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RESEARCH ARTICLE

Science Communication and Democracy

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Abstract

It should first be noted that the topic here is science communication and not scientific discourse. A primary scientific discourse is one produced by a researcher for another researcher. Science textbooks fall into this category, and such discourses are generally geared to specific audiences. Science communication, on the other hand, is not aimed at specialists but at a broader, more disparate, audience. This means that communications about science geared to lay audiences and delivered via various types of media, including the printed press, radio, television and the internet (Jacobi, 1999; Schiele, 2001), are received and interpreted in a cultural, institutional and political environment that is broader than the scientific context of the original discourse (Gregory & Bauer, 2003). They also get caught up in issues of professional communication and the general business of media and networks that generate a very heterogeneous social structure. Our focus here is on science communication in the areas of professional communication and media, apart from the strictly educational and cultural fields. This paper investigates contemporary modes of science communication in society. We wish to show that, contrary to the spirit of the Enlightenment, which fostered the free flow of ideas in the public sphere, making it a condition of democratic debate (Habermas, 1978), science communication is today beset by many and varied at-tempts to control it, and which ultimately threaten the relationship between science, an informed public, and the functioning of democracy.

Keywords: Science Discourse, Democracy, Communication, Media and Journalism

Introduction

Knowledge and Democracy

Modern democracies entertain a seminal, and essentially political, relationship with knowledge and its dissemination. In his *Cinq mémoires sur l'instruction publique* (1994), Condorcet analyses how knowledge begets freedom and how shared knowledge is a fundamental safeguard against an absolute monarchy, tyranny and other more modern forms of totalitarianism. Republican and democratic citizenship is practised through voting, and this voting can only have real democratic power if citizens are enlightened by genuine knowledge. Voting is the constitutive tool of democracy, but a vote 'clouded' by ignorance, fanaticism, prejudice, disinformation, propaganda etc. would be a sham democracy. The appropriation, retention, secrecy, concealment, or non-disclosure of knowledge and also its distortion, misrepresentation and deformation are prime obstacles to democracy.

Dewey further pursues this analysis of the relationship between knowledge and democracy, seeing individuals not as isolated but as continuously immersed in social interactions, and thus constituting a 'public'. In this sense, freedom—the essence of democracy — is the opportunity to participate in social and political life, to actively 'live together'. This activity entails a cognitive practice, a process of learning, socially and politically through inquiry (Dewey, 1938). Such inquiry, or investigation, has its roots in the methodology of scientific research, and is akin to inquiry in investigative journalism. The 'public' is invited to be informed, and any appropriation of knowledge runs counter to the exercise of democracy.

Science is Everywhere

In an article entitled 'Ce qu'il faut de culture (scientifique) pour lire un journal quotidien' ('The science you need to know to read a daily paper'), Daniel Jacobi (2005) noted that, while science and technology (S&T) appear in *Le Monde*, they are not major news themes. They are simply mentioned here and there, by chance. This might suggest that science news is getting short shrift, but that conclusion would be misleading. More significantly, Jacobi further shows that 'science and technology

is mentioned almost everywhere' in the paper, 'in keeping with the space they rep-resent in our society'. So, tallying science news coverage by analysing the sections that explicitly write about science does not give an accurate picture. It blurs just how regularly those themes do appear. In fact, S&T are omnipresent in the news-paper, 'in every section without exception. In the social and business pages, and also in those devoted to contemporary art'. In today's world, S&T are everywhere, wrote Jürgen Habermas (1973): newspapers give them vent 'because they infiltrate all the social concerns relayed to their readers'. This implies that reading a daily paper to get information, to understand and interpret, requires a core knowledge of S&T as a basic reference and guide.[1]

The evidence suggests that what we see in newspapers generally applies to the entire media field, resulting as it does from the unprecedented expansion of the means of communication starting in the 1960s, when television went global and became the benchmark *par* excellence of the media world.[2] Media, especially TV, became the realm of choice, where social and cultural realities converge and articulate. Society defined itself in and through the dynamics created by the media, which in turn served as catalysts for social and cultural change. This same period saw the shaping of a communication utopia summarized in the metaphor of the 'global village' (McLuhan, 1962, 1964) — a society recast as informational beings, or 'social beings completely defined by their capacities to communicate socially' (Breton, 1977: 51). Today, the internet symbolizes that recast society. So, it is natural to assume that the diversification of sources, the access to data and the constant interaction through a widening range of traditional media also help to create 'new knowledge areas' that may lead to a

[1] Of course, readers will sort and filter sections according to their interests and spontaneously pick the subjects that interest them, but this does not change the reference to S&T.

