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Commercialising Research at the University of Saskatchewan

— by Howard Woodhouse

The Canadian Light Source Synchrotron (CLS) will soon be used to commercialise research at the University of Saskatchewan (U. of S.). This $173.5 million facility will open in January 2004, enabling private corporations, especially those in the fields of biotechnology, pharmaceuticals, and mining, to maximize their stockholder value. Companies will conduct 25% of all research on the CLS, far more than at the other 75 synchrotrons around the world. Their contribution to the capital costs, however, has been virtually nil (see chart). This follows a familiar pattern of public funding being used to subsidise applied research for industry.

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Rhetoric and Reality

The rhetoric, which accompanied the announcement that the CLS would come to Saskatoon, knew no bounds. The facility was heralded "as an enormous saviour and a scientific beacon", a theme taken up by Premier Roy Romanow, extolling it as "a source of light, not only in the practical sense, but a visionary light in a philosophical sense". Others, like John Manley, claimed that the CLS "puts Saskatoon and Saskatchewan on the map as a centre of research for the world". There was very little criticism, even though the U. of S. contributed $7.3 million at a time when 130 faculty positions had been lost, staff drastically reduced, library holdings slashed, and buildings were literally falling down.

What, then, is the CLS? It is a huge microscope located in a building the size of a football field between the "main campus" and Innovation Place, the university's "research park". This "non-profit facility wholly owned by the U. of S." is already skewing funds to the "five high priority research areas" in which 28 of the 31 Canada Research Chairs are housed. Not surprisingly, these are all in the applied sciences capable of "adding value" to products for the corporate market: Biotechnology, Materials Science, Health Sciences, Technology and Change, and Environmental Sciences.

Synchrotron Science

How will synchrotron-based research achieve this goal? The CLS will produce very high levels of electro-magnetic radiation by accelerating particles of matter to virtually the speed of light. This is known as "synchrotron light" because it was first observed some 50 years ago in an electron synchrotron, or particle accelerator, and is capable of producing radiation a billion times brighter than that of the sun. Particles are fired from an accelerator "gun" into a "booster ring", and then into a larger "storage ring" where "focusing magnets" and "undulators" bend their trajectory. This process produces a bright and highly focused beam over a spectrum of infrared to x-rays.

Among the "scientific mysteries", which this technology opens up, is a more detailed analysis of the structure, composition, and chemical bonding of crystals and molecules in materials ranging from semiconductors to proteins. When the protein myoglobin is subjected to synchrotron light, for example, a series of snapshots can be put together into a movie, showing how oxygen molecules enter and leave the myoglobin molecule. According to a 1998 Scientific American article, "structural changes on a nanosecond-by-nanosecond timescale" reveal "the time behavior of a dynamic molecular-biological process", and increase scientists' control over the very processes of life itself.

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Maximising Corporate Money Profits

Private pharmaceutical companies are particularly well placed to cash in on this new technology, given the significance of proteins for the understanding of life and of disease in the development of new drugs. GlaxoSmithKline, which contributed $500,000 towards a CLS research chair, is a case in point. As manufacturers of Combivir, a combination of two principal AIDS drugs (AZT and 3TC), Glaxo constantly seeks new ways to maximize its money profits. In 2000, its British subsidiary, Glaxo Wellcome PLC, used the company's patent on Combivir to try to block access to less costly versions of the drug in developing countries. Combivir grossed $1.1 billion that year in revenues, but Glaxo was afraid that production of generic versions by Cipla Ltd. in Bombay, India, would threaten the larger markets of South Africa, Latin America, and South-East Asia. By funding a research chair at the CLS, GlaxoSmithKline will have access to knowledge about the very "dynamical structural changes taking place through time", which ensure the company new products and future patents.

Once again, this underlines the importance of heavy subsidies from both universities and governments for a facility which will enable private corporations "to bring new goods and services to market".

As many as 35 beamlines, costing between $6 and 10 million each, will be used by scientists in the private and public sectors. Another multinational pharmaceutical company, Boehringer Ingelheim, is alone in contributing $500,000 for the construction of part of one beamline, a sum matched by public funds from Saskatchewan Economic and Cooperative Development and the Canadian Institutes of Health Research. This "collaborative funding formula", which will grant Boehringer access to a beamline for the development of new products at a fraction of its price, will be adopted in each case of corporate involvement. In contrast,

the University of Western Ontario contributed three beamlines and $300,000 before construction even started. Once again, this underlines the importance of heavy subsidies from both universities and governments for a facility which will enable private corporations "to bring new goods and services to market".

