



Agriculture
Canada

IN SEARCH OF PLENTY

The first century of the
Agriculture Canada research arm



Canada



“A properly conducted experiment is a beautiful thing. It is an adventure, an expedition, a conquest. It commences with an act of faith, faith that the world is real, that our senses generally can be trusted, that effects have causes and that we can discover meaning through reason.”

*Vincent Dethier
American entomologist*

PUBLICATION 5212/B

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Cat. No. A15-5212/1986 ISBN: 0-662-54198-7

Printed 1986 Reprinted 1986 50M-6:86



Research centennial emblem.

In the Beginning

There is to all things a beginning. For Canada, June 2, 1886 is a beginning to remember. It was on that date that the Canadian Parliament authorized the establishment of five experimental farms throughout the sparsely populated young country. This insightful political legislation brought publicly operated research on a serious scale to a primitive agricultural industry.

Leap of the Century

From that modest start developed a network of federal research stations serving the agri-food industry in every province and region. Through the years they developed products, ideas, techniques and processes that helped build this most fundamental industry. By doing this they helped bring the country together politically and keep it so in an atmosphere of plenty most of the time. As it turned out, food production also meant nation-building.

Today the degree of political stability and prosperity enjoyed by Canadians is in part founded on a substantial agri-food industry, the resilient product of good times and bad. This industry was largely put in place over the last century by generations of farm families and an accompanying infrastructure beyond the farmgate – including food processing, distribution and, not least of all, science.

The federal government's scientific commitment set the tone for agri-food research during the century following the establishment of the Experimental Farm Service in 1886. The federally operated agri-food research establishment almost immediately became the dominant force in a field where there was little activity at all.

It remains dominant today, accounting for about half of all agri-food research dollars spent in Canada. Food processing and other industrial firms, universities, some provincial governments and other institutions do the rest. They too grew with the country in what became a diversified – but cohesive – agri-food research system.

The early federal scientists focused on primary agriculture – growing crops and raising animals on the farm. Over the years, food processing grew and prospered and research resources were applied in this direction. Canada emerged as a major producer and exporter of food. It traditionally exports far more than it imports, an important trading advantage. Our science, both public and private, has contributed to this happy position.

Despite its problems, our agri-food society generally provides a safe, wholesome and abundant food supply for itself and other countries. The role of science now is largely to help maintain and improve this position. About 40% of the country's economic activity is directly or indirectly related to the production, distribution and consumption of food. Our science is a partner in the creation of jobs and wealth.

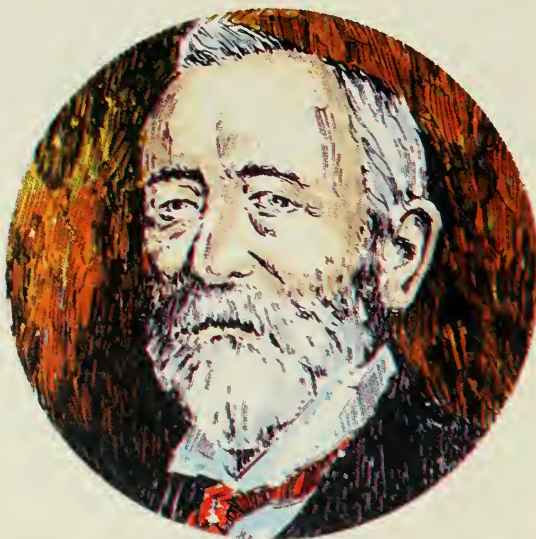
The Inheritors

Principal inheritor of the federal responsibility in agri-food research is Agriculture Canada's Research Branch. This title emerged in 1959 from a reorganization of department research units. They had grown up over the years through the opening of the west, war, depression, plague and drought.

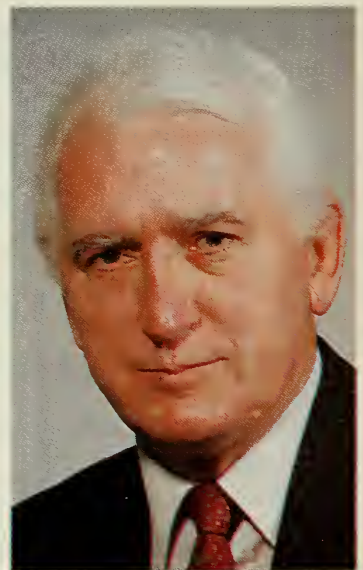
The first research head in 1886 was William Saunders, an English-born Ontarian. His name, along with that of his son Charles, is associated with the development of one of the world's famous wheats, Marquis. It was a key part of the economic development of the western plains. Today, wheat is still king among Canadian crops in economic terms.

