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The Hon. B. Wildman

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that Ontario Hydro and other AECB licensed facilities are required to follow.

5. A tritium in drinking water standard of 20 Bq/L as ultimately proposed would likely be frequently exceeded at the Oshawa, Ajax and Port Elgin water supply plants and occasionally exceeded at the Scarborough water supply plant unless large expenditures are undertaken by Ontario Hydro to reduce tritium inventories and/or retrofit aqueous tritium emission control systems in its nuclear stations, or by municipalities to extend water intake lines far out into the lake.
6. Tritium to water is but one radiological emission from nuclear stations. In fact, tritium in drinking water typically represents less than 1% of the dose to members of the public living 1-2 km from the Pickering Nuclear Station resulting from all radiological emissions. Airborne tritium emissions typically contribute about 20% of emission doses and other airborne radiological emissions typically contribute most of the remainder (about 80%). Thus, any expenditures by Ontario Hydro or municipalities to comply with the ACES proposed ODWO for tritium would have no impact on the 99% of emission doses not associated with tritium in drinking water. It should also be noted that the typical dose rate from tritium in Ajax drinking water is about 1 ten thousandth (<0.0001) of the dose rate from natural background radiation.
7. An ODWO for tritium of 100 Bq/L would be seriously out-of-line with the World Health Organization current recommendation, 8000 Bq/L, and with the value of 7000 Bq/L currently being considered by the Federal/Provincial Sub-committee on drinking water standards
8. While respecting the public consultation process undertaken by ACES in developing its recommendations, it seems apparent from the written submissions abstracted in the ACES report that there is a profound lack of appreciation by many members of the public and organizations for the technical complexities involved in setting a standard for radiological pollutants. For example, 22 submissions urged a standard of zero for tritium and 7 urged a standard at current Lake Ontario background concentrations (out of a total of 64 who commented on the MOEE recommended value of 7000 Bq/L). Unfortunately, many members of our society are not yet sufficiently well informed in such matters to permit standards to be set by public referenda. It seems apparent that ACES may have allowed itself to be unduly influenced by that segment of society that does not understand radioactivity and fears it and everything associated with it. The quality and background expertise of the submissions are more relevant than the quantity of the submissions. A health-based environmental standard should not be based on political criteria or expediency.
9. ACES clearly states that "MOEE currently has no formal policy on risk assessment which codifies the standard setting process" (p. 19 ACES report 94-01). We disagree with ACES' attempt to develop an "acceptable" risk value, which forms the basis for the development of

* BOOKS *

Why science should think about more than rock-hard tomatoes

SCIENCE UNDER SIEGE THE MYTH OF OBJECTIVITY IN SCIENTIFIC RESEARCH

BY BETH SAVAN
CBC Enterprises, 192 pages, \$14.95

REVIEW BY DAVID LEES

The transformation of tomatoes into the square, red baseballs we have all learned to loathe was a triumph for proprietary, profit-oriented science, but ironically it was achieved by university researchers.

Writing in *Science Under Siege*, Beth Savan, an environmental consultant and a research associate at the Institute of Environmental Studies at the University of Toronto, denounces what she calls "a purposive science, embedded in a very political research environment, where the research work underta-

ken can serve a host of internal and external interests." She maintains that biases and prejudices built into the scientific establishment are skewing scientific findings at a time when the infallibility of scientists is more important than ever before; faulty data can result in the marketing of dangerous pesticides and medications or the inadvertent extinction of commercially valuable species. In the case of the rock-hard tomatoes, the consequences were almost all bad.

The design work for the new vegetable was done at the University of California at Davis, and was financed by a grant from the manufacturers of farm equipment. This kind of academic-corporate co-operation is becoming more and more common both in the United States and Canada as universities, desperate for funding, provide re-

searchers for hire to private companies. At UCLA, there were two components to the assignment: to produce the harvester itself and to come up with a tomato tough enough to be picked at 13 miles per hour.

The breakthrough ushered in a whole new age of agricultural efficiency. Since the new harvesters each cost \$200,000 and worked best in volume, larger operators inevitably took over their smaller neighbors. Within a few years in California, 4,000 tomato farms were amalgamated into 600, an estimated 18,000 farm laborers lost their jobs, the price of tomatoes began to climb twice as fast as that of other vegetables and consumers were introduced to the concept of square tomatoes. The benefits of the breakthrough (in the form of maximized profits) were accrued exclusively by large farmowners and equipment manufacturers.

The same kind of phenomenon is taking place in Canadian universities, writes Savan. Among other unfortunate episodes, she describes the response of two McGill scientists, Irving DeVoe and Bruce Holbein, both with the microbiology department, to a federal policy that encourages universities to transfer

technology whenever possible to the private sector. DeVoe and Holbein had developed a technique for removing metals from liquids and set up their own companies, operating out of university labs with funding borrowed from departmental and grant funds.

The presence of a privately owned, profit-oriented company working on campus behind locked doors caused so much stress that the two researchers were "persuaded to take unpaid leaves of absence" and eventually resigned. The unauthorized loans were repaid, but the affair raised issues of academic ethics and corporate responsibility that have never been resolved. The unwritten code of upright academic behavior, Savan observes, had been tested and found wanting.

Savan is not exactly withering in her denunciation of scientific corruption — she is too much the reasoned, practical scientist herself — and she falls short in delineating the often cited "vested interests" that are driving scientific research. But her work is impressively thorough in its exploration of the effect of biased research. Anyone who still cherished the notion of scientists as social heroes or as Isaac Newtons

absentmindedly waiting for the apple to fall should be edified by Savan's portrait of scientists driven by vanity and greed like the rest of us. More important, she clearly demonstrates that the scientific profession is no longer dedicated (if it ever was) to the enhancement of a universal living standard.

Many of the studies in the book, which is based on a four-part series Savan produced for the CBC Radio program *Ideas*, document the corruption of scientific method by corporations. Researchers working for Ethyl Corp. and E.I. Du Pont de Nemours & Co. Inc., for example, consistently produced data to prove that there is no link between the levels of lead in gasoline and in the blood of children. Savan cites the lead debate to illustrate the bias of scientific protagonists; looking at comparable data, corporate scientists concluded that there is no connection between lead-gas and lead-blood levels, while government scientists decided that the link between the two is absolute. In the United States, government scientists won out, leading to the introduction of regulations that cut lead in gas by 91 per cent. In Canada, unfortunately, corporate scientists were more persuasive, and the per-

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