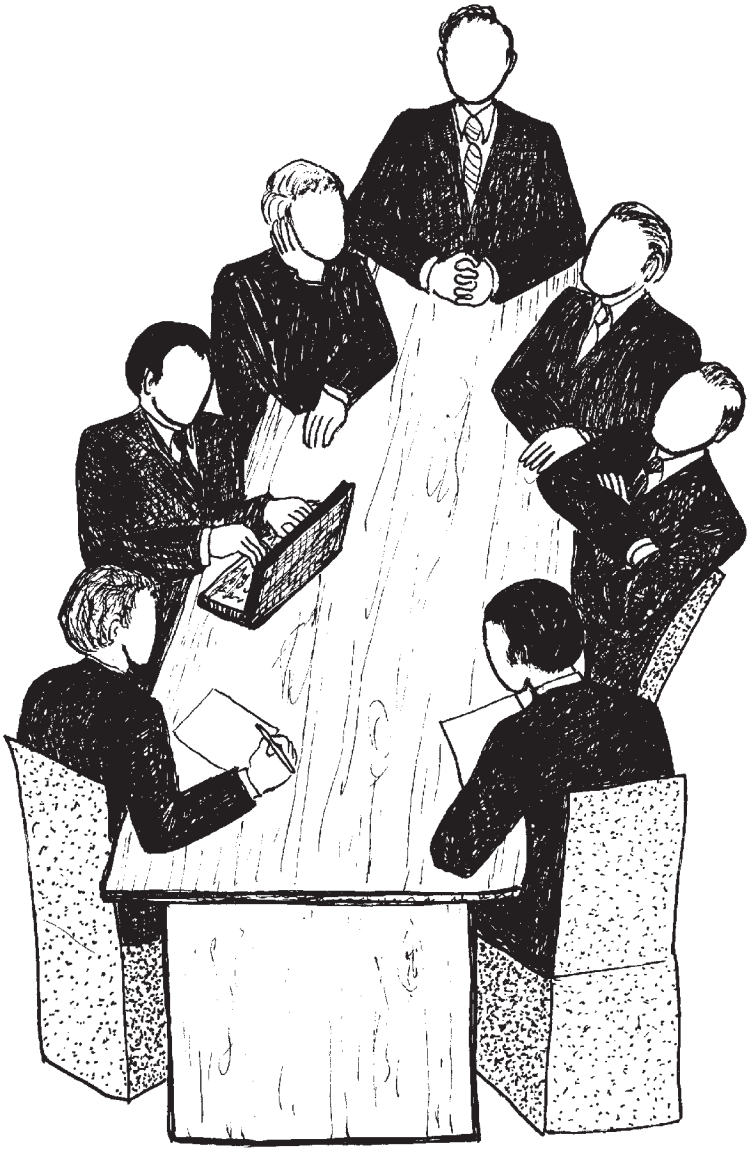
The Real Board of Directors

The Construction of Biotechnology Policy in Canada, 1980-2002



Devlin Kuyek

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The voices of elected officials are excluded. The voices of self-serving non-elected officials set public policy.

Acknowledgements

This book was produced through a collective effort. Brewster Kneen, Cathleen Kneen and I were the central collaborators and a third Kneen, Rebecca, pieced it all together at the end. Alisha Piercy was my constant teammate, lover, and companion. Karl Flecker, Elisabeth Abergel, and Colleen Fuller lent invaluable wisdom and encouragement. Michèle Brill-Edwards gave up many afternoons for long conversations rich with insights that make up much of this book. And so many others – family, friends, and colleagues (some who have passed away, many who are alive, and one that is nearly born) – are responsible for this work, including my Baba and Gido, who drove me to the Kneens' one fateful day.

— DK

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the biotech industry is a big drain on public resources

Introduction

Brewster Kneen & Devlin Kuyek

It's all a matter of context

Gaining the upper hand over nature has long been a project of Western Civilization.

Controlling nature for corporate profit is a more recent elaboration of this project. In recent years techniques of genetic manipulation have been developed enabling capital to gain control of life — plant, animal and human — by inserting the (patented) mechanisms of control within the subject organisms themselves.

Canada has all the trappings of a democracy: an elected parliament; a largely literate electorate; a market economy; more than one political party; local/national/global electronic and print media (albeit owned and controlled by a few corporations and individuals) and freedom of speech. One could reasonably assume that public policy is made by the public, utilizing the acknowledged tools of democracy, in the public interest, particularly regarding something as essential and personal as food and health.

We should expect to find a long record of public debate and parliamentary discussion on issues such as agricultural policy, biotechnology policy and corporate control, as well as a clear record of how the government of Canada and most of its provinces came to be so deeply committed to the promotion and financing of the biotech industry. However, there is no such record. There has been no such discussion, yet it is said that 75% of our food is derived from genetically engineered crops. How did this come to pass?

If not formulated and implemented democratically, how and by whom was Canada's biotechnology policy constructed and implemented? What is the real system of governance of the biotech industry in Canada? Who is the real board of directors and where are they taking us? These are some of the questions addressed in this study.

As thoughtful citizens, we had for some time puzzled over the Chrétien government's aggressive support for the biotech industry when there were so many reasons to back away: the vast majority of Canadians do not want to eat genetically modified organisms (GMOs); there is a good deal of international support, even within the Organisation for Economic Co-operation and Development (OECD), for a precautionary approach; and, most importantly, the biotech industry is a big drain on public resources — only 14 biotech companies in North America are even profitable.[1] So why, at the national and international level, are the Liberals prepared to face the potential political fallout for such a risky and financially unsound industry? We had our suspicions: a revolving door between industry and government and US influence over Canadian policy. But we were also aware that something deeper was going on.

North American materialist culture is strikingly in thrall to technology, which is always presented as mysteriously, if not mystically, emerging

1 Paul Hastings, CEO of Vancouver-based Quadra Logic Technologies, cited in David Paddon, "US biotech industry hotshot takes over as chief executive of Quadra Logic", Canadian Press, December 19, 2001. http://ca.news.yahoo.com/011219/6/fy2e.html

without context as the promise of progress, if not salvation. Technology is 'coming down the road' or, in the case of biotechnology, out of the labs, 'promising' all kinds of 'benefits,' but it is coming at us without agency, out of nowhere, though it is, at times, presented as arising in response to consumer demand for new products. We have been long and systematically conditioned to accept whatever is defined as technology as a means of progress.

Not believing in such magic or mythology, we decided to undertake, through this research, an exploration of the specific human agency responsible for Canada's plunge into biotechnology. To do so, we surmised that figuring this out requires a historical look at the development of this nation's biotech industry and the public policy surrounding it.

We should note at this point (see also footnote 21) that there is a difference between recombinant DNA techniques and other forms of genetic modification that some consider to be biotechnology or 'modern biotechnology.' The definition used by the government says that biotechnology is "the application of science and engineering in the direct or indirect use of living organisms in their natural or modified forms." Throughout this paper, however, 'biotechnology' refers only to recombinant DNA techniques.

The first part of this paper looks at the formative period of the biotech industry and biotech policy in Canada.

By the 1970s, the world's industrial elite had already pegged biotech as the technology of the future; the gene revolution, they believed, would replace the aging chemical revolution. (The atomic revolution never did live up to its advance billing — now it is focussed on irradiating meat and preparing for nuclear annihilation.) But technological shifts are expensive and time consuming and, as history demonstrates, they only come about with massive government investment, usually through the military. Biotech was no different; in the 1980s, governments in the richest OECD countries spent billions of dollars trying to kick start their biotech companies and secure competitive advantages. Where it differs from the chemical revolution, however, is that this government intrusion occurred as governments swept to power calling for a seemingly contradictory return to laissez-faire economics. The new politics are referred to as 'neo-liberal' and they generally involve: increased freedom of movement for capital, goods and services; budget cuts for social welfare programs and budget increases for programs that support industry; deregulation; privatisation of government enterprises, agencies and services; and the elimination or privatisation of 'public goods', such as biodiversity or community practices. The dominance of neo-liberalism, as both the first and second parts of this book will show, has profoundly influenced the development of the biotech industry in Canada and the nation's so-called 'Innovation' policy.

The record reveals that biotechnology policy has been the private domain of a small number of corporate executives, the offices of the Prime Minister and the Privy Council, a selection of senior government bureaucrats (we reserve the term 'civil servants' for those deserving of the title) university presidents and board members of governmental/industry promotion and granting agencies. The persons occupying any one of these positions, we have found, may reappear in

any number of other roles within the same play, either simultaneously or at different times.

Canada was not an original leader in biotech, even though some of the pioneer scientist/entrepreneurs came from Canada and the most important biotech boutiques of the US were set up with funds from a Canadian mining corporation. The story of biotech in Canada begins in the late 1970s and early 1980s with a cadre of scientists at the national research programs and the major universities who were well connected into international developments and were aware of the biotech buzz south of the border. They wanted to get in on the exciting new technology and were convinced that Canada's future economic competitiveness depended on it. Later in the 1980s, the scientists were joined by members of Canada's business elite who shared their enthusiasm, giving rise to a highly connected lobby group capable of putting biotechnology on the policy agenda. It was at this time, in 1984, that the Mulroney government came to power.

Under Brian Mulroney two key developments occurred that brought biotech to the centre of federal policy. First, the Mulroney Conservatives dropped federal support for the generic drug industry, which was deeply tied to the Trudeau Liberal government, in favour of the multinational pharmaceutical industry. Second, the Mulroney government negotiated two free-trade agreements with the US. Both these developments changed the emphasis of Canadian policy towards foreign investment. The role of government would now be to deregulate industry, enforce intellectual property rights (i.e. patents), and subsidize high-technology research and development to attract foreign investment. In addition, the accepted wisdom of the day within the bureaucracies of the West was that scientific advance and economic growth were directly related through a cause and effect relationship. Within this context, Canada's biotech industry became a key sector for the federal government — a necessary example of how neo-liberal policy brings in investment by big multinational firms in high-paying sectors. It also brought the biotech industry deep into Ottawa's corridors of power.

None of this has changed with the Chrétien Liberals. In fact, the government's commitment to the biotech industry has deepened considerably. In the second part of the paper we examine why. What we uncover is that Liberal policy for biotechnology is shaped by a number of factors. As we had originally thought, transnational corporations, particularly from the pharmaceutical side, are well connected in Ottawa. There is also a strong domestic lobby of scientist/entrepreneurs, usually tied to corporations through various contracts, that lobby effectively for biotech. They turn up time and again on different governmental advisory bodies. These scientist/entrepreneurs are joined by big players in the financial sector, particularly those engaged in venture capital, that are connected to government circles and heavily invested in biotechnology. We've also found that there's a culture and a form of organization within the bureaucracy that lends itself very well to the biotech industry's interests. Bureaucrats refer to industry as the 'client' or the 'partner' of government.

All these actors form a web of relations between industry and government that directs policy. While these relations tell us a lot about biotech policy under the Chrétien government, and a lot about the condition of

our supposed democracy, they do not, in themselves, entirely explain why, of all the possible sectors to support, the Liberals have singled out biotech as a key sector for development.

The answer to this question appears to be the same for the Chrétien Liberals as it was for the Mulroney Conservatives. Both governments priorized biotechnology because both governments were and are neo-liberal and both governments are beholden to a big-business agenda. Biotechnology is the technology of the 'new economy', where governments partner with industry to develop 'innovative' industries to keep the country competitive in an increasingly 'knowledge-based' and globalised economy. That's the theory. Ottawa bureaucrats have such blind faith in this simple theory that they have eagerly poured billions of dollars into a money-losing industry like biotechnology, which is terrible at producing anything worthwhile but very good at selling itself as 'cutting edge.' Do they realise, as many in the private sector certainly do, that this commitment to biotechnology is driving the health care system towards privatisation, that it threatens to undermine the so-called food security that we have, and that it limits innovation to the products of a handful of foreign corporations? While a select few do, most do not and are simply doing what they are told to do — carrying out the logic of neo-liberalism to its awful end. On the other hand, the many — the Canadian public — haven't even been asked, even as their resources are spent by the industry-government complex to sell the biotech agenda to them.

The federal government buries the lack of democracy in a pile of rhetoric. 'Transparency' is the current vogue in governmental policy. The regulatory process for genetic engineering is supposed to be transparent. Government decision-making is supposed to be transparent. A lot of material gets posted to the internet and paper copies even get mailed out to noisy citizens. On top of that there are 'stakeholder consultations' to bring into the process those who might arouse the larger public if excluded.

It is assumed that transparency will satisfy the demands of representative democracy. But transparency only means that the public should be able to see how and on what grounds a decision is made. The public remains on the outside looking in. What the public sees, like what the sidewalk superintendent sees when looking through a construction site hoarding, is only what is going on at the moment in one area of the building site. She does not see the boardroom and the individuals at the table making the decisions about what will be built, with what safety considerations, with whose money, or for what purpose. The view for the observer through the peek hole of transparency is not part of the decision making process. There is no inherent democracy in transparency.

The Chrétien government has a strong interest in keeping its biotech policy outside of public scrutiny. Biotechnology creates space for it to justify privatisation, deregulation, and the concentration of wealth in the name of innovation. In this sense, biotechnology not only destroys the integrity of living organisms; it shatters the integrity of our societies. It is our belief that this connection between biotechnology and neo-liberalism should be the focus of the opposition to biotechnology. When federal or provincial governments announce their commitment to

There is no inherent democracy in transparency.

biotechnology they are not just supporting a technology with potential environmental and health risks, they are also taking specific positions that have deep ramifications for our society. The opposition to corporate-led biotech needs to expose these deeper consequences. What does the government's commitment to biotech mean for workers, the poor, the elderly? What does it mean for our health care system? Here, those opposing biotechnology have an excellent opportunity to work with groups, individuals, community organisations or social movements committed to social justice not only in opposing biotechnology but in developing our own visions and capacities for innovation.

A note about 'information'

People often ask why Canadians are so much less concerned than Europeans and others about genetically engineered foods. The answer is quite simple: the industry and the governments have not wanted us to know. It was necessary for the biotech industry to proceed with the implementation of its plans without public interference.

Unfortunately, just as policy formation is regarded as the private affair of business and bureaucrats, so is the information on which public policy should be based. 'Competitive advantage' is the government's excuse for concealing from public scrutiny any information which is considered 'proprietary', i.e., private corporate information. The information it does make available is most often merely public relations propaganda produced by PR firms in collaboration with its industry 'clients.' This, of course, makes public research and debate challenging and difficult, to say the least. Diligent research, however, can uncover surprising explanations for the way things are. This study is offered as a contribution to the necessary public discourse that should be formulating public policy.

April 30, 2002

PART ONE: The Early Years

Baby biotech (1979-1982)

When biotechnology hit the headlines in the seventies, scientists and business leaders were already scheming about the possible commercial applications. As early as 1980, an executive with DuPont proclaimed: "The [biotech] bus is moving … and if you want a ticket you'd better get it now."[2] Initially, most of the hype and activity took place in the United States, but, by the beginning of the 1980s, the message crossed the border, carried by Canadian scientists from government and universities, eager to keep up with their counterparts to the south. By arguing that Canada would miss out if it didn't act quickly, they succeeded in convincing the federal government to commission a Task Force on Biotechnology, which led to the first National Biotechnology Strategy (NBS) in 1983.

Lewis Slotin, who was then a policy advisor to the Ministry of State for Science and Technology (MOSST), is considered the architect of the NBS. According to Slotin, the NBS process began "with one simple objective, and that was to create an awareness in the country that biotechnology was going to be damn important for the future of our competitive position."[3]

The Task Force was a mix of men from academe and industry. It included the Chair, Maurice Brossard of the Institute Armand-Frappier, Robert Bender of ENS BioLogicals (the first Canadian company involved in transgenics), David Clayton of the Pulp and Paper Research Institute, Henry Friesen of the University of Manitoba, Donald Layne of Connaught Laboratories, and Bertram Shelton of John Labatt Ltd. These crafters of the NBS saw in the science of biotechnology an industrial vision. From its very beginning, Canadian biotech policy was an industrial strategy to ensure Canada's competitiveness. According to the Task Force members:

> *Throughout the deliberations the Task Force was well aware of the advantages of a "market-pull" rather than a "technology-push" approach to industrial development. However, the almost total absence of biotechnology industrial activity in Canada necessitated recommendations supporting a technology orientation, at least in the short term, for this country's development of biotechnology.*[4]

Certain aspects of the initial vision have changed over the years. Those behind the NBS initially thought that Canada should focus on biotechnology applications for its natural resource-based industries. The pharmaceutical sector was not immediately seen as a priority given that Canada's pharmaceutical industry was weak and the Liberal government was still committed to a strategy to develop the generics drug industry, based on the compulsory licensing legislation enacted with the 1969 Patent Act.[5] By the time of the first biotechnology task force, the strategy was paying off, with considerably lower drug costs and the rise of two major generic companies — Apotex and Novopharm. These two companies had close connections with the Liberals and, at that point, were more interested in imitation than the development of biotech capacity. Once the federal government, beginning with the

2 Martin Kenney, Biotechnology: *The University-Industrial Complex*, Yale University Press: New Haven, 1986., p.198.

3 Lewis Slotin quoted in Murray Moo-Young and Jonathan Lamptey eds., *Proceedings of Biotechnology Day II*, University of Waterloo, November 6, 1984.

4 Report from the National Biotechnology Advisory Committee, Ottawa, 1994, p.v.

5 Lewis Slotin and Louis Berlinguet in Moo-Young and Lamptey, op cit.

final years of Trudeau's Liberals, began to take on a commitment to biotech, its support of the generics industry and cheap drugs began to deteriorate.

Enter the profit motive (1982-1985)

Biotech exploded onto the US stock markets at the beginning of the 1980s and it was probably then that certain Canadians began to see the potential pot of gold. Indeed, it was a Canadian mining company, INCO, that financed the first big biotech venture companies in the US and it was a graduate of McGill University, Ron Cape, who provided the brains behind Cetus, one of the US's top three biotech pioneers.

As in the US, Canada's biotech entrepreneurs have emerged from academe. Martin Kenney's study of the biotech-university complex in the US in the 1980s revealed an unprecedented linkage between industry, universities, and public research, that is equally applicable in Canada.[6] The biotech nexus was initially confined to a few biotech ventures (namely Connaught, Allelix, and BioLogicals), the universities of Waterloo and Guelph, and public agencies such as the National Research Council (NRC) and the Canadian Development Corporation (CDC). But interest was bubbling across the country and this was the period where the federal government and some provincial governments made their first big commitments to the industry and where the stars of the Canadian biotech scene made their names. In fact, as this document will demonstrate, the names that pop up during this period are, in many ways, still running the show.

The initial hesitation to support Canadian biotech efforts in health care rapidly diminished with the participation of representatives of the non-generic pharmaceutical industry on the Task Force. The first National Biotech Advisory Committee of 1984 was stacked with people from the pharmaceutical research side, including the Chair, John Evans of Allelix, and Jim Friesen and Donald Layne of the University of Toronto/Connaught. Furthermore, Slotin had moved over to the Medical Research Council and Brossard was now with the National Research Council, while both he and a new representative from the Institut Armand-Frappier were on the NBAC. The Institut Armand-Frappier, based at the University of Quebec, was one of the leading research institutes engaged in biotech-pharma at the time.

The first big guns to emerge in the biotech industry were the pharmaceutical companies Connaught and Allelix.

Connaught

The Connaught Laboratories was established in 1914 as a self-supporting, non-commercial part of the University of Toronto. In the 1920s it became the world's leading supplier of insulin after Fred Banting gave it the exclusive rights to his patents on insulin. It the 1950s Connaught played a critical role in the development of polio vaccines and became one of the world's leading suppliers. In 1972 the University of Toronto sold Connaught to the Canadian Development Corporation (CDC).

William Cochrane was the key person behind Connaught in the 1980s. In the late 1960s he became the first Dean of Medicine at the University of Calgary. In 1973 he left the university to become the Deputy

6 Kenney, op cit.

Minister of Health in the Alberta government only to return a year later to take over as President and Vice Chancellor. He remained at the university until 1978, when he became Chairman, President and Chief Executive Officer of Connaught Laboratories Ltd. Cochrane joined the NBAC in 1984 and became Chair in 1988.

Connaught's early biotech program was financed through NRC's Program for Industry/Laboratory Projects (PILP). At that time, the General Manager of the PILP program was John Vose. According to him, PILP approached Connaught in the early 1980s with funds to create a recombinant DNA team, and Connaught quickly put together a team led by Dr Michael Klein of the Toronto Western Hospital. [7] A few years later, Vose himself went to work for Connaught.

Allelix

Allelix was a biopharmaceutical and agriculture biotechnology company that grew out of research at Connaught Laboratories. It was similarly blessed with generous funding from the CDC. One former Connaught researcher describes the situation in those days as a "revolving door between Allelix, Connaught and Cangene [another early biotech venture]."[8] It was established in 1983 with $90 million[9] in capital by the CDC (50% share), the Ontario Development Corporation (20% share) and John Labatt Ltd (30% share). At this stage, some Canadian 'blue chips' such as Labatt were interested in biotech and, besides funding ventures, participated in big biotech gatherings and influential committees and advisory bodies. Labatt even had a representative on the Federal Task Force on Biotechnology. Graham Strachan, of Labatt, was proud of the government's support for the company's venture into biotechnology: "We have used a lot of government money. I make no apology for it … We've used IRAP [Industrial Research Assistance Program] money, PILP money, Agriculture Canada contract development money . . . and quite frankly, we'll use any other form of liberating legitimate government money we can get our hands on."[10]

John Evans, a past-President of the University of Toronto became the CEO of Allelix, Graham Strachan of Labatt became the commercial director, and Derek Burke became Vice-President. All three continue to be extremely influential proponents of biotechnology. Burke was appointed to the House of Commons Select Committee on Science and Technology. John Evans (see below) and Graham Strachan have been pillars in the development of biotechnology in Canada and both have served as chairmen of the National Biotechnology Advisory Committee. Another notable Allelix employee to rise up through the ranks is Wallace "Wally" Beversdorf. Beversdorf was Allelix's director of plant biology, before being named the University of Guelph's Director of the Institute of Agriculture and Rural Resources for Sustainability in 1990. He later took a position with Ciba Seeds and is now Syngenta's Head of Plant Science.

In 1986 Allelix split its agriculture and pharmaceutical divisions. The agriculture division was taken over by US-based Pioneer Hi-Bred (now owned by DuPont) and, in December 1999, Allelix Biopharmaceuticals merged with US-based NPS Pharmaceuticals.

Dr. John Evans

CEO, Torstar Corporation • Chairman of the Board, Alcan • Chairman and CEO of Allelix Inc. (1983 to 1989) • Chairman and CEO, Allelix Biopharmaceuticals (1993-1999) • President of the University of

7 Presentation at Biotechnology Day V, University of Guelph, October 29, 1987.

8 Personal communication with Elisabeth Abergel.

9 All $ figures in this document are in Candian dollars.

10 Graham Strachan quoted in Moo-Young and Lamptey, op cit.

The biotech firms grew out of public research, were supported by public funds, and relied on public researchers.

Toronto (1972 to 1978) • Member of Council, Medical Research Council (1970s) • Director, Population, Health and Nutrition Department, World Bank (1979 to 1983) • Chairman, Rockefeller Foundation (1987-) • Director, MDS Inc • Director, GlycoDesign Inc. • Director, Connaught Laboratories Ltd. • Director, Pasteur Mérieux Serums and Vaccines • Director, Royal Bank of Canada • Member of the Advisory Council of the Canadian Federation of Biological Societies • Chairman of the National Biotechnology Advisory Committee of Canada.

Every single institution that Evans has been involved with, with the possible exception of Torstar and Alcan, have been influential proponents of biotechnology in Canada. He began with the MRC and University of Toronto in the 1970s, then moved to Allelix (one of the pioneer biotech firms in Canada) which he would later return to, and then became involved with several other biopharmaceutical companies (notably Connaught) and some of the major sources of biotech venture capital (MDS and Royal Bank). Evans is an important insider for the biotech industry, having chaired the NBAC until 1988 and having served as a high-level advisor to government in several other capacities. In February 1997, he became the first Chairman of the new Canada Foundation for Innovation (CFI).

In its support for Allelix, the federal government was setting up an eventual conflict between the generic drug industry and the biotech industry. Generics companies make their money by developing ways to produce equivalents to brand name pharmaceuticals and then selling them for a much lower price than the brand names, whereas biotech companies seek profits from royalties off their patents, which are generally licensed to multinational pharmaceutical corporations. Even though the federal government had not yet broken with its strategy of building a domestic generics industry, it was propping Allelix up with considerable public funds, signalling a coming shift in its support from the generics industry to the new biotech sector. Allelix took in funding from the CDC and the Ontario Development Corporation, and much of its research and product development was financed through collaborative projects with the National Research Council (NRC), through IRAP. In 1986 for example, Allelix received an $800,000 grant from the NRC IRAP and another grant in 1988 of $4 million for a co-operative program with the University of Laval.[11]

At this point in the biotech industry's development there was really nothing but names separating the private sector from the public sector. Federal support for biotechnology actually began a few years before the National Biotechnology Strategy (NBS), averaging about $2 million annually. Federal funding jumped considerably with the NBS of 1983, as the government established an $11.9 million dollar annual fund for biotech and released another $70 million for the construction of biotech facilities.[12] There is little chance that Allelix, Connaught, or any other biotech firms would have got off the ground and lasted without complete support from the public sector. The biotech firms grew out of public research, were supported by public funds, and relied on public researchers.

Guelph was one of the key universities interested in this kind of collaboration with industry; the other was Waterloo. Under its President, Douglas Wright, the University of Waterloo established an Institution for Biotechnology Research in 1983. It joined forces with Guelph to

11 In 1986 Allelix's agriculture division split from the pharmaceutical side to form Allelix Crop Technologies (ACT). Allelix Biopharmaceuticals was bought out by senior management in 1990 and in 1991 the company went public, raising $24 million. However, the Ontario Development Corporation retained a 20% interest in the company. ACY, meanwhile retained its original shareholders (Labatt, Nova Corp and the CDC) until 1990 when the company was purchased by Pioneer Hi-Bred.

12 David Shindler, Ministry of Industry, Science, and Technology, "Government Expectations and Support of Biotechnology," in *Proceedings of Biotechnology Day V*, University of Guelph, October 29, 1987.

form a Guelph-Waterloo Biotechnology Planning Committee, and then launched a Guelph-Waterloo Plant Biotech Centre, which worked closely with Agriculture Canada and the NRC.[13] Under Wright's leadership, the Guelph-Waterloo partnership became a loud voice for biotechnology and, more generally, the incorporation of an industry-based research agenda at Canadian universities. A number of Waterloo and Guelph scientists from this period, such as NRC President Arthur Carty, remain leading voices in the biotech community.

The University of Saskatchewan also began its foray into biotech at this time. In 1980 the government of Saskatchewan established Innovation Place on the university campus. It housed (and continues to house) the Protein Oil Starch Pilot Plant Corporation, which was established in 1977 with $5 million in seed funding from the Governments of Canada, Alberta, and Saskatchewan to research canola. In 1983, Dr Stephen Acres of the University of Saskatchewan, who was also with the Veterinary Infectious Disease Organisation (VIDO), opened Biostar at Innovation Place, which, at the time, was wholly owned by the University of Saskatchewan.[14]

Other universities began biotech programs at this time as well. In the early 1980s, the Medical Research Council targeted funds to assemble biotech research teams and programs at four selected universities: Queen's, Dalhousie, Saskatchewan, and Toronto. McGill also began to pursue biotech research, with a large endowment from Canadian Pacific for a chair in biotechnology, part of Canadian Pacific's 5-year, $1 million Western Canadian Agriculture Research Program.[15]

Universities played a significant role in mobilising government support for biotech. Biotech presented university biology departments with an opportunity to reinvent themselves as high-tech departments and access the levels of funding usually only available to departments with industrial applications. In the US, universities and university researchers could tap into venture capital and launch spin-offs. In Canada, where there was less investment capital floating around, they had to rely much more on selling biotech to government.

The NRC was the lead government agency for the federal biotech strategy. It was the principal source of biotech research, with plans for a $61 million Biotechnology Research Institute in Montreal announced in 1983. It was also a critical source of funds, disposing of a special $7 million annual biotech fund and another $7.7 million that it channelled to biotech through its PILP and IARC programs.[16] These programs linked promising university research with private companies, and, under the original terms of the PILP program, the company received exclusive patent rights arising from the research.[17]

Paladin Hybrids and the NRC-PILP program

In the early 1980s, Allied Corporation was searching around for a way into the biotechnology gold rush. They contracted two Canadian professors, Paul Arnison and Steven Fabijanski, to identify possible commercial opportunities. In co-operation with Agriculture Canada, the group identified canola as an area for commercial development and then established a joint seed venture called Paladin Hybrids with OSECO of Brampton, Ontario (which was later purchased by AgriBiotech Inc) and Pioneer Hi-Bred. But, by the mid-80s, Allied decid-

"...it was premature to use the word profitability in relation to Canadian biotechnology firms since none had as yet achieved that enviable position..."

13 Lewis Slotin and Louis Berlinguet in Moo-Young and Lamptey, op cit.

14 Mulder Management Associates, "KBE Success Stories: The Origins, Growth and Future Prospects of Three Community-based Initiatives," Prepared for Industry Canada, September 1999.