Food production (as typified by wheat) is still an overriding consideration for today's Research Branch, led by entomologist Edgar J. LeRoux. He is the fourteenth head of Agriculture Canada's principal research arm. For him, food processing, environmental protection and soil preservation head a long list of modern research concerns little emphasized in Saunders' day.

Within Agriculture Canada today, some important research is done outside the Research Branch, notably by regulatory arms in the animal disease/veterinary and grainhandling fields. Outside



William Saunders



E. J. LeRoux

Agriculture Canada, federal players include the National Research Council and Health and Welfare Canada.

But most federal agri-food research is carried out at some 47 major Research Branch establishments (plus many supporting units) catering to the needs of farmers, food processing firms and the rest of the agri-food community. This research thrust is lodged in the activities of some 900 scientists. They are supported by a complement of technicians, administrators and others three times as large.



Sites of Agriculture Canada Research Branch establishments.

The Art of Plant Breeding

Agriculture Canada researchers are best-known for breeding new and improved crop varieties, about 35-40 a year. Their wheats and other crops (including those grown for animal feed) cover much of



Maturing wheat.



Prairie canola

our arable land. Their varieties are vital to the canola vegetable oil industry. Research has propelled canola into an important place in the Canadian agri-food economy in the space of three decades.

Plant breeders have traditionally built beneficial qualities into crops – higher yield, resistance to cold, drought and diseases (such as wheat rust) – by growing, selecting and crossing plants with differing characteristics. More recently, scientists have begun manipulating genes and cells in the laboratory to speed up and improve upon the classical breeding technique that gave us Marquis and hundreds of other commercial plants during this century. One day, using genetic engineering, we may have plants that manufacture their own insecticides to combat destructive insects. This could relieve the farmer of the need to buy and apply insecticides.



Genetic engineering: Needle injects genes into plant cell.

Basic and Applied Research

Plant-breeding is research with a clearly defined commercial application. But other research, including some genetic engineering, is basic – the exploration of fundamental processes that lay the foundation for breakthroughs offering great practical advantages. Current basic research may be crucial to enhance the capacity of commercial crops to obtain nitrogen from the air or indeed, introduce this beneficial characteristic to plants that lack it altogether. Success means reduced application of expensive nitrogen fertilizer to growing crops.

The Researcher at Work

As the Canadian agri-food industry develops and problems are resolved, new ones arrive. So there is no end to research, only new challenges. Beyond plant breeding and genetics, researchers tinker in thousands of ways with the changing food system. One example is the development of dwarf breeding hens to produce hatching eggs for meat production. These dwarf chickens eat 20% less and take up less space, yet their offspring sold for food are normal in size and performance. Dwarf breeders may be a significant technical and economic advance for the poultry industry.



Part of the Agriculture Canada dairy research herd.

Much current research is directed toward salvaging Canadian soils degraded through loss of organic living matter (by continuous cultivation), wind and water erosion and the buildup of salt deposits. Moreover, moisture content is crucial to the soil's capacity to produce crops, so knowing how much water is in the soil at any time is vital information for farmers and researchers. Agriculture Canada has just developed a portable electronic device to provide on-the-spot soil water measurements. The measuring principle employed may have much wider application. This is but one way we can control our future.

Scientists now seek the best non-chemical ways to commercially produce food. This is part of a more comprehensive, multimethod approach to the control of insects, weeds and diseases that interfere with plant and animal growth. The aim is to reduce the reliance on artificial pesticides with their expense and environmental concerns, while maintaining high production on the farm.

Various techniques and devices are making the Canadian farmer stronger economically. For example, in milk production science has helped create significant increases in the capacity of individual cows to produce milk, thus permitting more total production of higher quality from fewer animals. Agriculture Canada has the largest dairy cattle research herd (1000 head) in North America. It helps ensure continued performance increases through improved nutrition, breed advances, management and health practices.

The range of problems subject to scientific redress is virtually endless. Agriculture Canada scientists seek cheaper fuels for farm use and ways to ease drought problems. They develop new products and methods for Canadian food processors to make them more competitive internationally and less reliant on foreign technology. Others collect and preserve historic plant gene strains that may some day be needed again, improve farm machinery and buildings and find methods that extend storage life for crops and foods. There is scarcely an area of the agri-food industry that has not benefited from scientific support.



Artist's concept, new Agriculture Canada food processing research center at Saint-Hyacinthe, Quebec. Open in 1986.

The Human Factor

Whether basic or applied, all Agriculture Canada research is aimed primarily at creating a stronger agri-food community for ourselves and others. Canada lends scientists to less-developed nations to help with food production and the fight against hunger. The strength of our research and agri-food community permits us to fill this very human obligation.

