

THE LAST WORD

by William Smith

POLICIES FOR CANADA'S RESOURCE INDUSTRIES

B iotechnology holds special opportunities for Canada—if Canada is prepared to seize them. With its expertise in the natural resource industries, Canada could command a share of the burgeoning world market in biotechnological products, such as new hybrid seeds, stress-tolerant crops, improved pulp and paper products, faster-growing trees, and new biological methods of mineral extraction. Some financial commitment to the new technology is already in place. Canada, however, has neither a strong industrial sector nor much industrial involvement in R&D. Moreover, investment in biotechnology R&D is increasing against a background of years of declining support to government facilities and an underfunded university community.

What comparative advantage Canada has in world markets is dwindling. Mismanagement and depletion of resources—overfishing, soil erosion, and excessive felling—characterize many of the resource industries, and there is no strong processing sector to fall back on. Competition from the United States (crops), Chile (minerals), and Sweden (pulp and paper) is encroaching on Canada's traditional share of world trade in natural resources and weakening its hold on long-standing markets. Unless this trend is reversed, the economic outlook for Canada is dismal.

Estimates of new funds spent on or committed to Canadian biotechnology from all sectors in 1983/84 total about \$300 million (Cdn). During this period the federal government committed \$95.5 million to a National Biotechnology Strategy and to capital facilities managed by the National Research Council. In addition—but not as part of the strategy—the Medical Research Council spent \$20 million and the Natural Sciences and Engineering Research Council \$11 million to support biotechnology-related research. Provincial governments spent or committed about \$70 million. The private sector spent about \$110 million, including \$45 million from the Canada Development Corporation earmarked for Allelix—a Toronto-based biotechnology company funded jointly by the Canada Development Corporation, the firm of John Labatt Ltd., and the Ontario government. At the same time, Canadian corporations and venture capitalists invested about \$50 million in biotechnology in the United States.

The National Biotechnology Strategy and the funding for the National Research Council are a massive boost for government science but give little support either to the universities or to the industrial community. Like many federal initiatives, they provide only a technological "push." In this, they do little to promote cooperation among governments, industry, and the universities or to resolve one of Canada's fundamental problems in advanced technology, that of responding to market "pull" by commercializing research findings.

The federal government initiatives also lack clearly defined research goals. Although the National Research Council created the Plant Biotechnology Institute in Saskatoon for research in plant-related industrial, forest, and

agricultural biotechnology, the Biotechnology Research Institute (scheduled to open in Montreal in 1986 with a staff of over 550) was established in 1983 without any particular objectives. A preliminary strategic plan was published in the fall of 1985, which states that the institute is to conduct basic and applied research oriented toward industrial development, but the precise nature of the research is not defined.

Industrial investment in Canadian biotechnology does not fall into a clear pattern, either. A survey by the Science Council of Canada revealed that of 258 industrial R&D performers in engineering, pharmaceuticals, and the agri-food sector, only 33 companies (13 percent) do biotechnology research. Of the remainder, only 18 intend to do any biotechnology R&D in the next five years.

To promote intersectoral cooperation and commercial development, the federal government allocated increased funding for biotechnology projects under an existing industrial research grants program, which calls for matching funding from industry of at least 20 percent of the total project costs. Of the overall cost of any project, 25 percent must be used for university-based research and industry must identify a university sponsor.

University funding for research related to biotechnology was strengthened by the Natural Sciences and Engineering Research Council (NSERC) 1983/84 commitment of close to \$11 million for biotechnology. NSERC supports a range of biotechnology research applicable to the resource industries, including research on the biotechnological aspects of nitrogen fixation, biomass utilization, waste treatment, and mineral recovery. The overall level of support, however, remains too low.

The delay in Canada's full-fledged entry into biotechnology has had a high price-tag. Canada's attempt to carve out a niche in strategic research areas suffers from an inability to compete for the services of experienced scientists and research managers. The federal government's slow reaction to the needs of this area has caused disenchantment in Canada's biotechnology research community. Some particularly well-qualified scientists have left the country for better jobs elsewhere. The lack of clearly stated objectives to back many of the initiatives in place has diluted the federal government's commitment.

The Science Council of Canada is trying to promote the two essential conditions for the success of Canadian biotechnology: research and commercialization. Given the increased pressures on its natural resources, Canada must ensure that it has enough basic knowledge to develop the resource technology to maintain its position as a trading nation. Increased research alone, however, will not help the economy unless industry makes a concomitant effort to apply the results of this research.

William Smith is a Science Advisor for the Science Council of Canada, 100 Metcalfe Street, Ottawa K1P 5M1. The opinions are the author's, and are not necessarily those of the Science Council or *Bio/Technology*.