15 Louis Berlinguet, Secretary of MOSST, in Moo-Young and Lamptey, op cit.

16 Gordon MacNabb, President of NSERC, Presentation in *Proceedings of Biotechnology Day II*.

17 Terry Walker, Senior Project Manager of NRC's IRAP, Presentation in *Proceedings of Biotechnology Day V*.

ed to drop out of the biotech business and divested or sold off all of its interests in agriculture, including Paladin.

Paladin Hybrids probably would have gone under if it wasn't for the NRC-PILP program. When Allied pulled out, Arnison and Fabijanski contacted John Vose and Terry Walker at the NRC and they arranged to get them the critical funding they needed through the PILP program.[18]

Beyond the NRC, the Medical Research Council (MRC) and the National Science and Engineering Research Council (NSERC) offered considerable funds for biotech. A representative of Allelix sat on NSERC's Strategic Grants Panel, which oversaw an annual $11 million grant program for biotech research at Canadian universities.[19] By 1986, the program increased to $20 million. Indirect sources of public funding were also available for the biotech industry through agencies such as the Canadian Development Corporation (CDC).

The CDC was created by an act of Parliament in 1971 and was completely government owned until 1982, when the federal government's share of the corporation was reduced to 48.2%. The CDC had its own Life Sciences Division, which owned 100% of Connaught and 50% of Allelix. Its relationship with the biotech industry was hardly arm's length. Brian King, the President and CEO of CDC Life Sciences and Senior Vice-President of CDC responsible for life sciences, was a member of the board of Connaught. He's now the Corporate Director for MDS's Health Care and Biotechnology Venture Fund.

Two important pieces were missing from the biotech puzzle during this period. There was only minimal interest from the private sector. INCO and SB Capital were making massive investments in biotech through their North American Ventures Fund, but all of their money was going South — generating a lot of jealousy in the Canadian biotech community. Also, there was no visible, high-level political support for a major concerted federal strategy involving biotech. Nevertheless, this period did sow the seeds for biotech's development in Canada, particularly through the formation of a tight circle of biotech advocates. They were flush with public money, confident in their science, conscious of the money that their counterparts in the US were making, and very ambitious. This was also the time of the first National Biotechnology Strategy, and the creation of a political framework for biotechnology.

Lean and mean: the political machine gets going (1985-1992)

Two significant developments occurred for the biotech industry during the Mulroney years. First, as research began reaching the commercialisation stage, the private sector underwent a transformation. The biotech industry remained heavily dependent on the public sector, but a new dependence emerged as transnational corporations (TNCs) entered the picture, eager to scoop up any research with commercial potential. The division between the private sector and the public sector was suddenly more visible, even though both sectors would continue to operate as if they were one and the same. Hence the second development: a political context — a political machine — to support the biotech industry.

18 Paul Arnison, Paladin Hybrids, Presentation in *Proceedings of Biotechnology Day V*.

19 Graham Strachan, Paper presented at the 5th NRC Industrial Biotechnology Conference, Montreal, December 6-7, 1989.

The "private sector" during the Mulroney years

You have to take the biotech community's claims about its importance to the Canadian economy with a grain of salt. Most statistics on the biotech industry are based on the broad definition of biotechnology given by the federal government. But biotechnology defined as the development of transgenic products reveals that the sector is minute. In 1990, William Cochrane, Connaught's CEO and the Chairman of the National Biotechnology Advisory Committee (NBAC), admitted that only a few of the 220 companies involved in biotech were making a "major effort" in the area and "most research has actually been publicly funded."[20]

By 1993, after more than a decade of significant public support, there were only 30 firms involved in agricultural biotechnology — 9 of these were public institutions (University or government) and 7 were foreign TNCs.[21] There were only 94 firms involved in health care related biotechnology — 50 of these were public institutions and 2 were foreign TNCs. Only 147 firms over all were working on trangenics in Canada — 67 were public institutions and 14 foreign TNCs. The biotech sector employed a measly 7,230 full time employees and only 85 people were employed by Canadian biotech firms to work on transgenic plants. Some of the more prominent Canadian biotech companies in operation during the Mulroney years included: Allelix Inc (1981), Quadra Logic Technologies (1981), Cangene (1984), Hemosol Inc (1985), Biomira Inc (1985), Imutec Corp (1986) and BioChem Pharma (1986).[22]

What about profitability? In his 1995 survey of the biotech industry in Canada, James Heller writes, "Several respondents noted that it was premature to use the word profitability in relation to Canadian biotechnology firms since none had as yet achieved that enviable position."[23] Even in the US, out of some 235 publicly traded biotech firms in 1993, only six were profitable (only three were profitable in 1992: Amgen, Biogen and Genentech).[24] But, at least in the US, the lack of profitability did not deter finance capital. Until the recession of the late 1980s, biotech was one of hottest sectors on the US market, and the Canadian firms and researchers that built up their biotech projects on the backs of considerable public monies, began a frantic search for their piece of the pie.

The problem was that there was little interest within the Canadian financial community. INCO's venture capital arm, as mentioned earlier, was big into biotech, but didn't find much worth investing in north of the border. Two of the first financial firms to get their feet wet in the Canadian biotech community were Yorkton Securities and Gordon Capital — both of them also had big interests in mining. Yorkton Securities continues to be a major source of venture capital for Canadian biotech firms and even though Gordon Capital has faded from the scene, many of its executives and advisors are now involved with Yorkton and some have assumed much more influential positions (see below).

Gordon Capital

During his sojourn from politics, from 1986-1990, Jean Chrétien was a senior advisor with Gordon Capital, although nobody seems to know what he was advising them on. Another of Gordon Capital's senior

20 *New Biotech,* August 1990, p.25.

21 The following statistics are derived from the study by Jim Heller referred to below. This study is the only study that I know of that differentiates between recombinant DNA technology and other forms of technology that some consider to be biotechnology. Those studies carried out by the industry, government, or financial institutions typically consider the biotechnology industry to include any business working within the definition used by the government, which says that biotechnology is "the application of science and engineering in the direct or indirect use of living organisms in their natural or modified forms." Throughout this paper, however, biotechnology refers only to recombinant DNA technology and the statistics taken from the Heller study are only for companies involved with recombinant DNA technology.

22 James G. Heller Consulting, *Background Economic Study of the Canadian Biotechnology Industry*, Paper Commissioned by Industry Canada and Environment Canada, 1995.

23 ibid, p.152.

24 ibid, p.107.

advisors during the period was Chaviva Hosek, who went on to be one of the most powerful members of Chrétien's Liberal government as director of Policy and Research in the Prime Minister's Office (PMO). In December 2000, she became President of the Canadian Institute for Advanced Research.

Under the leadership of maverick trader James Connacher, Gordon Capital earned a name for itself as a risk-taker and a big player in the venture capital market — primarily in mining but also in biotech. After a trading scandal in the early 1990s and the departure of Connacher, Gordon Capital disappeared from the venture capital market, but some of its leading names continue to work in the venture capital business. Robert Cross, for instance, was a partner and director of Gordon Capital until 1994 when he left the company to join Yorkton Securities. In 1996, he became the Chairman and CEO of Yorkton.

Robert Fung was vice-chairman of Gordon Capital Corp when Chrétien and Hosek were there. He's a major figure within the federal Liberal Party. He was Paul Martin's university roommate and Martin is the godfather of his eldest son.[25] Chrétien appointed Fung as Chair of Toronto's Waterfront Redevelopment Task Force and as member of the Prime Minister's Advisory Committee on Asia Pacific Economic Corporation. He's also on Team Canada Inc.'s Advisory Board. After leaving Gordon Capital, Fung served as a director of the Export Development Corp and is now the Deputy Chairman of Yorkton Securities.

Yorkton, like Gordon Capital before it, has fallen into disgrace. In December 2001, the company fired its CEO, Scott Patterson, and reached a settlement with the Ontario Securities Commission to settle a scandal involving conflict of interest allegations.

Given its ambitions, the amount of venture capital available for Canada's biotech community was insufficient during most of the Mulroney period. In 1990 there were only three biotech firms listed on the Toronto or Montreal stock exchanges and their combined assets were only $40 million (Biomira, BioChem Pharma, and Quadra Logic Technologies).[26] Small firms looked for other methods to finance the development and commercialisation of their research, and for most, the best source of immediate cash were the large multinational agribusiness and pharmaceutical corporations.

The timing for the biotech community couldn't have been better. The US pharmaceutical lobby won a major coup in Canada in 1987 with the adoption of Bill C-22. The bill provided stronger patent protection, and, in return, foreign pharmaceutical companies pledged to increase their R&D expenditures in Canada. An easy way to meet this commitment was to buy up promising products of Canadian universities and small spin-offs or to sign multi-year research agreements. In 1990, Allelix's Strachan predicted that this would create an additional $100-$150 million a year in research and development expenditure that Canadian biotech firms could tap into. Strachan said that Bill C-22 was "the single most important government initiative that has assisted new biotech companies involved in health care."[27]

Canada's fledgling biotech pharma companies did reap some immediate benefits. Allelix formed a joint venture with Japanese pharmaceutical company Mitsui and signed a $2 million a year agreement with UK-based Glaxo, giving Glaxo exclusive commercial rights to a process for the production of parathyroid hormone to treat osteoporosis. Allelix

25 Financial Post, January 18, 2001, p.CI.

26 Heller, op cit.

27 Strachan, op cit.

developed the technology through a collaborative program with the NRC, McGill University, University of Toronto, and the University of Western Ontario.[28] In 1987, Quadra Logic signed a big agreement with American Cyanamid for the development and distribution of a cancer treatment drug. As part of the deal, Cyanamid bought 15% of the company. In 1989, IAF Biochem (which would later become Biochem Pharma) formed a joint venture with Glaxo to commercialise the AIDS therapeutic it developed. And, at around the same time, the Wellcome Foundation of the UK formed a joint venture in Vancouver with the Terry Fox Medical Research Foundation called the Biomedical Research Centre on the campus of the University of British Columbia. The first full take-over of a Canadian biotech firm occurred in 1989 when the Institut Mérieux of France purchased Connaught Biosciences Inc.

In 1987, a representative of the NRC estimated that the federal government was responsible for about 80% of the direct project costs of the biotech industry until around 1987 when it fell to 45-50% — still a high figure.[29] Given that the industry was so small, a few large contracts between TNCs and Canadian biotech firms, such as that between Quadra Logic and American Cyanamid, could have accounted for much of the change. Nevertheless, the figure does demonstrate that many projects that got off the ground with public funding were now at the commercialisation stage and that it was at this point where TNCs and venture capital firms decided to jump in.

Alan Nymark, Connaught-Mérieux, and Investment Canada

The sale of Connaught to Mérieux was facilitated by Investment Canada, as part of a program "to encourage foreign investment in Canadian biotechnology companies."[30] The person at Investment Canada responsible for the biotech program was Alan Nymark, the Executive Vice-President from 1989-1993. On December 13, 1989 he made a personal call to Jacques François Martin, General Manager of the Institut Mérieux, to inform him that the purchase could go ahead.[31]

The Mulroney government established Investment Canada in 1985 to replace the Foreign Investment Review Agency (FIRA), an independent agency intended to screen foreign direct investments in order to safeguard Canadian interests. As part of its strategy to liberalise foreign investment, the government gave Investment Canada a contradictory mandate: to screen and promote foreign investment. As one of their final acts in power, the Mulroney government placed Investment Canada under Industry Canada in 1993 and within a year it completely vanished as an independent agency.

Before helping to torpedo Investment Canada, Alan Nymark served as the Assistant Chief Negotiator for the US-Canada Free-Trade Agreement and then again for the North American Free-Trade Agreement. After his stint with Investment Canada, he became Assistant Deputy Minister of Industry and Science Policy with Industry Canada. In 1999, he took over as Associate Deputy Minister for Health Canada and, finally, in 1999 he was appointed Deputy Minister of Environment Canada. Nymark now sits on the important Deputy Ministers Biotechnology Coordinating Committee.

28 Strachan, op cit.

29 Terry Walker, "Government Funding of Biotechnology," in *Proceedings of Biotechnology Day V*.

30 National Biotechnology Advisory Committee, Fourth Report, 1989-1990, p.9.

31 *The Scientist*, February, 1990

Industry takes the Science & Technology helm

With so little separating public from private, the growing presence of the transnational pharmaceutical and biotech industry in the private sector was sure to flow over into the public sector. In May 1990, Bristol Myers-Squibb announced a 5-year, $5.75 million agreement with the Samuel Lunenfeld Research Institute, a division of Mount Sinai Hospital of Toronto, to fund its program on transgenic approaches to the research of disease. Pierre Blais, the Federal Minister for Corporate and Consumer Affairs, was in attendance at the ceremony announcing the agreement and in the press release there was careful mention of the links between Bill C-22 and the agreement.[32] These types of agreements served to boost the standing of biotech research — making it appear as a great source of financing for hospitals and research institutes — and they encouraged support for public partnerships with industry as a policy objective. The Bristol Myers-Squibb deal signalled that a broad transformation was underway in Canadian S&T policy.

There was actually no systematic S&T policy prior to Mulroney's Conservative government. The Conservatives established Canada's first National Science and Technology Policy in March 1987 — the outcome of discussions with the provinces under the Council of Science and Technology Ministers, which the Conservatives also established. As part of the new national policy, the government created a National Advisory Board on Science and Technology (NABST) and merged the Ministry of State for Science and Technology (MOSST) and parts of the Department of Regional Industrial Expansion to form a Department of Industry, Science and Technology (ISTC). Nevertheless, the national policy was criticised as "a motherhood statement of broad, general principles, lacking substance."[33]

The Mulroney government's position on S&T only became clear a few months later, in the spring of 1987, when it launched InnovAction — a five-track strategy to lead Canada's S&T efforts. InnovAction focused on the following issues:

- Industrial innovation and technology diffusion;
- Development of strategic technologies;
- Effective management of federal S&T resources;
- Human resources for science and technology;
- Public education in science and technology.

It also identified three areas of strategic technology "paramount to Canada's international competitive position":

- Advanced Manufacturing Materials;
- Biotechnology;
- Information Technology.[34]

The Conservatives followed up the launch of InnovAction a year later with a major new funding initiative for S&T of $1.3 billion over 5 years, with a portion of these funds going to ISTC to allocate to the three strategic sectors.

It was evident that the Mulroney government had taken sides in a long-running debate within the Canadian S&T community. Hugh

32 "Mount Sinai is selected for major funding agreement," New Biotech, May 1990, p.21.

33 Greg Pichler, "The Technological Capability of Canada, Inc.," *Management Science*, no. 232, April 17, 1989: http://www.opensystemsgroup.com/english/publications/docs/canada.html

34 ibid.

Wynne-Edwards, assistant secretary for Science and Technology and a member of both the NABST and NBAC, described the division this way:

> *In the throne speech of 1986, the Governor General announced that a Council would be formed called the National Advisory Board on Innovation and Technology, NABIT. About the same time of year, as we know, the Nobel Prize winners are announced, and John Polyani got his Nobel prize for Chemistry just after the throne speech. He had to be a member of this Board and I think that the deal was that Innovation disappeared from the Board's title, to be replaced by Science — NABIT became NABST, the National Advisory Board for Science and Technology. That was a pity, because innovation was the issue. What it meant was that the science lobby had made its point one more time. The basic point of the science lobby is correct. It's that discovery can't be predicted or managed or controlled. The message from this lobby in the 70s and 80s and even up to today is, Give us money, get out of the way, and milk and honey will flow in the land. The unfortunate thing is that we've had twenty-five years of science policies in support of this assertion and milk and honey has not flowed in the land.*[35]

In a 1989 address to the NABST, Mulroney clarified where his government stood:

> *The goal is an economy that can compete with the best in the world, producing stimulating new jobs and new opportunities for future generations of Canadians . . . Science and technology are the keys to a modern competitive economy. It is clear that our traditional manufacturing and resource-based industries will no longer assure us a strong position in the global economy if we don't complement them with modern technology.*[36]

Under Mulroney, S&T moved to the centre of Canada's industrial/economic policy — not because the government was giving more importance to science, but because the government began to conceive of science and industry as one and the same. Thus, it would be a mistake to see the government's shift in emphasis in 1989 towards cutting the deficit and its overall reduction of spending on S&T as a move away from S&T policy. Mulroney's primary objective was never to support better science but to ensure that science supported business.

Mulroney's cutbacks to the granting councils and other S&T programs opened the door to a new role for business in Canadian S&T. According to Mulroney's Minister of Science, William Winegard:

> *We believe that a united effort, involving industry, universities and governments, is the critical pathway to success in developing and marketing [biotechnology] . . . But it should not be the function of the Federal Government to replace private sector research with research paid for by the taxpayer . . . R&D is more effectively carried out by the business and university communities where it is industry-led and results-driven. That is why so much of the R&D efforts of this Government have been performed in partnership with the private sector.*[37]

The partnerships rhetoric was put into practice through the Centres of Excellence program, launched in 1988, which offered matching funds for industry contributions to university research. A similar logic was at work in the funding cuts to the NRC. In 1989, the Conservatives cut the budget of the NRC and encouraged it to seek outside sources of income by re-organising its funding rules for research, such that the NRC was allowed to keep 20% of its commercial revenue. The Conservatives

Mulroney's primary objective was never to support better science but to ensure that science supported business.

35 Hugh Wynne-Edwards, "Government recipes for industrial innovation: The promise, the practice, and the work ahead", presented at the Conference on Government Recipes for Industrial Innovation, Centre for Policy Research on Science and Technology, Simon Fraser University, Vancouver, BC, 20-21 October, 1994, http://edie.cprost.sfu.ca/agri/index.html

36 Cited in the Fifth Report of the National Biotechnology Advisory Committee, 1991.

37 *New Biotech*, May 1990, p.25

urged the NRC to focus on commercial applications in order to become a 'profit centre.'[38]

The biotech community was one of the big winners from this change in policy direction towards 'partnerships', or more aptly, industry-led, publicly-funded research and development. At this early stage, the biotech community knew that their survival depended on convincing the government that biotechnology was a high technology sector essential to Canadian economic competitiveness. If Canada didn't jump on the biotech train, the reasoning went (and continues to go), then Canada would be left behind. Yet, after several years of research and hundreds of millions of dollars, the industry had little to show for itself. In 1987, John Vose, the former NRC-PILP director who moved to Connaught, hinted at where the industry stood: "In Canada there is the danger that governments intervene to maintain non-competitiveness of companies perhaps beyond their natural stage of things . . . I'm not sure just how many of Canada's [biotech firms] would survive on their own."[39]

The dismal record did not deter the Mulroney government and the biotech community continued to tap into a long list of funding mechanisms. There were new funds from ISTC's Strategic Partnerships Program, but most of the money continued to flow through the granting councils. In 1986, NSERC, NRC, and MRC disposed of around $40 million for biotech R&D. For the fiscal year 1990-1991, the three councils dished out over $100 million. Even though most of the council grants went towards university or hospital research, the biotech money was targeted at research with commercial potential. For example, in the years 1987-1991, Maurice Moloney, a scientist at the University of Calgary who was formerly with Calgene, received nearly half a million dollars from NSERC for research into altered oil content in plants. Moloney eventually patented the technology, created a spin-off company called SemBioSys Genetics in 1996, and then licensed the technology to Dow.[40] In 1995, Moloney was appointed as the NSERC DowElanco Industrial Research Chair in Plant Biotechnology at the University of Calgary. Lorne Babiuk has also received over $1 million from NSERC for his research into transgenic vaccines for animals.[41] Babiuk is a scientist with the Veterinary Infectious Disease Organisation (VIDO) in Saskatchewan. VIDO took out 7 patents on their research into vaccines and created a spin-off company called Biostar, which has signed licensing agreements with a number of TNCs to commercialise the products.[42]

In 1988, the government set out a new federal strategy to develop centres of 'advanced research' to increase Canada's international competitiveness in the three sectors of industry that the government deemed essential to international competitiveness. Funding for R&D was reorganised to support specific Networks of Centres of Excellence (NCE) and biotechnology, as one of the identified sectors, gained privileged access to a wealth of new funds. The 'the centres of excellence' concept had actually been put forward by the National Biotechnology Advisory Committee in the early 1980s.[43]

The centres of biotech research

Each of the federal government's strategic centres of biotech research followed their own paths of development. Below are four of the most important examples.

38 Elisabeth Abergel, "Growing Uncertainty: The Environmental Risk Assessment of Genetically Engineered Herbicide Tolerant Canola in Canada," unpublished PhD thesis, Graduate Program in Environmental Studies, York University, Nov. 2000

39 John Vose, cited in *Proceedings of Biotech Day V*.

40 NSERC Strategic Grants Report and Leonard Zehr, "Power Plants; In the World of Molecular Farming, Plants are Living Factories that Produce Cheap Drugs, Plastics, even Human Blood Protein," *Globe and Mail,* November 4, 1999.

41 NSERC Strategic Grants Report.

42 VIDO website, April 2002, http://www.vido.org/annual/07.html#a

43 Gregg Van Volkenburgh, Director of IDEA Corporation, Presentation in *Proceedings of Biotechnology Day II*

Montreal

It is not clear why the federal government selected Montreal to host Canada's pharmaceutical sector, though one cannot ignore the political significance of Québec separatism. In the 1970s and early 1980s Montreal had a small pharmaceutical sector, but was home to the biggest pharmaceutical operation in Canada, Merck Frosst (a merger of Canadian owned Frosst and US giant Merck). Things began to change in the early 1980s, when the NRC announced that it was going to build a $60 million Biotechnology Research Institute (BRI) in Montreal, which was officially opened in 1987. The BRI was conceived to promote the biotech/pharmaceutical industry in Montreal and 45% of its budget was devoted to 'collaborative research' with industry. Its purpose was to "incubate the advanced research initiatives of several companies." At around the same time that the BRI was established, Dr Francesco Bellini founded BioChem Pharma in Montreal, which would become one of Canada's few 'home-grown' pharmaceutical industry successes after it discovered an AIDS treatment called 3TC.

There's no big secret to Montreal's 'success' in building a biotech/pharmaceutical industry. First, the NRC uses collaborative research to induce spin-offs. Second, Québec has the most generous R&D tax credit regime in Canada — a 40% refundable tax credit and a five-year tax holiday for foreign scientists.[44] And, third, the federal and provincial governments have pumped a tonne of money into the industry. There are four multi-million dollar government-supported venture capital funds for biotech business in Montreal: BioCapital (established in 1990 with $10 million), Société Innovatech du Grand Montréal (established in 1992 with $300 million), Sofinov (1995) and T2C2 Bio (1997).

The BRI was central to these developments. Bernard Coupal, the first Director-General of the BRI, with financial backing from financier Normand Balthazard and the Fonds de solidarité des travailleurs de Québec, was behind the establishment of BioCapital. Within two years they brought into being ten new ventures. In 1992 he became the president of Société Innovatech du Grand Montréal, which was established by the government of Québec. In 1995, Société Innovatech du Grand Montréal got together with the Caisse de dépôt et placement du Québec, the Business Development Bank of Canada, and the Canadian Medical Discoveries Fund Inc (MDS and MRC) to launch Sofinov — a venture capital fund for biotechnology and other high-tech sectors. In 1997, Sofinov set up T2C2 Bio to focus on venture financing for the biotech industry. Coupal is the President of T2C2 and Bertrand Cayrol is the Vice-President. Cayrol was Project Director at the BRI before following Coupal to Société Innovatech du Grand Montréal, where he became Vice-President.

Saskatoon

Saskatoon's emergence as a biotech research centre is related to the development of canola. Much of the research and public infrastructure that went in to the development of canola, as an industrial strategy, was located in Saskatoon and, from there, agbiotech was an easy step. In 1977, the POS (Protein Oil Starch) Pilot Plant Corporation was established with $5 million in seed funding from the Governments of Canada, Alberta, and Saskatchewan and industry. Shortly after, Agriculture Canada gave the Saskatoon Research Centre the national mandate for research associated with Genetic Resources and Oilseeds and the NRC's Plant Biotechnology Institute in Saskatoon took over the national mandate in agbiotech in 1983.[45]

44 Mulder Management Associates, "KBE Success Stories: The Origins, Growth and Future Prospects of Three Community-based Initiatives," Prepared for Industry Canada, September 1999.

45 ibid.

It was also around this time that local members of industry and the research community began to push for provincial support of high-tech research focussed on commercialisation. In 1980, the provincial government established Innovation Place on the campus of the University of Saskatchewan and since then, the Saskatchewan Opportunities Corporation has invested well over $700 million trying to attract agbiotech companies to Saskatoon.[46]

The availability of public funds and resources did eventually attract some biotech firms and led to some spin-offs from public research. In 1983, the University of Saskatchewan and one of its professors, Stephen Acres, who was with the Veterinary Infectious Disease Organisation (VIDO), opened Biostar at Innovation place. Supposedly there are now over 100 firms in Saskatoon's Innovation Research Park, including TNCs like Aventis, Pioneer, BASF, Dow, and Monsanto and local start-ups like Bioriginal, MicroBio Rhizogen, Prairie Plant System, Saskatoon Colostrum Inc, Fytokem, and Philom Bios Inc.

According to the Director General of the NRC's Plant Biotechnology Institute, Kutty Kartha, "Research priorities are now decided by what the consumer and the private sector want, not by what scientists like to do."[47]

Ottawa

The drive to make Ottawa a hub for the biotech industry in the late 1980s was led by the Ottawa-Carleton Economic Development Corporation (OCEDC). In 1988 it launched a Biotechnology Business Initiative, spearheaded by Ottawa mayor Jim Durrell and vice-rector of the University of Ottawa, Peter Morand.[48] The cornerstone of the initiative was the construction of a Life Science Technology Park next to the Ottawa Health Sciences Group (Ottawa General Hospital, Children's Hospital of Eastern Ontario, Royal Ottawa Health Care Group, and the University of Ottawa's Faculty of Health Sciences). The park was eventually financed and built by the Ontario Development Corporation.[49]

Even if Ottawa remains far from being a biotech hub, the initiative did make a lasting contribution to the development of biotech in Canada. One of the directors of the OCEDC at the time of the Biotechnology Business Development Initiative was John Manley, soon to be the first Minister of Industry Canada. Peter Morand, the chairman of the initiative, became the President of NSERC from 1990-1995 and then chair of the Ottawa Life Sciences Council from 1998-2000.

Vancouver

In 1980, four researchers from the University of British Colombia decided to form a biotech venture company in the health sector. The co-founders were Julia Levy, professor of Microbiology, James Miller, a professor with the Faculty of Medicine, Ronald Mackenzie, and Ronald Chase. Aptly enough, they called their firm Quadra Logic Technologies. Like BiochemPharma in Quebec, Quadra Logic went on to be a commercial success — initiating exaggerated claims about the potential of the biotech pharma sector in Vancouver and a slew of followers.

Quadra Logic's success rests primarily on the development of a drug called Photophrin. Johnson & Johnson and the Roswell Park Cancer Institute of New York did the early research work on the drug but decided to give up on it for unknown reasons. The founders of Quadra Logic believed that the research was promising and thought they could turn it into a blockbuster. Through a partnership with American Cyanamid

46 ibid.

47 ibid, p.9.

48 "Ottawa gears up to be major biotech centre," New Biotech, September 1989, pp.18-19.

49 Ontario Life Sciences Technology Park website, April 2002, http://www.olsc.ca/about/olstp.htm

they raised $15 million dollars to take over the rights for research and development of Photophrin. Although Photophrin only achieved regulatory clearance in Canada in 1993, it attracted a lot of interest on the stock market and the four founders succeeded in taking the company public in 1986.

Quadra Logic was and continues to be intimately connected with UBC. The four founders were professors at UBC and they remained professors at the school while working for Quadra Logic. David Dolphin, one of Quadra Logic's leading researchers, began working for the company when he was Dean of Sciences. The close ties paid off, as Quadra Logic was able to utilize UBC facilities and students for its own research and development purposes. As explained by Levy, "An almost seamless relationship developed between researchers at the university and those employed by QLT . . . Over the years, 11 graduate students and post-doctoral fellows have been directly involved in research initiatives undertaken by QLT. Six of those students are now employed by the company, and there's every reason to think that more opportunities will follow."[50]

QLT's commercial success generated enthusiasm for biotech on campus. In 1987, Michael Smith became the first director of UBC's Biotechology Laboratory. Two years later, Smith's program was selected to head the Protein Engineering Network of Centres of Excellence (PENCE). Over the next ten years, PENCE would receive upwards of $64 million in federal National Centres of Excellence funds. Besides UBC, other PENCE partners include, the University of Alberta, the University of Toronto, the National Research Council, and the Biomedical Research Centre in Vancouver — a joint venture between the Terry Fox Medical Research Foundation and the Wellcome Foundation. PENCE was conceived in close co-operation with the private sector and has always operated in partnership with industry. The initial industry partners included Connaught, Allelix, the Pulp and Paper Research Institute of Canada, and Syntex Research.[51]

In 1985, David Strangway began a twelve-year term as President of UBC. Under his leadership, the university made a clear turn towards industry partnerships and technology transfers. Biotechnology and medical technology were viewed as key areas of industrial interest and ideal for 'technology transfer' programs with the private sector. Over the course of Strangway's presidency, 35 life science companies were spun-off of the university.[52] Many of these companies were closely linked with Quadra Logic. For instance, James Miller and Ron Mackenzie, co-founders of Quadra logic, founded Inex Pharmaceuticals and Tazdin Esmail, the former Vice-President of Medical Operations for Quadra Logic, established Forbes Medi-Tech. As with Quadra Logic, these spin-offs function in close collaboration with UBC. To cite another example, Pieter Cullis is a professor with the UBC Faculty of Medicine. He began consulting for The Liposome Company of New Jersey in 1984 and in 1987 he became President of its newly established subsidiary, the Canadian Liposome Company. Cullis then joined Miller and Mackenzie in the establishment of Inex Pharmaceuticals and joined the Board of Directors of Synapse Technologies, another UBC spin-off.

