

## Silent university support aids our war machine

# Canada spends more per capita on military research than U.S.

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In Ottawa's Elgin Street, about five minutes walk from the Parliament Buildings, is a gray-stone cubic building. It's set inconspicuously in the capital's tourist centre, near theatres, art galleries, convention centres, and the Chateau Laurier.

Over the main entrance to the five-storey building, in small lettering, is the inscription: Department of National Defence.

The Canadian Department of National Defence, to those Canadians aware of its existence, is always associated with peace-keeping — Cyprus, the Middle East, Germany and here at home.

But under the smoke screen of an international image as peace-keeper, Canada's defence experts (most of whom have backgrounds in and still maintain connections with, large corporations and Canadian universities) have built a booming war industry.

Incredible? During the past 12 years Canada has jumped to the Number Five position in the world as an international arms exporter. And today Canada spends more on defence projects, on a per capita basis, than the United States does.

With no war to draw attention to it, very few Canadians are aware of their country's war machinery. Almost none of our academic community knew that the Defence Research Board (ever hear of it?) is sponsoring research in every Canadian university with an enrolment over 2,500 students.

To defense analysts, the line between defensive and offensive weaponry and warfare research is a very tenuous delineation. Universities and industries (most of them American-owned subsidiaries incorporated under Canadian law) are currently studying, designing and testing weaponry that runs the gamut from chemical and bacteriological to atomic.

### The Defence Research Board

This military effort in the name of peace, is directed and organized by the Defence Research Board. Research remains under the board's jurisdiction until a finished product is finally marketable. Saleable products in the past have included commodities of war ranging from chemical defoliants to green berets to airplanes.

After the defence research people have done their work, the Department of National Defence, operating under defence-sharing plans with NATO countries and special agreements with the U.S. steps in and pushes the products to nations with more immediate military needs.

It's a lucrative business and an invisible one. The Canadian war machine is, in essence, a closed corporation with interlocking directors who link the major universities to large corporations and then link both these groups to the Defence Research Board.

The administrative interlockings among industry, government and the universities is a basic element in the structure of our society. And institutions with complimentary functions and integrated administration are built to enable the most efficient operation of the capitalist political-economic system.

Industry, government and the universities are operated in the interests of the same class, so there are no contradictions — from their viewpoint — in the close functional co-operation that springs up in areas such as defence research.

Defence research and contracting, (done both in universities and industries) is always shrouded in secrecy. Tight security is a necessity and thousands of dollars are spent on public relations as each separate part of the war machine tries to keep its public image shining.

What is the Defence Research Board? Back in 1916 the National Research Council was created by the Canadian government because of a necessity for wartime technology and scientific research. For the next three decades it maintained a high percentage of military research at the expense of industrial research in the civilian sector of the economy.

### Universities get a bundle

After the Second World War ended, the National Research Council began a trend towards basic scientific research and its applications in an industrial peacetime economy. At this time other research agencies began to spin off from the parent body.

Research in the universities is a chancier operation for DRB. Scientific research is always a risk investment (defence research is not value-free science — it is science serving corporate and military needs). But the defence experts, with their corporate allies, have done well: for every dollar they have spent on research, they are netting about \$25 in arms sales.

The universities are, for the most part, unaware of the end result of the research they do for DRB. Almost all research done in Canadian universities is basic scientific research. The applied research is generally done in one of DRB's seven private research institutions which are spread across Canada or by private companies.

Since the board was formed in 1947, it has spent \$40 million on research in Canadian universities. About another \$10 million has been spent on university contracting during that period.

Where has the money been spent? All across the country — from Memorial University in Newfoundland to the University of Victoria. The lion's share has gone to the bigger universities, especially McGill, University of Toronto and the University of British Columbia.

### 36 do work for DRB

Other major recipients of defence research monies are the universities of Alberta, Calgary, Manitoba, McMaster, Saskatchewan, Waterloo and the Royal Military College. In 1970, there were 36 Canadian universities who did work for the DRB.