[2] The first televised US presidential debate, between Nixon and Kennedy on 26 September 1960, was watched by 70 million viewers. It is considered to have been the turning point: from then on, everything went through television. The second such moment, broadcast worldwide, was the live transmission of Neil Armstrong's first steps on the Moon on 21 July 1969.

'collective intelligence' (Lévy, 1999). In other words, S&T should not only be everywhere in an intensely communicating society but must also openly reflect S&T's own self-generated debates, if only through a cross-control exerted by those involved in the media and networks as if the authenticity of reported facts and the objectivity of debates would be guaranteed by a increasing number of media points and interactions.

Yet, in every society, 'the production of discourse is monitored, selected, organized and recast, all at the same time, by a certain number of procedures that play the role of guarding against its powers and dangers, of managing unpredictable events', wrote Michel Foucault (1971: 10). And this applies today, despite the proliferation of modern means of communication that lay claim to transparency and openness. There is something skewed about producing scientific knowledge whose potential must be channelled and whose would-be risks curbed.[3] We see serious actions being taken to limit the scope of science discourse circulating in the social field. This is short-circuiting democratic debate.

However, explicit control procedures that apply to information such as classified military secrets or industrial and government secrets must be distinguished from implicit procedures. Our focus here is on implicit procedures precisely because they are hidden and conceal 'the why' and 'the how we struggle' (Foucault, 1971: 12).

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[3] For example, the physicists who, with a sense of urgency, worked determinedly towards the completion of the Manhattan Project, convinced that Nazi Germany was also working on the creation of an atomic bomb, were the first to understand that mastering nuclear energy would irrevocably change the course of all human history. Niels Bohr, to mention just one of them, immediately realized that it would be impossible to keep the secrets of the bomb's production because there would be an atomic arms race as soon as the first one had exploded. He vainly tried to convince Franklin Roosevelt and Winston Churchill to reveal the secret once the war was over and to hand over surveillance to an international organization, as he was convinced that a more open world would be less subject to conflict. Roosevelt and Churchill, refusing to reveal anything whatsoever to the Soviets, brushed off his proposal. The Cold War started well before the end of World War II. See Rhodes (1986: Chapter 16).

Thus, the question of communicating science to the general public, from popularizing to publicizing, no longer raises issues concerning the required competency and skills. For many years, researchers queried which means of communication would best convey scientific information to the public. That question no longer applies. Knowledge and know-how are now constantly updated and widely circulated through research and the development of new communication practices (websites, web media, social media, blogs and so on), and training is available on a global scale. Scientists themselves are students of communication, and have included many out-standing writers (Hubert Reeves, Stephen Hawking), interviewers (Etienne Klein) and TV and radio hosts (Jacob Bronowski, Carl Sagan), among others.

The real problem concerns the nature and form of the information being purveyed or which should be purveyed. To distort information or to distract the public from information deprives individuals of the opportunity to make real choices. It withholds their right to make enlightened decisions about their own lives, and to understand the role that S&T plays in an evolving society (Shortland & Gregory, 1991: 6-7, *passim*). Only to the extent that people are informed can they form valid opinions on the nature and value of science. Communicators and scientists are adamant that the exercise of democracy today demands that scientific facts be brought to public attention and critically discussed.

Recent Changes in Science Communication

To understand the current issues affecting science communication, we must ex-amine recent transformations in the written press and journalism in general, and the factors propelling these changes.