The BC Research Corporation, based at the UBC campus, also played a significant role in establishing UBC as a biotech centre. During Strangway's presidency, the agency took on a decidedly pro-industry bent. In 1977, the provincial government re-organized the BC Research Council — transferring the policy and program mandate to the BC Science Council and establishing the BC Research Corporation as a non-profit agency to support the industrial research needs of the province. But by the early 1990s, the BC Research Corporation became

50 NSERC, QLT PhotoTherapeutics and the University of British Columbia, 1996: http://www.nserc.org.ca/seng/success/qlt.htm

51 "Background," *New Biotech*, July 1990, p.7

52 Angus Livingstone, Associate Director, UBC University-Industry Liaison Office, "Report on UBC Spin-off Company Formation and Growth,"1997: http://www/vilo.ubc.ca/technology%20transfer%20&%20Commercialization/spinoff%20Companies/spin.htm

little more than a contract research outfit. In 1993, the province decided to convert it into a for-profit enterprise and sell it off to Terracy Inc, NORAM Engineering, and the Stothert Group. Hugh Wynne-Edwards, professor at UBC, member of the NBAC and President of Terracy, became the first President of BC Research Inc. (BCRI).[53]

BCRI has a transgenic tree program, the outcome of research supported by the National Research Council, the British Colombia Ministry of Forests, the Canadian Forest Service, and the former BC Research Corporation. Eventually, a technology with commercial potential emerged from these R&D efforts that facilitates the mass propagation of trees through somatic embryogenesis. BCRI secured the patent rights to the technology and in 1997 it formed a new company called Silvagen to license the technology from BCRI and commercialise it. A year later, it signed a $1 million deal with the Canadian Forestry Service for forestry biotechnology development. In 1999 Silvagen amalgamated with another firm to form Cellfor, with BCRI retaining a substantial interest. That same year, Cellfor formed a Chilean forestry joint venture with Fundacion Chile and InterLink Associates of the US called GenFor. The joint venture benefited from a handsome $5 million dollar investment from the Chilean development agency Corfo.[54]

In 2000, two-thirds of BCRI was purchased by Immune Network, with NORAM retaining the other third. Immune Network describes itself as "biotech's merchant developer." The objective of the company continues to be to commercialise promising scientific technologies from academia — primarily from UBC.

BCRI's President and major shareholder, Hugh Wynne-Edwards, is just one of many influential biotech proponents that have grown out of the Vancouver circle. He was a member of the National Advisory Board on Science and Technology from 1987-1990 and was one of the lead authors of the NBAC's sixth report. Julia Levy was also a member of the National Advisory Board on Science and Technology at that time as well as a member of NBAC from 1988-1991. Later on, the Chrétien government appointed her as a member of the Advisory Council on Science and Technology's Expert Panel of Commercialisation of Research, where she was joined by fellow NBAC member Michael Brown of Venture's West Management — one of the key sources of venture capital for UBC spin-offs. [55]

Strangway has climbed the ladder to one of the most influential positions in the science and technology policy arena. In 1998, he was named the new President of the Canadian Foundation for Innovation — which was established by the federal government in 1997 with an initial endowment of $800 million. Strangway is one of the leading proponents for private universities and has even planned to establish his own American-style private university in BC. According to Strangway, "We have to appreciate that collaboration with big corporations will provide researchers with the opportunity to learn about the latest advancements in the industry and, at the same time, allow them to embark on research projects that would be unlikely to obtain funding through other possible channels."[56] But Strangway is doing his best to make sure that plenty of public dollars are available for sectors such as biotechnology where the private sector has a keen interest. Shortly after stepping into his new position, Strangway announced $9.4 million in funding for the construction of a 7,400-square-metre biotechnology laboratory that will be part of a new centre of integrated genomics at UBC.[57]

Martha Piper took over as President of UBC after Strangway and has kept up, if not deepened, the school's involvement in biotech. Piper has

53 BC Research Inc web site: http://www.bcresearch.com/innovation/htm

54 Company Press Release on the GAAGET website: http://www.gaaget.org/players/genfor.html

55 Angus Livingstone, op cit.

56 "Industry and University Collaboration," *City University of Hong Kong Bulletin*, Issue 22, December 2000: http://www.cityu.edu.hk/mpu/bulletin/issue22/e2220.htm .

57 BC Cancer Agency, "BC Medical Research gets Major Boost," June 12, 2000: http://www.bccancer.bc.ca/pg_g_03.asp?PageID=2678&ParentID=5

roots in many of biotech's key agencies: she's a board member of PENCE, the Canadian Genetic Diseases Network of Centres of Excellence, and the Alberta Research Council. In recent years she has served on significant science and technology advisory bodies to the Liberal government. She was a member of the National Advisory Board on Science and Technology and the Advisory Council on Science and Technology. She's also a member of the Canadian Foundation for Innovation and the Interim Governing Council of the Canadian Institutes for Health Research (CIHR) — Canada's two biggest public funds for biotechnology research and development.

For an industry that had yet to turn a profit, the biotech industry had done well in securing support from the Mulroney government. Several key factors contributed to this success: the international context, the take-over by transnational corporations, the domestic lobby, and the biotech bureacracy.

International Context

Canada was not the only country making a direct effort to build a biotech industry. The US, Japan, and the European Community had begun to build their biotech industries in the 1970s and their support continued into the succeeding decades. Canada's biotech strategy began as an effort to keep up with the other leading industrial nations.

In Europe, the UK directly co-sponsored two major biotech firms, Celltech Ltd in 1980 and the Agricultural Genetics Company in 1983. The Dutch Ministry of Economic Affairs offered grants of up to 45% of corporate biotech research programs. The European Commission, for its part, channelled funds through a number of programs, with names like BAP, BRIDGE, ECLAIR and FLAIR. It also ran a major R&D funding program called the Eureka Project that dished out over $6 billion to industry for science and technology research, over half a billion of which went towards biotech. Japan was also in the game, albeit a little later. By 1989, TNCs in Japan spent $1.4 billion in biotech R&D, while the government kicked in $550 million. But the US was out in front of the others. By 1986, it was spending over $600 million in public funds on biotech R&D annually.[58]

The proponents of biotechnology were selling it as the next technological revolution and most governments of the Organisation for Economic Co-operation and Development (OECD) were buying into this. And, as biotech became the focus of international competitiveness, national interests and the interests of the biotech industry merged in the eyes of policy-makers. The OECD itself fanned the flames of excitement for biotech with a series of reports in the 1980s led by its Group of National Experts on Biotechnology, which met twice a year to discuss how to facilitate the development of biotechnology in member countries.

Transnational Corporations (TNCs) take over

The foundations of biotechnology were built by public researchers and the 'new biotechnology firms' or 'biotech boutiques' that spun off of public institutions. But once the TNCs entered the game, it only took a few years before they had a stranglehold over the industry. By the end of the 1980s, a biotech boutique really only had three options: do con-

58 Henk Hobbelink, *Biotechnology and the Future of World Agriculture*, Zed Publications, London: 1991, p.32.

tract research for a TNC; merge with another boutique; or sell out to a TNC. These start-up ventures dominated agbiotech R&D in the early 1980s, but, at the end of the decade, only four remained in the top 25 in terms of R&D expenditures on biotech, and these four have since been taken over by TNCs.[59]

In Canada during the late 1980s, foreign TNCs became much more present in the biotech community. Canada's biotech firms were tied to the TNCs through mergers, joint ventures or contract and licensing arrangements. Also, the number of agreements between public research agencies, such as hospitals and universities, and TNCs began to expand. The federal and provincial governments and university administrators openly encouraged this latter development, seeing corporate funding as a way to make up for perceived shortfalls. Bristol Myers-Squibb became partners with the Lunenfeld Hospital and Glaxo stepped in to fund McGill's Sheldon Biotechnology Centre. Government programs also rode the wave. For example, the Department of Fisheries and Oceans' Biotechnology and Genetics in Aquaculture program received funding from Monsanto in the late 1980s to pursue collaborative research to isolate and characterise genes in fish.[60]

Nothing made the tight relationship between the Mulroney government and the transnational biotech industry more clear than the legislation it forced through on intellectual property rights. Bill C-22 and Bill C-91, which were passed on the eve of the Progressive Conservative Party's devastating electoral loss in 1993, brought Canadian patent legislation into conformity with the US patent regime for pharmaceuticals.

Before Mulroney came to power, patent rights for pharmaceuticals were governed according to a principle of compulsory licensing. A compulsory license is a permit that allows a company to market its own generic version of a patented drug, a generic drug, before the patent has expired. The compulsory aspect means that the company owning the patent cannot block the license from being granted. In 1923, Canada amended its Patent Act to allow individuals or corporations to apply for a compulsory license to use a patented process to manufacture a drug. According to Joel Lexchin of the University Health Network, the amendment failed to stimulate much generic competition because it limited compulsory licenses to generic drugs manufactured in Canada and the Canadian market was simply too small to support much manufacturing. A series of reports in the 1960s revealed that Canada's drug prices were among the highest in the world and identified patent protection as one of the main causes. A study commissioned by the federal government had even recommended that patents be banned on all inventions emanating from public institutions.[61] Shortly thereafter, in 1969, the Liberal government brought in new legislation, under section 41.4 of the Patent Act, which, while not going as far as the federal study had recommended, allowed companies to obtain licenses to import generic drugs into Canada.[62] The legislation gave rise to a Canadian generic drug industry and brought drug prices in Canada down to among the lowest in the OECD countries.[63]

Even though the changes to the patent system proved effective, the Liberals brought the question of pharmaceuticals back onto the agenda in the early 1980s. The Minister of Consumer and Corporate Affairs, André Ouelette, announced a review of section 41 of the 1969 Patent

59 ibid.

60 "DFOs Genetic CODE," *New Biotech*, August 1990, p.18.

61 Personal communication from Colleen Fuller, February 26, 2002.

62 Joel Lexchin, "Drug firms wallowing in profits — but they want more," *The CCPA Monitor,* November 1996: http://infoweb.magi.com/~ccpa/articles/article69t.html and Joel Lexchin, "Canada, free trade agreements and drugs costs," October 2001: http://apha.confex.com/apha/responses/129am/242.doc

63 Department of Foreign Affairs and International Trade, "The Pharmaceutical Industry in Canada," http://www.dfait-maeci.gc.ca/english/foreign/dfait/policypapers/1993/9312e/s19.html

Act, and then in 1984 Judy Erola, the new Minister of Consumer and Corporate Affairs, announced the establishment of a commission of inquiry into the pharmaceutical industry, led by Harry Eastman of the University of Toronto. Although the Eastman Report credited the 1969 Act with having saved Canada's health system $211 million in 1983 and noted that, despite the limited patent protection, TNCs had only lost 3.1% of the market to Canadian generics manufacturers since 1969; that profit levels for the pharmaceutical companies were higher than in most other OECD countries; and that growth in the pharmaceutical industry in Canada was even more buoyant than in the US during this time; it went on to recommend that brand-name patent protection for drugs be extended to a four-year period of market exclusivity after approval — meaning 14 years of patent protection.[64] The Commission also recommended the establishment of a Patented Medicines Review Board, which, according to Michèle Brill-Edwards, a former senior regulator with Health Canada, was deliberately given no teeth to create the illusion of government regulation.[65] While the report did not offer the pharmaceutical industry exactly what it wanted, it did establish a significant break from the Liberals' generics strategy. Brill-Edwards believes that, with the Commission, the Liberals had purposely "planted a time-bomb" that would give the multinational pharmaceutical industry greater and greater control over Canada's health care system.[66]

When the Liberals were defeated in 1984, Judy Erola and Harry Eastman were heavily rewarded for their efforts: Erola became the president of the Pharmaceutical Manufacturers Association of Canada and Eastman became the first director of the Patented Medicines Prices Review Board.

Two years later, Mulroney and his cronies seized on the space opened up by the Eastman Report and put forward Bill C-22 to establish seven-year monopoly protection for brand name drugs, in effect 17 years of patent protection — 10 for R&D and 7 for market exclusivity. In exchange for this incredibly generous gift, the pharmaceutical industry pledged new jobs and increased R&D spending.

The influential US pharmaceutical industry was the driving force behind Canada's shift in drug patent policy. Gerald Mossinghoff was US President Ronald Reagan's Assistant Secretary of Commerce and Commissioner of Patents and Trademarks. During his time in office, Mossinghoff orchestrated important legislative changes to support the pharmaceutical industry and began putting together an international US pharmaceutical agenda through his roles as Ambassador to the Diplomatic Conference on the Revision of the Paris Convention and Chairman of the General Assembly of the World Intellectual Property Office (WIPO).[67] In 1985, Mossinghoff became President of the Pharmaceutical Manufacturers Association, the world's most important pharmaceutical lobby.[68]

In the early 1980s, Mossinghoff and other leaders of the US pharmaceutical industry recognised that they could advance their interests in national patent legislation most effectively through international trade agreements. According to Mossinghoff:

> *There was a lot of frustration during negotiations about intellectual property matters. As the U.S. ambassador to the diplomatic conference of WIPO, I per-*

"I personally felt this frustration because I was representing the United States of America — the wealthiest, most powerful, biggest free market in the world — and I had just one vote."

64 Submission by the CLC to the Standing Committee on Industry on Bill C-91, the Patent Act Ammendment Act 1992, April 8, 1997, http://www.ck-ctc.ca/policy/social/c91.html

65 Personal communication, December 2001.

66 Personal communication, December 2001.

67 Teresa Stanek Rea, Partner with Burns, Doane, Swecker & Mathis, LLP, Alexandria, VA, "Striking the Right Balance Between Innovation and Drug Price Competition: Understanding the Hatch-Waxman Act — An Introduction of Speakers": http://www.fdli.org/pubs/Journal%20Online/54_2/art7.pdf

68 Centre for Responsive Politics, "Revolving door between the US government and Industry," January 2001: http://www.cptech.org/ip/health/politics/revolvingdoor.html

sonally felt this frustration because I was representing the United States of America — the wealthiest, most powerful, biggest free market in the world — and I had just one vote. As a result, the Reagan Administration decided to move these intellectual property negotiations out of WIPO and into the trade world.[69]

In 1981 Reagan appointed Ed Pratt, the CEO of pharmaceutical giant Pfizer Inc., to head the United States' top private sector trade advisory panel.[70] Canada's compulsory licensing legislation, which was an international embarrassment for the industry, became the US's priority target.

Reagan and his officials raised the issue of compulsory licensing repeatedly in meetings with Mulroney and his officials prior to 1987, particularly during negotiations for the US-Canada free-trade agreement. But, the Mulroney government was hesitant — not wanting the political damage that would inevitably ensue from any changes to the Patent Act. According to Bill Merkin, the U.S. deputy chief negotiator during the US-Canada free trade talks: "Ottawa didn't want it [intellectual property] to be in the free trade negotiations. They didn't want to *appear* to be negotiating that away as part of the free trade agreement. Whatever changes they were going to make, they wanted them to be *viewed* as, quote, 'in Canada's interest.' . . . It was a high priority issue for us. We were not above flagging the importance of resolving the issue [to the Canadian negotiators] for the success of the overall negotiations" [Emphasis in original].[71] In the end, a clause was negotiated, even though it was not included in the final text of the agreement, "to make progress toward establishing adequate and effective protection of pharmaceuticals in Canada by liberalizing compulsory licensing provisions."[72] With the passing of Bill C-22 in December 1987, the industry got what it was promised.

During the free-trade negotiations, the US pharmaceutical lobby developed an effective lobby within Canada. Its point man in Ottawa was John Zabriskie, the vice president of Merck and the head of Merck Frosst. He hired Government Consultants International to spearhead the Canadian effort. Government Consultants was owned by former Newfoundland premier Frank Moore — perhaps Mulroney's closest advisor and political ally. Moore himself took over the pharmaceutical industry's account along with Gerry Doucet, the brother of Mulroney's senior advisor, Fred Doucet.[73]

Bill C-22 was a significant victory for the US pharmaceutical industry, but they were after more.

For one, Bill C-22 did not go as far as US patent legislation and the US pharmaceutical industry wanted to bring patent coverage for drugs in Canada up to what it was in the US — 20 years. Second, now that Canada had gone from pariah to partner in the eyes of the US pharmaceutical industry, the US looked to seize upon the relationship to advance its global agenda. The US pharmaceutical industry, led by Ed Pratt, organised a formidable lobby of US, European and Japanese corporations to put patents, or intellectual property rights, onto the GATT agenda. Patents were bound to be controversial within the GATT negotiations and, in order to strengthen their negotiating position, the industry sought a precedent. The North American Free Trade

69 Gerald J. Mossinghoff, "World Patent System Circa 20XX, A.D.,*Yale Symposium on Law and Technology*, Spring 1999: http://lawtech.law.yale.edu/symposium/98/speech_mossinghoff.htm

70 Joel Lexchin, "Canada, free trade agreements and drugs costs," October 2001: http://apha.confex.com/apha/responses/129am/242.doc

71 ibid.

72 S. Auerbach, "U.S. bowed to Canadian demands to change pact," *Washington Post*, October 17, 1987, p.G2.

73 Marci McDonald, *Yankee Doodle Dandy: Brian Mulroney and the American agenda*, Stoddart Publishing: 1995, p.210.

Agreement (NAFTA) was the logical choice. According to Mossinghoff, NAFTA is

> *an important breakthrough in intellectual property rights . . . What NAFTA did was to affirm that (1) intellectual property is a proper subject for trade agreements, and (2) intellectual property standards should be set at a very high level. These developments in NAFTA occurred just before the agreement known as Trade-Related Aspects of Intellectual Property (TRIPs), which was being negotiated by GATT at the same time. The TRIPs provisions are very similar to the NAFTA provisions because the three NAFTA countries were representative of countries at different stages of development and thus were quite influential during the negotiations about TRIPs. The U.S. pushed for TRIPs, while Mexico and Canada were able to draw the support of developing and smaller emerging countries.*[74]

The language agreed upon in the NAFTA agreement was precisely what the pharmaceutical industry was asking for and goes beyond what they were able to achieve in the GATT negotiations. The NAFTA text served as the basis for Canada's Bill C-91.

But getting Bill C-91 passed was still going to take a fight and in Canada the lobby was led by Judy Erola, President of the Pharmaceutical Manufacturers Association of Canada (PMAC). Erola and PMAC ran a dirty and effective campaign. According to John Harding, a member of the opposition at the time, "When we got close to the final vote, we were offered baseball tickets, invites to expensive restaurants, promises of research and development grants for the university in my riding. The PMAC hired practically every lobby firm in Ottawa. The message we got was: 'Whatever you want, you can have'."[75] To finalise the deal, industry offered up some crumbs to give the Tories something to appease the general public with. The give and take was spelled out in a letter from Erola to then Minister of Industry, Michael Wilson — one of the key Cabinet Ministers behind the free trade agreement with the US. The pledge made by PMAC members in exchange for Bill C-91 included $400 million in new investments and the launch of a joint MRC/PMAC Health Program.[76] The lobbying paid off; the Mulroney government pushed Bill C-91 through before being tossed out of office.

The passage of Bill C-22 and Bill C-91 had enormous implications as far as biotech was concerned. On the one hand, it put into legislation a commitment on the part of the federal government to protect the interests of the health care industry over the interests of public health care. Higher drug prices were traded off for promised increased R&D spending on pharmaceuticals, which, given trends already present at that time, would mean more R&D on biotechnology. In a round-about way, high expenditures on biotechnology became the government's measure of a well-functioning health care system.

The battle around Bill C-22 and Bill C-91 also brought in a large and highly effective pharmaceutical lobby, led by the leading players in biotech. Once established within Ottawa, this political machine did not disappear. The PMAC remains and has mutated, merged, and manoeuvred its way into all kinds of policy-making channels.

In a round-about way, high expenditures on biotechnology became the government's measure of a well-functioning health care system.

74 Gerald J. Mossinghoff, op cit.

75 Roxanne Snider, "Patents and Profits," *New Internationalist*, issue 246, August 1993, http://www.oneworld.org/ni/issue 246/patents.htm

76 http://stretegis.ic.gc.ca/ssg/ph01309e.html

The MRC/PMAC Health Program

One of the outcomes of Bill C-91 was a joint program between the member companies of the PMAC and the MRC that was part of industry's promised contribution to R&D in Canada in exchange for stronger patent protection. The MRC/PMAC Health Program was a five-year, $237 million collaborative research program launched in 1993, with $205 million coming from industry and $32 million from the MRC.

The MRC/PMAC Health Program put industry at the helm of health research in Canada. Under the first five-year phase of the Program, it provided funding to over 1,000 projects including eight mega-projects, 50 clinical trials, and 1,040 full-time equivalent positions for research assistants, technicians, graduate students, post-doctoral students and other health-related professionals in Canadian universities, hospitals and research institutes.

The Domestic Lobby

It is clear that Mulroney and his government were heavily influenced by the US pharmaceutical industry. But American TNCs were not alone in campaigning for Bill C-22 and Bill C-91. Their demands were echoed by a domestic biotech lobby with political muscle of its own. Canadian lobby groups and associations supporting Bill C-91, like the Canadian Society for Clinical Investigation, played a critical role in its passage. The Society, with leadership from physician Calvin Stiller, mounted a major campaign to get all its members to press for the Bill.[77] Stiller would later become the CEO of the Canadian Medical Discoveries Fund — the most important source of venture capital for biotech pharma in Canada.

The Canadian biotech community was also central in the push for stronger patent protection. Way back in 1983, the Task Force on Biotechnology recommended that the government undertake a general review of the Patent Act and abolish Section 41 since it had "a negative effect upon the growth of the health care product industry." The following year, the Eastman Commission began its review of the pharmaceutical industry and the NBAC made a strong submission, calling once again for Section 41 to be abolished.

The biotech community and the Mulroney government, as discussed above, were singing the same tune. The thrust of Mulroney's policies was liberalisation and privatisation and these policies were undertaken in the name of increasing foreign investment. The government referred to increased investment in justifying all of its policies — from free-trade to deficit reduction. But you can't sell trade liberalisation by talking about all the possible sweatshop factories that the country can attract if it opens its borders. When the government talked about attracting investment, it had to emphasise a particular form of investment that Canadians would support. For the Mulroney government, and practically all other neo-liberal governments and institutions around the world, the investment they talk about is in the glamorous high-tech sector.

The push towards high-technology or knowledge-based industries is a fundamental characteristic of neo-liberal policy. At the same time that the Mulroney government began downsizing and liberalising trade, it began to put in place the framework and institutional basis for a

77 Personal communication with Michelle Brill-Edwards, December 2001.

knowledge-based industry. The biotech industry was a critical part of the neo-liberal package.

Bill C-22 was just one of a number of initiatives that the Mulroney government launched in 1987 to improve the investment environment for biotechnology and other high technologies. That year the government:

- released its National Science and Technology Policy;
- established a National Advisory Board on Science and Technology, chaired by Mulroney himself;
- launched the InnovAction program;
- hosted the Canada-OECD Joint Workshop on National Policies and Priorities in Biotechnology; and
- opened the new NRC Biotechnology Research Institute in Montreal.

When the Progressive Conservatives introduced Bill C-22, they weren't simply caving in to pressure from the American pharmaceutical lobby; they were announcing their clear commitment to the knowledge-based economy. This was the beginning of good times for Canada's biotech community.

In fact, as soon as Bill C-22 passed, after lengthy and heated debate in both Houses, the Conservatives put forward legislation for Plant Breeder's Rights (PBR). Again, this was something that the biotech community had pushed since the first Task Force. In 1977, the Liberals announced that they would bring out a PBR bill within a year, but it proved too controversial.[78] The Conservatives, on the other hand, eagerly seized upon this hot potato, and pushed it through by 1990 — right in the midst of the national controversy over pharmaceutical patents.

In line with the government's approach to science and technology, the NBAC was reorganised in 1988 so that over 80% of its members were from industry. William Cochrane of Connaught became the new chair of NBAC and the committee began to work more regularly with government. During 1989-1990, the Minister for Science attended every single NBAC meeting, where concerns were aired, action plans drawn up, and presentations made by key people in the industry, such as Jack Wearing, Manager of Business Development of Monsanto Canada.[79]

At this time, the industry also set up its own lobby group, the Industrial Biotechnology Association of Canada (IBAC). IBAC was federally incorporated in 1987 with a mission to "represent the interests of all segments of the Canadian biotechnology industry to the public and to government." In 1989, IBAC and Industry, Science and Technology Canada signed an agreement to establish the Canadian Institute of Biotechnology. According to the agreement, Industry Canada and IBAC would contribute matching dollars over five years, worth $1.1 million each, to fund the Canadian Institute of Biotechnology programs.

People from the Biotech community began to seep into every relevant policy arena. IBAC and the NBAC each had a representative on the Intellectual Property Advisory Committee of the Department of Consumer and Corporate Affairs.[80] Three NBAC members were on the National Advisory Board on Science and Technology: Julia Levy, William Cochrane, and Michel Brown. Hugh Wynne-Edwards, who later joined the NBAC, was also on the Advisory Board, as was Beverly Brennan, the Vice President of PhilomBios. Henry Friesen, one of the

78 Wilf Bradnock, Agriculture Canada, cited in *Proceedings of Biotech Day V*.

79 Fourth Report of the National Biotechnology Advisory Committee, 1989-1990.

80 ibid.

members of the Task Force on Biotechnology, became the President of the Medical Research Council and Peter Morand, the architect of the Ottawa Life Sciences Park, became the President of NSERC. Canada's two biggest research granting councils were now led by members of the biotech community.

The biotech bureaucracy

The wheels of government went into motion with the National Biotechnology Strategy of 1983. Under the Strategy, the government's role was to create the right conditions for the development of a biotech industry. No government since has questioned this role, even as its requirements have shifted. In the early days, the implementation of the National Biotechnology Strategy was left largely to the granting councils. This changed during the Mulroney years as products reached the commercialisation stage and the government took a more pro-active role in building the industry. During the initial years government was only called upon for funding infrastructure, but now, confronted with a suspicious financial sector and general public, industry wanted the government to take on the added role of salesman. Since Mulroney's government was willing to comply, the government became more and more concerned with managing and selling biotechnology.

The figures below are Industry Canada estimates of federal funding for the years 1989-1992, although certain expenditures are not included. According to Industry Canada, the total federal expenditure on biotechnology for the year 1991-1992 is around $200 million — $40 million more than what the table shows.[81] Nevertheless, the figures do demonstrate the extent of government involvement at this point and they also make it clear that the government was making significant expenditures

81 Biotechnology Directorate, Industry, Science and Technology Canada, "Federal Expenditures for Biotechnology, 1989-1992," March 1993.

82 ibid.

Table 1. Federal Biotechnology Expenditures and Person-Years 1989-90 ($000)[82]

Department/Agency	Expenditures	In-house Contracts	Grants/ Contributions	Total
Agriculture Canada (1)	19,973.2	0.0	0.0	19,973.2
Consumer and Corporate Affairs	401.0	0.0	0.0	401.0
Energy, Mines and Resources (2)	615.0	2,100.8	0.0	2,715.8
Environment Canada (2)	1,104.3	150.0	0.0	1,254.3
Fisheries and Oceans Canada (2)	241.9	42.3	0.0	284.2
Forestry Canada	3,750.0	120.0	0.0	3,870.0
Health and Welfare Canada	7,493.9	348.5	312.4	8,154.8
Industry, Science and Technology Canada (2)	324.0	0.0	293.4	617.4
International Development Research Centre (2)	0.0	0.0	808.1	808.1
Investment Canada (2)	0.0	0.0	157.0 1	57.0
Labour Canada	22.0	0.0	0.0	22.0
Medical Research Council (2)	0.0	0.0	44,461.0	4,461.0
National Defence (2)	153.0	190.0	0.0	343.0
National Research Council (2)	27,129.0	11,041.3	38,170.3	
Natural Sciences and Engineering Research Council (2)	0.0	0.0	24,888.0	4,888.0
Western Economic Diversification Canada (2)	0.0	0.0	101.1	101.1
TOTAL	**61,207.3**	**2,951.6**	**82,062.3**	**6,221.2**

(1) Capital expenditures not included
(2) Salaries not included

on biotech outside of applied R&D. Agriculture Canada had over 368 person-years' worth of full-time employees working on biotech. Consumer and Corporate Affairs had a $400 thousand annual budget for biotech. The figures also show that in 1991-1992 Industry Canada and Western Economic Diversification Canada became significant grant agencies for biotechnology in Canada. This was part of the shift towards a more commercial approach to research and development. The funds from these agencies and Investment Canada went directly to finance private sector biotech companies.

Initially the federal biotech strategy was managed by the Interdepartmental Committee on Biotechnology (ICB), which was established in 1983 as part of the National Biotechnology Strategy. It was struck at the Associate Deputy Minister level and involved several relevant departments. Yet, with the federal government's involvement in biotech increasing rapidly, two subordinate committees were formed in 1986 at the director or research co-ordinator level "to assist in dealing with ongoing issues and co-ordination of departmental activities." The first was the Interdepartmental Working Group on Biotechnology, which was later renamed the Biotechnology Co-ordinating Group (BCG). The BCG was mandated to

> *provide a forum for early discussion of policy options and issues of mutual concern to the development of commercial biotechnology; develop recommendations on these policy issues for discussion by the ICB; provide scientific advice to the ICB on projects to be supported with the funds of the strategy, to strengthen government R and D; provide a link between the national biotech advisory committee — that is the external body — the ICB and the research networks; and co-ordinate network activities and ensure appropriate network information exchange.*[83]

83 John Banigan, Assistant Deputy Minister, Industry Canada, Testimony before the Standing Committee on Environment and Sustainable Development, June 13, 1996.

