SCIENCE DIMENSION



National Research Conseil national Council Canada de recherches Canada

Vol. 10, No. 4, 1978

ISSN 0036-830X Indexed in the Canadian Periodical Index

CONTENTS

- **4 Scrap metal recycling** Recovering non-ferrous metals from junked cars
- 8 Meningitis vaccine Industrial scale-up
- **10 A new soybean cutter bar** For more efficient harvesting
- **12 Gonorrhoea identification** Gonorrhoea identification to be more simple, reliable and effective
- **14 Railroad switch protector** Keeping railroad switches operational
- **16 Stadol: a painkiller with punch** Bristol Laboratories newest pharmaceutical
- **18 An arm for a spacecraft** Extending the astronaut's reach
- **22 Technical Information Service** A service for all seasons
- **26 NRC's national facilities** Open door policy for industry
- **30 Standard practice** Roots of precision
- **32 Building research at NRC** Firmer ground for Canadian construction
- **34 The Peace River hoverferry** Climate is not a problem

36 Computer-aided learning Computer as tutor

Cover: The lubricant that keeps the wheels of industry in continuous motion is research and development. This special issue of Science Dimension describes the many facets of the National Research Council's program for the support of industrial research in Canada. Photo by Bruce Kane, NRC

Notre couverture: L'industrie ne pourrait survivre sans la recherche et le développement. Ce numéro spécial de Science Dimension décrit les différents aspects du programme d'assistance à la recherche industrielle canadienne du Conseil national de recherches du Canada. Photographie par Bruce Kane, CNRC

Editor Loris Racine Managing Editor Wayne Campbell Executive Editor Joan Powers Rickerd Design John B. Graphics Inc. Editorial Production

Coordinator Diane Bisson Staigh

Supporting Industry

The lifeblood of industry is its capacity to innovate and adapt to the changing circumstances of the market place. The drive that maintains this evolution and to a significant degree gives it direction is research and development. This urge to improve has led us in six short decades from the flight of the Wright brothers' gossamer-winged biplane to the silent descent of the spider-like Lunar Excursion Module, floating on its careful computer curve to the lunar surface. It underlies the transition from the primitive light microscope to modern machines that reveal the shapes of molecules with electron beams. Because of it, fields once barren and untilled now bloom with man-made crops, sustained by fertilizers fresh from chemical production lines.

Most of industry's innovations, however, involve the common products that society uses and consumes: better hockey sticks, new drugs, superior crop harvesters, and so on. In fact, it is in this middle technology area that the health of a nation's economy is largely determined, the most important vital sign being the creativity of its businessmen and their opportunities to develop and exploit new ideas. To support this entrepreneurial spirit and ensure that the means exist to carry out the needed research, the National Research Council maintains a multifaceted program of support to Canadian industry.

Say a company would like to pursue a promising line of research but cannot, either due to lack of funds or because the economic return on the venture is not sufficiently assured. NRC's Industrial Research Assistance Program (IRAP) is set up to cope with just such a situation. Under the terms of an IRAP agreement, the Council will pay the salaries of the scientists involved in the project; for its part, the company assumes the rest of the research costs, and retains all rights and titles to whatever products are developed. This Program ranks as one of NRC's most successful industrial support initiatives, with grants awarded to over 800 research projects during its 16 years of operation.

As one might expect from an organization that does research in biology, chemistry, physics and the several engineering sciences, NRC has many scientific projects at any given time that have moved beyond the lab development stage and are advanced sufficiently to be exploited by industry (in fact, one of the best arguments for fundamental science is that, sooner or later, practical applications of newlyacquired knowledge come to light). Before making the transition from the laboratory to full-scale production, however, the product must go through an interim "pilot plant" stage to assess whether or not such a scale-up is industrially feasible. To facilitate this transfer, NRC's Program for Industry/Laboratory Projects (PILP) enters into contractual arrangements with industries in which Council money, staff expertise and special facilities are made available.

NRC also has a specialized service that fulfills a troubleshooting role for small and middle-sized industries. The Technical Information Service, or TIS, has been identifying and providing solutions to problems confronting these industries for the last three decades.

While much of Canadian industry benefits from NRC's money, invention and expertise, certain sectors require its tools as well. To develop and test an aircraft or evaluate the effects of wind on buildings, bridges and other structures, expensive wind tunnels and highly trained personnel are needed. To design new ship hulls, model-making shops, towing tanks and manoeuvering ponds are required. NRC owns and operates such complex equipment and has designated them as National Facilities, to be used for all Canadian research needs, thereby avoiding costly duplication.

Commerce depends upon standards of measurement: mass, length, time and temperature, to name a few. NRC is not only the national custodian of such physical standards, with a calibration service available to Canadians, but it also carries out research that underlies other less visible but equally important standards. Excellent examples are the National Building Code and the National Fire Code from the Council's Division of Building Research (which now carries out onefifth of all research in Canada relating to building construction).

Such then is the complex of relationships that exists between NRC and industry. Generally speaking, the stories that follow reflect these ties but, because of the sheer number of industry-related projects, they can do no more than provide a thumb-nail sketch of the NRC/Industry connection.