What does DRB spend their money on? Consider the following fields of study (some of which appear to be civilian studies but are not — anything DRB studies is directly connected to military strategy in which they are doing research this winter):

- Chemistry. The main trends of research in this field are toward fluorine compounds, nitrogen compounds, radiation chemistry and the effects of shock waves on various chemicals. Radiation chemistry is being studied at Memorial University, University of Alberta and University of Waterloo. Other chemical studies are scattered around the country.

- Entomology. Another area of intrigue: what DRB seems to be looking for here is a better pesticide. New poisons are being developed and their effects on "insects of military importance" are being studied. Insects are more valuable as carriers of viruses than as guinea pigs for the same viruses. New pesticides are being studied at University of Alberta; control of cluster flies (like mosquitoes or black flies which operate in clusters and can be studied in groups) is under study at Western Ontario and McGill.

- Bacteriology. We're still in the horrific area of chemical and biological warfare. Research projects include a study of bacteria under physical stress (being carried out at McGill) and identification studies of virus agents (University of Ottawa).

- Human resources. This is an area of fairly general human studies, psychological and sociological. Among the more interesting projects are studies pertaining to the leadership process (Royal Military College), punishment capability (McMaster) and the effects of rewards on performance, (Carleton).

- Medicine. DRB does extensive medical research in many universities, the most notable being York and the U of T which is a major recipient

of defense money. The key areas of study are toxicology, radiation effects, Arctic medicine, underwater medicine and aviation medicine.

- Engineering (structures and materials). This sphere of research is one of the few areas of applied military research. Studies are being carried out on ship hulls, airplane metal fatigue and various stresses and corrosions of materials.

- Engineering (mechanical and electrical). Under this heading comes the more dramatic research — bombs and rockets. The defense experts never refer to bombs and rockets, of course, preferring to use more delicate and precise scientific jargon. Among the projects: detonation in explosives (Calgary), slurred explosives (Queen's), response of thin dome-type shells to dynamic loading (Calgary) and electromagnetic detonation research (Carleton).

- Political Science. Why would a military research agency be involved in studying political science? It's a necessity the experts argue, for any nation involved in warfare and weaponry research to study local and international attitudes and factors involved in disarmament policies (Queen's); to study the possibility of continental defence (Laval). One researcher is even studying people and institutions who do research on research (British Columbia).

- Special Studies. The two big fields of special study in Canadian defence are lasers (DRB is internationally recognized as a leader in laser research) and the interrelations of plasma and fluid dynamics (this has application to space research among other things). The military possibilities have not yet been fully explored in these areas, but DRB is confident that they are on the verge of major breakthroughs in warfare research.

This list (which is not complete: there are too many projects to list them all) is a good indicator of research policies within the Department of National Defence. Chemical and biological warfare is still a consideration as is atomic warfare. New areas of exploration are submarine and Arctic research.

The single biggest field of study is aerospace technology and aviation. This field, not surprisingly, also pays the highest dividends: the bulk of the millions that Canada earns through arms sales comes from the aircraft industry.

DRB is so interested in airplanes and aviators that they started an institute of aerospace studies at the University of Toronto back in 1951. They gave grants totalling \$2,300,000 until 1968 when they phased out direct support. The Aerospace Studies Institute is, according to a DRB spokesman, of general interest to joint NATO defence. The institute has done joint space research with the American space program.

Another such institute — McGill University's Institute of Aviation Medicine Research — has been supported (and still is) to the tune of \$50,000 a year by DRB.

There are other university institutes, though not in the aerospace field, that have received Defence Research Board grants during recent years. One of them is the nuclear reactor at McMaster University.

DRB gave \$50,000 a year until 1968 to McMaster's nuclear studies program. It was supported heavily during the 1960s when Canada's defence experts felt it was suicide not to have personnel trained in the use of nuclear energy.

Another is the Institute of Upper Atmospheric Studies at the University of Saskatchewan. The studies done by DRB there (direct support was again phased out in 1968) revolved around ionized particles in the air that often garbles radio transmission. The defense people were interested in the possibilities of being able to jam lines of electronic communication.