Table 2. Federal Biotechnology Expenditures and Person-Years 1990-91 ($000)

Department/Agency	Expenditures	In-house Contracts	Grants/ Contributions	Total
Agriculture Canada (1)	23,033.7	0.0	0.0	23,033.7
Consumer and Corporate Affairs	418.0	0.0	0.0	418.0
Energy, Mines and Resources (2)	720.0	2,367.0	0.0	3,087.0
Environment Canada (2)	1,385.5	400.0	0.0	1,785.5
Fisheries and Oceans (2)	330.0	121.6	0.0	451.6
Forestry Canada	3,900.0	167.0	0.0	4,067.0
Health and Welfare Canada	8,087.2	594.6	306.4	8,988.2
Industry, Science and Technology Canada (2)	715.0	0.0	765.3	1,480.3
International Development Research Centre (2)	0.0	0.0	209.0	209.0
Investment Canada (2)	0.0	0.0	226.0	226.0
Labour Canada	72.0	0.0	0.0	72.0
Medical Research Council (2)	0.0	0.0	48,863.0	48,863.0
National Defence (2)	126.0	245.0	0.0	371.0
National Research Council (2)	22,770.0	0.0	10,217.8	32,987.8
Natural Sciences and Engineering Research Council (2)	0.0	0.0	26,607.0	26,607.0
Western Economic Diversification Canada (2)	0.0	0.0	900.1	900.1
TOTAL	61,557.4	3,895.2	88,094.6	153,547.2

(1) Capital expenditures not included
(2) Salaries not included

During the Mulroney years, the BCG met regularly to discuss issues pertinent to the commercialisation of biotechnology, such as regulations, labelling, communications, and intellectual property rights.

The other subordinate committee of the ICB was the Subgroup on Safety and Regulations, which reported directly to the ICB and represented Canada on the biotechnology group of the OECD. The Subgroup was responsible for the disbursement of the National Biotechnology Strategy funds. Its chair was held on a rotational basis by the departments of Agriculture, Health, and Environment Canada. Within the subgroup there were five very important working groups on regulations, communications, public involvement, the OECD, biosafety, and risk assessment. [84]

The Subgroup on Safety and Regulations became a key agency within government, particularly for regulatory policy concerning biotechnology. Not only did it work closely with industry, thereby bringing industry directly into the policy-formulation process, but it also established a cadre of bureaucrats to ensure policy continuity. A number of original members of the subgroup appear time and again in influential government positions, for example:

> **Terry Walker:** A Senior Project Manager with the NRC/IRAP program who later moved to Industry Canada, where he was the specialist in biotechnology for the Chemicals and Biotechnology Branch. Walker was a consultant to NBAC in its sixth report.
>
> **Margaret Kenny:** The Agriculture Canada representative on the Subgroup and was later appointed Associate Director of Biotechnology Strategy and Coordination with Agriculture and Agri-Food Canada

84 ibid.

Table 3. Federal Biotechnology Expenditures and Person-Years 1991-92 ($000)

Department/Agency	Expenditures	In-house Contracts	Grants/ Contributions	Total
Agriculture Canada (1)	22,611.7	0.0	0.0	22,611.7
Consumer and Corporate Affairs	435.0	0.0	0.0	435.0
Energy, Mines and Resources (2)	670.0	2,171.5	0.0	2,841.5.0
Environment Canada (2)	1,301.2	325.0	0.0	1,626.2
Fisheries and Oceans (2)	258.0	165.5	0.0	423.5
Forestry Canada	4,425.0	264.0	0.0	4,689.0
Health and Welfare Canada	8,359.8	794.7	306.4	9,460.9
Industry, Science and Technology Canada (2)	689.0	0.0	4,405.9	5,094.9
International Development Research Centre (2)	0.0	0.0	315.3	315.3
Investment Canada (2)	0.0	0.0	160.0	160.0
Labour Canada	72.0	0.0	0.0	72.0
Medical Research Council (2)	0.0	0.0	51,210.0	51,210.0
National Defence (2)	204.0	396.0	0.0	600.0
National Research Council (2)	22,032.0	0.0	8,309.4	30,341.4
Natural Sciences and Engineering Research Council (2)	0.0	0.0	27,129.0	27,129.0
Western Economic Diversification Canada (2)	0.0	0.0	3,377.4	2,006.7
TOTAL	61,057.7	4,116.7	95,213.4	160,387.8

(1) Capital expenditures not included
(2) Salaries not included

Desmond Mahon: The Subgroup representative from Environment Canada who was active in drafting the Canadian Environmental Protection Act of 1993. He later became Chief of New Substances Division, Commercial Chemicals Branch, Environment Canada.

This is not to say that regulatory decision-making was concentrated within the bureaucracy. The bureaucrats were merely carrying out an agenda for regulations on biotechnology coming down from the centre of government.

Soon after the Conservatives took office, Don Mazankowski, Minister responsible for Privatisation and Regulatory Affairs, introduced two major policy statements on regulations, guided by two basic objectives: reduce impediments to economic growth and remove obstacles to innovation.[85] The government's approach to regulation was put forward quite clearly in their third Guiding Principle for regulatory policy: "the government intends to limit as much as possible the overall rate of growth and proliferation of new regulation."[86] Deregulation was now the order of the day.

The Conservatives began to build the architecture for deregulation in the 1991 Budget Speech, when they dissolved the Office of Privatisation and Regulatory Affairs and moved overall regulatory responsibilities to the Privy Council Office (PCO) and the Treasury Board. The task of the PCO was "to ensure that regulatory initiatives fit in with all other government initiatives", while the "Treasury Board remains the guardian of the overall regulatory policy." Consequently, as pointed out by Jim Martin, the head of the Regulatory Affairs Directorate in the Treasury Board, "in any regulatory fight it is Department X versus PCO and Treasury Board Secretariat — two 'heavyweight' central agencies."[87]

After putting these structural reforms in place, the Tories then turned to the policy arena. In the Budget Papers of February 1992, under the heading "tackling the regulatory burden", the Minister of Finance announced that,

> *The government is beginning a department review of existing regulations to ensure that the use of the government's regulatory powers results in the greatest prosperity for Canadians. In this context, departments will be instructed to review their existing regulations to ascertain whether they comply with this objective. This is a major undertaking and will have to proceed in stages. Agriculture Canada, Transport Canada and Consumer and Corporate Affairs will be the first departments to engage in this review.*
>
> *Part of this review should require a public "rejustification" of existing regulations that are to be retained to ensure that those which stifle the creativity and efficiency required by Canadian business to compete and grow in today's modern world or which serve no public good, are removed.*[88]

Three days later, the newly established Regulatory Affairs Directorate in the Treasury Board published an update on the federal government's regulatory policy. According to the update, departments must demonstrate, among other factors, that for existing or proposed regulations:

- *A problem or risk exists, government intervention is justified, and regulation is the best alternative;*
- *The benefits of the regulatory activity outweigh the costs; and*

85 W.T. Stanbury, "Reforming the Federal Regulatory Process in Canada, 1971-1992," Annex to the Report of the Sub-Committee on Regulations and Competitiveness of The Standing Committee on Finance, December 10, 1992, p.58.

86 ibid, p.69.

87 ibid, p.68.

88 ibid, p.69.

- *Steps have been taken to ensure that the regulatory activity impedes as little as possible Canada's competitiveness.*[89]

In effect, the Tories, through the PCO and the Treasury Board, were making it much more difficult for departments to enact new regulations or even maintain existing ones, particularly if they clashed with industry interests.

The Canadian biotechnology industry emerged in the midst of this larger trend in federal regulatory policy. While the biotech policies were being developed behind closed doors for some time, the Cabinet made an official decision to develop a federal regulatory framework for biotechnology in 1992 and the ICB was tasked with carrying it out. It was the ICB's Subgroup on Safety and Regulations, through constant consultation with industry and regulators in the US, that proposed the critical language for the regulation of biotechnology that would be adopted and would come to define Canada's regulatory framework for genetically modified organisms (GMOs).[90] They recommended a broad definition of biotechnology that was subsequently adopted in the 1993 Canadian Environmental Protection Act:

> *"...the application of science and engineering in the direct or indirect use of living organisms or parts or products of living organisms in their natural or modified forms."*

The Subgroup also insisted that the regulation of genetically modified organisms consider GMOs on a product, not a process basis, leading to the division of regulatory responsibility among a number of agencies.[91] Moreover, the Subgroup and colleagues at Agriculture Canada developed the notion of 'substantial equivalence.' According to Simon Barber, who arrived at Agriculture Canada's Food Inspection Branch to set up the regulatory framework in 1990: "We propose that by determining if the new product is substantially equivalent to existing, familiar products accepted as safe; if so, we could then waive further requirements for risk assessment."[92] After helping put in place this industry-friendly regulatory system, Barber left Agriculture Canada for a job as Director of Plant Biotechnology with EuropaBio — the leading European biotech industry lobby.

The Subgroup did exactly what industry and the central agencies expected of them. Through clever use of language they brought a new and unknown technology under existing regulations, without creating new regulatory 'burdens' for the industry. As noted by the Subgroup's chair at the time, Desmond Mahon: "A critical principle in the framework is that no new institutions or legislation respecting the regulation of biotechnology products will be developed."[93]

The regulatory framework introduced by the Mulroney government was one aspect of a larger effort to advance the biotech industry's interests and Agriculture Canada exemplified the government's vision of its role.[94] The Department was a solid backer of biotech and its activities extended well beyond research and regulation, which its Food and Inspection Branch was tasked with. In 1991, the Department established a Biotechnology Management Team (BMT) reporting to the Assistant Deputy Minister Art Olsen and chaired by Jean Hollebone from Food Production and Inspection. The BMT was responsible for defining the Department's 'corporate position' and co-ordinating activi-

89 ibid, p.69.

90 Desmond Mahon, Chair of the Interdepartmental Sub Group on Safety and Regulations, "The Federal Regulatory Framework for Biotechnology," 10 November 1993: http://www.inspection.gc.ca/english/ppc/biotech/consult/agri/introe.shtml

91 Jean Hollebone, Director, Biotechnology Strategies & Coordination Office, Agriculture and Agri-Food Canada," Regulating Agricultural Products of Biotechnology,": 10 November 1993: website as above

92 Simon Barber, "Risk-Based Approach to the Regulation of Agricultural Products," : 10 November 1993: website as ab ove

93 Mahon, op. cit.

94 Information below comes from Agriculture Canada, "Biotechnology Coordination in Agriculture Canada: Issues and Activities for Internal Discussion," October 1991.

ties relevant to biotechnology. The 'corporate position' reads like a statement right out of an NBAC report:

> *Biotechnology is a key new technology which can contribute to the significant advancement of the agriculture and food sectors, thereby enhancing the well being of Canadians and promoting successful competition of agricultural goods and services in the increasingly competitive global marketplace.*

The BMT also developed a corporate communications strategy, with the objective to:

> • *Foster public understanding and acceptance of new biotechnologies and products . . .*
> • *Position the department as playing a leadership role*
> • *Position biotechnology as an integral part of Canada's future prosperity.*

The Food Production and Inspection Branch, which looked after biotech regulations, took the lead in providing public information and in "market[ing] Agriculture Canada activities in the field of biotechnology." The first objective of this marketing strategy was "to foster public understanding and acceptance of new biotechnologies" (emphasis added). This would be achieved through 'communications messages,' such as:

> *The application of biotechnology will help improve the viability of agriculture and lessen its impact on the environment. Nutritionally improved crops and healthier animals are possible benefits of this technology.*

and

> *If Canada's agri-food industry is to be competitive in global markets in the future, we must establish ourselves as leaders in biotechnology. There is great potential for biotechnology to improve the competitiveness of agriculture products through added value.*

The BMT was also responsible for developing a set of 'communications products,' including brochures, information kits, tip-sheets, speeches and exhibits "to promote biotech success stories." In order to handle more immediate issues, the BMT planned to establish a "quick response mechanism" with "departmental spokespersons with training in media relations and a correspondence unit to monitor and feedback developing issues."

Agriculture Canada was both influenced by and a mouthpiece for the pervasive 'new economy' jargon of 'innovation' and 'competitiveness' that was so crucial to the development of biotechnology. The language had even seeped into the Department's positions on the General Agreement on Trade and Tariffs (GATT), which was going through another round of negotiations at the time. The stated position of the Department in 1991 was that "biotechnology has an important role to play in [the] global and domestic restructuring [brought about with the GATT]." It was also evident in the Department's technology transfer program. According to the departmental position:

> *The Department continues to facilitate the transfer of technology and technological information in regulatory activities in biotechnology to enhance the competitiveness of the agri-food industry by:*

• increasing support for regulatory research to ensure that regulation does not become an impediment to commercialization of biotechnology products;
• encouraging partnerships and joint ventures with the industry to ensure that the technology transfer agreements become marketable;
• ensuring that the long term strategic research would lead to stocking of the 'technology shelves' by promoting excellence, market driven factors and entrepreneurship by scientists;
• promoting resolution of intellectual property issues in order to encourage deployment of the technology and products of biotechnology by the industry;
• educating the consumer on the importance of biotechnology to competitiveness.

Agriculture Canada's 1991 biotech strategy oozes with neo-liberal dogma — a reflection of how the growth of neo-liberalism and biotechnology in Canada were inextricable. The Mulroney period laid the foundations for their development; now the Chrétien government would erect the edifice.

PART TWO: Biotech in the Chrétien Era

Enter the Innovation Agenda

The Canadian electorate may have voted for big changes in government when it decimated the Tories and voted overwhelmingly for the Liberals and their Red Book promises of reform and employment, but the Chrétien government refused to budge from the policies of its predecessor. Nearly every department kept on the course laid out by Mulroney, particularly in the area of trade where the Liberals showed no interest in pursuing their pledge to re-negotiate NAFTA. The only department that differed significantly from the Tory period was that of finance, not because of a new ideology, but because the Department of Finance, under Paul Martin, was willing to take the spending cuts much talked about by Mulroney to dimensions that even the Tories had been unwilling to venture into.

Martin's first two budgets ushered in a massive program slashing campaign designed to reduce the deficit to zero. His 1995 budget alone lopped off $29 billion in government spending. These deep cuts extended to federal research and development. Funds for the National Biotechnology Strategy were reduced by 15% for the 1995-1996 year and by a further 6% for 1996-1997.[95] Funds for biotechnology were also cut indirectly through program cuts to the Departments of Industry, Agriculture and Health.

The process of gutting the departments put Chrétien and Martin in control of the rebuilding process when spending returned a few years later. Individual line ministers had to approach the PMO or the Department of Finance to support new spending on their programs, while Chrétien and Martin made their own new spending decisions, as Martin would do in 1998 when he allocated $800 million to the Canadian Foundation for Innovation.[96] In effect, the interests of the biotechnology industry in Canada became more dependent than ever on support within the uppermost circles of federal power.

The Liberal deficit reduction campaign was a triumph for neo-liberalism — small government and freedom of capital. Spending cuts focussed primarily on public programs, with minimal efforts to increase revenue, particularly from corporate tax. The Red Book that the Liberals produced for the election may have emphasised demand-side economics, but once in power, the Liberals took up the supply-side economics of their predecessors. Apparently Martin told his senior Financial officials: "Don't tell me what's in the Red Book . . . I wrote the goddamn thing. And I know that a lot of it is crap . . . The goddamn thing was thrown together quickly in the last three weeks of July."[97] The thrust of Liberal policy was to hack away at public programs while, at the same time, putting in place the policy environment to attract and encourage industry. Yet, because of the incessant focus on deficit reduction, the Liberals had signalled their overall commitment to neo-liberalism but had yet to specify their vision for the role of government within it.

An early indicator of where they were going came in 1996 when the Liberals launched the report entitled, "Science and Technology for the

95 John Banigan, Assistant Deputy Minister, Industry Canada, Testimony before the Standing Committee on Environment and Sustainable Development, June 13, 1996.

96 Donald J Savoie, *Governing from the Centre: The Concentration of Power in Canadian Politics*, University of Toronto Press, 1999, p.190.

97 ibid, p.78.

New Century," after a two-year science and technology (S&T) review process. The report signalled that Liberal S&T policy was, like that of the Conservatives, clearly in the realm of neo-conservative thinkers like Michael Porter and Richard Lipsey. Porter is a widely-quoted Harvard economist and popular consultant for the world's biggest TNCs. In 1991 the federal government and the Business Council on National Issues brought him in, under a $1 million contract, to produce a report on how to improve Canada's productivity. Porter told them what they wanted to hear: that Canada relies too much on comparative advantage (i.e. natural resources) and needs to foster leading companies in innovation (i.e. high-tech sectors). According to Porter, the federal government should pursue this agenda aggressively by way of subsidies, infrastructure, tax credits, deregulation, and education.[98] The Liberal government has been an obedient servant of this ideology.

Porter's ideas have been picked up by some of Canada's most influential economists, notably Pierre Fortin and Richard Lipsey, both federal government advisors, fellows of the Canadian Institute for Advanced Research (CIAR), and economists affiliated with the CD Howe Institute. Lipsey argues that the West's 'supremacy' is due to its creation of "a society in which innovation was continuously encouraged."[99] Lipsey believes that we are in the midst of an economic boom due to new technologies, but Canada risks becoming poor if it removes the conditions to innovate. Hence the Canadian government must not only reward entrepreneurs and stick to 'market incentives', as advocated by Porter, it must provide "substantial, coordinated government assistance to encourage commercial innovation." For Lipsey, governments must go beyond laissez-faire to be competitive in the new "techno-economic paradigm." Fortin makes a similar argument, while underlining the importance of 'labour productivity' and, therefore, technology to economic growth.[100]

The same ideas are put forth by Michael Hart, another influential Canadian economist and advisor to DFAIT. He maintains that, with regards to trade and innovation, for "Canada to make the transition to a knowledge-based economy, we must take steps to become a more innovative society. This means not only that we must encourage research and development at all levels and promote the commercialisation of innovation, but facilitate the use of the best technologies and practices, whatever the source" — even if this means weakening regulations: "Governments at all levels must become more vigilant about the burdens they impose on the wealth-creating sectors of the economy and recognize the extent to which such requirements undermine our capacity to compete at home and abroad." As an advisor, Hart encouraged the federal government to play an 'activist role' in the promotion of business, much in line with the Team Canada missions that Chrétien himself has led.[101]

The government's 1996 S&T report shows how much this thinking seeped into the Liberal agenda. In the report, the government describes an 'innovation gap' in the Canadian economy that will cause Canada to fall behind if it is not filled. It says, "We must recognize that our economy is undergoing a major transformation unlike any since the industrial revolution" and "knowledge and information are at the root of [this] economic and societal shift." Therefore, "we must take a more deliberate approach to building the Canadian innovation system."[102]

98 Michael Porter, "Canada at the Crossroads: the Reality of a New Competitive Environment," BCNI and the Government of Canada, Ottawa, 1991.

99 Richard G. Lipsey, "Economic growth, technological change, and economic policy," Forthcoming in a volume on Canadian Economic Policy edited by Pierre Fortin and Craig, Riddell.

100 Pierre Fortin and Elhanan Helpman "Endogenous Innovation and Growth: Implications for Canada", Occasional Paper No. 10, Industry Canada, 1995.

101 Michael Hart, "What's Next: Canada, the Global Economy, and the New Trade Policy," Centre for Trade Policy and Law, Ottawa, 1994.

102 Industry Canada, "Science and Technology for the New Century: A Federal Strategy," Ottawa, 1996, p.3 and p.13.

In the same 1996 report, the Liberals signalled their response and their willingness to spend and legislate on behalf of high-tech industry: "The Federal Government recognizes that it has a legitimate role to level the playing field [with other industrial countries] and, by doing so, to share both the risks and benefits in those strategic industries in which we choose to compete."[103] Here are some of the major initiatives that were announced in the 1996 report:

- The National Advisory Board on Science and Technology, which was chaired by the PM, was replaced by a new Advisory Committee on Science and Technology (ACST), which would be appointed by and report to the PM and meet regularly with the Economic Development Policy Committee of Cabinet.
- The renamed Ministry of Industry was given responsibility to ensure coordination across departmental lines for horizontal, cross-cutting issues.

The government also promised to:

- make regulatory and intellectual property legislation more competitive;
- work out a 'clustering strategy' with the provinces over the next few years; and
- reorient funding among the granting councils to focus on partnerships with industry and product commercialisation.

The following year, the Ministry of Industry issued another report on S&T that went deeper into the innovation agenda. The report openly criticises the government for reducing spending on R&D (even though the cuts were fairly minor in most departments, except in Environment Canada and Natural Resources Canada where the cuts were substantial), saying that "innovation is the key to success in this new, knowledge-based economy."[104] Now that the Liberals had achieved their deficit target, Paul Martin's budgets would make amends.

In the 1999 budget, Martin pumped in $1.8 billion in new funds for S&T, including: $200 million for the Canadian Innovation Foundation (on top of the $800 million initial investment in 1997); $390 million for the CIHR (the reorganised MRC); $90 million for the National Centres for Excellence; and $34 million for the Industrial Research Assistance Program (IRAP). There was another $150 million over three years for Industry Canada's Technology Partnerships Program, on top of the $250 million allocated the previous year. And, as the government pointed out, the private sector saved around $1.4 billion a year from the generous Scientific Research and Experimental Development tax credit. For Nortel lobbyist, Peter Kastner, "Canadian R&D incentives are clearly, clearly, the most favourable in the G7."[105]

The Atlantic Innovation Fund was a perfect example of this new innovation agenda. According to its framework:

> *The Atlantic Innovation Fund represents a significant evolution in the federal government's approach to regional economic development in Atlantic Canada … Atlantic Canada's economy is undergoing structural change; while continuing to benefit from a strong resource sector, it is experiencing a transition from a primary resource dependent economy to one that is increas-*

103 ibid, p.13.

104 Government of Canada, "Minding Our Future: A Report on Federal Science and Technology," 1997.

105 Peter Kastner, "Why we need to take care of R&D and why governments should help," presented at the Conference on Government Recipes for Industrial Innovation, Centre for Policy Research on Science and Technology, Simon Fraser University, Vancouver, BC, 20-21 October, 1994, http://edie.cprost.sfu.ca/~grii/index.html

ingly being driven by innovation, technology, and growth in non-resource sectors.

It then goes on to talk about the global situation:

> *In the 21st century, levels of R & D and innovation will determine the competitiveness and economic growth potential of all leading economies. Increasing the creation of knowledge as well as the successful diffusion and adoption of technologies throughout the economy has therefore become a global strategic objective . . . Success in the global economy depends on competitiveness, and innovation is the key element of competitiveness ... Globally, there is an expanding "club" of innovators. Countries such as Germany and Japan are successfully mobilizing their resources to yield national innovation systems comparable in strength to that of the United States, which is clearly the world leader. In addition, a number of smaller countries are making the transition from imitator to innovator, such as Taiwan, Korea, Singapore and Israel. The competitive challenge will increasingly come not only from the low-cost producer but also from the most efficient innovator. ...*

Michael Porter's prescriptions were now policy at the centre of government.

Force feeding biotech

Biotech occupied a special place within the Liberals' new S&T agenda. Chrétien singled out biotech as a 'key sector' in the 1997 Speech from the Throne and established a team of seven ministers led by Manley to oversee the renewal of the Canadian Biotechnology Strategy. Chrétien also established a new biotechnology committee at the Deputy Ministerial level and brought the NBAC back together to issue a report for the development of the new national biotech strategy. In August 1998, after a contrived public consultation process, the Liberals announced a new Canadian Biotechnology Strategy (CBS) and their intention to make Canada a world leader in the field.

The CBS opened the door to almost limitless government spending and policy support. Martin dished out $145 million specifically for in-house biotech programs for the years 1999 and 2000 combined. The biotech community, as one of the priority sectors, also had privileged access to all the granting councils and the heavily financed Technology Partnerships Canada (TPC) program, run by Industry Canada. In April 2000, TPC invested $80 million in BioChem Pharma to "allow the company to evolve into a fully integrated biotechnology company in the field of recombinant protein vaccines."[106] Industry could also get money for biotech research through Agriculture Canada's Matching Investment Initiative, where the government promised to match industry contributions to collaborative research projects for up to $107 million over the five years from 1995-2000. And there was the newly established $800 million Canadian Foundation for Innovation that was well suited to support biotech R&D. But it was in the 2000 budget that the Canadian biotech community scored its biggest coup, when Martin announced the establishment of Genome Canada in his budget speech.

Genome Canada

Since it was first announced in 2000, Genome Canada has received $300 million in federal funding. According to its website,[107]

106 Industry Canada, "Pathways to Growth: Opportunities in Biotechnology," 2000, p.20.

107 http://www.genomecanada.ca

"Genome Canada is a not-for-profit corporation dedicated to developing and implementing a national strategy in genomics research for the benefit of Canadians . . . The overriding objective of Genome Canada is to coordinate genomics research to enable Canada to become a world leader in a few selected sectors that are of strategic importance to this country, such as health, agriculture, environment, forestry and fisheries.

In order to accomplish this objective, Genome Canada will:

1. *Bring together industry, governments, universities, hospitals, research institutes and the public in support of the national genomics research program.*

2. *Support large-scale genomics projects that draw on existing Canadian strengths and expertise, and whose scale and scope are such that they cannot currently be funded at internationally competitive levels, through existing mechanisms.*

3. *Put in place research infrastructure to support the major science and technology platforms essential for the large-scale projects, including, but not limited to functional genomics and proteomics, genomics sequencing, genotyping, bioinformatics and new technology development.*

4. *Ensure leadership in ethical, environmental, legal and social issues related to genomics.*

5. *Effectively communicate the results of genomics research to the public, thereby helping Canadians to understand the relative risks and rewards of this type of research.*

6. *Provide leading-edge technologies to researchers and cross-disciplinary training of the necessary workforce in all genomics-related fields through support for five Genome Centres across Canada: one each in British Columbia, the Prairies, Ontario, Québec and the Atlantic.*

7. *Foster Canadian participation in international genomics research programs.*

8. *Encourage investment in genomics research by others."*

Genome Canada has the dual and conflicting mandate of promoting and assessing genomics. It claims it will "ensure leadership in ethical, environmental, legal and social issues related to genomics," but it has no process for carrying out such a function. Furthermore, its advisory committee is made up of scientists and business people, including a senior executive of Pioneer Hi-Bred, and its project selection committee is chaired by Thomas Caskey, the CEO of Cogene Biotech Ventures of the US and former president of the Merck Genome Research Institute. None of these people are in a position to represent the diversity of concerns and interests related to the technology that exist in Canada. In fact, all of the members of the selection committee are from outside of Canada.

Board of Directors includes: Henry Friesen, Heather Munroe-Blum, Susan Smith, Lorne Babiuk, Alan Bernstein, and Murray McLaughlin.

Scientific Advisors include: Brian Harling (MDS Inc), Michael Dennis (SignalGene Corp), James Friesen (UofT), and Steven Rothstein (Pioneer Hi-Bred Int.)

Selection Committee: Chaired by Thomas Caskey (CEO of Cogene Biotech Ventures in the US, and former president of the Merck Genome

Research Institute). There are no Canadian-based scientists on the selection committee.

In April 2001 Genome Canada completed its selection process and announced funding for 17 large-scale projects and 5 science and technology platforms worth $270 million. The bulk of the money went towards the establishment of five regional genome centres in Quebec, Ontario, BC, the Prairies and the Atlantic. It's worthwhile glancing through the website to look at the boards of directors of these centres. The Prairie Centre, for instance, is chaired by Pete Desai of AgrEvo, and other directors include Peter McCann of AgWest Biotech and Marsha Sharp, the CEO of the Dieticians of Canada.

The PM and his agencies exercise almost complete control over the Cabinet and the ministries.

Why did the Liberals take on such a commitment to biotech? Certainly the ideology that they were putting forward and their 'innovation agenda' was a good fit with the claims of the biotech industry, but why did the Liberals privilege biotech over other areas of R&D with 'innovative' potential? The answers to these questions appear to have more to do with politics than ideology and the people in government supporting biotech, from the very inner levels of government out.

Looking at the Biotech Lobby from the Inside Out

The Inner Circle

Understanding pretty much any policy of the Chrétien period begins with the inner circle. Donald Savoie, in his book *Governing from the Centre* maintains that power is consolidated around the Prime Minister and the central agencies that surround him — the Privy Council Office (PCO), the Treasury Board and the Prime Minister's Office (PMO). The PM and his agencies exercise almost complete control over the Cabinet and the ministries. Since biotechnology is a major element of Liberal policy, singled out in speeches from the Throne and the national budgets, it is certainly supported heavily by the PM himself. Nevertheless, it's hard to say exactly why he supports it.

