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Don Macy holds a plaque presented on behalf of the Premier and the Province of Alberta for his many years of service.



▶ Linking Industry and Science

AARI's new business plan fosters collaboration among stakeholders, sets strategies, and increases accountability to improve the outcomes of agricultural research, adding value to Alberta farms.

The Alberta Agricultural Research Institute has long believed that shared visions and good teamwork across the sector lead to the best scientific successes and contributions to economic, social and environmental well-being.

The new business plan lays out a long-term road map to do just that. The goal for the Agriculture and Food Industry in Alberta is to achieve \$20 billion of value-added shipments and \$10 billion of primary production by 2010, and to do this in a sage and sustainable way. Research will play a crucial role in achieving these goals. So, in consultation with industry and stakeholders, the Institute has defined the following strategic directions:

- Developing new market-driven value-added products (linking agricultural production to higher value food and renewable non-food products);
- Improving production and processing systems capable of sustaining and enhancing the basic resources of land, water, and air;
- Ensuring global competitiveness in technology and knowledge applicable to primary production efficiency and secondary processing;
- Basic research in life sciences essential to agriculture (eg. genomics, proteomics, and bio-informatics).

The business plan lays a careful blueprint to foster an atmosphere of partnership around the larger aim of improving the outcomes of agricultural research. Those partnerships recognize the need not only within the Agricultural

R&D community, but the need for true partnerships with industry, and the partnership of Agriculture, Health, Forestry, Environment, and Renewable Energy in a Life Sciences approach.

Alberta is blessed with many outstanding researchers. The Institute and other funders believe we can improve the operating environment for scientists by providing them with clear goals in the context of larger strategies, support to work together effectively, and access to funds in a rational, transparent manner. The work of Alberta's most creative scientists should be focused more on the lab and the field than on endless applications for funding.

One of the primary goals is to improve the funding decision mechanism so that the R&D community as a whole benefits through strategic focus, collaborative teams, streamlined processes, and increased investment in R&D. This may sound ambitious, but so many pillars are already in place.

For example, the Research Funding Consortium is contributing to the strategic direction, collaborating to provide leadership, and rationalizing the process for researchers. Research Performers are active in developing strategies and opportunities to pool their expertise, creating synergies and new opportunities for impact. The business plan hopes to build on these achievements. There is an ambitious growth curve planned for agricultural research, and we will need the resources to achieve this in the years ahead – but the foundation has been laid.

On September 5, 2002, Don Macyk was recognized at a retirement party held in his honour. Many friends and colleagues came out to toast Don. Below are some scenes from the party.



Don with Lloyd Andruchow, AAFRD



Ron Dyck presenting Don with a token of appreciation from Alberta Innovation and Science.



A print called, "Prairie Harvest" was presented to Don as an expression of thanks for all his dedication and valued contributions.

▶ Adding Strategy to Science

Six of Alberta's major agricultural research funding groups have formed a strategic partnership to support an innovative, sustainable, and world-class agricultural industry in the province. The partnership will work together to fund research initiatives and ensure that shared strategies are being implemented.



Diversified Livestock Fund of Alberta



Where would you rather have the top scientists in the province - in the lab - or in the hunt for funding dollars? The goal of the new funding consortium of the major agricultural research funding groups in Alberta is to increase the efficiency of applying for funding and also to ensure the outcomes are consistent with the goals of the industry.

The partnership primarily includes public funding bodies. It is designed to improve all aspects of research funding, through co-ordinated planning and activity and efficient use of expertise and resources, says Freda Molenkamp of AARI, which has spearheaded this joint venture.

"This type of partnership is essential in today's research environment," says Molenkamp. "There are more research activities and more funding organizations than ever before, and it only makes sense for us to work together to avoid duplication and make the best use of public dollars. Using our collective knowledge and resources, we can co-ordinate our efforts into a broader vision that allows us to accomplish far more than we ever could individually."

In addition to AARI, the partnership includes three industry development funds - the Alberta Crop Industry Development Fund (ACIDF), the Alberta Livestock Industry Development Fund (ALIDF), and the Diversified Livestock Fund of Alberta (DLFOA) - along with the Agriculture and Food Council of Alberta (AFC) and AVAC Ltd. These groups allocated a total of \$9.0 million to agricultural research projects in 2002.

"Together, the groups around the table represent a broad cross-section of stakeholders and industry sectors," says Darcy Fitzgerald, General Manager of ALIDF. "This gives us a big picture view of the overall priorities and where our individual

needs fit in that puzzle. From this, we can look for ways to complement each other and lay out a long-term game plan to meet our collective goals."

The partnership is an informal one that preserves the autonomy of the individual funding organizations and their mandates. The organizations share the workload of evaluating research funding applications and participate in round table discussions to co-ordinate their funding activity.