Up until World War II, many scientists were helping to circulate scientific thinking and the spirit of science. In the tradition of the great 19th century popularizers, it was normal for many already well-known scientists to share the results of their work with the public at large, and by the late 1940s science had achieved a pinnacle of prestige. In the United States, the Manhattan Project exemplified the power of fundamental

research and led to the creation of the atom bomb (Rhodes, 1986). Based on that contribution to military success, science was expected to serve social and economic progress just as effectively. With the media extolling a positive image of science and with public funding of research, the scientific community sought to enhance its own interests by drawing closer to a media culture that both high-lighted and glorified scientists. During the 1950s, the scientific community began promoting an image of science 'as a guardian of democracy and cultural values' (Gregory, 1988: 77).

While journalism had become a structured profession before the research field did, the science journalist as such really only appeared in any numbers during the 1950s,[4] a more or less golden age for the image of science. Science was grabbing headlines and enjoying ample media coverage. Scientist and writer C. P. Snow (1956) predicted that scientists, and especially the hyper-popular physicists, were key to the future, while literary culture, for all its tradition, would become mired in the past. The space race between the United States and the Soviet Union (after its successful launch of Sputnik, the first artificial satellite) further reinforced a positive perception of science, waiting to conquer the last frontier.

A threefold shift occurred in the late 1960s. First, science journalism became autonomous, asserting its independence at arm's length from science. Science journalists became 'sceptics' in a 'spirit of free inquiry' (Gregory & Bauer, 2003: 48). They began questioning the ability of scientists to speak to the public and touted their own legitimacy as professionals. They saw themselves as the ideal intermediaries between science and the public.[5] As a result, the scientists so accustomed to the spotlight faded into the background (Schiele, 2005). Ill at ease with a TV culture that redefined the rules of media discourse and demanded

[4] Of course, there were journalists covering science as early as the 19th century, but we had to wait until the 1930s for science journalism to become a specialist area. England, for example, had only three science journalists in 1930 (Calder, 1964).

[5] For an idea about the evolution of the relations between media professionals and researchers in television programs on the question of legitimacy, see Babou (2004).

new skills, scientists made their own retreat. Second, science journalists began criticizing scientific development that wrought negative impacts and noted the risks associated with major technological changes that affected social organization, the environment and health. Third, the investigative journalism they advocated took hold in the early 1980s when environmental issues became important social concerns. Henceforth, the media were suspicious of science.[6]

Spurred by the OECD, governments sought to reverse the trend by adopting policies promoting science. Public ignorance was identified as the culprit. Measures were implemented to boost the visibility of science and inform the public, since a better-informed public would embrace science more favourably and more young people would choose scientific careers. This was the premise for programmes developed from the 1980s to the early 21st century and aimed at highlighting science.

That era also marked the beginnings of changes in the press and other media that would transform the journalism profession and with it science communication. Along with, and part of, the economic changes of the time, government's role in science was also evolving. The printed press, which until then had set the tone, now had to contend with TV and was increasingly beset by rapid changes in cultural habits as new communication technologies relentlessly entered daily life. This was accentuated by the increasing convergence of the various media. Daily newspapers were going out of business, and those that remained were restructuring by cutting the number of permanent staff in the newsroom. Science journalists were among the first to go, and many ended up as freelancers (Göpfert, 2003). Observing the effects of this developing cyber-culture, Brian Trench (2007:133) pointed out that 'it is plausible to claim that journalists have been more thoroughly affected by technological change in recent decades than any other occupational group. In

[6] Note that from the 1970s onward, these trends went hand-in-hand with an intense critical reflection on the techno-sciences, which accompanied and often linked up with movements of intense social and political protest (the struggle against military intervention in Vietnam in the United States, protests against energy policy choices in France, the beginnings of the environmental movement following the Club of Rome declarations).

the cross-connection of these processes science journalism is being redefined'. Newcomers from different horizons were entering the field of science communication, which increased the number of sources of information but also served to 'challenge the established mode of science journalism' (Trench, 2007: 133). In other words, the frontiers between different professions were vanishing, and it became harder to distinguish between scientific and quasi-scientific news or to affirm the validity of the scientific stance. The multiple viewpoints about science added to this shift, while the internet became the hot spot where different discourses confronted each other.