There are some potential theories:

One of the strongest advocates of biotech is the PM's brother Michel Chrétien. He's the CEO of the Loeb Institute of the Ottawa Civic Hospital, which recently merged with the Ottawa Hospital Research Centre to form the Ottawa Health Research Institute, and the former Director of Science and President of the Administrative Council, Montreal Institute of Clinical Studies. Michel Chrétien's work in protein chemistry is highly prized by the pharmaceutical industry and he recently received the Health Research Foundation Medal of Honour from the pharmaceutical industry's lobby group Rx&D.[108] In 1999, Michel Chrétien's research team at Loeb obtained $13.8 million from a consortium of Glaxo Wellcome, CpG ImmunoPharmaceuticals (a US biotech boutique that Loeb researcher Heather Davis co-founded) and the Ontario Challenge Fund to develop DNA vaccines."[109] Chrétien's also one of the longest serving members of NBAC — since at least the late 1980s. In the 1998 NBAC report, Michel Chrétien is quoted as saying, "In the new millenium, biotechnology will be at least as important for the economic growth of Canada, as electricity, metallurgy, chemistry and forestry were at the start of this century."[110]

108 Judy Erola, past-President of the Pharmaceutical Manufacturers Association of Canada is a member of the Board of Directors of the Loeb Institue and the University of Ottawa. Adherex web site: http://www.qadherex.com/board.htm

109 Ottawa Health Research Institute, "Scientist Profiles: Michel Chretien," http://www.ohri.ca/profiles/chretien_summ.asp; Ontario Challenge Fund, "Backgrounder: Ontario research and Development Challenge Fund," April 12, 1999: http://www.ontariochallengefund.com/english/news/04121999b.shtml; and Beth Schachter, "The Case of the Dinucleotides that Spell Danger," *The Beagle*, April 13, 2001, Issue 100: http://nasw.org/users/bschachter/Danger2.html

110 1998 NBAC Report, p.26.

Another possible link between Jean Chrétien and the biotech industry could have occurred during his leave from politics between 1986-1990. During that time, Chrétien worked as a senior advisor with Gordon Capital — one of the earliest sources of venture capital for the Canadian biotech industry as noted earlier. Many of the senior executives of Gordon Capital, including Robert Fung, moved on to work with Yorkton Securities, currently a major source of biotech venture capital, and Robert Fung remains a close personal friend of Chrétien and Paul Martin.

During his hiatus from politics, Chrétien also worked with the Ottawa legal firm Lang Michener, which specialises in patent law. According to its website: "Our Ottawa office provides strategic advice to businesses dealing with the federal government, its institutions, and the capital's booming hi-tech sector." Chrétien's closest advisor, Eddie Goldenberg, worked with Lang Michener at this time as well.

Eddie Goldenberg is the Senior Policy Advisor of the Prime Minister's Office (PMO). In the Chrétien government, the PMO, along with the Privy Council Office, are the most powerful governmental agencies. According to Donald Savoie, the combined power of the PMO and the PCO have "grown far beyond anything reasonable in a parliamentary democracy." Support of biotech at the top probably has a lot to do with support in the PMO and the PCO.

Another influential advisor within the PMO was, until recently, Chaviva Hosek, the Senior Advisor of Policy and Research. She worked with Chrétien at Gordon Capital during the late 1980s, and is well known for her leadership of the National Action Committee on the Status of Women. In December 2000 she left the PMO to take up the position of President and CEO of the Canadian Institute for Advanced Research (see below). Her post in the PMO is now held by Paul Genest, the former Senior Advisor to Health Minister Allan Rock.

The Canadian Institute for Advanced Research (CIAR)

The CIAR is a little known scientific network for 'cutting-edge' research. It was established by scientist Fraser Mustard in 1982 as a network of scientists working on artificial intelligence. The centre now brings the elite of university scientists and the business establishment together on several programs that the CIAR believes will be key to future economic development. These programs include: Cosmology and Gravity, Earth System Evolution, Economic Growth and Policy, Evolutionary Biology, Human Development, Nanoelectronics, Population Health, and Superconductivity. In 1999, the CIAR released the "Early Years Study" commissioned by Ontario Premier Mike Harris. Two of the leading Canadian economists advocating for 'innovation' work with the CIAR, are Richard Lipsey and Pierre Fortin. According to Chaviva Hosek, "CIAR isn't a physical place, it's an idea. It's a community of minds trying to push the frontiers of human knowledge together. We give people the resources to take the time to do their work and connect with each other."[111]

The CIAR has close links with the Canadian biotechnology community. According to its Annual Report, CIAR "has been working with the Networks of Centres of Excellence Programs, particularly the Protein Engineering Network, to explore how the work from biological sciences can be better commercialised without eroding the national base in fun-

111 Dawn Calleja, "The mother of invention," *Canadian Business*, Feb. 05, 2001.

damental research." Its Evolutionary Biotechnology Program is connected to the Atlantic Genome Centre through its co-ordinator, Ford Doolittle, who is responsible for planning the research programs for the Atlantic Genome Centre. Michael Gray, a CIAR fellow, is the Chair of Genome Canada's Science and Industry Advisory Committee and Franz Lang is the Chair of the Science and Industry Advisory Committee for the Quebec Genome Centre.

Over 50% of CIAR funding comes from federal and provincial governments. In May 2000, Manley announced $14 million in matching federal funding over 4 years. Public funding will likely increase now that Hosek, with her tight connections to the top levels of government, is the CEO.

A sizeable amount of CIAR funding comes from the private sector: 14.4% of funding comes from corporations, including $2.5 million over the past 13 years from the Royal Bank. The private sector has an influential voice in determining the CIAR research agenda, as the majority of the CIAR's Board Members are drawn from the largest R&D and financial companies in Canada. They include: Peter Bentley of the Canfor Corporation, Beverley Brennan of Philom Bios, Purdy Crawford of AT&T Canada, Michael Decter of Lawrence Decter Investment Counsel Inc., J. Trevor Eyton of EdperBrascan Corporation, Anthony Fell of RBC Dominion Securities Inc., Rick George of Suncor, Kerry Hawkins of Cargill Limited, Richard Ivey of Livingston Group, Maureen Kempston Darkes of General Motors of Canada Ltd., David Kerr of Noranda, Claude Lamoureux of the Ontario Teachers' Pension Plan, Peter Nicholson of BCE Inc., Roger Parkinson of World Association of Newspapers, Raymond Royer of Domtar, Helen Sinclair of BankWorks Trading, Allan Taylor of the Royal Bank of Canada, and Victor Young of Fishery Products International. Other notable Board Members are former Ontario Premier Bob Rae and Andrei Sulzenko, the Assistant Deputy Minister of Industry Canada.

The current Chairman of the CIAR and former CEO before Hosek took over is Tom Kierans. He served as a member of the Business Council on National Issues, as President of the CD Howe Institute for ten years, and currently as Director of the Clarkson Centre for Business Ethics at the University of Toronto. Kierans has been a Director and Executive with many major corporations including Petro-Canada, McLeod Young Weir Limited (later ScotiaMcLeod), Pitfield Mackay Ross, Nesbitt Thomson and Company Limited, and IPSCO.

Hosek was carefully selected by Kierans himself and appears to be very much on board with the innovation agenda. "Funding this kind of research is key to Canada's strength over the long haul, not just because it will give results you can take to the bank," says Hosek. "It's about creating and maintaining intellectual leadership in Canada."[112]

The PCO sits at the top of the federal civil service. Unlike the PMO, it is supposed to provide the government, primarily the Prime Minister, with non-partisan advice and support. People in the PCO are typically very sharp and determined and most have spent years working their way up the public service ladder. The PCO takes its cues from the PM and then manages the government. As its website says, "the Clerk of the Privy Council provides advice to the Prime Minister on the overall conduct of government business, including the strategic handling of major issues and subjects that are of particular interest to the Prime Minister. The objective is to ensure that all the affected interests have been consulted, and that a full range of alternatives has been considered prior to deci-

112 ibid.

sions — in sum, that the Prime Minister and the Cabinet possess the information required to make decisions."

The PCO also "supports the Prime Minister's power to recommend appointments by providing substantive policy and management advice on certain senior appointments, including the appointment of deputy ministers and heads of agencies." This is a very important point to bear in mind, especially when it comes to Deputy Ministers.

It is the PM, working with the PCO, who appoints the Deputy Ministers; the Cabinet Ministers have virtually no say. Deputy Ministers owe their positions to their relationship to the PM and his closest advisors and it is to these people that they are most loyal. Through the Deputy Ministers, the PM and his advisors can keep a very tight reign on Cabinet Ministers. This chain of command makes the Deputy Ministers powerful instruments in the exercise of the PM's orders, and their influence has grown under the Chrétien government. Savoie argues that "Deputy Ministers, in many ways, have become as much a part of the centre of government as they are the administrative heads of their departments." Like the PCO, the Deputy Ministers are capable and ambitious people. Most have not moved up through the departments that they manage, but have served as deputy or assistant deputy ministers with various departments. The Deputy Ministers even have a 'club' that "meets regularly over breakfast, luncheon, and at special retreats, all chaired by the head of the public service, the clerk of the PCO."[113]

The Cabinet Ministers have lost out as power has shifted to the PCO and the Deputy Ministers. According to Savoie:

> *Cabinet has now joined Parliament as an institution being bypassed. Real political debate and decision making are increasingly elsewhere — in federal-provincial meetings of First Ministers, on Team Canada flights, where First Ministers can hold informal meetings, in the PMO's Office, in the PCO, in the Department of Finance, and in international organisations and international summits.*[114]

The voices of elected officials are excluded. The voices of self-serving non-elected officials set public policy.

The Deputy Ministers exert their influence over biotech policy through the Biotechnology Deputy Ministers Coordinating Committee (BDMCC). It's unusual for a Deputy Ministers committee to exist when a Ministers committee already exists and it may indicate that authority over biotech policy rests primarily with the BDMCC and not the Biotech Ministers Committee. Since the centre of government has made its support for biotech clear in the Canadian Biotechnology Strategy, in Chrétien's remarks in the Throne Speech, and in Martin's budget speeches, the role of the BDMCC is to ensure that this position is carried out by the relevant ministries. As a result, they have enormous influence over how Chrétien's support for biotech actually plays out in terms of concrete government actions. Federal biotech policy, therefore, is translated into action by the people operating at the Deputy Minister level.

At this study goes to print, the Deputy Ministers on the BDMCC are Peter Harder of Industry Canada, Alan Nymark of Environment Canada, Ian Green of Health Canada, Robert Wright from

113 Savoie, op. cit. p.278 and 302.

114 Savoie, op. cit. p.362.

International Trade, Wayne Wouters from Fisheries, Peter Harrison from Natural Resources, and Samy Watson from Agriculture. Peter Harder chairs the committee and may have the most influence over its decisions. He's been at the Deputy Minister level since 1991 and was Secretary of the Treasury Board at one time. This is an important connection since much of push behind the deregulation agenda, which has been so present in the Mulroney and Chrétien governments, has come from the Treasury Board and it is the Treasury Board, along with the PCO, that, since 1991, has had overall responsibility for regulatory policy.

Here's how Harder describes the role of the BDMCC:

> *The life sciences revolution is a transformative technology, and it infuses not just eight departments, but how we think about biology and economic activity. So the challenge or the task I have is to, with my colleagues, ensure that issues that cut across government are dealt with by ministers in the appropriate fashion, and that the linkages of our collective efforts on ensuring that this transformative evolution is linked to a broader innovation agenda of the Government of Canada.*[115]

He also says, "Our task as deputy ministers is to ensure that the life sciences agenda is part of the innovation agenda."

Harder is not alone in his excessive support for biotech. Alan Nymark stood behind biotech as Assistant Deputy Minister of Industry and Science Policy with Industry Canada and Associate Deputy Minister for Health Canada before becoming Deputy Minister of Environment Canada in 1999. In 1999, when he was with Health Canada, Nymark ruled against a grievance filed by civil servant scientists Margaret Haydon and Shiv Chopra questioning the government's push to approve Monsanto's bovine growth hormone.

One must, of course, bear in mind that a primary concern of Deputy Ministers is to shelter their Ministers and the Prime Minister from bad press. They will pick up on any issues that may generate controversy and scandals and manage those issues appropriately. Any personal commitment they have to biotechnology will most likely be tempered by their concern with PR. Plus, they take their orders from above.

Ministers and Ministries

Ministers play an important role in creating the illusion of broad official support for the PM's policies. They serve as instruments for preordained decisions. When the government issued the renewed Canadian Biotechnology Strategy, it was the Biotechnology Ministers Co-ordinating Committee that was tasked to carry out the agenda. The Committee draws Ministers from Agriculture and Agri-Food Canada (AAFC), Health Canada, Natural Resources Canada, Environment Canada, International Trade, Fisheries and Oceans Canada, and Industry Canada. Without a doubt, the Ministers within this committee with the most weight on biotech issues are those from the AAFC, Industry Canada, and Health Canada. Ralph Goodale, Minister of Natural Resources, is probably also heavily involved, given that he's the former AAFC Minister, the current Chair of the Cabinet Committee for the Economic Union, and the voice in Cabinet for the Prairies. Those

115 Bill Curry, Interview with Peter Harder, *The Hill Times*, http://www.thehilltimes.ca/briefs/policy-biotech.html

Ministers that champion biotech the most tend to come from departments with histories of support for biotech and close work-a-day relations with industry.

Agriculture and Agri-Food Canada

Of all the Departments, the AAFC has been the most active proponent of biotech. It's hard to find current data, but throughout the 1980s and into the 1990s, AAFC had the biggest budget for in-house biotech research — nearly three times that of Health Canada, its nearest competitor.[116] For biotech pharmaceuticals, the private sector, in collaboration with university and hospital researchers, is now almost exclusively responsible for carrying out R&D. The agriculture side of biotech R&D, on the other hand, has had less private sector R&D and the government has participated more directly to keep it going. Yet this direct participation in agricultural biotech research has always been carried out in close collaboration with industry. (Saskatchewan's Innovation Place is an outstanding example.) AAFC and the biotech industry work as a team.

In 1997, AAFC Minister Lyle Vanclief reassured members of the Canadian Seed Trade Association, the seed industry lobby group, that he would carry on the team spirit of his predecessor Ralph Goodale:

> *There is no question the opportunities of biotechnology are absolutely incredible. But I can tell you, having spent about 14 days in Europe, we have some incredible challenges. The consumer pressure in Europe is absolutely phenomenal. When groups like Greenpeace are referring to these new products as 'genetically manipulated,' that really strikes a scary thought in the minds of a lot of consumers.*
>
> *We have a collective task and opportunity ahead of us to explain to the consumer that safety is number one. And we have the challenge and the opportunity to explain to the consumer what these things can do. They can produce efficiencies. They can save on the use of pesticides. They can make better use of limited soil moisture.*
>
> *We have to explain that the regulatory framework is in place to ensure that safety is number one. We cannot be complacent. So we will also continue to work very closely with the Canadian industry in the pursuit of international market acceptance of genetically-modified crops such as canola. Canadian industry and government officials have been co-ordinating efforts toward the pursuit of the necessary approvals in the EU for the Canadian varieties that are now in commercial production.*
>
> *In fact, I raised this very issue with the EU agriculture commissioner, Frank Fischler, when I met him last week in Brussels. And I certainly had the discussion last week with the Minister of Agriculture from France. He kept talking about the scientific research they're doing. And I said, "I don't have a problem if you're going to talk science. But be very careful that you don't start making your decisions based on emotion." . . .*
>
> *I think we all know that we've all got a big challenge ahead of us. I can tell you that I'm committed doing all that I can for your industry.... So you can rely on us to do all we possibly can.*[117]

Before becoming Minister, Vanclief served as Parliamentary Secretary to former Minister Ralph Goodale. In that capacity he chaired the

116 Biotechnology Directorate, Industry, Science and Technology Canada, "Federal Expenditures for Biotechnology, 1989-1992," March 1993.

117 Notes for an address by Lyle Vanclief to the Canadian Seed Trade Association Semi-annual Meeting, Ottawa, November 17, 1997: http://www.agr.ca/cb/speeches/s91117e.html

Public money is spent to 'educate' the public about risky products that the public is concerned about and has never asked for, while safety checks on these risks are 'streamlined'.

Committee on the Canadian Food Inspection Agency and worked closely on the development of the Pesticide Management Regulatory Authority, where he was in close communication with the industry lobby. According to Vanclief:

> *I am a strong believer in government-industry partnerships. I firmly believe that we need to sit down and have a coffee or a chat as often as we possibly can about what we can do separately; what we can do separately, but together; and what we can do together. So I certainly look forward to continued joint efforts with your organization [the Canadian Seed Trade Association].* [118]

Vanclief seems to have learned a lot from Goodale.

Goodale was a fierce advocate for biotechnology in his AAFC days and continues to be in his position as Minister for Natural Resources and Minister Responsible for the Canadian Wheat Board (CWB). Whereas the wheat farmers are very concerned about GM wheat, Goodale champions biotech wherever he goes. Speaking in his capacity as Minister for the CWB, Goodale told the International Grains Conference:

> *Agriculture and food are very much an integral part of the knowledge-based and technology-driven global economy. And we will need all the intellectual capital — all the brain power — we can muster to meet the food and nutrition needs of burgeoning world population. For that reason, Canada supports the research and development and the scientific advances associated with agricultural biotechnology.*[119]

Goodale, as an MP from Saskatchewan, is the voice for the Prairies in the Chrétien Cabinet. In large part, this means securing federal subsidies to keep the Prairies in the biotech industry. Just before leaving office, Goodale announced more than $15 million in funding from the Agri-Food Innovation Fund for 24 agricultural biotechnology projects in Saskatchewan. Most of the money went to research on GE crops at the NRC Plant Biotechnology Institute in Saskatoon, but close to $6 million went towards infrastructure projects, including Ag-West Biotech Inc. projects to "promote public understanding of agriculture biotechnology, to support and facilitate Saskatchewan industry access to the biotechnology regulatory process," and to "work to streamline the regulatory process for products of the Saskatchewan agricultural biotechnology industry."[120] Public money is spent to 'educate' the public about risky products that the public is concerned about and has never asked for, while safety checks on these risks are 'streamlined'.

Even after he left the AAFC, Goodale helped secure a $15.3 million extension to the NRC Plant Biotechnology Institute and a $500,000 Chair in Managing Knowledge-Based Agri-Food Development at the University of Saskatchewan. The Chair holder, Dr. Peter Phillips, "will examine intellectual property rights related to agri-food research and commercialization, as well as marketing of new biotechnology products and ways of gaining access to international markets." Phillips will also "train students in how to manage technological change in the agri-food industry, develop courses for company executives, and provide advice and analysis to the industry on issues related to technological change."[121] Yet another public subsidy for the biotech industry.

118 International Grains Conference, Regina, June 15, 2000, http://www.agr.ca/cb/goodale/speeches/sg000615e.html

119 ibid.

120 *PBI Bulletin*, May 1997, http://www.nserc.ca/news/1999/p990713.htm

121 http://pbi.nrc.ca/bulletin/may97/research.html

For Goodale, Saskatchewan's future depends on the biotech industry. By funding biotech projects, the federal government is "stretching Saskatchewan's horizons — to better position this province and its people in the knowledge-based and technology-driven global economy."[122] He says, "Western Canada is shifting its reliance from the resources beneath our feet to the resources between our ears; using our expertise in agriculture, to develop revolutionary products and services for the 21st century." [123]

Goodale may have left the AAFC but he still has the capacity to influence government policy on biotech, both as Minister for Natural Resources and as chair of the powerful Cabinet Committee for the Economic Union. This committee conducts annual reviews of Canada's S&T policy and all the major S&T advisory bodies report to it. According to Savoie,

> *Chairs of committees have a special relationship to the prime minister and the PCO. PCO officials prepare briefing material for the chair and are always available to advise or assist them. Committee chairs are also in a better position to influence the process and even tilt some decisions to their way of thinking or to pursue their own goals.*[124]

The Committee for the Economic Union is the principal and perhaps only venue for Cabinet members to debate federal S&T policy. Only half of the Cabinet sits on the committee, giving Goodale and Vanclief, who also sits on the committee, excellent leverage to promote their position in Cabinet.

Not surprisingly, the AAFC has played a key role in the development of federal regulations on biotechnology. In the late 1980s, when the biotech industry looked to bring the first wave of biotech products to market, most of these products were genetically engineered agricultural crops. Industry and others in the biotech community were adamant that these products should be evaluated according to the existing regulatory framework, with the AAFC's Food Production and Inspection Branch playing the central role. There are probably two major reasons for this. First, if Environment Canada took over regulations of biotech then it would open the products up to an environmental assessment. Industry was weary of an association between GMOs and environmental pollution.[125] And, second, industry had developed close ties with the AAFC over the years and did not want to risk the involvement of Environment Canada in regulation, given its 'green' tendencies.

The latter reason is probably the most significant. Industry actually has a direct voice in guiding regulatory policy within the AAFC. A 1992 assessment of AAFC regulations led to the formation of a Regulatory Advisory Panel. This panel recommended the formation of an AAFC External Advisory Panel that would play a similar role to a central agency, overseeing the Department's regulatory plans to ensure that they match 'federal policy objectives'. Shortly thereafter, AAFC did establish this External Advisory Panel with "a private consultant, people from the agri-food sector, a consumer group and academe."[126]

The AAFC bureaucracy dealing with regulation has remained fairly consistent from the Mulroney days until today. It began as a small office under the direction of Jean Hollebone in the Pesticide Directorate, was recast as the Biotechnology Strategies and Coordination Office in

122 http://www.innovationplace.com/html/newslttr/nov.2000/november00.html

123 http://www.ntc.ca/corporate/english/media/news/pbiext00_e.html

124 Savoie, op. cit. p. 271.

125 Personal Communication with Elisabeth Abergel, November 2001.

126 Regulatory Best Practices Committee, "Enlightened Practices in Regulatory Reform, vol.2" Government of Canada: http://www.pco-bcp.gc.ca/raoics-sdrc/docs/Publications/enlighvol2_e.pdf

1993, and then in 1997 was put under the jurisdiction of the newly formed Canadian Food Inspection Agency (CFIA), which reports to the Minister of Agriculture and brings all biotech regulations under one window.[127] The first President of the CFIA was Arthur Olsen, former AAFC Assistant Deputy Minister of Research and the head of the Inter-Branch Biotechnology Management Team as well as representative of AAFC on the interdepartmental deputy minister biotechnology committee. Hollebone, who headed the Biotechnology Strategies and Coordination Office and chaired the AAFC's Biotechnology Management Team, became the CFIA Assistant Vice-President. Margaret Kenny, the former Associate Director of Biotechnology Strategies and Coordination Office became the Director of the Biotechnology Office in the CFIA, and this office retained the promotional function of its predecessor. (Kenny left this position abruptly in 2001 and disappeared from public view.)

To date, the AAFC Ministers have matched their bureaucracy's support for biotech on regulatory issues. Industry singled out Ralph Goodale for his personal crusade to keep Environment Canada out of the regulatory process:

> *Mr. Goodale was instrumental in the implementation of a national agricultural policy which ensured that regulation of agricultural biotechnology would occur within AAFC, rather than within the anti-biotech confines of Environment Canada.*[128]

Industry has never doubted AAFC's commitment to biotech. AAFC acts at once as the regulator (with CFIA), the promoter (with the Biotechnology Strategies Office), and the developer (with the AAFC research branch). Just to give one example of the contradictions that can arise, the CFIA is responsible for evaluating Monsanto's Roundup Ready Wheat for approval — a wheat that Monsanto developed in collaboration with Agriculture and Agri-food Canada's Cereal Research Centre on the University of Manitoba campus.[129]

The AAFC is the biotech industry's most trusted ally within government, with the possible exception of Industry Canada. It's hard to imagine any Minister or Deputy having the ability to shift the department's direction. The roots are firmly planted within the bureaucracy. The only way that this could change is if things were shaken from above. But given Chrétien and Goodale's allegiance to industry's 'innovation agenda', this seems more than unlikely. Unfortunately, the avenues where opposition to the biotech agenda may have emerged within government, such as in Health Canada or Environment Canada, have been sealed off and effectively dealt with.

Health Canada

For some time now, Health Canada has been the focus of a deregulation agenda that began as far back as the 1970s and has only deepened under the Chrétien government.[130] Deregulation, often disguised as 'risk management', was part of the Conservatives neo-liberal policy package that Chrétien eagerly embraced upon taking office.

There were two parallel streams in the Chrétien government's deregulation of Health Canada: the dismantling of the its regulatory capabili-

127 Brewster Kneen, *Farmageddon: Food and the Culture of Biotechnology*, New Society Publishers: Gabriola Island, Canada, 1999, p.135.

128 *Ontario Corn Producer Newsletter,* August/September 1997 http://www.ontaricorn.org/news0897.html

129 Monsanto Establishes BioTech Crop Development Centre in Winnipeg, NaturalLife Magazine #67, http://www.life.ca/nl/67/biotech.html

130 W.T Stanbury, "Reforming the Federal Regulatory Process," Appendix to the Report of the Sub-committee on Regulations and Competitiveness, December 1992 and personal communication with Michelle Brill-Edwards, December 2001.

ties and a PR effort to downplay the dismantling. The first stream began in 1994 when the government released the Federal Regulatory Reform Agenda, which was essentially the outcome of a regulatory review process launched by the Conservatives and managed by the Treasury Board Secretariat. The Regulatory Reform Agenda gave "priority to improving regulation for six selected sectors of the economy" including biotechnology and health, food, and therapeutic products.[131]

The Agenda got going at Health Canada in 1997 when the Department's food inspectors were sent over to Agriculture Canada as part of the establishment of the Canadian Food Inspection Agency (CFIA). Essentially, the means to take responsibility for public health, in terms of food safety, were placed under the Minister of Agriculture, but the authority for public health, which derives from the Food and Drugs Act, remained with the Minister of Health. The shift generated a conflict of interest: inspectors now had to report health and safety concerns about the food industry to the Minister of Agriculture, who was mandated to promote the industry.

The Liberals then turned their attention to Health Canada's food and drug researchers. In 1997, shortly after the shift of the food inspectors to Agriculture Canada, Health Canada's Bureau of Drug Research was eliminated and its facilities for independent lab investigations of pharmaceuticals were destroyed. Then, by the early fall of 1997, without any public announcement, half the food research labs were decommissioned, leaving Health Canada without the capacity to conduct laboratory research into food safety in critical areas. As explained by the Canadian Health Coalition, the objective was to replace the investigative laboratory system and staff with "an office of science" which would "consist of a small library and Internet connection with pharmaceutical companies and industry funded research institutes."[132] In this atmosphere of destruction of labs, the Department had no opportunity to build its research capacity for GMOs, which, given that GMOs were going through a first wave of commercialisation, should have been a priority during this period.

The Liberals did not succeed in pushing the cuts to Health Canada's food safety research facilities all the way through. When they were half-way through the process of decommissioning the food research labs, 70 food scientists from within the department rebelled and went public with what was going on. The public scandal that ensued forced the Liberals to back off for the time being, although plenty of damage had already been done.

By the following year, with the public scandal still simmering, Chrétien's government was ready for another round of deregulation. Early in 1998, the former Deputy Minister of Finance David Dodge came back from a one-year sabbatical at UBC in public health policy to take over as Deputy Minister of Health and to champion the "Health Protection Branch (HPB) Transition", which involved a rewrite of the Food and Drugs Act and a continuation of the interrupted dismantling of the Department.

The HPB Transition stated that one of its objectives was "to update and integrate the federal health protection legislation,"[133] yet the document then went on to describe a new Food Act to be followed by a drugs act,

131 Treasury Board Secretariat of Canada, *Managing Regulation in Canada: Regulatory Reform and Regulatory Processes*, 1996: http://www.pco-bcp.gc.ca/raoics-srdc/docs/publications/managing_reg_canada_e.pdf

132 Canadian Health Coalition, "Transition = abdication: A citizen's guide to the Health Protection Branch Transition Consultations," September 1998: http://www.healthcoalition.ca/abdication.html

133 Health Canada, "Health Protection for the 21st Century: Renewing the Federal Health Protection Program, A Discussion Paper," July 1998: http://www.hc-sc.gc.ca/hpb/transitn.21ce.pdf

the Therapeutic Products Act. Nowhere did the transition document explain how the 'integration' of legislation would be furthered by cleaving the Food and Drugs act in two. Rather, one could speculate that the Food and Drugs Act was split to ease the transfer of all responsibilities and authority to Agriculture Canada, the mandated promoter of the food industry — a development that would certainly please industry.

The proposed Food Act and the Therapeutic Products Act would also minimise government liability by diluting the obligation of federal ministers to protect public safety. The Food Act that was proposed to Parliament was rewritten such that industry was solely responsible for the safety of its products. Industry was not adverse to these changes. To the contrary, it stood to benefit from reduced product approval times and, as industry understood full well, if safety problems did arise from their drugs or GMOs, it would be difficult, if not impossible, for victims to trace the source of their illness to a particular product without strong, independent research capacities and monitoring, and, in the case of GMOs, without labelling.

The other stream of the deregulation process at Health Canada was public relations. Gutting the federal capacity to ensure public safety without raising public alarms was tricky work. The Liberals had to maintain the illusion that they were simply reducing red-tape and strengthening 'sound science.' However, when whistleblowers from the Department came forward with documentation exposing Health Canada's cozy relationship with industry — its treatment of the food and drug industry as the *de facto* 'client' — the illusion faltered.[134] The HPB Transition, both the physical dismantling and the legal re-jigging, was put on hold while the Department attended full-time to repairing its tattered public image.