Opposing the Corporate Agenda

Should this really be the goal of publicly-funded university research and education? Or is there need to ensure that universities' long standing goal of advancing and disseminating shared knowledge is sustained? Fortunately, a movement has arisen in opposition to the corporate agenda at the U. of S., resulting in the opening last fall of The People's Free University of Saskatchewan (PFU). A variety of courses were offered in different locations in Saskatoon for free and, since the university is built on the premise that "everyone can teach, everyone can learn", it connects faculty, students, and community members in ways that enhance the capacities of all. Courses including those in "Human Rights in Saskatchewan", "Music, Politics, Religion and Society", "Canadian Political and Legal System", "Understanding People", and "Shamanism and Aboriginal Religions" were offered to 200 students ranging in age from 14 to 82. A new slate of courses began this month. A future article in *Saskatchewan Notes* will detail the successes of The People's Free University.

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CANADIAN LIGHT SOURCE (CLS) SYNCHROTRON
DECLARED CAPITAL FUNDING TO DATE (in $ Millions)

PUBLIC SECTOR	
Canada Foundation For Innovation:	**$56.4**
Other Federal Depts. (Natural Resources, NRC, Western Economic Diversification):	**$28.2**
Saskatchewan Government (Sask. Economic and Cooperative Development):	**$25.0**
SaskPower:	**$ 2.0**
U of S (plus in-kind contribution of Linac):	**$ 7.3**
City of Saskatoon:	**$ 2.4**
U of A and UWO:	**$ .3**
Alberta Innovation & Science and Alberta Heritage Foundation for Medical Research:	**$ 9.4**
Government of Ontario:	**$ 9.4**
Consortium of 19 universities and 6 public support groups	**$ 33.1**
Total:	**$173.5**
PRIVATE SECTOR	
Boehringer Ingelheim	$ .5
GlaxoSmithKline	**$ .5**
Total:	**$ 1.0**

Sources: www.lightsource.ca and The StarPhoenix, 1April 1999, p. A1 and 27 February 2001, pp. A1-A4.

"HIGH PRIORITY RESEARCH THRUSTS" AWARDED 31 CANADA RESEARCH CHAIRS

1. **BIOTECHNOLOGY (All 5 Chairs to use CLS): "**Overlap" with Health Sciences and Technology and Change; Includes Virtual College of Biotechnology; Will focus on structural biology, and also assist pharmaceutical companies in "development".
2. **TECHNOLOGY AND CHANGE (6 Chairs to use CLS):** Overlap with VCB, Computer Science, and Engineering; Will focus on information technology and biotechnology; Research conducted with "industrial partners".
3. **HEALTH SCIENCES (5 Chairs to use CLS):** Overlap among College of Medicine, Veterinary Medicine, and Vaccine and Infectious Disease Organization; Will focus on neurosciences and reproductive biology.
4. **MATERIALS SCIENCE (6 Chairs to use CLS):** Overlap among Physics, Mathematics, Chemistry, Geology, and Engineering; Will focus on plasma physics, techniques of spectroscopy for the analysis of structures and surfaces, and the relationship between material structures and macro-properties; Applications include faster computer chips, tougher plastics, and better lubricants.
5. **ENVIRONMENTAL SCIENCES (6 Chairs may use CLS) :** Overlap among Agriculture, Natural Sciences, and Geography; Research conducted in "partnership" with Potash Corp. and Cameco; Will focus on soil science, geochemistry, environmental engineering, and conservation and climate change.
6. **IDENTITY AND DIVERSITY (3 Chairs): Two main themes:**
   a) Aboriginal Experience: Overlap among Native Law Centre, ITEP, and Native Studies.
   b) Multiculturalism and Citizenship: Use of Prairie Centre of Excellence on Immigration and Integration (1996).

Sources: Strategic Research Plan (2000); Memorandum from the VPs. Academic and Research to U of S Campus Community, July 6, 2001.

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