despite a markedly less rosy economic situation south of the border (and an astronomical federal debt) Mr. Obama's 2014 budget plan included a 9.2% increase in federal non-defense R&D spending. These increases reflected Mr. Obama's view that, economic exigencies notwithstanding, investment in federal government scientific research is critical to the welfare of Americans.

So if it's so important, why not let business do it?

Simple. Corporate science serves the interests of the corporation. Even the most zealous proponents of Adam Smith's invisible hand concede that the public interest, and that of the corporation, need not align.

Why not let the academics do it? Academic science is an attempt to understand the workings of the natural world, including the people in it. Its responsibility is knowledge generation, pure and simple. By contrast, a major portion of federal government science is that which directly informs - or rather, ought to inform - programs, policies, laws and regulations intelligently (one hopes) designed to sustain healthy bodies, healthy minds, healthy environments, and healthy economies. This sort of science relies heavily on long-term, systematic and comprehensive monitoring and surveillance, often in partnership with provincial, territorial or First Nations governments: monitoring of our bodies, our air, our water, our transportation infrastructure, our changing demographics, our socioeconomic performance ... the list goes on and on. Only governments have the infrastructure and, more importantly, the fiduciary responsibility, to conduct this sort of scientific research.

It is not just me that believes this. In a recent Environics poll<sup>2</sup>, 73 per cent of respondents considered the top priority of government science to be science in the public interest, including protecting public health, safety and the environment.

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<sup>1</sup> "Decline in federal support for S&T now a long-term trend according to latest data, Research Money Volume 27 Number 12 August 27, 2013.

<sup>2</sup> <http://www.ipolitics.ca/2014/02/19/on-values-ottawa-and-canadians-are-drifting-further-apart/>  
P.O. Box 87004, Ottawa ON, K2P 1X0 613.866.6921 [evidencefordemocracy.ca](http://evidencefordemocracy.ca)

There are other worrisome trends.

Since 2006, there has been an ongoing shift away from federal funding of basic scientific research to targeted research, especially research of interest to business<sup>3</sup>. Between 2007-08 and 2013-14, funding for the three major scientific research councils has fallen by 10, 6.4 and 7.5 percent in inflation-adjusted dollars. For example, since 2008, annual “unfettered” research funding at the Natural Sciences and Engineering Research Council has declined from \$389M to \$321M (in constant 2010 dollars), while “fettered” research has increased from \$268 to \$361M<sup>4</sup>. “Fettered” research is, in this context at least, investigator-driven, “fettered” research is not. Fettered research funding includes funding for NSERC’s Research Partnerships areas, including strategic areas, university-industry-government partnerships, and commercialization initiatives.

The concerns voiced by the scientific community about the shift away from basic research may be having some effect. Economic Action Plan 2014 includes an apparently unfettered – or at least untargeted - \$46M for the three major research councils, representing an increase of 1.7%. What proportion of EAP 2014’s proposed \$1.5B (over 10 years) Canada First Research Excellence Fund will go to basic research is unknown. But by comparison, US Budget 2014 increased funding to the basic research agencies by an average of 4%<sup>5</sup>. Said Mr. Obama:

“We know that the nation that goes all-in on innovation today will own the global economy tomorrow. This is an edge America cannot surrender. Federally-funded research helped lead to the ideas and inventions behind Google and smartphones. That’s why Congress should undo the damage done by last year’s cuts to basic research so we can unleash the next great American discovery – whether it’s vaccines that stay ahead of drug-resistant bacteria, or paper-thin material that’s stronger than steel.”

There is a sentiment in some quarters that basic research amounts to indulging the curiosity of scientists on the public dime. But consider: the modern-day laser is the culmination of decades of work that began with Albert Einstein’s basic research in 1917. The first working laser wasn’t built until 1960, with bona fide commercial applications first appearing in the mid-1970s – five decades later. Yet in 2014, laser technology is everywhere.

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<sup>3</sup> See, for example, the recent analysis of federal R&D funding by the Canadian Association of University Teachers (CAUT) at <http://www.caut.ca/docs/default-source/education-review/educationreview13-1-en.pdf?sfvrsn=2> (accessed January 26, 2014)

<sup>4</sup> For a description of “fettered” research, see footnote 3.

<sup>5</sup> <http://news.sciencemag.org/funding/2014/01/u.s.-science-agencies-get-some-relief-2014-budget>

The laser is one of a host of commercial technologies that, their technological diversity notwithstanding, have two things in common: they were conceived by scientists doing basic research, and they were a long time in gestation.