More power to Public Relation (PR)

The fields of science and journalism, particularly investigative science journalism, share a common objective — the search for truth. Their approach is based on 'methodical doubt' (a form of scepticism, etymologically speaking), precision, objectivity and, of course, actual demonstration. But their search also requires open-minded-ness and transparency. The term *openness* covers both intentions: to pursue all avenues of inquiry, and to keep an open mind. Scientists therefore demand the right to debate questions freely and without constraint, to advance their goal by finding and signalling mistakes and misconceptions. The famous Lysenko case illustrates a distorted use of science bent on bypassing its own rules (Salomon, 2006). Science journalism, and the media in general, share as an ideal principle the pursuit of truth and seek to apply it to society as a whole. Questions, debates, issues and facts must be brought to public attention as a necessary condition for democracy. And science, like everything of public interest, must be open to debate.

A classic case is the outcry by journalists in France at Minister Emmanuel Macron's announcement[7] that he would include an amendment[8] to the law (the so-called Macron Law) that would protect business secrets and would make journalists who disclosed 'sensitive' information or 'business secrets' liable to fines and imprisonment.[9] The proposed law was roundly denounced by journalists as 'a weapon of mass dissuasion'. This

[7] *Le Monde*, 30 January 2015.

issue pointed up the importance of freedom of expression as crucial to the democratic ideal, and the extent to which it is under constant threat. Several days before the amendment was withdrawn after an overwhelming and unanimous reaction from journalists who declared 'information is not a criminal offence', they wrote:

> Under the Macron Law, you would never have heard of the Mediator scandal or the asbestos scandal, or of Luxleaks, UBS, and HSBC concerning tax evasion, of the hidden strategy of tobacco giants, or again of the Elf, Karachi, Tapie-Crédit Lyonnais scandals, or of the Amésys affair, named after the French company which helped a dictator to spy on his people. And there's more … (*Le Monde*, 28 January 2015)

> After the dramatic 'Charlie Hebdo' events, and the massive demonstration in Paris by two million people to defend freedom of the press and freedom of expression, such a cynical amendment is equalled only by last year's discreetly shelved law, 'a law aimed at reinforcing the protection of journalists' sources'. (*Le Monde*, 30 January 2015)

Note, however, that this is but one skirmish in the battle to control and limit access to information sources and to regulate the circulation of information, all under the guise of economic security!

The weakening of the press, accompanied, as mentioned, by an increasingly concentrated media controlled by large and fiercely competing national and transnational groups, also coincided with an upstart internet, once seen as the spur to an

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[8] 'With this amendment', explained *Le Figaro* on 28 January 2015, 'a judge could be referred to by the company targeted by a journalistic inquiry. The judge would then, like an editor-in-chief, assess the interest or lack of interest of the information in question. If the article or the reporting infringed on a company's industrial secrets, the courts could then stop the publication of an inquiry. Thus it becomes more difficult for the investigating journalists to bring affairs to light. Companies would immediately deploy their new censorship weapon, permitted by the Macron Law, to protect themselves from scandals. Furthermore, journalists who have revealed sensitive information without the authorisation of a judge and the targeted company would incur a 3-year prison sentence and a fine of 375,000 euros.'

[9] 'Business secrets' covers 'non-public information, subjected to reasonable measures of protection' and which has 'economic value'. (*Le Monde*, 29 January 2015).

ever-expanding public space. Both the press and the internet were subject to a re-alignment of science communication practices fomented by an economic discourse that put business at the core of the social project, while at the same time reducing the role of the state, as advocated by the neoliberal doctrine that has increasingly characterized the social model since the 1980s (Harvey, 2005). This explains how:

> After the crisis in the mid-seventies, public representation of science underwent a total reconstruction: this representation is now an industry in itself. Modes of reporting and ways of structuring public attention are now closer to professional public relations than to the journalistic principles, admittedly less modern, of inquiry, education and the dissemination of knowledge. (Gregory & Bauer, 2003: 56).

