

already apparent in Canada. Until a sufficient domestic supply of such people becomes available, immigration priorities must be established to ensure the rapid entry of designated individuals crucial to the build-up of a Canadian biotechnological manpower capacity.

Training of students is only one component of the biotechnology manpower picture. Existing scientists and technologists must be offered the opportunity to acquire new skills relevant to biotechnology and its developments.

There are many industrial opportunities presently offered by biotechnology. As biotechnology matures, there will undoubtedly be many more opportunities presented; this explains why so much long-term investment capital is currently being directed into building up biotechnology capacity throughout the world.

...The Task Force feels that Canada should pay special attention to biotechnological developments related to Canada's resource sectors, with particular emphasis placed on nitrogen fixation, novel aspects of cellulose utilization, plant strain development, treatment and utilization of wastes, and mineral leaching and metal recovery; and the development of needed health care products as necessary elements in the country's future social as well as economic development.

**Regulation**

...For the future development of biotechnology in Canada, it may be necessary to enact, modify or eliminate certain regulations or legislation which, if not addressed, will leave Canada at a serious disadvantage relative to the rest of the world with respect to industrial investment in and exploitation of biotechnology....

Bill C-32 is a piece of legislation presently before Parliament, which, if

The Task Force on Biotechnology, chaired by Dr. Maurice Brossard at the Institute Armand-Frappier in Montreal, was set up by the federal government last June to investigate the opportunities offered to Canada by biotechnology. Biotechnology is the use of biological processes to produce goods and services and is expected to have a significant impact on the agricultural, food, forestry, energy, health, mining and chemical sectors within the next decade.

enacted, would provide the plant breeder or developer with control over the multiplication and sale of reproductive material. These rights would then be similar to those accorded a patent or copyright. The intent of this legislation, which is similar to that currently in place in other countries, is to encourage greater investment activity in plant breeding in both the private and public sectors.

Biotechnology, which will have a major impact on the development of new plant varieties, could receive considerable impetus from the adoption of this legislation. However, the compulsory licensing provision of the Bill could negate any positive intention of the Bill towards industrial development, and as a consequence would most certainly inhibit, if not eliminate, this high priority area of biotechnological development for Canada.

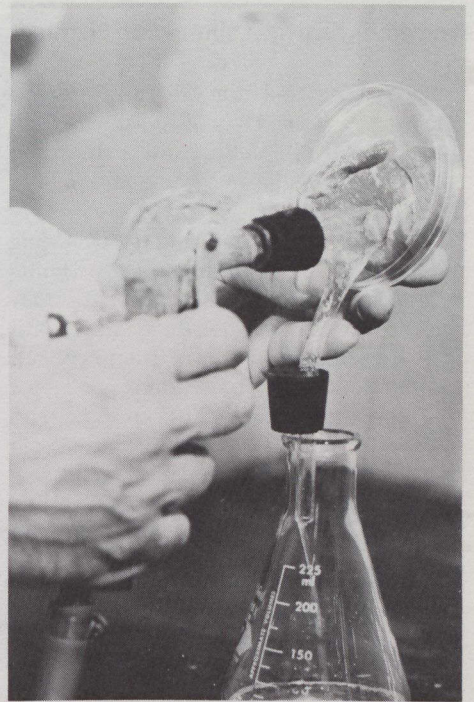
Guidelines for the handling of recombinant DNA molecules, animal viruses and cells, currently administered by the Medical Research Council, reflect the current state of knowledge surrounding these materials. As new knowledge has surfaced, these guidelines have, through a flexible system of modification, evolved accordingly. Legislation embodying these guidelines would reduce the present flexibility and would be inadvisable in an area of science and technology experiencing rapid change.

Since the guidelines are not directly binding upon industry, a system of voluntary compliance should be considered, and could be made mandatory for the receipt of government assistance.

**International collaboration**

World-wide escalation of investment in biotechnology began about a decade ago, but the greatest acceleration has come within the last five years. West Germany, the United States and Japan have been the leaders in this activity, but recent impetus has also been evident in Britain, France, Scandinavia, Switzerland and New Zealand among others. It is vitally important for Canada to have access to this activity and at the same time to be able to contribute to it. The progress of biotechnology in Canada will be accelerated through the furtherance of international collaborations and measures must therefore be instituted to facilitate all forms of interchange between scientists, technologists and planners from Canada and the rest of the world.

In addition, Canada's participation in



*Biotechnological techniques include genetic engineering; enzymes and enzyme systems, and fused cell techniques.*

Third World development could be furthered through collaboration with developing nations on biotechnological applications in food and energy production, as well as other areas of natural resource utilization.

**National organization**

In order to facilitate the implementation and operation of a development plan for biotechnology in Canada, a national organization must be established to:

- oversee, co-ordinate and evaluate federal resource allocations in biotechnology;
- maintain contact with global developments in biotechnology;
- provide advice to the federal government on a range of issues related to biotechnology development (legislation, international commitments, etc.);
- ensure a flexibility in the development plan to allow it to be modified as circumstances dictate; and
- provide, to all sectors, information and guidance on Canadian programs and activities in biotechnology.

It is important that this organization include industrial representation and be open to advice from all interested parties. At the beginning, the pathways of advice could take the form of national symposia and later evolve into a series of advisory boards.