The final two institutes do research of a more general and basic nature. The Lady Eaton Laboratories at McGill study microelectronics and the University of Montreal has an Institute for Mathematical Research. Both institutes have had considerable financial support from DRB.

### ... meanwhile at York

Despite a slight drop in total research grants, York's work for the U.S. military increased over 400 percent this year.

In figures released by assistant vice president and comptroller Ken Clements, York researchers got \$86,888 compared with \$17,425 from the U.S. military last year. Total research slipped from \$2.9 million to \$2.3 million.

Grants from the Canadian military rose slightly from \$91,550 to \$92,952 this year. Non-military U.S. grants rose from \$27,916 to \$30,835.

The bulk of American military research money went to an American, professor Robert A. Young who studied metastable species of upper atmospheric interest with \$53,000 from the U.S. Army. American psychology professor John Gaito's research on man's gene products and behaviour, got \$2,618 from the U.S. Navy, compared to \$1,975 last year, and \$17,441 in 1969.

Professors Harold Schiff and Karl Welge are working on chemical aeronomy with grants from both the Canadian and American military. Schiff and Welge are receiving \$14,818 from the U.S. Army for their joint study on photo-chemical processes.

Grants from American sources, both military and non-military totalled \$129,135 this year.

Excalibur, Sept. 30

All these technical institutes, whether or not they continue to receive annual DRB grants, still receive a large number of specific research grants and contracts from the defense research coffers. This is where up-and-coming defense personnel learn the tricks of the trade.

### Untapped areas

Despite this massive industry that DRB has built up around Canada's booming business in other countries' wars, there are a few other areas that the defence scientists would like to explore. Among them:

- Sociology. The Department of National Defence is proud of what it calls "disciplined mobility" when it was called in to help with domestic problems (troops were mobilized during the Montreal police strike, during the Quebec crisis last winter and during the Kingston Penitentiary riot). DRB is now looking for universities interested in studying crowd control, group decision-making, analysis or organizations and control of dispersed groups.

- Systems Analysis. DRB is also interested in initiating university studies in the mathematics of combat and in games theory applicable to military situations.

- Environment (political and social). The final area of interest to defence experts is historical and geographical analysis of war and war potential. This includes a study of domestic and international hot spots; a study of future international alliance possibilities; a survey of the public's attitude toward the Department of National Defence and studies of riots and insurgency and maintenance of law and order.

What happens after the university research project is completed, after DRB has filed away their new-found information and after the graduate student has published his thesis and spent his research grant?

The basic research now has to be applied. The military and business interests take over at this point; the research investment is about to pay off in dollars and cents. The war machinery swings into full gear; the university has served its purpose, now there's money and power to be gained.

But first, the Defence Research Board may want to do further applied research to check that the information that they have paid for is really what they wanted. To do this they have to apply the basic research to the military problems that necessitated the original study.

Some of the research projects are earmarked for application before they are finished. The file card on each research project is coded with a call number and a lettering that corresponds to one of the seven private research establishments that DRB owns. It is at these establishments that the classified research gets done.

"After all," said a DRB spokesman, "we could never do classified research at universities. Suppose somebody got blown up by an explosive?" Suppose, indeed. Have to keep up the public image.

So the basic information, gleaned from Canadian universities, is shipped to one of the research establishments, far from the attention of the mass media and the people of Canada. Now the research becomes overtly military: the singular purpose of these establishments is to convert the basic scientific information into weaponry and warfare — either for use at home or for sale to some warring neighbour.