In a nutshell, the 'public understanding of science' now tended to merge with its 'promotion'. Enter the Macron amendment with its twofold aim: first, to restrict access to sources of information (that is, to control the information allowed to circulate in the social sphere by putting limits on the right to speak, from the science journalist to the whistleblowing blogger) and, second, to let companies and their agents be the sole arbiters of the nature and content of the information they wish to circulate — in short, to put a tight lid on what is said and 'who says it'.

At the turn of the 21st century, Germany had 50,000 journalists and 16,000 re-lationists.[10] Seven years later, there were 70,000 journalists and 50,000 relationists. By comparison, in the United States in the early 1990s, there were 122,000 journalists and 162,000 relationists, while 10 years later the number of relationists had reached 200,000 (Göpfert, 2007: 291). A similar upward trend is evident in England (Bauer & Gregory, 2007). The now-fewer newspapers and their downsized news-rooms (a situation equally affecting television), besides resorting to free sources of information, have often eliminated speciality pages and programmes (health, environment, science, and so on), and increasingly engaged temporary staff or freelancers as

[10] The term 'relationist' is used above all in North America, referring to positions such as communications manager, communications officer and press attaché.

contributors. What's more, the new working conditions oblige journalists to 'deliver in real-time' to tight daily deadlines (Hansen, 1994), without the time and resources to check information, and have encouraged the use of public relations sources. Television journalism has been affected in the same way.

By contrast, relationists can take the time to conceive, plan and orchestrate in-formation campaigns. They have that advantage over science journalists, while for obvious reasons they maintain complex networks of connections by methods that range from providing free entry to conferences, to making exclusive material avail-able, to covering fees and travel costs (Bauer & Gregory, 2007).

Nor is job instability peculiar to science journalism. It is a result of the profound restructuring of employment under the 'new' capitalism (Sennett, 2006; Boltanski & Chiapello, 1999), which forces them to more readily accept such complimentary benefits when they are not holding down several jobs, including that of relationist!

No wonder the public raises questions about the credibility of science communications (Bauer & Gregory, 2007). Some 20 years ago, Dorothy Nelkin (1995: 160), analysing journalists' sense of betrayal by NASA following the *Challenger* space-shuttle explosion (28 January 1986), wrote:

> Fascinated with space technology, reporters had simply accepted what NASA fed them, reproducing the agency's assertions, promoting prepackaged information they received, and rarely questioning the premises of the program, the competence of the scientists or the safety of the operation.

The disaster reminded them of their responsibilities, which they had deferred to NASA's public relations department — responsibilities that are all the more important because science journalists are often the only source of information about science for the vast majority of the public.

But the transformations in the media world do not in themselves adequately ex-plain the ascent of public relations. That rise is part of a broader movement involving both the privatization of research and a reorientation of its aims. Research

now became driven by the potential to capitalize on its results. Innovation took precedence over fundamental research or, more precisely, fundamental research was henceforth geared to innovation. The distinction between applied research and fundamental research became fuzzy. In this new environment, preferment is given to research leading to commercial applications. And funding is granted with a view to creating conditions that push economic development (Etzkowitz, 1983 & 1989) to the detriment of other considerations. Nor are universities immune. Indeed, where science is concerned, they naturally adopt a logic of communication, advertising and public relations (Bauer & Gregory, 2007: 44). Edward Bernays, famously the double nephew of Freud and dubbed the 'Father of Spin', stated right off in 1928 that:

> [The] conscious and intelligent manipulation of the organized habits and opinions of the masses is an important element in democratic society. Those who manipulate this unseen mechanism of society constitute an invisible government which is the true ruling power of our country. (Bernays [1928] 2004: 1)