And beyond this, all agri-food research in Canada adds to the store of human knowledge on which scientific advance is founded. This responsibility is particularly important in Agriculture Canada's work on genetic engineering as it deals with fundamental life processes and has far wider applications and impact on our lives.

The Original Five

Those first federal experimental farms began the large-scale application of science to food production in a predominantly rural nation. Today Canada is largely urban, but still economically rooted in large part to the land. And the first five experimental farms are still on the job helping the whole food system work.

Like all Agriculture Canada research stations, the original five are open year-round to the public as well as to their principal clients, the people in the agri-food industry. They can be visited at Nappan, Nova Scotia; Ottawa; Brandon, Manitoba; Indian Head, Saskatchewan; and Agassiz, British Columbia.

One of the first five, Ottawa's Central Experimental Farm, is a bustling collection of office buildings, laboratories, greenhouses, trees, people, animals, lawns and rolling farmland. It is also a 500 hectare reminder of our alliance with the land in the urban setting of the

national capital. Appropriately, this historic institution is also home to the national headquarters of Agriculture Canada and its Research Branch.



Hay harvest, Central Experimental Farm, 1892.

Other Information Sources

The complete story of Agriculture Canada's Research Branch is in a book entitled *One Hundred Harvests*, written by a former Agriculture Canada scientist, T. H. Anstey. Additional information on research and centennial matters can be obtained from any Agriculture Canada research station or by contacting:

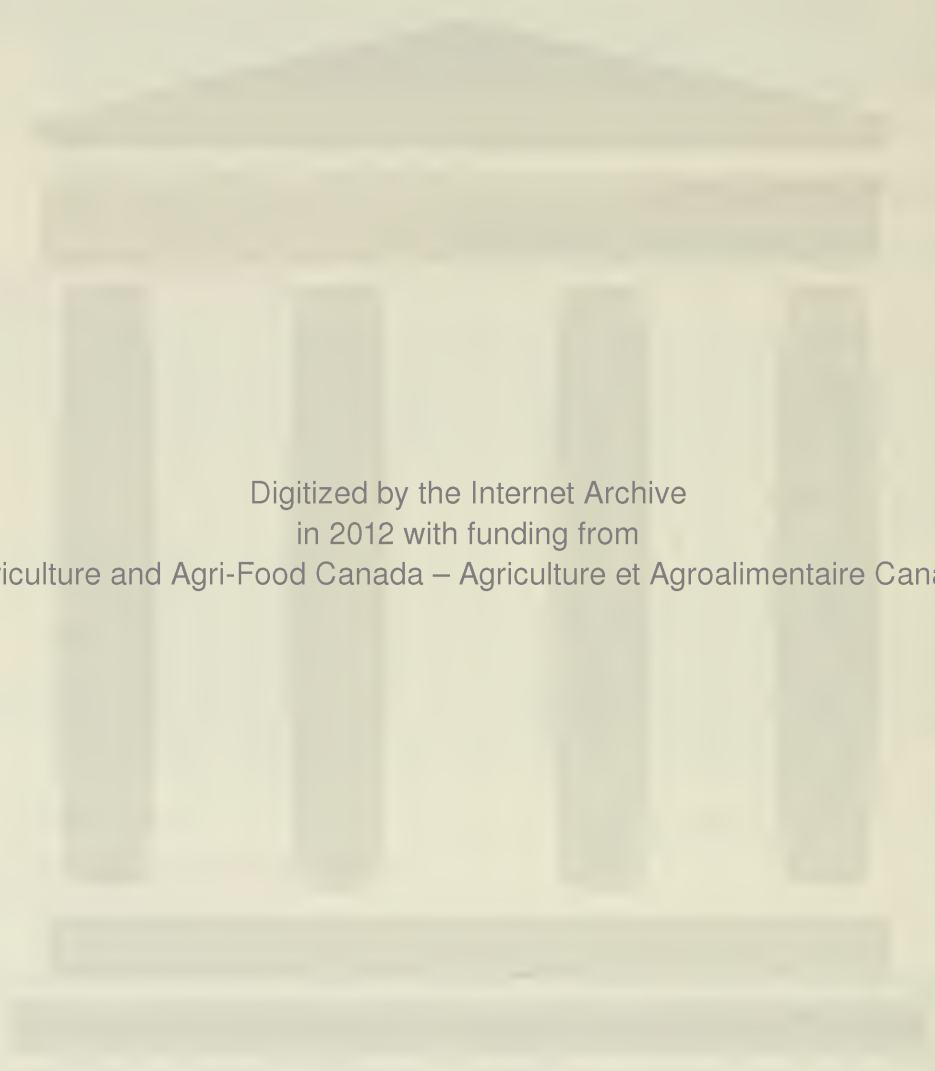
Public Inquiries
Communications Branch
Agriculture Canada
Sir John Carling Building
Central Experimental Farm
Ottawa, Ontario
K1A 0C7
Tel. (613) 995-8963