### Research coalesced

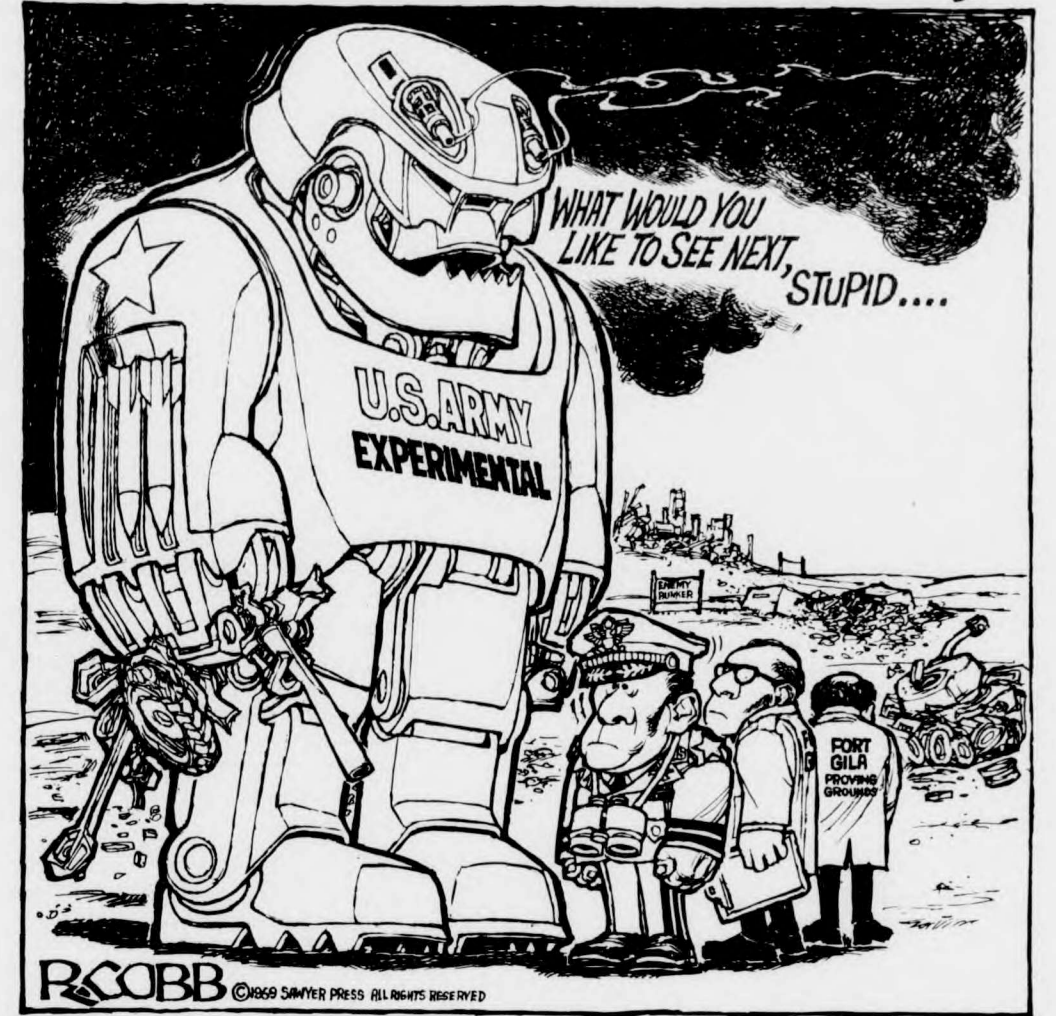
Two of the establishments, one in Dartmouth, N.S. and the other in Esquimalt, B.C., primarily study naval applications of the university research, in addition to doing research of their own. Of paramount importance to these institutes are surveillance, submarine detection and tracking in undersea warfare.

Two others, in Shirley Bay, Ontario and in Ralston (Suffield), Alberta, receive little or no public attention. There is as far as the defence people are concerned, a good reason for this quiet invisibility; these two research establishments handle the scariest research in modern day warfare. The scientists there are Canada's foremost experts in chemical, biological and nuclear weaponry.

Why is Canada so involved in chemical and bacteriological weaponry research?

There are two reasons: first, Canada was one of the first countries to explore the military possibilities of this type of warfare and has an international reputation as being a pioneer in the field. Second, nerve gases, chemical defoliants, non-lethal gases and viruses are saleable commodities with an immediate market in the United States' war in Vietnam.