"It's a very practical process," says Neal Oberg, a Forestburg producer and Co-Chair of AARI's Board of Directors. "Each group comes to the table with its own unique mandate and priorities, and each is accountable to its own board and makes its own funding decisions. But we look for logical ways to work together, to improve the overall efficiency and effectiveness of our efforts."

An obvious benefit is avoiding duplication, says Doug Walkey, General Manager of ACIDF. The three industry development funds began in 2001. Rather than each developing their own application and funding mechanisms from scratch, these funds were able to build on what AARI already had in place and share collectively in the process. "AARI's desire to build the broader part-



The six strategic priority areas for agricultural research and technology development identified by AARI are:

- New Value-Added Food and Agri-Based Health
- Bio-Products
- Interaction of Agriculture with water, soil and air resources
- Livestock Opportunities
- Crop Opportunities
- Food Safety and Quality



Hector Goudreau, MLA

nership and our need for a mechanism came together very nicely. It was a process of learning from what had worked in the past, and developing that into something that works for all of us.”

The partnership encourages sharing of research applications and joint funding of projects. As a result, more projects get funded, and they are chosen with a broader vision of how the outcomes will benefit agriculture in Alberta.

“There’s no question that the more horse power you have around the table, the better the decisions that are going to be made. And the different perspectives that our groups bring to the table are highly valued,” says Ross Bricker of AVAC Ltd. “We can look at a proposal in the context of every point on the continuum from primary agriculture to value-added market opportunities. So there’s less likelihood that good projects will slip through the cracks.”

The round table allows smaller funders to see more projects, and extend their influence by communicat-

ing with larger groups and pursuing joint funding opportunities, says Bill Buchta, General Manager of DLFOA. “We’re a small group, with small funds, and there’s no way we can fund some of the larger projects alone. But by collaborating with organizations like AARI, there’s opportunity for us to get some fairly big projects funded.”

“The partnership also offers benefits to research funding applicants,” says John Christensen of AFC. The funding organizations have worked towards a one-window process for applications, which simplifies the workload for applicants and ensures their proposals will get wide exposure to funding opportunities. “The researchers like the one-stop shopping aspect. And with the greater potential for joint funding, their chances of success are significantly higher for worthy projects.”

In the end, that’s what it’s all about – using strategies to make the processes, goals, and accountability better, so researchers can work their magic for the province.

“The cross section of stakeholders gives us a big picture view of the overall priorities and where our individual needs fit in that puzzle.”

Darcy Fitzgerald,
General Manager, ALIDF

The MLA for Dunvagen, Hector Goudreau, joined the AARI Board of Directors in February 2002.

In these two roles, Goudreau acts as a link between AARI’s goals and the provincial legislature. His vision for a diversified Alberta economy has helped AARI focus on funding globally competitive research.

Goudreau brings a vast array of experience in agriculture, community development, and government affairs to the table. After earning his B.Sc. in Agriculture, he spent 21 years as a district agriculturalist and crop specialist. During that time, he was engaged in a number of related activities, including community programs that highlight the needs of Alberta’s farm families.

“I am excited to be working with AARI and the world-class participants in AARI programs,” says Goudreau. “I am committed to helping to build an effective, integrated, agricultural research and technology development system in Alberta that can be a model worldwide.”

► Research Upstream, Quality Downstream

A recent three-year study addressed Agricultural management to assist the industry in responding pro-actively and responsibly to environmental concerns. The multi-agency study, supported significantly by AARI and the Canada-Alberta Beef Industry Development Fund, recently released a report called ***Relationship Between Beef Production and Waterborne Parasites***.

The report examines land use and water quality within streams, particularly those draining into the North Saskatchewan River. The study was commissioned partly due to the heavy runoff conditions in the spring of 1997, when abnormal levels of cryptosporidium and giardia were identified in the North Saskatchewan River.

James Wuite, Water Quality Biologist for the Conservation and Development Branch of Alberta Agriculture, Food and Rural Development (AAFRD), says the study was also initiated as a result of the scrutiny agriculture has faced outside the province on water issues. The Province wanted to get ahead of the curve and make sure appropriate protocols were in place to ensure Albertans a high quality water supply.

The study focused on comparing the contributions of cattle, wildlife, and

municipal sewage to surface water cryptosporidium and giardia levels, and determining whether high density livestock operations contribute greater numbers of parasites to the North Saskatchewan River than non-agricultural (forested) watersheds.