The government's first effort to restore credibility, the creation of the Science Advisory Board in 1997, chaired by astronaut Roberta Bondar, was unsuccessful.[135] A committee appointed and reporting to the Minister, meeting in secrecy, and unaccountable to the public could not lend even a veneer of credibility. The Liberals would have to do more to counter the whistleblowers and restore the credibility of the Minister. When David Dodge arrived, Health Canada recast its Health Protection Branch as the Health Products and Food Branch and established the Office of the Chief Scientist of Health Canada, with responsibility for "ensuring that the science performed and supported by Health Canada is of a solid national and international reputation."[136] According to a Health Canada press release:

> *The role of the Chief Scientist is to bring greater leadership, coherence and expertise to the overall strategic direction of the department's scientific responsibilities, activities and needs [and to] provide expert scientific advice to Health Canada officials concerning national and international scientific trends. He will also report on public and private sector developments, as well as establish partnerships to build on scientific strengths.*

The Office of the Chief Scientist, like the Science Advisory Board, is a PR ploy without substance. Neither the Advisory Board nor the Chief Scientist have any real capacity to carry out public safety research and neither can reverse the increasing incapacity of Health Canada to assure public health.

134 John Demont, "Pressure Point: Federal researchers say drug companies push hard for approval," *Maclean's Magazine* Nov. 16, 1998, pp.70-72.

135 In 2001, medical geneticist Judith Hall became the new Chair.

136 Health Canada web site: http://www.hc-sc.gc.ca/english/about/org.html

The biotech industry was pleased with the government's efforts. In response to the announcement of the creation of the Office of the Chief Scientist, Joyce Groote, President of BIOTECanada, said, "An even stronger focus on science-based decision making will ensure that Canadians benefit from the applications of biotechnology in health care, agriculture and the environment."[137] Even if the deregulation agenda had stumbled against public opposition and the Department's own scientists, the government was advancing the biotech industry's interests wherever it could. In 2001, Astronaut Bondar was replaced as Chair of the Scientific Advisory Board by Judith Hall, a medical geneticist, and Kevin Keough, a leading voice for biotech in Canada, was appointed as the first Chief Scientist.

Kevin Keough

In January 2001, Kevin Keough became the first Chief Scientist of Health Canada. He was given an annual salary of $225,000 and a 5-year, $5 million fund over three years to work with. According to Keough, "There's a lot more that's needed to be done with a limited amount of money. My job involves not only being a champion for science, but also providing sound advice on how Health Canada might move in new directions and re-invigorate other areas."[138]

Keough is the former Vice President of Research & International Relations at the Memorial University of Newfoundland and continues to devote 20% of his time to his work with the Biochemistry Department at Memorial, where he continues to lead his research team.[139] He and his team at Memorial have worked on liposomal encapsualtion since 1988. In 1998, Keough established a biotech startup company called NovaLipids as a joint venture with Seabright Corporation, the technology transfer arm of Memorial, to commercialise the research of his biochemistry team. In the summer of 2000, NovaLipids was spun off "to pursue the commercialization of a novel vaccine delivery system for animals" but the company is still housed at the Department of Biochemistry.[140] Supposedly NovaLipids has now formed an alliance with a major multinational partner, but they haven't said who. Keough now acts as the company's Scientific Consultant.[141]

Keough is an Executive Member of the Board of Directors of Seabright, now known as the Genesis Group. It was established by Memorial University in 1987 to identify and commercialise promising technologies emerging at Memorial, such as the fish growth gene technology now licensed to A/F Protein. Bio-east is a division of Genesis that lobbies for the biotech industry. It describes itself as "a network of over 50 members from business, government and academic institutions who are actively involved in and strongly support the growth of the biotechnology industry in Newfoundland and Labrador."

Keough played a key role in the formation of the Canadian Institutes of Health Research (CIHR) while he was Vice-President of the MRC, and he now sits on the CIHR Board of Governors. He's also a founding member of the board of Genome Canada.

It is hard to say where the Minister of Health at the time, Allan Rock, stood on all of this. Either way, it doesn't really make that much of a difference. The decision to restructure Health Canada came from above, which is why David Dodge was called in. Such policies emanate from the PCO and the Treasury Board, and are implemented by the Deputy Ministers. Even if Rock opposed the changes, there's little he could do. Donald Savoie provides an example that helps explain why.

137 BIOTECanada News Release, April 20,2000: http://www.biotech.ca/EN/nrApril20.html

138 http://www.med.mun.ca/131/pages/chief-scientist.htm

139 University Relations, Memorial University, News Release, January 4, 2001: http://www.mun.ca/univrel/news/31082001/memorial_vp_named_chief_scientist_health_canada_04012001.html

140 Memorial University, *President's Report on Research 1999-2000*, http://www.mun.ca/president/99-00report/research/research2.html

141 NovaLipids website: http://www.novalipids.com/scientific.htm

"... consensus means any group of ministers that includes the prime minister ..."

In 1996 the Chrétien government undertook a review of the drug patent regulations brought in by the Tories in 1993. To paraphrase Savoie:

> *The proposal to change the regulations would pit brand name multinational drug companies against generic drug companies. The dispute pitted Allan Rock, a strong minister, and his Department of Health (which is not regarded in Ottawa circles as particularly strong, given that it has no presence in any debate on Canada's economic performance or plans), against John Manley, a relatively weak minister [at the time] and his relatively strong Department of Industry, which is always present on economic issues. There was also a split between Ontario, which favoured its generic manufacturers, and Quebec, home to several brand name companies. The prime minister agreed with Manley, but it became clear that Rock was winning the debate against Manley and also that he had the numbers in Cabinet and caucus needed for his views to prevail. But when the matter came to Cabinet, Manley and the Prime Minister won the day. In discussing this case with another minister, I mentioned that Cabinet decisions are supposed to be reached by consensus, and that, by all accounts, if there was a Cabinet consensus it would have been with Rock. His answer, "Consensus in Cabinet does not mean a majority. You must understand that consensus means any group of ministers that includes the prime minister."*[142]

This puts Rock's statements in support of labelling for GMOs in October 2001 into perspective. It's never a bad thing to have a Minister on your side, but at the end of the day, support from a Minister of Health doesn't mean much in Cabinet.

Under the Chrétien government all ministers, as individuals, have lost influence. Some, however, have lost more than others. Those that have held on to the most influence are those dealing directly with business issues — mostly the Department of Finance and the Department of Industry. These two departments have played a critical role in federal biotech policy.

The Department of Finance

> *"You know, I have always felt that governments cannot pick winners but losers can pick governments." Paul Martin,* "High Frequency Economics," February, 2000

Finance may not be on the biotech cabinet committee, but there's little that the various departments can do without the support of the Minister of Finance. Paul Martin wields significant power in the Chrétien government. According to Donald Savoie, "When Chrétien came to office, Finance was able to come full circle and regain its position of power. Without a doubt it has become the most powerful economic actor on the Ottawa stage."[143] The Department of Finance has been awfully kind to the biotech industry, despite the drain it has been on scarce federal resources. The department has even announced its own initiatives to support the industry. Has the biotech industry infiltrated this bastion of objective economic wisdom?

There are some loose connections between the industry and the upper levels of the department. Martin was a Director of the Canadian Development Corporation (CDC) from 1981-1986, when the CDC was one of the major sources of capital for the biotech industry, and he probably would have met some of the bigger players in the biotech

142 Savoie, op. cit. p.328.

143 Savoie, op.cit. p.170.

community, like John Evans, at that time. Members of Martin's inner circle of advisors, such as David Herle and Mike Robinson, have some links to the biotech community. Herle and Robinson led electoral campaigns for Martin and both now work for Ottawa-based Earnscliffe Research and Communications. Earnscliffe "develops communications strategies and advice for Finance Minister Martin," but it also does lobby work for major TNCs, including some from the pharmaceutical industry. According to Donald Gutstein of NewsWatch Canada, Robinson is a registered lobbyist for two of the largest international pharmaceutical TNCs — Bristol Myers-Squibb and Glaxo-Wellcome.[144] In 2000, Earnscliffe carried out a controversial survey of the Canadian public on biotech questions for the Liberals.

Another Martin insider with ties to the biotech industry is Richard Mahoney. He's Martin's former executive assistant and was once President of the Ontario Liberal Party. Mahoney's a Board member of the Canadian Technology Alliance — an industry lobby group — and he's a partner with Fraser Milner Casgrain, a law firm with close ties to the biotech industry. Mahoney heads the firm's Government/Industry Joint Venture Practice Group and has represented clients from the biotechnology and pharmaceutical industries.[145]

Martin is a primary target of industry lobbyists. Once Martin put down the axe and gave the hint that he was ready to spend, the 'innovation lobby' came a-knocking. They besieged the Minister with demands for more federal spending on research, particularly in the 'knowledge-economy' sector. Martin was heard telling one of the lobbyists for the creation of the CIHR, "I'm getting sick of hearing about it."[146] Nausea notwithstanding, the lobbying did pay off, as Martin himself orchestrated an initial $800 million to establish the Canadian Foundation for Innovation in his 1997 budget.[147]

Department officials say that Finance functions like a graduate school where economic policies are debated at great length.[148] But the general consensus is definitely neo-liberal, and over the 1990s, its thinking has become increasingly influenced by economists supporting government intervention for innovation, such as Paul Romer, Elhanan Helpman, Michael Porter and Canadian economists Richard Lipsey, Peter Howitt, and Pierre Fortin. The Department's new-found enthusiasm for government intervention was articulated in a 1997 internal paper:

> *The assumption that the determinants of long-run growth are endogenous to the decision-making process of the firm is a major departure from the neo-classical growth theory and has important policy implications. Indeed, if long-run growth is driven by knowledge-based factors of production that are part of the normal cost structure of the firm, then by changing the cost of those factors through, for example, direct subsidies, tax incentives or trade policies, governments can influence long-run growth.*[149]

Martin began to take concrete steps in this direction in the 1997 budget. In his budget speech he said:

> *We must broaden our notion of infrastructure. We must take it beyond its traditional meaning, to include the components of future economic success — post-secondary education, knowledge, innovation, for example. These are the building blocks of the new wealth of nations and it is in this infrastructure as well that government must invest. (1997)*

144 Donald Gutstein, "Biotech poll's hidden agenda," Free the Media website, 10 August 2000: http://www.presscampaign.org/articles_8.html

145 Canadian Technology Alliance web site: http://www.cata.ca/cata/catainfo/bod/mahoney.cfm

146 Rosemary Speirs, "Canada's health research agency," *Toronto Star*, January 28, 1999.

147 Savoie, op. cit. p.190.

148 Savoie, op. cit. p.161.

149 Finance Canada, "Why and How Governments Support Research and Development," December 1997, http://www.fin.gc.ca/resdev/why_e.html

The next year he went a step further:

> *The creation of jobs in the new millennium will be anchored in two essential components: the infrastructure of innovation, and the infrastructure of skills and knowledge. (1998)*

By the 1999 Budget Speech, Martin's concerns had completely shifted from fiscal responsibility to economic innovation:

> *The fact is, much of our economic challenge can be summarized in two words — knowledge and innovation. These are the new raw materials of the 21st century economy. (1999)*

The 2000 Budget Speech left no doubt that Martin was utterly devoted to the innovation agenda. At certain points he sounded like a fanatic:

> *Today, the strength of a nation is measured not by the weapons it wields, but by the patents it produces. (2000)*

He even used the speech to underline the particular importance of biotechnology:

> *Understanding how genes function opens the door to substantial progress in advancing the treatment of cancer and other life-threatening diseases. ...Gene research will save the lives of many. It will enhance the lives of still more. It will surely form the basis for many advances in biotechnology, which many believe will be as important in the new century as computer technology was in the last. (2000)*

What's important to understand is that the budget emanates from the Department of Finance and the PMO. The view of genomics research that Martin expressed, therefore, is that of political strategists and economists, not the Department of Health or Agriculture — even though their answers probably wouldn't differ. Given that the department of finance has exercised its views in a wider range of policy areas in recent years, the department's support for biotech has major implications for all areas of relevant policy-making. As pointed out by Savoie, the budget "has come to dominate policy and decision making in Ottawa as never before."[150]

Industry Canada

Industry Canada is the promotional vehicle for the biotech industry within government. NBAC reported to the Minister of Industry and the Minister championed its message in Cabinet. It was former Industry Minister John Manley that approached the NBAC in March 1997 "to discuss national and international developments in biotechnology and future directions for revitalizing Canada's biotechnology strategy." Significantly, the Minister and the Deputy Minister of Industry Canada chair the Biotechnology Ministers and Deputy Ministers Co-ordinating Committees respectively.

Manley, with his background as a corporate lawyer, involvement with Ottawa-Carleton Economic Development Corporation, and negligible contact with the non-business world, was a strong voice for the biotech industry in Cabinet. Brian Tobin took over from Manley in October 2000 and basically kept to the same agenda, and there is little reason

150 Savoie, op. cit. p.189.

to believe that Rock, who took over the job from Tobin in January 2002, won't do the same. The Industry portfolio, amazing as it may seem, is not controversial and provides easy points for those with political ambitions. The Minister gets to announce all kinds of prizes for those industries privileged by the Liberals. Rock may not be the champion of the biotech industry that Manley was, given his close connections with generics manufacturer Apotex, but he's not going to risk a fight with his staff or those above him over it. He'll probably be happy to stick to the line of the bureaucracy and leave biotech policy to his deputy minister, Peter Harder.

The bureaucracy of Industry Canada is completely behind the biotech industry and other 'key' economic sectors it has identified. The Department acts as an interdepartmental policeman, making sure all the other departments support the needs of these industries. Industry Canada is responsible for the renewal of the Canadian Biotechnology Strategy and the annual national reports on S&T policy. It has its own Bio-Industries Branch and a Health Sciences Branch, which merged to form the Life Sciences Branch in 1999 (yes, mergers are happening even in government). This Branch works with other departments to co-ordinate government biotech programs and policy, including regulations.[151]

Industry Canada keeps any department or agency that might diverge from the biotech agenda in line. For instance, news broke early in 2001 about CIDA-Industry Canada's involvement in a pilot farm project to support the use of Monsanto's Bt cotton in China. According to information obtained by the Toronto Star, the plan was opposed by people within the department and the Chinese embassy. An internal analysis noted that "the level of effort on this appears high, especially as INC does not support demonstration projects." Nevertheless, funding was approved on July 31, 1998.[152] A senior CIDA official explained off-the-record that the Bt cotton project was taken up after officials from Industry Canada visited CIDA and urged the agency to do more to support biotech in its programs.

Environment Canada

Environment Canada is another department that has to be kept in line, because of its potential 'greeny' tendencies. The main concern is to marginalise it from regulatory functions. Bureaucrats at Environment Canada have helped moved this process along through the Interdepartmental Committee on Biotechnology's Subgroup on Safety and Regulations. The Subgroup was instrumental in developing the federal Regulatory Framework for Biotechnology in 1993, which placed regulations of biotech firmly within the jurisdiction of the AAFC and Health Canada. In 1995, a House of Commons Standing Committee on Environment and Sustainable Development took issue with the move to take responsibility for biotech regulations away from Environment Canada and recommended the creation of a new part within the Canadian Environmental Protection Act (CEPA) dealing specifically with biotechnology that would require all biotechnology products to pass through an environmental impact assessment under CEPA or its equivalent under another department. The government issued an official response to the Committee that completely ignored their recommendations and, instead, relegated Environment Canada to the role of

151 Terry Walker, the Special Advisor on Regulations to the Life Sciences Branch has been active on the important interdepartmental subgroup on safety and regulations since its conception and was a consultant to the NBAC for their 1998 report.

152 Peter Gorrie, "Taxpayers fund biotech food giant CIDA aids project in China promoting Monsanto crops," *The Toronto Star*, February 11, 2001.

'safety net' — leaving it with any crumbs that Health Canada and AAFC were not given.[153] Since the Mulroney years, the thrust of regulatory policy has been to ensure that regulations do not interfere with industry competitiveness. AAFC and Health Canada, whose regulatory capacity has been dismantled, are the best departments for carrying out this agenda and the biotech industry knows it. Margaret Gadsby of AgrEvo told the Standing Committee why giving regulatory responsibility to Environment Canada was not in industry's interests: "We got line departments [Health Canada and AAFC] up to speed on regulations that work and making commercial decisions, and now it's not clear to us exactly what the involvement of Environment Canada will be."[154]

The Granting Councils: New and Old

The federal granting councils involved in research and development have played a pivotal role in the emergence of Canada's biotech agenda. They were there at the origin of Canada's biotech policy, when the first National Biotechnology Strategy was drawn up in the early 1980s, and have consistently articulated the idea that biotech will be a driving force of the new economy that Canada cannot afford to miss. The councils are in the unique position of being theoretically independent from the government of the day, in terms of where they put their money, while at the same time being active and influential in the development of government research and development policy.

It's fair to say that Canada's biotech industry could not have developed had it not been for the support it received from the granting councils. Indeed, it was people like Lewis Slotin and Henry Friesen of the MRC that put forward the early vision for the federal biotech strategy. Pretty much every biotech company in Canada has benefited from some support from one of the granting councils and most of the people from the biotech community active in the biotech lobby and on government advisory boards were connected in one way or another with a granting council. Only a well-worn revolving door separates the granting councils from the biotech industry. Here are just a few examples:

> **Alan Bernstein:** a physician/scientist who was the Associate Director of the Samuel Lunenfeld Research Institute, a division of Mount Sinai Hospital in Toronto. At Lunenfeld, Bernstein was the lead scientist for a multimillion dollar agreement with Bristol Myers-Squibb to investigate transgenic approaches to the research of disease. He later became the Chief Scientific Advisor of Yorkton Securities' BioCatalyst Venture Fund before being named President of the Canadian Institutes for Health Research (formerly the MRC).
>
> **Henry Friesen:** a physician/scientist who was part of the first NBAC and later became President of the MRC. Friesen then became the first president of Genome Canada. While President of the MRC, he and Calvin Stiller launched the Canadian Medical Discoveries Fund — a joint industry-government venture capital fund that is probably the most important source of venture capital for the biopharmaceutical industry in Canada.
>
> **Lorne Babiuk:** a scientist with, and now director of, the Veterinary Infectious Disease Organization in Saskatchewan, Babiuk has been a big recipient of funding from NSERC, leading to the development of patents, spin-off companies, and contracts with TNCs. From 1985-1995 Babiuk held NSERC's Chair in Biotechnology and he's currently a

153 The Regulation of Biotechnology, Second Report of the Standing Committee on Environment and Sustainable Development, House of Commons of Canada, June 1996: http://www.parl.gc.ca/committees352/sust/minutes/sust_issue-03_19_29/reporte.html

154 Tuesday, June 4, 1996.

member of the Canadian Biotechnology Advisory Committee. When he's not advising government, Babiuk also serves as a scientific advisor for Foragen, the Royal Bank/Saskatchewan government biotech venture fund initiated by Murray McLaughlin (who also started Ag-West Biotech).

Bernard Coupal: a scientist who was the Director-General of the NRC's Biotechnology Research Institute until the early 1990s, when he left the institute to develop several biotech venture capital funds. The most important were the Société Innovatech du Grand Montréal and, later, in 1995, Sofinov — a merger of the Société with the Caisse de dépôt et placement du Québec, the Business Development Bank of Canada, and the Canadian Medical Discoveries Fund Inc.

Peter Morand: He was a chemistry professor at the University of Ottawa. In the late 1980s he became Chairman of the Biotechnology Business Initiative of the Ottawa-Carleton Economic Development Corporation. He then became President of NSERC from 1990-1995, and, after that, Chair of the Ottawa Life Sciences Council from 1998-2000. Morand is currently on the board of several Canadian start-up biotech companies and President and CEO of the Canadian Science and Technology Growth Fund.[155]

In line with the personal linkages between the granting councils and the biotech industry, there has been a noticeable shift in the research strategies of these organisations towards an emphasis on innovation and partnership with industry and away from basic research. The NRC, for instance, now focuses on 'incubating' high-tech industry in urban centres identified across the country. Their strategy is to form Silicon Valley-type clusters of public research institutes, spin-off companies, multinationals, and investment houses.

Those activities and agencies that do not fit the innovation agenda have been dismantled. Such was the case with the Science Council of Canada. The Science Council acted quite independently of government and from time to time issued critical reports on the direction of public science. In 1982 it offered a prescient warning to the government with a report called "Regulating the Regulators" and later, in the early 1990s, it released a major study calling for increased research in alternative models of agriculture.[156] But, as pointed out by Brewster Kneen, "the government response was to treat the Science Council as a noxious weed and eradicate it."[157] The Conservatives terminated the Council in 1992, along with dozens of other federal public interest agencies, before they left office and, when spending on research returned late in the first term of the Chrétien government, the Council did not. Instead, Finance Minister Martin opened the national purse to a new set of science agencies, such as the Canadian Foundation for Innovation (CFI) and Genome Canada.

These agencies are, in effect, new granting councils. But they have much more defined parameters for funding and they are more open in their encouragement of industry partnerships. The CFI only contributes up to 40% of eligible project costs and forces the recipient to seek out the rest, either from the provincial government or the private sector. Genome Canada's selection committee is chaired by the head of an American venture capital firm. The Atlantic Innovation Foundation, for its part, has a number of private sector representatives on its advisory committee and it gives preference to research project proposals from

155 Canadian Science and Technology Growth Fund is a venture capital fund sponsored by the Canadian Auto Workers to invest "primarily in early-stage Canadian technology businesses." It has a cooperative agreement with the NRC, NSERC and the Canadian Space Agency and is managed by Technology Investments Management Corporation(TIMCO). TIMCO is owned by MDS Capital Corp, Talvest Fund Management, and Calvin Stiller (CEO of the Canadian Medical Discoveries Fund): http://www.cstgf.com/new/index.html

156 Science Council of Canada, "Regulating the Regulators: Science, Values, and Decisions," Ottawa, 1982.

157 Kneen, op. cit. p.119.

public-private partnerships in sectors "which have strong global growth prospects" — namely, IT, oil and gas exploration, aquaculture, biotech, medicine and environmental technologies.

The tight relationship between industry and the traditional and new granting councils becomes even more problematic given their increasing influence in determining federal biotech policies. In the preceding pages I discussed how the Deputy Ministers have taken on a more prominent role in setting and controlling federal biotech policy and programs. Their major organ of influence is the Biotechnology Deputy Ministers Co-ordinating Committee (BDMCC). However, deputy ministers aren't the only members of the BDMCC. The heads of the granting councils are also members of the powerful committee and, unlike the deputy ministers, who are supposedly bound by PR considerations for their ministers and the PM, the heads of the granting agencies can bring whatever agenda they'd like to the table.

The NRC, CIHR, NSERC, SSHRC, and CFI presidents sit on the BDMCC. All of these presidents are also members of the board of Genome Canada. Some of them, particularly, Arthur Carty of the NRC, Alan Bernstein of CIHR and David Strangway of the CFI are long-time boosters of biotech and it's quite amazing that they have a voice on such a powerful body as the BDMCC. Here's what Bernstein thinks about biotech:

> *Well, this new century has been called the Century of Biology, and the Century of Health Research. I'm on record as saying that. So to me, biotechnology, and the whole area, the whole broader area of health research is central to Canada and to our future. It has impacts on everything we are about as a country, building our country. So it's a centrepiece, from my point of view.*

Whereas a deputy minister like Peter Harder will stick carefully to Liberal policy pronouncements, Bernstein can talk openly about his own ideas. This is what Bernstein told the Hill Times about labelling:

> *I think biotechnology is very safe. It's really utilizing natural biological processes to hopefully improve the human condition . . . I've always said that my own view of the labelling of foods is, and I look at it from the point of view of a scientist in a health area, not in an agricultural area, what a great lesson for our young people, to take them to a grocery store and show them these tomatoes that are genetically modified, a great opportunity to teach them about the values of science, and the importance of science in modern society. I'd like it for just that reason, and there's no other one. I think that, if it's presented properly, people would snatch these foods up.*[158]

It's not so easy to see who is telling who what to do with biotech policy. While it could be said that the granting council presidents participate in the BDMCC to enhance coherence among all federal departments and agencies, their participation also gives them the opportunity to influence what this coherence entails. There's clearly some degree of conflict of interest when the industry's major investment partners sit on the federal government's most important policy-making committee.

Federal R&D spending and those institutions that control R&D spending have been very influential in the biotech community and in setting federal biotech policy. How the government allocates money for and carries out biotech research has significant bearing on overall policy. In

158 Bill Curry, interview with Alan Bernstein, *The Hill Times*: http://www.thehilltimes.ca/briefs/policy-biotech.html

this regard it's important to understand the larger story going on with the federal R&D agenda.

The Big Picture on R&D in Canada

Most research that the federal government pays for is not carried out in-house but at universities. Canadian universities are the most important sources of biotech research in the country. Nevertheless, overall federal funding for universities declined sharply when Martin reduced transfer payments to the provinces. The cuts hit universities hard and led to tuition fee hikes, layoffs, and restructuring.

The federal government must have known that the cuts would force universities to raise tuition and restructure, and, likewise, it surely knew that universities would start looking elsewhere for funding. With the cuts, universities put more emphasis on raising money from alumni, donations, and partnerships with industry. Certain universities are, of course, much more able to draw on these sources of funding than others. The University of Toronto, with its geographic location, excellent resources, and reputation has innumerable advantages over a university like Lakehead University in Thunder Bay. In this context, the principle of equal education, which was at one time the pillar of Canada's federal university system, was torn apart.

It seems that this decision was deliberate. The Presidents of the big universities, such as Doug Wright of the University of Waterloo, had pushed for such a transformation for years. In 1983, 25 CEOs of the major Canadian corporations and 25 university presidents came together for a Corporate Higher Education Forum. They issued a report that established the blueprint for the direction that the universities have followed since.[159] Those who carried the dream into the 1990s include Robert Prichard of the University of Toronto, David Strangway of UBC, and William Leggett of Queen's. Basically this was their vision:

First, the federal government has to get its fiscal house in order and cut transfer payments to the provinces. The money that's left over after the cuts should then be distributed equally to all the universities. This will provide enough money for the universities to fulfil their teaching activities. Those universities that are not able to attract significant amounts of money beyond what they receive from the block transfers become 'teaching universities.' Then, in order to remain competitive in the global economy, the government must identify several universities as the nation's top-notch schools — the 'research universities.' As Leggett says, "I often invoke Princeton and Stanford as quality benchmarks." To be among the world's best, these schools will require big budgets. This is where the third point comes in; if they're going to be the best then the research universities must have the financial support and the flexibility to pay for top level professors and facilities. There are essentially four ways that they could (and eventually did) do this:[160]

One, they could raise tuition fees. According to Leggett: "This country must have some universities that rank among the world's best. And you can't expect to achieve that exclusively on the back of government funding." Queen's, for instance, recently introduced a 22-month Executive MBA program that costs $68,000 (see box below). Leggett has already deregulated tuition fees for the Commerce, Medicine, Law and

159 Janice Newson and Howard Buchbinder, *The University Means Business: Universities, Corporations, and Academic Work*, Garamond Press: Toronto, 1988.

160 See William Watson, "The freedom to innovate" Interview with William Leggett, and William Watson, "Learning is a contact sport," interview with Robert Prichard, *Policy Options*, September 2000: http://www.irpp.org/pm/index.htm

Engineering undergraduate programs and tuition fees have soared as a result. For Leggett and the other elite university leaders, the answer to reduced government spending is to deregulate tuition fees and let the universities set rates that reflect market demand and the quality of education they provide. The obvious assumption here is that some universities have more valuable programs than others. As Prichard puts it, deregulation "leads to meaningful differentiation through market competition."

Two, the universities could seek funds from corporate donors or partners. Prichard speaks of "meaningful differentiation" but, with deregulation, a university's ability to increase revenues depends to an important extent on its attractiveness to corporate investment, not just students. Prichard knows this better than anyone. In 1995 he launched the U of T on an unprecedented $400 million dollar fundraising drive, led by fund-raising superstar and U of T Vice-President Jon Dellandrea. Dellandrea was once Doug Wright's fundraiser at the University of Waterloo, before joining Mount Sinai Hospital from 1989-1994, where he helped put together some major partnerships with the pharmaceutical industry. Dellandrea went to work immediately, with success. Peter Munk, the CEO of Barrick Gold, pitched in $6.4 million towards a Centre for International Studies. Energenius Inc put up $12 million to support research on robotics and nanotechnology in the Faculty of Engineering. And Barry Sherman, head of the drug firm Apotex, gave the university $20 million. Other major donors include business magnate Joseph Rotman, Northern Telecom Ltd. and Newcrest Capital Inc.[161] The donations led to several scandals. Munk's donation is suggested to have influenced the university's decision to award an honorary doctorate to Barrick Gold Director and former US President George Bush Sr. and Sherman's donation came in the midst of the Olivieri affair, when Nancy Olivieri, a researcher studying an Apotex drug, was subjected to a smear campaign for releasing information about the drug's health risks.

Three, the universities can commercialise their research. The U of T, for example, raised $25 million through contracts with corporations that essentially rent out the research talents of university faculty for a fee.[162] Most universities now have their own technology transfer companies or offices, responsible for filing patents, licensing out university research, and supporting spin-off companies. This is a strategy that the federal government fully supports:

> *There is growing evidence that education and research institutions can play a critical role in promoting technology development, not just through the traditional mechanisms of advancing knowledge and educating the labour force, but by actively engaging in commercialization activities. The translation of knowledge into new products, processes, and services must primarily be the role of industry, but industry cannot do this alone. Innovation is increasingly a process dependent on collaboration between university, industry and government.*[163]

Four, the universities could receive targeted funds from the federal and provincial governments for research. Funding from the private sector for university research has increased significantly since the early 1980s.[164] Nevertheless, the majority of funding comes from and will continue to come from the federal and provincial governments. The University of Saskatchewan, for instance, received 66.6% of its funding

161 *ROB Magazine*, June 1998.

162 ibid.