While research is done at both Shirley Bay and



Ralston, the actual testing of these weapons is done near Ralston (The research establishment there, code-named "Suffield", includes a 1,000 square-mile testing ground). Weapons tested there, including defoliants, crop-destruction agents, insecticides and non-lethal gases, have already been used in Vietnam.

And every time Canada sells weapons, the university research is paying off for DRB. War is good business.

Two of the other three research establishments, at Ottawa and Downsview, study current problems in the Canadian armed forces. Among the projects now being done are studies of human capabilities and limitations, plus other behavioral studies.

The final establishment, at Valcartier, Quebec, again does marketable research. The scientists there study lasers, armaments, surveillance equipment, explosives and they do weaponry systems analysis.

From these seven defense research establishments come the finished weapons, ready to be mass produced and sold.

### DRB employs 2,500

At this point, the 2,500 employees of DRB have performed their functions well: the ultimate decisions involving contracting (for mass produced weapons) and selling, rest with the actual board members of the Defence Research Board.

The actual board is split in two parts: ex officio members (government representatives) and appointed members who represent universities and industries. These men are very powerful: they decide what research should be pursued and which universities and what industries receive defence contracts.

Not surprisingly, there is a substantial amount of patronage toward the institutions these men represent.

Board members at present include high administration officials from University of Winnipeg, University of Saskatchewan, Université de Montréal and Laval University.

Industrial representatives include or have included directors of de Havilland Aircraft of Canada, ATCO (Calgary), Canadian Westinghouse and RCA Victor Company of Canada. All these corporations are major recipients of defence contracts.

Most corporations receiving Canadian defence contracts are foreign-owned and controlled, with the bulk of them in the U.S. and others scattered around Britain and Western Europe.

Among the major contractors are General Electric, Westinghouse, Hawker-Siddeley, Litton Industries, Bendix, Sperry Rand and General Dynamics (America's biggest defence contractor). All business with these companies is done, of course, through their Canadian subsidiaries.

Most of these corporations do research, design and mass production in the electronics and aerospace industries. The more overt weaponry contracting is done through crown corporations like Atomic Energy of Canada Limited and Canadian Arsenals Limited.

### Profits from wars

The research done and the weapons produced, the final step for the Department of National Defence and the rest of the government is to find a country at war who needs a stockpile of arms.

The days of smuggling guns to banana republics is long gone. Today, in the sophistication of power-bloc warfare, there are treaties and alliances and defence-sharing programs that are socially acceptable. The two main markets for Canada's military exports are NATO and the United States.

In 1970, Canada made over \$400 million by selling arms to other countries.

The Defence Production Sharing Agreement signed by Canada and the U.S. in 1959, while touting mutual defence for the protection of North America, binds Canada to American foreign policy. Canada, as a Canadian defence analyst William Cobban says, a contracted appendage of the American military machine.

How this agreement works is quite simple. The U.S. is fighting a war, so they need certain weapons. Under the Defence Production Sharing Agreement, there is very little duplication of work. For example, Canada is a specialist in chemical and bacteriological warfare.

If the Pentagon needs a new chemical defoliant, they get in contact with Canadian defence experts who get to work on perfecting the defoliant and then sell it back to the U.S. Or if the Americans have developed a new nerve gas, then they occasionally bring it to Defence Research Establishment, Suffield (Alberta) and have it tested by Canadian scientists on Canadian soil.

So the Pentagon orders weapons, DRB produces them and people die in Vietnam. And this vicious cycle is supported and endorsed, directly and indirectly, by Canadian universities.

It makes one wonder about the purposes of universities. The ivory-tower concept of value-free science, of research in the name of humanity, is a thing of the past.

Canadian universities serve a military-industrial complex based mainly in the U.S. This complex has two basic aims: to keep down any threat to the established order at home (particularly in Quebec) and to provide any equipment to anybody as long as there are profits to be made.