Science is a rather torturous and convoluted set of paths, with lots of backtracking and blind alleys, with the wellspring of basic research leading, eventually, to many different outflows, one of which is technology innovation. Along the multiple paths, knowledge accumulates, but slowly.

Markets, on the other hand, operate on much shorter time-scales: as the fates of RIM and Nortel attest, technology companies can go from darling to dog in a few years or less. So the market clock ticks comparatively fast, but the clock of science runs considerably slower.

If the only science worth doing is that with commercial value; and that value must be delivered apace with the ticking of the business clock, it follows that governments will invest only in end-of-path research and development. The result is inevitable: the outflow might increase temporarily, but the wellspring soon dries up. No basic research, no technology innovation: it's that simple.

But in fact the real value of basic science lies still deeper.

What is our most valuable natural resource? Oil? Timber? Fish? No. Our most valuable natural resource is creativity and imagination.

Creativity and imagination are born of curiosity. And as E.O Wilson pointed out, the natural world is the natural focus of the inquiring mind. This is the real value of basic – some would call it curiosity-driven - science: to stimulate creativity and imagination and temper it in the crucible of the scientific method. To paraphrase Shaw, real innovation comes not simply from observing things and asking, 'Why?' but rather of dreaming of things that aren't, and asking "Why not?" It is these questions that are, fundamentally, the business of basic science.

If science is to serve the public interest, it must be communicated. Last November, the Professional Institute of the Public Service released the first results of a survey of more than 15,000 government scientists seeking information on, among other things, the communication and dissemination of government science. Its report, entitled the Big Chill, reported that 90% of the over 4000 survey respondents felt that they were prevented from speaking publicly about their scientific work, and more than 1/3 reported having been prevented from responding to questions from the public or the media over the last five years.

This is worrisome. More worrisome still is the fact that nearly one-quarter of respondents have apparently been directly asked to exclude or alter information for non-scientific reasons. Almost half know of instances where their institution suppressed scientific information. Seventy-one percent of respondents believe political interference has compromised Canada's ability to develop evidence-based programs, policies or laws.

The PIPSC survey adds to the growing pile of anecdotal reports of political interference in the communication of public interest science, ranging from restricted or impeded media access to communication policies that constrain the flow of scientific information not only between government scientists and the public, but among scientists themselves. Concerns have been raised by a wide range of institutions including the Canadian Association of University Teachers, the Canadian Science Writers Association, and the Royal Society of Canada. Last May, the University of Victoria's Environmental Law Clinic successfully petitioned Information Commissioner Suzanne Legault to investigate the legality of the government's communication policies.

A compelling case can be made that government scientists ought not to comment publicly on government policy. And there may well be circumstances where the public interest is better served by preventing disclosure. But a government committed to informed public debate should not discourage its scientists from communicating and disseminating their science unless there are overwhelmingly compelling reasons for doing so.

The consequences of impeded science communication are far-reaching. Science is an intellectual crucible that depends both on the freemasonry of, and unfettered communication among, government, industry, NGO and academic scientists. Impede this communication and the blast furnace becomes a brazier. The result? A poorly annealed science, an intellectual ill wind that blows nobody good. My colleague Dr. Jeff Hutchings perhaps said it best: impede the communication of science, and you impede science itself.

My second claim is that we are currently experiencing what might be called a retreat – if not a flight - from evidence informed decision-making. As is the case with the shuttering of public interest science institutions and the termination of public interest science programs, the evidence is extensive and growing. Let me just note a couple of examples.

In Canada, supervised drug injection sites require an exemption from the prohibitions of possession and trafficking of controlled substances under the *Controlled Drugs and Substances Act*. The Act provides for exemption at the discretion of the Minister of Health, for medical and scientific purposes.

In 2008, one such facility, Insite, located in Vancouver's downtown east side, applied for a new exemption. The Minister at the time indicated that he would deny the application. In an effort to keep Insite open, a case was brought before the BC trial court arguing that application of several sections of the *Act* violated the *Charter* rights of InSite clients. The trial judge granted Insite a constitutional exemption, permitting it to continue to operate.

Unhappy with the decision, the Attorney General sought an appeal, which was dismissed. The case eventually wended its way to the Supreme Court, which upheld the decision of the original trial judge and the B.C. Court of Appeal.