163 Atlantic Foundation for Innovation, Framework Paper, 2000.

from the federal granting councils and federal and provincial departments and agencies in 1995-1996. Eleven percent came from industry.[165] Although research partnerships with the private sector are typically justified with complaints about budget cuts, the federal budgets from 1984 to 1993 did not reduce expenditures for university research grants, although expenditures did decrease briefly during the first years of the Chrétien government. [166] Moreover, even where there is private sector involvement, it remains largely subsidised by the government (see box below). A major objective of the self-styled 'research university' administrators, therefore, was to ensure that the federal cuts to the transfer payments did not affect their research funding. They argued that the cuts should be made almost exclusively to funding for tuition fees. They also began a big lobby effort to ensure that, when spending returned, the funds did not go back into tuition fees but that the money would be spent on research, particularly in areas where they have competency.

How Queen's, the Royal Bank and the corporate elite take from the public teat

The Queen's Executive MBA (EMBA) program now costs an incredible $68,000 for a 22-month program. This being a program designed for the private sector, Queen's urges employers to finance the tuition by dividing the cost between the employer and employee by any percentage or by reimbursing the employee for part or all of the tuition at the end of the program. The school advertises certain benefits for this contribution: it helps the employer in training talent, it enables their employee to forge important new business contacts, and, according to the website, "our alumni were able to recoup the investment in the MBA degree in a couple of months, by applying ideas or tools from the program." What are not posted on the Queen's EMBA promotions page are the tax breaks that benefit the employer.

According to Arthur Anderson's Guide for the Corporation, employers can deduct training expenses for their employees on their financial statements when filing their corporate tax return. Revenue Canada officials maintain that there is "no limit on what can be claimed under the categories of salary, wages, benefits and training." Only a reasonable standard is applied when assessing the validity of these corporate tax breaks. According to one Revenue Canada Agent, an employer who paid the full tuition cost ($68,000) could then deduct that same amount as an expense from the company's financial statement. Moreover, the employee in training can also claim a tax credit for any portion of what they pay, typically in the order of 25%.

For those who can't negotiate full employer paid funding for this program, the Royal Bank, "a proud partner and supporter of the Executive MBA Program at Queen's is pleased to provide a special loan package to meet your financial needs." Under an agreement with the Queen's EMBA, the Royal Bank provides loans up to the maximum amount with preferential rates for the 2 years of the program. Students make interest-only payments during the period of enrollment and there is no minimum amortization and a maximum of 10 years. But no worries: most graduates pay off their debt within 2 to 3 years. Of course with annual salaries roughly 3 times the Canadian average, that makes sense.[167]

One of the ways to ensure that they would benefit was to argue for matching grants instead of direct funds. Universities would then be required to source a percentage of their funds from other sources, gener-

164 Government of Quebec statistics: http://meq.gouv.qc.ca/stat/indic99a/Fiche116.pdf

165 University of Saskatchewan Annual Report, 1995-1996: http://www.usask.ca/vofs/1996report/research.html

166 Paul LaFleche, Senior Advisor to the Minister of Science, quopted in Valerie Drogus, "Underfunded Canadian Scientists Migrating Southward," *The Scientist,* Vol:7, #2, January 25, 1993

167 Karl Flecker, "Queen's executive MBA program —$68,000 for 22 months: Worth the money or just a slick way to milk the public tax teat?" April 12, 2002: www.polarisinstitute.org

ally the granting councils and/or the private sector. Since the granting councils had already moved towards partnerships with industry, the matching grant system would favour those research programs that could attract the interest of corporations. This is precisely what the federal government has done in its budgets since 1997, establishing the Canada Foundation for Innovation, the Canada Research Chairs, Genome Canada, and other granting agencies, and revamping the MRC into the CIHR. Provincial governments have followed suit, such as Ontario with its $500 million R&D Challenge Fund. These funds prioritize university research that can secure matching private support from corporations, foundations, alumni, friends and/or the granting councils. Under these funding conditions, private interests determine the course of public research.

What's happened, then, is that a greater percentage of federal funding is going towards research at a specific set of institutions and towards a specific type of research that supports the innovation agenda. For instance, the Canada Research Chairs program states:

> *The key objective of the Canada Research Chairs Program is to enable Canadian universities, together with their affiliated research institutes and hospitals, to achieve the highest levels of research excellence, to become world-class research centres in the global, knowledge-based economy.*

Martin provided $900 million for the Research Chairs program in his 2000 budget. Just six universities (Toronto, Montreal, Laval, McMaster, UBC and Alberta) account for over 47% of the chairs allocated up to April 18, 2002.[168] Furthermore, only 21% of the chairs are in the Social Sciences and Humanities; the rest are in the Natural Sciences and Health. [169]

It's a similar story with the Canadian Foundation for Innovation (CFI). Those same six universities account for 35% of the funds dished out by the CFI (not including the funds allocated to the hospitals and research centres based at or associated with the universities). If you include McGill, the figure climbs to 44%.[170]

Queen's Principal Leggett said that for every dollar in direct funding there were 40 cents in indirect costs. As it turns out, this is precisely the percentage that the Canadian Foundation for Innnovation (CFI) allocates for infrastructure costs that it covers in research projects. The universities are required to seek other sources of funds for the direct costs. But only a specific type of research is covered by the CFI: "Investments made by CFI are intended to keep Canada competitive in the global economy. ... [CFI applicants must make a] contribution to strengthening the capacity for innovation."[171] So who determines what qualifies as innovative research?

With the CFI, the Board of Directors have the final say on what gets funded.[172] And who's on the board? The Chair is John Evans of Allelix, Connaught, MDS and NBAC fame. The President is the champion of university privatisation, David Strangway, and the Directors include Bernard Coupal, the architect of Montreal's biotech industry, Lorne Babiuk, a long-standing voice for the biotech community, David Dolphin of Quadra Logic Technologies, Kevin O'Brien Fehr of Glaxo-Wellcome and several others from the private sector. These people are responsible for a budget of $2.4 billion, giving them enormous influ-

168 Based on search conducted on the Canada Research Chairs website, April 18, 2002.

169 Website search, October 2001.

170 ibid.

171 Watson, op. cit.

172 CFI Policy and Program Guide: http://www.innovation.ca/programs/index.cfm?websiteid=83

ence over the direction of R&D in Canada. The CFI is targeted at infrastructure expenses; it builds the base for future research. Given the interests of those on its Board, the CFI is, in effect, building the base for Canada's long-term participation in the biotech industry.

The Re-organisation of Health Research: The path to privatisation

The process to restructure the Medical Research Council (MRC) into the Canadian Institutes of Health Research (CIHR) can be traced back to the introduction of Bill C-91, as noted earlier. In exchange for stronger patent protection under the Bill, the member companies of the Pharmaceutical Manufacturers Association of Canada (PMAC) pledged to increase R&D investments in Canada. The pledge led directly to the creation of a five-year, $237 million collaborative MRC/PMAC Health Program in 1993. Industry contributed $205 million and the MRC $32 million. The program was essentially a subsidised vehicle for commercially oriented research and development at Canadian universities and hospitals. The first five-year phase of the Program provided funding to over 1,000 projects including eight mega-projects, 50 clinical trials, and nearly 1,040 full-time equivalent positions for research assistants, technicians, graduate students, post-doctoral students and other health-related professionals in Canadian universities, hospitals and research institutes.

Then MRC President Dr. Henry Friesen led the project from the government side. Friesen is one of Canada's original biotech advocates. He was a member of the first Task Force on Biotechnology and during his term as President of the MRC, from 1991-2000, he was one of the most important voices in favour of the creation of the Canadian Institutes for Health Research. Once the CIHR was established, he became the President of Genome Canada. According to Friesen, the Program with PMAC "helped us synchronise our efforts in creating an environment that improves the health of Canadians through the discovery and application of new and innovative medicines."[173] He also claims, "This collaboration [was] vital to such health policy issues as the creation of the Canadian Institutes of Health Research which will allow us to modernise and transform the health research enterprise in Canada."[174] There is no doubt that a transformation was underway.

Before it became the CIHR, Friesen took the MRC into other joint arrangements with industry. The biggest was the Canadian Medical Discovery Fund (CMDF), a $175 million venture capital fund for start-up companies in the health sector, particularly in biotech, managed by MDS Inc. The partners in the fund are the MRC, MDS Capital Corp, the Professional Institute of the Public Service, Talvest Fund Management Inc, and both CIBC Wood Gundy and CIBC Wood Gundy Capital. According to the MDS website, "Through its strategic alliance with the MRC, the Fund will have access to the MRC's peer review panels and research proposals which will provide sources of investment opportunities." CMDF and, consequently, the MRC (CIHR) have investments in most of Canada's biotech start-up companies in the health sector, many of which are subsidiaries of MDS.[175]

173 Rx&D Update, Fall 1999: http://www.canadapharma.org/en/publications/rxupdate/update-nov99/update-1.html

174 Rx&D Update, December 1999/January 2000: http://www. canadapharma.org/en/publications/rxupdate/update-jan00/update01.htm

175 Colleen Fuller, *Caring for Profit: How corporations are taking over Canada's Health Care System*, CCPA/New Star Books, 1998.

The CIHR, MDS, and MedTech Partners Inc have also joined forces to launch the University Medical Discoveries Fund (UMDF). The CMDF is considered a partner of the UMDF. The UMDF's "focus is to help develop and commercialize early-stage biomedical innovations" at Canadian universities and since 1996 it has invested in 31 early stage companies. This relationship between the CIHR and CMDF goes further. The CIHR and other granting councils fund the Canadian Genetic Disease Network (CGDN), one of the Network Centres of Excellence. According to the CGDN, "CGDN Management works closely with investigators and university/hospital partners, who retain ownership of intellectual property developed, to create robust intellectual property positions which can underpin commercial activities." Calvin Stiller, CEO of the CMDF, sits on the board of the CGDN. In June 2001, the MRC (by then the CIHR), CGDN, MDS Inc and IBM announced a joint venture company, Blueprint Worldwide, to centralise genetic information on proteins.[176]

The MRC's move to channel public health research funds through venture capital financing gave industry leverage over the direction of health care research in the country. For Ed Rygiel, President of MDS Capital Corp, the company managing the CMDF, venture capital funding allows his company to "see what is happening in the marketplace much more broadly ...so we can take a look at the opportunities, the implications, and the best way to go forward."[177] With MDS and other companies determining the "best way forward" for the MRC's collaborative venture capital efforts, the agency was in effect abdicating its responsibility to support research in the public interest.

The next logical step was the transformation of the MRC into the CIHR. Henry Friesen was a key player here as well. When he became President of the MRC Friesen says he was disturbed by its focus on basic and clinical research. According to Friesen, "We began to make the point with increasing vigour, that the government should broaden investment in health services and health care research. Innovation should drive health care and it has to come from thoroughly done research."[178] Friesen says that the idea for the CIHR first surfaced at an MRC council meeting in March 1998. The council recognized that it was "substantially at a disadvantage at an international level in terms of support for health and medical research, and unless the MRC developed a strategy that was more inclusive, it would be left further behind."[179] Essentially, the transition to the CIHR was a means for Friesen and those backing him to introduce an overt economic development mandate into Canada's health research spending.

The Preamble of the Act establishing the CIHR states: "Parliament believes that this transformation in Canadian health research will also enhance economic development in Canada and promote growth and job creation in key sectors of the knowledge based economy." In practice the CIHR has gone beyond the mandate of Parliament, emphasizing the commercial aspects of research without reference to public interest. According to the CIHR, its 2001 Budget "addresses immediate needs through targeted, strategic investments that provide a stimulative boost to confidence in the economy," including a $75 million increase in the budget "to further support leading-edge health research of this kind and its translation into economic benefits for Canadians through a *commercialization* strategy developed by the CIHR" [emphasis in origi-

176 Jennifer Couzin, "IBM's Biotech Ambitions," *The Industry Standard Magazine*, June 11, 2001.

177 Fuller, op.cit.

178 "Man of Milk and Money — Dr. H. Friesen" Margaret Munro, *National Post* http://www.fcihr.ca/friesen_NP_news.htm

179 CMAJ April 4, 2000. http://www.cma.ca/cmaj/vol-162/issue-7/1029a.htm

nal].[180] But the CIHR does not have the appropriate mechanisms to assess whether the "economic benefits" of the technologies it supports are in the public interest and what the implications of these technologies are for the overall health and health care of Canadians.

The CIHR's commercial orientation fits in very well with the interests of the biotech industry. As a strategic sector of the 'knowledge economy,' it gets privileged access to CIHR funds, even if it has a miserable record of producing products in the public interest. The CIHR and its Chair, Alan Bernstein, are enthusiastic backers of the industry. The granting council begins the backgrounder on itself by paying homage to research on the Human Genome:

> *As we begin a new century, a revolution in health research is upon us. Scientists have mapped the complete sequence of all three billion bases of DNA belonging to the Human Genome. This is a phenomenal first step towards understanding a variety of diseases; and by understanding them developing novel treatments. One day, researchers will be able to understand the molecular bases of life and human biology. CIHR will help lead this scientific charge.*[181]

The new expenditures on R&D in recent Liberal budgets are not simply a return to old spending levels, but a major transformation in government research that has benefited the biotech industry immensely. Public R&D is now more commercially oriented and more independent of government or public accountability. Liora Salter pointed to this trend in a 1995 paper for Industry Canada. She explained that:

> *<u>direct</u> responsibility for research has diminished within government. The larger proportion of research activity now takes place outside government (although often funded with government resources) — in industry, in consulting houses, through strategic research partnerships and similar initiatives, through contracted research or in policy research institutes. Research is largely conducted by bodies operating with their own mandates, priorities, political predilections, decision-making procedures, interests and agendas. Even in the case of the Centres of Excellence (and other examples of partnered research) a large grant is given (often by government) to an autonomous body made up of researchers and their industrial and government partners. It then acts as if it were an independent granting agency, making decisions according to its own agenda, predilections about the funding, end-products and evaluation of specific research studies.*[182]

The reorganization of research that was already under way in 1995 when Salter wrote the paper, and which has advanced considerably since then, has left government, including Parliament, without the research capacity necessary to carry out assessments of the technologies that industry and public research agencies are developing — with the government's money. The bulk of funds for R&D are going into the development, not the assessment, even though the first cannot function adequately in the interests of the public without the latter. The implications for health care and the food system are enormous.

If Henry Friesen wants innovation to drive health care and innovation essentially means biotechnology, then what he's really saying is that health care in Canada should be organised around our biotech industry. In this sense, he's also saying that health care should not be organised around the principle of universal access. Biotechnology — gene therapy, xenotransplantation, cloning, etc. — is going to produce very

180 CIHR 2001 Budget, "Budget Plan 2001," CIHR Web site: http://www.cihr.ca/notice/budget2_e.shtml

181 http://www.cihr.ca/about_cihr/who_we_are_fold_e/shtml

182 Liora Salter, "Mechanisms and Practices for the Assessment of the Social and Cultural Implications of Science and Technology," Industry Canada Occasional Paper No. 8, July 1995, p.20.

expensive treatments that will probably sink any universal health care system that tries to incorporate them. I recently heard one broker advise radio listeners to make sure they increase the size of their pension plans because new advances in biotechnology will probably extend life expectancy dramatically. Longevity, or the promise of longevity, has a price that not everyone can afford. The question that needs to be asked is why is our federal government pursuing a research agenda that threatens to destroy the health care system that we, as Canadians, are overwhelmingly in favour of keeping?

It is important that we begin to see what is happening to health care as part of a larger strategy that industry has aggressively pursued for some time now. Its major objectives are to:

1. dismantle regulations and technology assessment,
2. increase patent protection,
3. increase access to public money and tax breaks for research and development, and,
4. allow for a certain amount of privatised health care.

The last objective is the remaining piece of the puzzle that industry has yet to put in place. But it's a piece that is needed so that industry can create a market for the expensive genetic technologies it is developing. This study offers some clues as to what is going on, but more research is definitely needed to expose the connection between Canada's research agenda, its emerging biotech industry, and the privatisation of health care.

This could, for instance, help to explain why a recent report commissioned by Ralph Klein on the future of health care in Alberta, which calls for two-tier health services, was written by Don Mazankowski. Mazankowski was not only the Deputy PM and lead negotiator for NAFTA under Mulroney; he's also the newly appointed Chairman of the Board for the Canadian Genetic Disease Network and the industry-dominated Institute for Health Economics. Mazankowski's report is right in line with industry's strategy: "Medicare was never designed to cover the full range of health services, treatments, drugs and technology available today or envisioned for the future . . . If we want to make sure there is access to the best treatments available, we are going to have to make some choices about what services are covered and what services are not."[183] And who joined Mazankowski in developing the report? None other than the Canadian biotech community's leading voice, John Evans.

The movement towards the corporatisation of health care and health policy is not going to change course with a Cabinet shuffle. With the last Cabinet shuffle in early 2002, Anne McLellan became the Minster of Health. On her first day as Minister, she told reporters that she was open to amendments to the health act: "Let's look at the act; let's look at modernizing it." According to the Globe & Mail, McLellan told reporters that "the act might put more emphasis on disease prevention and community-based health care and *new technologies*"[184] [emphasis added]. As for the former Health Minister Allan Rock, who once championed the cause of Canada's generic drug industry in Cabinet, the change of portfolio gave him a change of heart about pharmaceutical patent laws. "We have a law on patents here in Canada to protect the fruits of labour and to have protection for ideas and innovative devel-

183 John Cotter, "Health Report recommends reform,", CP, January 8, 2002, http://www.canoe.ca/Health0201/08_report-cp.html

184 Brian Laghi and Jill Mahoney, "McLellan willing to modernize Canada Health Act," *Globe and Mail,* January 16, 2002, p. A4.

opments," he told reporters, one week into his new position as Minister of Industry.

The Lobby

The machine working to ensure that big business interests define the government agenda can broadly be referred to as the industry lobby. But the industry lobby is not easy to pinpoint. The most visible actors within the industry lobby are the traditional industry lobby organisations: the manufacturers associations, the business councils, chambers of commerce. These associations strictly and openly represent business, often according to sectors. Members gather behind closed doors and work out common strategies. The Business Council on National Issues or the Canadian Manufacturers Association are two examples of traditional business lobby groups.

The traditional industry lobby groups have certain limitations. For one, they are not part of government and therefore, even though they rarely have trouble accessing top-level officials, access is ultimately left to the discretion of the government officials. And more importantly, these traditional organisations cannot hide their bias. They are business-only groups with a particular set of self-interests and they therefore lack external credibility. These limitations have encouraged industry to look to new formations.

Over the last couple of decades a new set of actors have emerged to perform roles that the traditional lobby groups are incapable of. These groups are typically hybrids, with representatives from industry, government, citizens' groups and academe. They can take the form of committees, councils or advisory bodies. For industry, they meet three key needs: they provide a credible external voice; they integrate government into lobby work; and they give industry access to and control over public opposition.

In the biotech arena, the traditional lobby groups are easy to identify, but they typically hide some measure of government support and participation. The most important traditional lobby group is the Biotechnology Industry Organization (BIO). BIO is an umbrella lobby group for the industry, both biotech firms and venture capitalists, that claims to "speak with one united voice, supported by the expertise and collective influence of our members, on legislative, regulatory and public policy issues affecting our industry." BIO is based in Washington but it has many dues-paying Canadian members, including several public institutions such as the Alberta Research Council, City of Toronto Economic Development Division, Genome Canada, the Government of Ontario, and the National Research Council.

Aside from BIO, Canada's start-up biotech firms and venture capital companies participate in several regional or provincial biotech lobbies, such as the Toronto Biotechnology Initiative, AgWest Biotech, BioEast, and the BC Biotechnology Alliance. These and most other Canadian biotech groups receive some support from government, either through funding or participation. BIOTECanada, "Canada's voice for biotechnology," which is little more than a traditional business lobby group, is funded, in part, by Industry Canada. It was established in 1989 as the Canadian Institute of Biotechnology as part of an agreement between

Industry Canada and the Industrial Biotechnology Association of Canada, a biotech industry lobby group, to contribute $2.2 million in matching funds towards its programs. Between 1994-2000, the government gave it $6 million.[185] BIOTECanada currently operates several task forces and committees, including a lobby committee called 'government relations' with an agriculture sub-committee led by Bill Anderson of Aventis. By contributing to BIOTECanada, the government is essentially paying the industry to lobby government.

The big guns of the agrotoxin industry have their own lobby outfit in Canada called Crop Life Canada (formerly the Crop Protection Institute). According to Crop Life, the name change "reflects a global move towards representing the plant science industry, which the institute added as part of its remit in 1998 — foreseeing the need for plant life science products — chemical or biotech — to share one strong voice and a single mission."[186] But membership is not confined to the gene giants. Sask Wheat Pool and Agricore United sit on the Board of Directors — which should give some pause for thought about how these companies are positioning themselves in the GMO debate.

The representative for 'big pharma' in Canada is Canada's Research-based Pharmaceutical Companies (Rx&D), formerly the Pharmaceutical Manufacturers Association of Canada (PMAC). Rx&D focuses on the promotion of drug-based health care and advocacy around regulation and legislation, particularly patent law. It issues regular reports and press releases and is frequently called upon to make presentations to federal standing committees. The current president of PMAC is Murray Elston, the former Minister of Health with the Ontario Liberals.

The traditional biotech lobby focuses a great deal of its efforts on the international trade arena. Since the 1980s international trade, through a series of critical bilateral and multilateral agreements, has come to dominate all areas of government policy and social life. Trade has also become more important, as trade liberalisation has increased our dependence on imports and exports and privatisation has opened up countries for business and foreign investment. In this context, Canada is trying to position itself as a major player in the global capitalist world — a powerhouse in transnational industry. These developments have had an important impact on Canada's biotech policy.

The government views the biotech industry as an important source of foreign investment and an equally important source of export growth. If Canada engages in multilateral agreements that open its health sector to foreign investment, it's not because the government believes that this will result in improved health care (although this may be a reason given), but it's because Canada wants to secure foreign markets for its growing health care 'industry' sector, even if it is dominated by foreign corporations. Trade policy increasingly influences government policy in all areas, including health and agriculture. And trade policy is set through international agreements that continue to recede from democratic accountability.

For biotech corporations, international trade agreements provide a means of expanding their influence over government policies and open new avenues of access to decision-makers. For example, Canada and the EU launched an EU-Canada Trade Initiative in 1998 to develop

185 Aaron Freeman, "Federal Government's Pro-Biotech Bias is Most Evident at CFIA,"The Hill Times, November 19, 2001: http://www.healthcoalition.ca/collusion.html

186 Crop Life Canada Press Release, http://www.cropro.org/english/pdf/newname.pdf

mutually supporting trade policies at both the bilateral and multilateral level. Shortly after the Initiative began, a Canada-Europe Round Table for Business (CERT) was inaugurated, made up of some of the largest corporations operating in Canada and the EU. CERT drafts policy recommendations and brings top CEOs together at the semi-annual Canada-EU Summits to meet with and lobby top-level government officials. Former Director Jan Candries is clear about business' interest in CERT: "CERT offers access to high-level policy-makers in the Canadian government and the European Commission. Ministers and Commissioners attend our executive meetings."[187]

Biotechnology is a focus of the EU-Canada Trade Initiative and, not surprisingly, the biotech industry is active within CERT. Novartis is one of CERT's three founding members and other 'life science' giants have since joined, including MDS and Glaxo-Wellcome. CERT is concerned with European regulations of GMOs and IPRs for biotech products: "CERT supports voluntary compliance measures for biotechnology and life sciences industries affected by sanitary and phytosanitary measures" and "we also view the efforts to restrict the protection of bio-genetechnology as conterproductive."[188]

In June 1999 it issued a number of recommendations concerning biotech to the EU and Canada including a call for both countries to

> *commit to work on predictable and transparent regulatory requirements for the approval of agri-food biotech products, on mutual sharing of safety data and assessments and to consider the compatibility of the European and Canadian regulatory requirements as an important long term goal to achieve;*

and to

> *adopt a common strategy to remove the current optional exclusion from patent protection for certain biotechnological inventions (Article 27.3(b) of the TRIPS agreement).*[189]

While the EU, in its response, refused to accept these recommendations, Canada responded with a vague affirmation of its intent to work towards these objectives over the long-term and to see to the enforcement of the TRIPS provisions in the near-term.

With European interest in the initiative waning, CERT hired a very capable Canadian co-director. He is Roy Maclaren, the Minister of International Trade from 1993-1996, High Commissioner to the UK from 1996-2000, and Canada's candidate to succeed Ruggiero as Director-General of the WTO. Maclaren also recently joined the board of Toronto-based Patheon Inc.

> Patheon is a leading global provider of outsourced drug development and manufacturing services to pharmaceutical and biotechnology companies. With nine facilities and more than 2,500 employees in North America and Europe, Patheon has the capacity, expertise and global reach to meet the growing needs of the international pharmaceutical industry. We serve more than 120 pharmaceutical and biotechnology clients, including 13 of the world's 20 largest pharmaceutical companies.[190]

187 Canadian information for Europeans, Vol. 22, Nov. 1999, Canadian Mission to the EU: http:// www.dfait-maeci.gc.ca/eu-mission/InfoCanada/IC_nov99p5.html

188 CERT Positions on the launch of a new WTO Multialteral Trade Round, June 2001: http://www.canada-europe.org/en/Resources/pdf/CERTWTOMemorandumtoCanEU21June01.pdf

189 CERT Recommendations directed at Canadian Government and European Union, June 1999: http://www.canada-europe.org/en/Resources/pdf/RecommendationstoCanGovntEUJune99.PDF

190 Patheon Website, April 2002: http://www.patheon.com/overview/overview.htm

"To ensure eventual economic success, everything we do must be dominated by the spectre of public acceptance."

Under Maclaren and Patheon, the interests of Canadian biotech companies and those of the biotech TNCs come together in support of the same neo-liberal policy prescriptions.

The new lobby groups that dominate the international trade arena, like CERT, are really little more than the traditional business lobbies with a new name and an official status. As international trade grows in importance, so does their influence. The Team Canada missions are perhaps the most important example. The biotech industry has its own Trade Team Canada Bio-Industries group. When the team goes on missions, the representatives from industry that attend get personal access to high-level officials, including the PM. The Team also meets with members of the Department of Foreign Affairs and International Trade, Industry Canada, and AAFC officials on a regular basis. The Bio-Industries team is one of 12 Trade Team Canada Sectors (TTCSs), which, according to the federal government, are

> *the key vehicle through which to co-ordinate national trade planning and implementation of activities in the 12 sectors identified. They constitute the federal government's sectoral priorities for trade, and, as such, receive benefits commensurate with priority status. These benefits include influence in aligning federal government resources with priorities, enhanced profile associated with Team Canada Inc, and access to key federal decision-makers.*[191]

In sum, the biotech industry has formidable and effective representation within the traditional lobby sector. Yet, while these groups have had great success in controlling government, they are less capable of reaching the public. For this task, they have developed an intricate web of hybrid lobby groups.

One of the most influential hybrid groups has been the National Biotechnology Advisory Committee (NBAC), which was established as part of the first National Biotechnology Strategy to bring business leaders and scientists involved or interested in biotech into the federal policy-making process. NBAC consisted mainly of industry representatives or scientists from public institutions with personal commercial interests in biotech. Twelve of the 19 members of the 1998 NBAC were from industry and the consistency of NBAC over the years is striking. Seven members of the 1998 NBAC were NBAC members prior to 1992.

As public awareness and opposition to GMOs mounted in the 1990s, the biotech industry began to recognise the limitations of the NBAC. In 1995, the President of the Canadian Institute of Biotechnology acknowledged: "It is the public, the consumer — the poorly informed and uninitiated average individual that holds the key to our future. This may not be comforting but this is reality. To ensure eventual economic success, everything we do must be dominated by the spectre of public acceptance."[192] NBAC was good at putting forward a united industry position to government, but, given its domination by industry, it was not the proper vehicle for convincing the public. Government was already in industry's pocket; the priority was the public. So NBAC had to change.

In its 1998 report NBAC noted:

> *It is imperative that we attend to the need for increased public awareness and confidence. To this end, we have suggested some substantial modifications to the NBAC so that it can contribute to the development of ongoing*

191 Minutes of Trade Team Canada Bio-Industries Meeting, May 16, 1999 (http://strategis.ic.gc.ca/SSG/bo01354e.html)

192 Rick Walter, "Public Perception – Challenges and Opportunities," *BIO/TECHNOLOGY*, March 1995.

conversations in a variety of fora. ... Building public support and confidence requires a broader base of experience and perspective, and significantly more resources than NBAC now enjoys."[193]

It put forward the idea of a Canadian Biotechnology Advisory Council, which would manage a "National Conversation" whose central goal would be "the development of a socio-ethical framework for public policy decision-making."[194] That year, as part of the Canadian Biotechnology Strategy, the government morphed NBAC into the Canadian Biotechnology Advisory Committee, with an expanded range of members — maintaining the biotech community's dominance but decreasing the number of representatives directly from industry. CBAC is administered by the Canadian Biotechnology Secretariat within Industry Canada. Whereas each NBAC was convened by the government at key times to develop biotech industrial strategies, the CBAC facilitates an already established strategy. It reports to the Biotechnology Ministers Co-ordinating Committee, advising them on how to deal effectively with sensitive issues, and, at the same time, engages with the public to provide the semblance of consultation.