OR

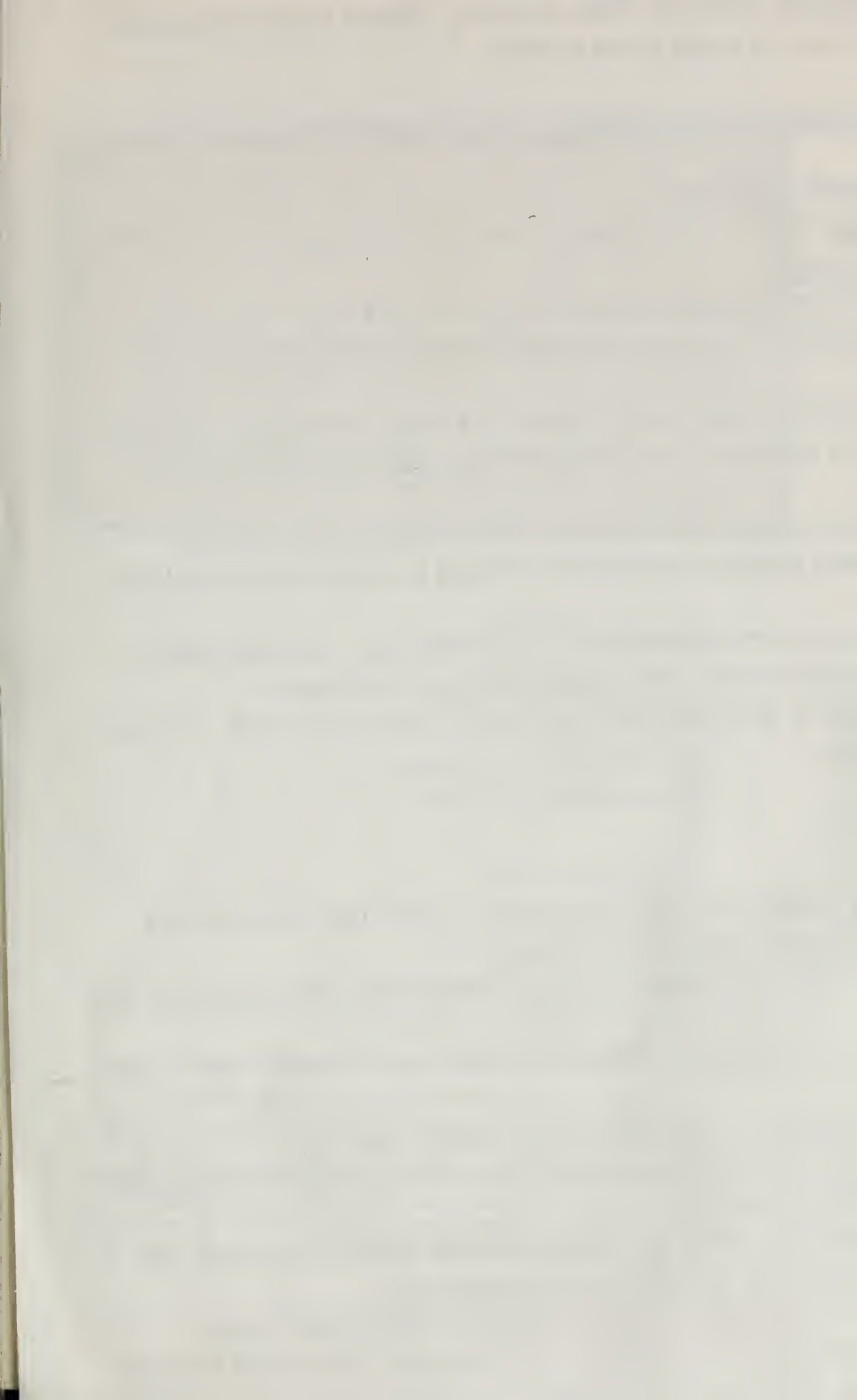
Centennial Coordinator
Research Branch
Agriculture Canada
Building #26
Central Experimental Farm
Ottawa, Ontario
K1A 0C6
Tel. (613) 998-1986

“As a highminded nation, we pursue such central ideals as justice, equality and freedom for all. Their attainment comes in many ways, not the least of which is through science. For science gives substance to our dreams.”

E. J. LeRoux
Assistant Deputy Minister, Research
Agriculture Canada



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