Part of the argument advanced by the Attorney General was that harm reduction sites and similar initiatives are not only harmful to human health, they also deepen and prolong addictions. This claim was dismissed by the trial judge, by the appellate court, and by the Supreme Court. Indeed in the view of the courts, the evidence was precisely the opposite. Said the Supreme Court: "Insite saves lives. Its benefits have been proven. There has been no discernible negative impact on the public safety and health objectives of Canada during its eight years of operation,..."<sup>6</sup>

Consider now the demise of the mandatory long-form national census. The rationale provided by Minister Clement at the time was that it was too intrusive. He also suggested that the data from a voluntary national household survey (NHS) would be an adequate substitute.

The response from the professional survey community was immediate, implacable and remorseless. In its view, not only was there was no evidence that a voluntary survey was an adequate substitute, but there was overwhelming evidence to the contrary.

It was here that Mr. Clement made a tactical error that served only to further undermine his scientific (and other) credibility. In an interview with the *Globe and Mail* he claimed that Statistics Canada had itself advised him that the NHS was a suitable substitute. StatsCan, of course, did no such thing. Indeed, the intimation that it had done so led Canada's Chief Statistician, Dr. Munir Sheikh, to resign. In his resignation letter, Dr. Sheikh explicitly repudiated the claim that the NHS could be a viable substitute for the long-form census. And it has not: there are major problems with the NHS data, so much so that Statistics Canada itself has withheld release of important elements due to concerns about data reliability.

Let me conclude with a third example, this time from the natural sciences. As part of the massive 2012 omnibus bill, the federal government amended the Fisheries Act such that, instead of applying to all fish species, the habitat protection provisions applied only to fish that

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<sup>6</sup> <http://scc-csc.lexum.com/scc-csc/scc-csc/en/item/7960/index.do>, s[133]

are “part of a commercial, recreational or Aboriginal fishery or support such a fishery” Furthermore, it affords such protection only against “serious harm”, thereby doing away with the prohibitions on (merely) "harmful alteration, disruption or destruction of fish habitat", despite a wealth of scientific evidence that it is precisely these sorts of activities that put fish species at risk<sup>7</sup>.

According to the Department of Fisheries and Oceans, the rationale for these amendments was that the previous *Act* was too obtrusive, resulted in overlong review periods, and prevented projects from moving ahead. Yet several empirical analyses reported evidence, based on DFO’s own data, that directly contradicted these claims, and to my knowledge, no countervailing evidence has yet been adduced.

I have provided here only some of the evidence consistent with the claims of a decline of federal investment in public interest science and the retreat from evidence-informed decision-making. Much more could be brought.

But I will not belabor the issue. My point is that I believe that neither trend is in the interests of Canadians.

So what might be done? For some time others and I have believed that we need a national organization that advocates for public interest science in general and, in particular, for government decision-making informed by evidence. We now have one: Evidence for Democracy. E4D is a non-partisan organization that advocates for government decision-making informed by the best available evidence, a thriving democracy where citizens are informed and engaged and all levels of government are both – from an evidence perspective at least - transparent and accountable, and a national culture that values both science and evidence.

But more is needed. And I believe that all of us – scientists, politicians and the public - have something to contribute.

What can scientists do? Of course, doing science is certainly important. But the health of the public institutions that allow us to do our science is just as important. Perhaps the declining health of public interest science is partially due to neglect on our part.

I believe it is: we have, collectively, relaxed our vigilance, and it shows.

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<sup>7</sup> [http://myweb.dal.ca/jhutch/publications\\_pdfs/2013\\_hut\\_post\\_fish.pdf](http://myweb.dal.ca/jhutch/publications_pdfs/2013_hut_post_fish.pdf)  
P.O. Box 87004, Ottawa ON, K2P 1X0 613.866.6921 [evidencefordemocracy.ca](http://evidencefordemocracy.ca)  
[evidencepourlademocratie.ca](http://evidencepourlademocratie.ca)

My view is that there is a need for scientists to become vocal advocates both for public interest science and for evidence-informed decision-making. I know this is difficult. It does not come naturally. Many of us feel – with some justification – that our job is to do the science. Period. We fear that by being advocates we will be drawn into politics, thereby compromising our scientific objectivity and credibility.

I assure you that to be an advocate - for anything - is to be political. How could it be otherwise? But political does not mean partisan. Science cannot speak directly to most questions of value, partisan or otherwise. So it cannot speak directly to the issue of whether the goal of, say, reducing voter fraud, is more important than increasing voter turnout; it can, however, speak to the issue of what is less, versus more, likely to achieve either goal.