Industry's influence over CBAC is more indirect, yet still significant. The linkages are there but more removed. For instance, the CBAC website's biography of its chair, Alan Naimark, lists his academic positions, but does not mention that he's a member of the Board of Directors of the Winnipeg-based biopharmaceutical company Medicure Inc.[195] Naimark's also been on the Board of Directors of the Canadian Imperial Bank of Commerce (CIBC) since 1987 and owns, controls or directs 4,174 shares in the company.[196] CIBC is a leading investor in biotechnology in Canada and its World Markets venture capital fund for biotechnology and pharmaceuticals has "one of the broadest and deepest of any financial institution, with current coverage of over 45 biotechnology companies and 35 specialty pharmaceutical companies."[197] Similarly, the biography of CBAC member Robert Church that is available on the web site provides a comprehensive listing of his awards and service to academia and government, but does not mention that he has served on the Board of Directors of several biotech companies, including Connaught, Biostar, and Ciba Geigy, or that he is the founder/advisor to "a number of start-up high technology companies, including Alberta Livestock Transplants Ltd. (1971) through to Neurospheres Ltd. (1990), as well as a member of the Investment Committees of the Boards of Vencap Equities Ltd. and AVAC Ltd." His biography on another web site, that of the Board of Directors of the Canadian Science and Technology Growth Fund, claims: "Through his numerous activites, Dr. Church has over sixteen years experience representing investments in high technology start-up companies of well over $50 million."[198]

Similar strategies are at work in other areas of federal S&T policy development and biotech people can be found on all of the most important federal advisory committees. Réné Simard, member of CBAC with close connections to the pharmaceutical industry, and Susan Smith, member of the NBAC and VP of the Royal Bank's Knowledge-based Industries division, sit on the influential Advisory Council on Science and Technology (ACST). The ACST is "mandated to review the nation's performance in science and technology, identify emerging issues and advise on a forward-looking agenda." It reports to the Cabinet

193 NBAC 1998 Report, p.3 and p.71.

194 ibid, p.71

195 Company PR, "Medicure appoints Dr. Arnold Naimark to the The Board of Directors," March 28, 2000: http://www.medicureinc.com/press/2000/mar28-2000.html

196 CIBC Notice of Annual Meeting of Common Shareholders and Special Meeting of Class A Preferred Shareholders, 2001: http://www2.cbic.com/download/proxywith-pics01.pdf

197 CIBC World Markets web site: http://www.cibcwm.com/conferences/biopharm02/

198 Accessed April 20, 2002: http://www.cstgf.com/new/index.html

It is understood from the outset that the government and the advisory bodies share a common agenda.

Committee for the Economic Union, but can also be called upon by the PM to answer specific questions. Much of ACST's work takes place through Expert Panels and to date the panels have reported on the commercialisation of university research, skill requirements, and international S&T research. The ACST can bring non-members on board these panels, as with the expert panel on the commercialisation of research where two former members of NBAC and the Royal Bank's Vice-President of Life Sciences and Agri-Sciences were called in.

The success these advisory bodies have had in translating their recommendations into policy should not be confused with their power in the policy-making process. Their recommendations only become policy because they articulate positions that the Liberal government is intent on pursuing. This is the reason why an advisory body or committee is called in the first place. It is understood from the outset that the government and the advisory bodies share a common agenda. The advisory bodies, and the government itself, are only there to act out the roles of and make a few adjustment to a script that, in many ways, has already been decided upon behind closed doors. A recent example within the biotech sector was the function of the advisory bodies, commissions, and committees in pushing the US pharmaceutical industry's agenda for Canadian patent legislation.

The biotech industry has also helped establish a number of hybrid lobby groups at the fringes and outside of government. These groups tend to be a mix of representatives from industry, government, academe and the public, and they are often funded both by industry and government. One of these groups is the Biotechnology Human Resources Council — formed in April 1997 in response to a study initiated by industry. Graham Strachan, the former Chair of NBAC, heads this industry-dominated council, which "designs, distributes and promotes programs and services of value to Canada's biotechnology industry for attracting, developing and retaining a highly-skilled Canadian workforce."

Another group is the Food Biotechnology Communications Network (FBCN). It describes itself as "Canada's leading information source for balanced, science-based facts about food biotechnology and its impact on our food system," and a "a tri-partite organization with equal representation from NGOs, the private sector and governments." FBCN receives money from biotech companies, such as Monsanto, and from government agencies, notably the Canadian Food Inspection Agency. Through an Access-to-Information request, Canadian Health Coalition research Bradford Duplisea found a September 2000 memo to Samy Watson, Deputy Minister of Agriculture and Agri-Food Canada, that provides an example of the critical role FBCN plays for the biotech industry. The memo reads:

> *During the 'biotechnology crisis' last year, [the Food and Consumer Products Manufacturers of Canada and the Canadian Council of Grocery Distributors] worked very closely with the Department through the Food Biotechnology Communications Network to develop and implement a co-ordinated public and media communications program on food biotechnology.*[199]

The FBCN is not only a public relations vehicle for the industry; it also serves as a vehicle for co-option. The Consumers' Association of Canada (CAC) works actively with FBCN, and its Vice-President Jenny

199 Lyle Stewart, "Lines are fuzzy on GM foods," *Montreal Gazette*, April 5, 2002: http://www.healthcoalition.ca/linesarefuzzy.html

Hillard is on the FBCN Board of Directors. The CAC lends credibility to the FCBN through its participation in the group and through the joint publication of pamphlets on biotechnology. CAC receives funding to work on biotechnology from the CFIA and Agriculture Canada and has developed close ties with industry; the Association's lead spokesperson for biotechnology was Lee Ann Murphy until she took a job with Monsanto in November, 2001.[200] As of mid-April, 2002, Hillard was no longer V.P. of Issues for the CAC, no longer on its board, and no longer a spokesperson for the organization. CAC has played a particularly important role for the industry in its support of voluntary, as opposed to mandatory, labelling of GE foods, even though polls consistently show that 90-95% of Canadian consumers want mandatory labelling.

There are a number of important hybrid lobby groups that are active on the pharmaceutical side of biotech. For instance, the pharmaceutical industry's lobby group Rx&D is an associate member of the Coalition for Biomedical and Health Research (CBHR). This coalition brings together a number of influential and, in some cases, respected medical organisations, including the Association of Canadian Medical Colleges, the Confederation of Canadian Faculties of Agriculture and Veterinary Medicine, the Canadian Society for Clinical Investigation, the Canadian Institute of Academic Medicine, Royal College of Physicians and Surgeons of Canada, and the College of Family Medicine of Canada.

The CBHR was set up in 1992 and since then it has been instrumental in the formation of Liberal S&T policy. Over the years, it has successfully advocated for the creation of the CIHR, the inclusion of the biotech sector in the Technology Partnerships Canada program, and increased intellectual property protection for pharmaceuticals and other products of biotech. The Chair of the CBHR, Barry McLennan, was part of the Task Force and Interim Governing Council that orchestrated the formation of the CIHR.

In April 1999 the CBHR submitted a brief to the House of Commons Standing Committee on Industry, entitled "Setting the stage to become a world leader in biotechnology." The brief recommends a speedier regulatory process, changes to relevant patent legislation, including the patenting of higher life forms, and increased federal spending to stem the 'brain drain' to the US.

The CBHR is not the lone voice from the biotech community lobbying for increased federal R&D spending. The Canadian Federation of Biological Societies (CFBS) lobbies on behalf of researchers in the 'life science disciplines' in order "to contribute in a substantive way to the development of a forward-looking science and technology policy for Canada." It has about 2500 members; most are university based researchers, but a "significant number" are from research laboratories in government and industry. The CFBS generally links up with other university-based associations to lobby the federal government on science policy. In recent years, the main vehicle has been the Canadian Consortium for Research, which released a publication in 1998 entitled, "Closing the Gap: Investing in Knowledge for a Better Canada."

200 Lyle Stewart, "Who can you trust? There's a too-cozy relationship between food regulators and producers," *The Montreal Gazette,* July 20, 2001: http://www.healthcoalition.ca/cac-fbcn.html and Aaron Freeman, "Federal Government's Pro-Biotech Bias is Most Evident at CFIA," *The Hill Times,* November 19, 2001: http://www.healthcoalition.ca/collusion.html

Conclusion

Canada is deep into biotech. We are the third principal producer of genetically modified (GM) crops in the world.[201] Fifty-one GM crops have been approved for commercialisation and it is estimated that 60 percent of the processed foods in Canada now contain genetically modified organisms (GMOs).[202] Our federal, provincial and, in some cases, municipal governments have established biotechnology strategies and have spent billions of public funds on the development of biotechnology industries in agriculture and health. The federal government maintains that Canada had to take this giant leap into biotech so that it would not miss the bus. But in the rush to get on board, no one asked us where we wanted to go or informed us about where the bus would be going. Some basic questions that should have been asked twenty years ago, when the federal government announced its initial support for biotechnology, still need to be asked today: What are the objectives of R&D in biotechnology and who determines these objectives?

The latter question has a straightforward answer: when it comes to the two primary areas of biotech, agriculture and pharmaceuticals, R&D is dominated by a handful of transnational corporations (TNCs). The pesticide TNCs dominate agricultural biotech. Ten pesticide companies, based in the US and Europe, control 84% of the $30 billion annual pesticide market and five of these companies (DuPont, Syngenta, Bayer, Monsanto and Dow) control 25% of the global seed market and 71% of all patents on agricultural biotechnology.[203]

The situation is similar in the pharmaceutical industry. In 2000, the top ten pharmaceutical TNCs controlled 48% of the $317 billion pharmaceutical market. These TNCs have considerable in-house R&D facilities for biotech, but at least 20% of their research is out-sourced to smaller biotech and genomics firms, universities and public labs. A *Nature Biotechnology* survey in May 2001 found that of the 361 biotechnology companies worldwide, only 21% were profitable. The genomics industry, with its patent rights on the genetic information of organisms, is in the same position. The biotech and genomics firms are essentially "feeder companies" that stay afloat through alliances with and equity investments from the big pharmaceutical and pesticide TNCs.[204]

The pesticide and pharmaceutical TNCs are investing massively in biotechnology R&D because they have a particular agenda. The pesticide industry's interest in biotechnology dates back to the 1980s. At that point, the industry faced several emerging problems. First, the chemistry behind pesticides was exhausted, and it was becoming increasingly difficult and expensive to identify and develop new pesticides. Second, several blockbuster pesticides were set to come off-patent and the TNCs feared that competition from generic producers would lower prices and reduce their market share. Off-patent pesticides were set to account for 69% of the entire pesticide market by 2005.[205] Third, the food retailers, processors, and distributors were using their monopoly positions to squeeze farmers and take an increasing share of the revenue from the food system, leaving the pesticide industry with less space to squeeze farmers on the other end.[206]

201 Clive James, "Global Review of commercialized transgenic crops: 2000," *ISAAA Briefs*, No. 23, 2001: http://www.isaa.org/publications/briefs/Brief_23.htm

202 Canadian Food Inspection Agency website: http://www.inspection.gc.ca/english/ppc/biotech/gen/statuse.shtml

203 ETC Group Communique, "Globalization, Inc.", July/August 2001, Issue #71. ETC stats are here adjusted to account for Bayer's purchase of the agricultural division of Aventis and Aventis' controlling interests in the seed companies Groupe Limagrain and KWS AG.

204 ETC Group Communique, "Globalization, Inc.", July/August 2001, Issue #71.

205 Agrow, no 322 (12/02/99).

206 See Devlin Kuyek, "Lords of Poison: The Pesticide Cartel," *Seedling*, June 2001: http://www.grain.org/publications/jun003-en.cfm

Biotechnology offered a solution to all these looming problems. It addressed the difficulties in finding new pesticides by opening up a whole new area of science, biology, for the industry to identify and patent new pesticide technologies, this time from the DNA of organisms. TNCs could use biotechnology to counter generic competition by genetically engineering plants for dependence on their brand-name pesticides. Genetically modified (GM) crops could have the added advantage of reducing regulatory costs; a new pesticide costs a company between $40-100 million to bring through the regulatory process, while it costs less than $1 million to bring a new plant variety to market.[207]

The pesticide industry also saw in genetic engineering a tool for strengthening its position in the larger agribusiness sector. They realised early on that they could develop value-added crops, like corn with higher protein to reduce feed processing costs or canola with high Vitamin A content for the production of specialty oils. The pesticide industry could conceivably sell these crops for a higher price since the food and feed processors would pay more for them. So far, this vision has served to bring the upstream (inputs) and downstream (food and feed processing) industries together, thereby bringing further consolidation and monopoly control to the food system. Joint biotech ventures have already been established between the pesticide TNCs and the world's largest food and feed processors, such as Renessen, a joint venture between Monsanto, the principal producer of GM crops, and Cargill, one of the world's largest food and feed companies, that the companies describe as the "first global alliance that spans the agricultural value chain."[208]

The pesticide industry's influence over agricultural biotechnology is reflected by the first wave of GM crops. In 1999, 82% of all the GM crops planted in the world were engineered for herbicide tolerance and the vast majority had tolerance to the herbicide Roundup (glyphosate).[209] For Monsanto, the world's leading supplier of Roundup and the owner of most Roundup resistant GM crops, the GM crops were an effective way to protect sales of its herbicide, which was coming off-patent around the world in 2000-2001. The other major technology, which has been applied to various crops, is plants modified with genes from Bacillus thuringiensis (Bt), a soil microbe that is toxic to certain crop pests. The technology is most often used as a substitute for certain insecticides and is generally integrated within a regime of pesticide applications, without any significant changes to agricultural practice.[210]

The pharmaceutical industry, which is in much better financial shape than the pesticide industry, sees similar advantages to biotechnology. It is interested in biotechnology for the production of genetically engineered drugs such as insulin, and for the possibility it provides of identifying genes that cause side-effects to drugs. But biotech's big potential for the drug industry is gene therapy. This is how Mark Levin, CEO of Millennium Pharmaceuticals, describes the emerging biotech pharmaceutical market:

> *In the future, maybe it won't be us but it will be our kids' kids who will certainly have their genome on a [micro]chip. Your doctor will understand the different possibilities or the different probabilities of disease. People will be in*

207 Henk Hobbelink, *Biotechnology and the Future of World Agriculture* (Zed Books: New Jersey, 1991), p.147.

208 Renessen website: http://www.renessen.com/ about.html

209 James, op.cit.

210 Dr. Charles M. Benbrook, "An Appraisal of EPA's Assessment of the Benefits of Bt Crops," Prepared for Union of Concerned Scientists, October 17, 2000"

the doctor's office to talk about the kinds of foods they should eat, potentially the kinds of medications they should take based on their genome.[211]

In effect, Levin is describing a future of cradle-to-grave drug therapy based on the genetic identification of potential diseases among individuals. Roy Whitfield, CEO of Incyte Pharmaceuticals, explains the industry's vision:

We will know all the genes in an individual pathway. And we will know how they all relate to each other and we will have already lined up a potential drug for intervention at any point of time that will all be in a database somewhere.[212]

This shift to 'personalised' treatments could take drug sales to new heights.

The pesticide and pharmaceutical industries that dominate biotechnology R&D are using it to advance their own interests. These interests are not determined by consumer demand, but are based on long-term strategies for market control and profit maximisation. The TNCs are driving the biotech bus, everyone else is just aboard for the ride.

The federal government's biotech strategy is all about trying to get a piece of the money that the big TNCs are investing into their biotech dreams. There has never been a Canadian vision for biotechnology, only a federal strategy for how Canada can compete with other nations in the race to attract private capital for this 'hot' economic sector.

Canada's plunge into biotech occurred in 1982 when public scientists and industrialists gathered together to forge Canada's first national biotechnology strategy. They argued that biotech was the source of the next industrial revolution and Canada would be left behind if it did not act fast. Their recommendations led to the National Biotechnology Strategy of 1983 and the establishment of public biotech research capacity and a few biotech companies. During these initial years, the industry had a tough time attracting interest from private investors and it was only kept alive through large injections of public funds. As we have shown, this dependence on massive government support has not disappeared; the form of government intervention has, however, become more complex and difficult to track. What is, in effect, support for the biotech industry is camouflaged as public policy, and the people who carry out the biotech agenda are dressed up as public servants acting in the public interest.

Federal support, as it is detailed in this study, can be broken down into three principal areas of government policy:

In the mid-1980s and early 1990s, the federal government made significant changes to federal intellectual property right legislation to encourage private investment in R&D in pharmaceuticals and agriculture. Bill C-22 and Bill C-91, in 1986 and 1992 respectively, modified Canadian patent legislation to eliminate compulsory licensing and give the pharmaceutical industry 20-year patent protection on their brand-name drugs. In 1990 the federal government enacted a Plant Breeders Rights Act that extended patent-type rights over plant varieties to public and private breeders. The National Biotechnology Advisory Committee, composed mainly of industry representatives and biotech scientists, had

211 Quoted in "Roundtable Discussion: The Promise of Genomics" in Ernst and Young, Bridging the Gap: Ernst and Young's 13th Biotechnology Industry Annual Report, 1999.

212 ibid.

lobbied for these changes since its formation in 1983. In return for the generous changes to the patent laws, the pharmaceutical industry pledged to increase investments in R&D in Canada, and a significant portion of these investments went towards Canada's biotech companies and researchers.

The second avenue of federal government support for the Canadian biotech sector was regulatory reform. The regulatory reform agenda, which was launched by the Mulroney government and has continued unchecked during the Chrétien administration, put control over regulations in the hands of unelected officials in the Privy Council Office and the Treasury Board Secretariat, with the objective of ensuring that regulations did not impede Canada's competitiveness in six key sectors, of which biotechnology was one. Regulatory policy for biotechnology proceeded according to plan. No new regulations were developed for GMOs. The capacity for independent research into public and environmental safety concerns was gutted — with most labs at Health Canada shut down in 1997. The capacity for research into the safety of GMOs was transferred to Agriculture and Agri-food Canada, a department with a mandate to support agribusiness, even though the mandates for public health and environmental protection stayed with Health Canada and Environment Canada respectively. Agencies such as the Science Council of Canada, with the capacity for independent assessment of technologies, were shut up and closed down. And, to top it off, proponents of biotechnology were named to departmental oversight positions. Biotech regulations are now just a legitimising stamp in the commercialisation process; the capacity and the intent to protect the public interest has been destroyed.

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The third area of federal government support for biotech is in the reorganisation of public research. By the late 1980s, science and technology moved to the centre of the federal government's industrial/economic policy. The government assumed that 'innovation' was the key factor determining international competitiveness and defined innovation narrowly as high technology. With Canada's competitiveness at stake, the government abandoned its free-market principles and picked a few key sectors of the economy for which it would build up a research base; biotechnology was one of these sectors. Federal research funds were reoriented towards 'incubation' centres and 'partnerships' with the biotech industry. The major federal granting councils were given economic mandates to support Canadian competitiveness and new sources of research funding, such as Genome Canada, the Canadian Foundation for Innovation, the Technology Partnerships Program and Agriculture and Agri-Food Canada's Matching Investment Initiative were opened up, each one giving priority to biotech. In addition, people with biotech backgrounds were brought in to take over key positions on federal research agencies and advisory bodies.

Other areas of federal support for the biotech industry are on the horizon, with the most important in the near term being the privatization of health care. Recent statements from the provincial and federal governments suggest that private services will be permitted to provide 'new technologies', such as gene therapy or xenotransplantation, to those who can afford them.

By privileging the biotech industry, the government has taken resources away from other sources of innovation and directions for research.

The federal government's website and the literature that it has put out are full of accolades for the biotech industry. It's hard to find any mention of the negative consequences, as the debate has been framed to avoid any discussion of the deeper implications of the government's commitment to biotech. These consequences need to be put at the centre of the debate. They can be grouped into three categories:

First, by privileging the biotech industry, the government has taken resources away from other sources of innovation and directions for research. Biotech is driven by a corporate research agenda and research therefore focuses on technologies that can be patented and that can generate the greatest revenue, such as drug-based therapies. The health researcher is paid to look through the microscope at specific factors affecting health, notably the genes, and is unable to see the larger complex system that determines health. The solutions that emerge, therefore, are often inappropriate for the communities they are supposed to serve. If the researcher looked holistically at the health of the community and worked with the community in the development of solutions, she or he would most likely have pursued an entirely different avenue of research.

This is certainly the case in agriculture. The industrial model is in a crisis. Across the planet, yields are in decline, water sources are drying up, biodiversity is disappearing at an alarming pace, pesticide use is spiralling out of control, soil is losing fertility, and disease and pest pressure is getting stronger. Add to this the severe income and/or land crisis affecting farmers and it is not hard to see that the industrial agriculture model is in need of an overhaul. Biotech will not resolve these problems because it only offers more of the same.

Industrial agriculture research focuses on finding pureline high-yielding varieties (HYV), or, more appropriately, high-response varieties (HRV) to plant in vast monocultures. When these varieties are grown on the farm, their resistance properties break down rapidly as they are overcome by the intense pest and disease pressures that monoculture farming generates. The industrial approach to the problem is to either increase the use of synthetic pesticides or identify genes with disease and pest resistance from traditional varieties to cross-breed with the HRVs. But neither strategy resolves the underlying problem, since pests and disease pathogens rapidly overcome any new resistance genes or pesticides that are used. The result is a constant race between breeders trying to find new genes, and disease pathogens and pests trying to overcome them. Breeders must inevitably lose the race because there are only so many resistance genes they can turn to.

Instead of questioning the logic of these strategies, scientists are turning to biotech to extend the search for genes — to go beyond the confines of a single species to a search for genes across species and kingdoms — searching, for example, through soil microbes for genes that will produce insecticidal toxins in maize, cotton, or tomato. The strategy is risky, unproven, and not likely to present any significant advantages over the old strategies, as most biotech technologies simply imitate what was possible with conventional breeding strategies: herbicide resistance, insect resistance, or disease resistance.

If the promoters of the industrial model have nothing new to offer, others certainly do. Scientists and farmers across the world are demonstrat-

ing the value of sustainable agriculture systems that see farming in its ecological and socio-economic complexity. While our governments and the biotech industry invest in a narrow research on the seed or genes, others are showing that yields can double at a fraction of the cost by looking at soil fertility restoration, water management and harvesting, crop rotations, multi-cropping, and livestock integration. The research is done as a joint effort between scientists and farmers so that the research reflects on-farm knowledge and meets the needs of farmers.

This kind of research is strongly supported by the Canadian public.[213] The federal government, however, is more interested in what agribusiness wants. A study by Helen Forsey of the National Farmers' Union found that three-quarters of Agriculture and Agri-Food Canada's (AAFC) research budget — 930 research projects out of 1270 — is devoted to its Matching Investment Initiative, which, according to AAFC: "allows the department to match . . . private sector investment in collaborative research in our labs. It also allows us to set our research priorities in tune with market signals." In this context it is hardly surprising that less than $40 million of the $4 billion spent by all levels of government on agriculture programs goes to support the development of sustainable agriculture.[214]

A second set of consequences are those that emerge from the federal government's support of a losing industry. After twenty years of significant public support for the biotech industry, involving billions of dollars and a profound dismantling of the government's capacity to serve the public interest, we have no major biotech corporations. Canada's biotech industry is simply a feeder industry for the big TNCs of the US, Europe, and Japan and consists almost entirely of small firms, spun-off from university or hospital research. They get their start with public money and resources and then race for patents that they can advertise on the stock market to attract venture capital and alliances with the big TNCs. In the early 1990s, none of these companies were profitable.[215] Today, according to an executive of one of Canada's leading biotech firms, only 14 biotech companies in North America are profitable.[216]

The biotech industry is in a bad spot. People simply do not want the products of biotechnology, particularly when it comes to food. Moreover, as pointed out by Barry Commoner, a senior scientist at the Center for the Biology of Natural Systems at Queens College, the "critical dogma" of the biotech enterprise, that specific DNA codes for specific traits, was put to rest with the publication of the complete Human Genome, which demonstrated that there were far fewer genes than would be necessary to account for the entirety of human traits.[217] The assumed correlation between genes and traits appears to be spurious, bringing the foundations of the entire biotech industry into doubt.

The federal government, as biotech's largest Canadian shareholder, is caught up in the industry's mess. It sees the industry's problems as its own problems and is therefore prepared to do anything to rescue the industry from its troubles, whether this means pushing through the deregulation of Health Canada in the midst of national public scandal, giving public money directly to biotech lobby groups, such as BIOTECanada, or opposing mandatory labelling of GMOs when surveys show that it is supported by over 90% of the Canadian public.[218]

213 Anon., "Winter 1988 survey," *The Environmental Monitor*, 4 March, 1988; and Baseline Market Research, "Organic Agriculture Study. A report to the Agricultural Development Branch, Agriculture Canada," Baseline Market Research, Fredericton, NB 1998. See REAP Canada's website for more information: http://www.eap.mcgill.ca/publications/eap104a.htm

214 World Wildlife Fund, "Making pesticide reduction a reality in Canada: Funding programs to advance biointensive IPM and organic farming," August 2000: http://www.wwfcanada.org/satellite/prip/resources/reduction-reality-full.pdf

215 James G. Heller Consulting, *Background Economic Study of the Canadian Biotechnology Industry*, Paper Commissioned by Industry Canada and Environment Canada, 1995, p.152.

216 Paul Hastings, CEO of Vancouver-based Quadra Logic Technologies, cited in David Paddon, "US biotech industry hotshot takes over as chief executive of Quadra Logic", Canadian Press, December 19, 2001. http://ca.news.yahoo.com/011219/6/fy2e.html

217 Barry Commoner, "Unraveling the DNA Myth: The spurious foundation of genetic engineering," Harper's Magazine, February 2002, v.304, n.1821, pp. 39-47.

218 Decima Research Inc. poll of September 2001 interviewed 2,022 Canadians and is accurate to within 2.2 percentage points 19 times out of 20 (full questions and regional breakdowns are available at www.greenpeace.ca) and Environics Research Group poll commissioned by the Council of Canadians in March 2000 (http://www.canadians.org).

Under this framework, the government's primary function is to create a favourable climate for business through deregulation, free-trade, the dismantling of social services and the elimination of restraints on the movement of capital.

A third set of consequences from the government's commitment to the biotech industry relates to governance, although what is cause and what is consequence is not always apparent. Biotech has advanced in public policy as part of the government's science and technology, or 'innovation', agenda. The innovation agenda is itself part of a larger neo-liberal policy framework that has been in place since the Mulroney government. Under this framework, the government's primary function is to create a favourable climate for business through deregulation, free-trade, the dismantling of social services and the elimination of restraints on the movement of capital. A less obvious feature of neo-liberal policy is the increase in government intervention to support business. Neo-liberal governments employ a rhetoric of small government, but they intervene in every possible way to support the industries that they deem to be the most important.

Biotechnology is one of the federal government's chosen sectors. It could be argued that the federal government embraced biotech because it was following the lead of other industrial countries or because of US pressure. There is certainly some truth to these and other arguments. But, as this book helps to illustrate, the major reason for the biotech industry's success in getting the support of the federal government is its close connections and effective lobbying work.

Biotech was backed by the right people and interests. The original federal strategy was set out by a small group of influential, unelected elites from industry and the public sector. In the ensuing years, this core of biotech representatives remained small and tight, and soon became close partners with the TNCs of the pesticide and pharmaceutical industries, which provided strong lobby networks and the support of the US government. The biotech lobby has had tremendous success in getting their people on the critical advisory bodies and federal agencies involved in policy decisions. They have also established close working relations with federal departments and agencies, and personal connections between the biotech community and the federal government extend from the bureaucracy right up to the centre of government. High-level federal officials and biotech leaders meet regularly on Team Canada missions, on advisory committees, and in any number of closed door affairs to sort out how the industry's interests can be advanced. The bureaucracy is then tasked with putting the decisions in motion.

The bureaucracy, in turn, makes sure that nothing stands in the way of the privileged industries. All matters related to biotechnology are dealt with according to a strong chain of hierarchical command that bypasses most elected federal representatives and Parliament. Decisions taken at the centre of the government, between the Prime Minister, his senior advisors, the Privy Council Office, the Prime Minister's Office, and the Treasury Board, sometimes in discussion with Cabinet and with the Department of Finance, are tasked to the Deputy Ministers to implement through their respective departments. Everything is carefully managed and anyone who steps out of line, whether Cabinet Minister or civil servant, is punished for it, as the whistleblower scientists at Health Canada have learned.

This undermining of representative democracy is particularly grave at a time when industry is bringing a whole new range of products to mar-

ket, such as GMOs, gene therapies, and nanotechnology. We should have learned an important lesson from the preceding chemical revolution: it is much more effective over the long-term to evaluate new technologies before public policies are made to support their development and commercialisation. But the space and tools that the public needs to effectively participate in the evaluation of technologies at this critical time have been dismantled or ignored. The federal government should be building up its capacity to assess the environmental and health risks of GMOs; instead it is shutting down its laboratories. The elected members of Parliament should be able to represent the concerns of their constituencies in a meaningful way; instead policy-making is concentrated under the PM, his unelected advisors and central agencies, and the unelected Deputy Ministers and their bureaucracies. There should be avenues for effective public participation in decisions regarding science and technology; instead public consultation processes have become vehicles for undermining criticism. Public funds for research should be allocated according to long-term national plans determined through public consultation; instead they are allocated according to the short-term interests of industry.

This book explores the construction of biotech policy in Canada. The findings, however, go well beyond a mere description of 'the real Board of Directors'. They show that what we need is a total overhaul of both the policy and the method of its formation. The closed doors behind which this policy is formed and implemented must be opened — not just made 'transparent' — and a truly democratic process with genuine public participation must be established.

Note: Further elaboration of this research is encouraged. The publishers welcome comments, new information and insights.

Cast of Characters

The voices of elected officials are excluded. The voices of self-serving non-elected officials set public policy.

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