Bernays is credited with being the first to hit on the idea of turning a potentially disastrous controversy to advantage; that is, turning an obstacle into an opportunity by changing public perceptions. He completely invented 'an apparently disinterested third party, which would serve as a credible intermediary between the public and the subject of controversy and modify how it was perceived' (Baillargeon, 2005: v). In 1917, to support a theatre play that was tackling taboo subjects by speaking openly about syphilis, he set up a scientific committee composed of well-known personalities whose role was to present the theme as educational. He was to use this strategy again in 1917, when it was a case of convincing the Americans of the need to go to war when the majority of the population was opposed. The tobacco industry solicited him in 1929 when seeking to boost sales at a time when women who smoked were frowned upon. Arranged by Bernays, women hired to play militant suffragettes during a demonstration explained to journalists, also set up by Bernays, that their cigarettes were 'torches of freedom' (Brandt, 2007)! The fantastic media impact induced women to start smoking

cigarettes as a way to assert their freedom. The tobacco industry was to recall the expedience of 'third party' and other stalling tactics to distract public attention when researchers established the carcinogenic effects of cigarettes (Oreskes & Conway, 2010).

Today, the third-party strategy has gone a step further with 'astroturfing', which is a big hit on Web 2.0. This practice intentionally creates fake groups to serve hidden interests. They use the web to present themselves as spontaneous citizens' groups defending particular interests (see Boulay, 2015). But what happens when, despite the odds, the scientific community mobilizes and successfully communicates in 'precise' and 'easily accessible' terms the social implications of collected knowledge on the environment and climate (Mann, 2012: 253)?

Suppressing the Production of New Knowledge

Stephen Harper has been elected Prime Minister of Canada three times since 2006. Using the pretext of a need to achieve a balanced budget, he has in nine years completely reversed Canada's environmental policy, systematically undermined research in this field, and gagged scientists working for the government and government agencies.

In 1962, Rachel Carson published her groundbreaking book, *Silent Spring*.[11] In denouncing the indiscriminate use of pesticides and the threat to wildlife and human health, the book helped bring about a global awareness of environmental issues, and the environmental movement emerging at the time was galvanized around a controversy never before experienced. *The Limits to Growth* (Meadows *et al*., 1972), published 10 years later, questioned models of economic development based on consumption and the untrammelled exploitation of natural resources. In 1987, the World Commission on Environment and Development, which advocated a radical change in modes of production and consumption, promoted 'sustainable development', taking into account the environment's capacity to support life and the life-style changes needed (CMED, 1988).

[11] The book was first published in serialized form in *The New Yorker* earlier that year.

Public opinion was being mobilized during these years and Canada, a country whose sheer immensity bespeaks unspoilt nature, took an active environmentalist role in talks resulting in the Kyoto Protocol (1997). It developed policies and supported research aimed at protecting the environment.

One example of such action was the Experimental Lakes Area (ELA) programme set up in 1968. Experiments were conducted on the lacustrine ecosystems of 58 small lakes in northern Ontario. The results of the work on eutrophication spurred the government to enact legislation on detergent composition in 1973. Research into acid rain convinced Canada and the United States to conclude a 1991 treaty on air quality. Research on mercury led the United States to tighten standards in 2011 and led to a global treaty in 2013. Further research efforts examined the effects of flooding, toxic contaminants and other concerns. The ELA programme's results have affected environmental policies worldwide (Smith, 2013). Yet, in 2012, Stephen Harper's government cut off this programme's funding.[12]

It would be naive to think that Harper's decision was motivated by the simple wish to balance the budget. The dire announcement of the end[13] of the ELA programme and of other environmental research programmes included the injunction not to communicate with the media or the public (Smith 2013, Turner 2014: 37). It was all to happen very discreetly. But the news got out. There were inter-national protests by people appalled that a research centre that cost so little and achieved so much should be closed. It's 'what you might expect from the Taliban in Afghanistan', declared Swedish researcher Ragnar Elmgren (Smith, 2013). Another researcher, preferring to remain anonymous, noted that '[t]he bulk of the cuts to scientific research programs come in the Prairie and Arctic regions, which have the most industrial development; the new Ring of Fire, the oil sands, huge industrial projects, it doesn't quite add up'

[12] To ensure its survival, in 2013 the provinces of Ontario and Manitoba took over the funding of this unique laboratory.

[13] It really was a closure, as the government terminated the researchers' contracts.

(Smith, 2013). So that's the upshot: sooner or later, environmental research leads to a fateful duel between public and private interests.