Nor is being political incompatible with the principles of science – though this charge is often leveled, especially by those of an (epistemologically) crepuscular or nocturnal nature who would prefer to avoid the uncomfortable light of scientific evidence.

What does “being political” mean? For me, it means simply that we apply the scientific method to problems of political import, that is, problems that resonate in the public space. To do otherwise means that we relegate (or resign) ourselves to working on problems about which few people care. But it is precisely these problems which demand rigorous scientific analysis. And if not by us, then by whom?

Nonetheless, caution is required. As David Hume pointed out in 1757, the fact-value distinction is nowhere near as clean as some believe. Nor is science itself value-free – indeed, it is permeated by all manner of values, some obvious, others less so.

How then to avoid political infection? My recipe for prophylaxis is simple. First, declare your values. Second, try - as best you can - to distinguish where facts end and values begin, and recognize that there are gray areas where it is not entirely clear. Third, recognize the limitations of your work, and state them explicitly. Fourth, consider- *really* consider – alternate explanations for your results, and make sure your audience is aware of them.

These are the sorts of issues that judges consider when evaluating the credibility and probative value of expert scientific witness testimony in the courtroom. And so too do Canadians in the court of public opinion.

I also believe that for scientists, a little humility is in order. A number of commentators have argued – cogently, in my view - that science is coming dangerously close to being a new

religion<sup>8</sup>. All science is fallible. And fallibility notwithstanding, there are transcendentally important issues in Canadian society for which scientific knowledge is necessary, but certainly not sufficient, to resolve. Science is, after all, a quintessentially human enterprise, and as such, prone to all the infelicities, peccadillos, errors, biases and serendipities that plague (or bless) any human undertaking.

Finally, recognize that science-informed decision-making does not mean that decision-makers ought not to consider other factors. (Here I might confess that I am growing somewhat weary of hearing from those who, with great earnestness and well-meaning, say to me “Scott, there is more to informed decision-making than scientific evidence!”) Of course there is. So there should be. And to paraphrase D.H. Lawrence: how much worse if there weren’t!

What can politicians do? Three things.

First, if you say you are going to base decisions on evidence, then do so. Show us the evidence that has informed these decisions, and do so on your own volition rather than in response to yet another request under the *Access to Information Act*.

In handing down his decision in a famous legal case in England in 1923, Lord Hewart noted that “... it is... of fundamental importance that justice should not only be done, but should manifestly and undoubtedly be seen to be done.” The same principle applies to science-informed decision-making: if one commits to doing it, then one also commits to ensuring that it is seen to be done. Why? Because a *sine qua non* of science is the independent examination and evaluation of scientific evidence and any conclusions drawn therefrom.

Following the Death of Evidence rally in July 2012, the frequency with which words like “science” and “evidence” appeared in government communiqués and speaking notes took an abrupt upswing.

Less than a month later, in responding to questions about the Northern Gateway pipeline, the Prime Minister asserted that “the only way that governments can handle controversial projects of this manner is to ensure that things are evaluated on an independent basis scientifically, and not simply on political criteria.”

Several months later, again as part of the 2012 Omnibus bill, the government amended the Navigable Waters Protection Act so that only projects potentially affecting a select set of water bodies would be subject to federal review. How was the list of designated water bodies

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<sup>8</sup> <http://www.theguardian.com/science/occams-corner/2013/sep/19/science-religion-not-be-questioned>

determined? According to Transport Minister Denis Label, “That is science talking and we will continue working this way.”

In March 2013, Minister of Natural Resources Joe Oliver advanced the view that President Obama is— on the Keystone XL issue, at least – “driven by facts“, adding “and that’s what drives us as well.”

But saying it’s so doesn’t make it so. So I would say to Mr. Harper, Mr. Label, Mr. Oliver and indeed anyone who claims to be making decisions on the basis of scientific evidence: show us the evidentiary beef! And show us all of it, right off the farm, not after preparation for supermarket shelves.

Second, show Canadians you are serious by putting in place institutions that protect public interest science, or that enhance the role of evidence in government decision-making. Here a number of suggestions have been made. One is to engage members of the scientific community in developing a set of principles and associated criteria for guiding decisions concerning the allocation of federal support for different elements of the research ecosystem, from basic research to technology innovation.

Another is to establish a Parliamentary Office for Science and Technology to assist parliamentarians in understanding the scientific information relevant to decision-making as well as providing oversight on the use of scientific evidence in public policy. Something along these lines has recently been proposed by Kennedy Stewart, the NDP Science and Technology critic, in a private member’s bill currently before the House.

Still another suggestion is the establishment of an independent science audit or report card that would provide regular progress reports to Canadians on the impact of federal investments in science and technology, both public and corporate.

Third and perhaps most importantly, stop treating the public like a bunch of potato heads.

The other morning I was listening to Anna Maria Tremonti’s “The Current” interview with Pierre Poilievre, the Minister of State for Democratic Reform, about the Fair Elections Act. Ms. Tremonti asked Mr. Poilievre why, under the amended Act, Elections Canada was no longer able to run campaigns encouraging Canadians to get out and vote. His response was that since 2003, electoral turnout had been declining despite efforts by Elections Canada to encourage voting. Ms. Tremonti then asked whether he believed Elections Canada’s efforts were causing the declining turnout. His response was that it was clear from the data that their efforts weren’t effective. In a follow-up clarification email to Post-Media news, he said:

“I am not arguing that Elections Canada’s advertising drives turnout down,” “Rather, it fails to drive turnout up, because it does not address the practical obstacles that prevent many from voting.”

It is, of course, entirely possible that without the efforts of Election Canada, voter turnout might be even more abysmal – in which case Elections Canada’s efforts are indeed having an impact. Moreover, the decline in and of itself does not allow one to infer anything about the reason for the decline. Perhaps it has nothing to do with practical obstacles: perhaps – just perhaps – it is because many Canadians feel disconnected, disempowered, or disenfranchised. During the interview, Mr. Poilievre adduced no evidence whatsoever to support his hypothesis that - the marvels of the information age and the ubiquity of the internet notwithstanding - low voter turnout is because Canadians don’t know where or when to vote.

One hears this sort of argument all the time, and it infuriates me. Perhaps those proffering this sort of thing really do not see that such arguments are merely superficially plausible, or have gaping logical flaws, or fly in the teeth of the evidence. Or perhaps they do, but figure that we won’t. Or perhaps they know it, know we know it, and simply don’t care. All three explanations are disturbing, the latter profoundly so.

What can the public do?

First, become one of us – us scientists, I mean. Not a scientist by vocation, but by attitude. Embrace your inner scientist. Be skeptical. Remember that superficial plausibility in no way implies truth, and that absence of evidence is not evidence of absence. Demand evidence – all of it, in unfiltered form - and when it is provided, consider it carefully.

Second, think carefully about the economics of evidence. Remember that it is your tax dollars that support programs and policies designed, we are told, to achieve certain goals: increase employment, protect the environment, enhance human health, and so on. The more evidence that is considered in designing programs and policies, the more likely they are to achieve stated goals and avoid undesired consequences.

Think of evidence as a form of insurance, a comparatively inexpensive yet effective way to ensure that much larger investments in government enterprises are not wasted, that opportunities are not squandered, and that others – such as your children - will not have to shoulder the burden of undesired and unanticipated consequences.

Third, take ownership of science in the public interest. Remember, it is your interest, your values that public interest science is supposed to sustain. Think about what sort of science needs to be supported in order to sustain and enhance these values, for you, your children, and

generations to come. And make those views known, in no uncertain terms, to those who decide the fate of our public interest science institutions.

What is the future of Canadian public interest science? Or of Canadian democracy for that matter?

The title of my talk tonight suggests I might have some ideas. I am sorry to disappoint you, but frankly, I don't.

But I do know at least two things. First, the two are inextricably linked. Second, their fate depends not upon professional scientists, nor upon politicians, but upon those folks about whom everyone talks but nobody has ever encountered –average Canadians.

Earlier I talked about the final card that I would put on the table tonight. It is not the blind trust card. It is, rather, the *earned* trust card. It is, in the words of Ronald Reagan and (apparently) Russian tradition, the “trust but verify” card.

Contemporary society is riven by the malaise of mistrust: mistrust of politicians, mistrust of scientists, mistrust of one another. In legal parlance, the societal presumption has shifted dangerously close to “untrustworthy unless demonstrated otherwise”. If as politicians or scientists, we wish to regain the public trust, we must overcome this presumption by providing, of our own volition, the required evidence. Here at least the evidence is clear: no science, no evidence; no evidence, no trust; no trust, no true democracy.