This closure is part of a deliberate strategy to control the production of know-ledge, its impact, the statements of scientists and science communication. The government intends 'to make Canada the most globally attractive country for investment in natural resources' (Turner, 2014). To reach that goal, it needs to minimize the risk of mobilized public opinion. It must snuff out information sources that foment public debate. So it abandons 'responsible management of the environment':

- 'By reducing' its capacity 'to gather fundamental data […] particularly in areas where a lucrative exploitation of resources is expected'.
- By 'downsizing or eliminating offices and organisations' — both governmental and non-government — that 'survey and analyze this data and respond to risk'.
- By attempting to 'seize control of the channels that all these organizations use to communicate their conclusions to Canadian public opinion (Turner, 2014).

Scientific programmes were eliminated by the reassignment or outright dismissal of some 5,332 scientists or other professionals (Nelson, 2013). While those cuts were purportedly justified by the need to reduce costs, this same government allocated a budget of $8 million to the Canada Revenue Agency to audit the accounts of environmental NGOs, claiming that they spent more on political activities than their charitable status permitted. A year and some 900 inspections later, only one miscreant had been found: 'a group campaigning in favour of nuclear disarmament' (Turner 2014). In effect, the government has been muzzling potential sources of dis-sent while simultaneously abolishing or severely limiting the scope of laws aimed at constraining the excesses of private economic interests.[14] 'The Harper Cabinet', concludes journalist Joyce Nelson (2013), 'looks like nothing less than the New Inquisition dressed in a cowboy hat.'

This 'New Inquisition', which looks suspiciously like a new obscurantism emanating from a government blind to the effects

of its own policies, is essentially an ideology that wants only an expedient science, a science subservient to the quest for innovation, whose sole goal is to maintain the 'process of industrial change that relentlessly revolutionizes the economic structure from within, relentlessly destroying the old one, and creating a new one. This process of Creative Destruction is the essential fact of capitalism' (Schumpeter, 2008). This ideology disparages 'citizen science' — that is, a science 'aware of its social responsibilities', one that contributes to the 'knowledge capital and capacity for evaluation that every ordinary citizen can draw on in the domain of political debate and decision-making' (Salomon, 2006: 393). The restrictions imposed on scientists, forbidding them to talk directly to media or speak in public without prior authorization, are part of this desire to control public debate.

As for accessing information sources, the same logic applies to the media. Since 2007, the Media Relations Headquarters, the government's public relations agency, coordinates all media requests. So, for example, after David Tarasick, a researcher who had detected an abnormally large ozone hole and reported the fact in *Nature* (Manney *et al*., 2011), was asked by a journalist for an interview, he replied: 'I am available when Media Relations says I'm available' (Davidson 2012). Similarly, during the International Polar Year 2012 Conference, Environment Canada sent a memo to its specialists, stipulating that:

- If you are approached by a journalist, just ask him for his card.
- Tell him someone from Media Relations will get back to him to set up an interview.
- A Media Relations rep will likely be with them during the interview to assist and record it. (Munro, 2012).

Ever since the Enlightenment, it has been felt that science, and thus today's science communication, must contribute

[14] The list of measures adopted by the Canadian Government can be consulted in *The Canadian war on science: A long unexaggerated, devastating chronological indictment*. See http://scienceblogs.com/confessions/2013/05/20/ the-canadian-war-on-science-a-long-unexaggerated- devastating-chronological-indictment/.

to the public good, and that, in a democracy, it is the duty of government to defend it against all private interests, but now some wish to reduce science simply to a productive role: they want it to relinquish its autonomy and gear knowledge to practicality alone. Similarly, in their view, science communication should refrain from taking a critical stance and be content with fascinating people and promoting scientific vocations. Heaven forbid that it should try to inform citizens!

'Without a science-literate and politically aware populace,' wrote Michael E. Mann, 'there can be no match against well-funded, well-organized groups that place little value on honesty or integrity, that cleverly masquerade denialism as scepticism, and that are more than willing to state their own positions in the most absolute terms, while exploiting and indeed mis-representing the frank admission of uncertainty by those they view as their opponents' (Mann, 2012: 256).

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