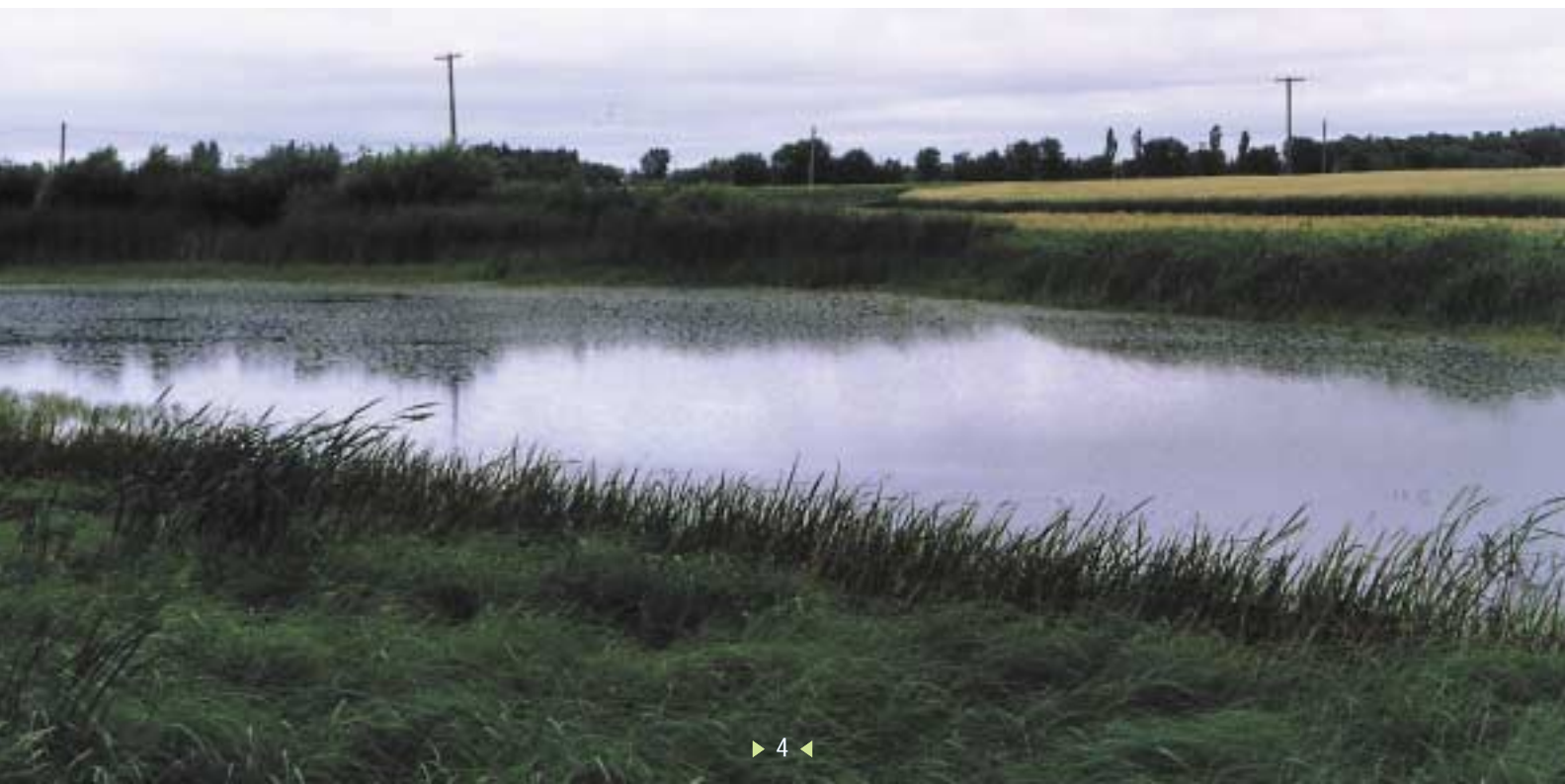
The initial results indicate that the highest levels of parasites moving into the North Saskatchewan River occurred seasonally, and some of the cryptosporidium and giardia during the spring and summer months may have come from agricultural lands. However, occasional drainage from non-agricultural (forested) areas also contributed high loads. Concentrations of giardia, although significant in municipal sewage effluent, appeared to be insignificant in comparison to total parasite loads from watersheds.

Wuite cautions against assumptions, suggesting that further studies must be conducted to ascertain if coincidental factors, such as wildlife inhabiting livestock-concentrated land, may have influenced the early results. Wuite sees future promise in a second phase of this study, where new microbial source tracking technology might be employed to strengthen results. Currently, it is difficult to pinpoint the sources of waterborne parasites, and the

Water is one of our most precious resources and protecting our water quality is of economic and social importance. The Alberta Agricultural Research Institute and others in Alberta's agriculture industry are partnering to fund research into the effects of cattle operations, wildlife, and municipal sewage on the quality of water in local waterways.

new technology should help.

Further studies will help to effectively reduce land use impact on water quality. However, all watershed stakeholders – wastewater operators, drinking water treatment plant operators, livestock producers, rural residents, and other landowners and industries – must work together to make the most of this effort. Support from the agricultural industry, provincial and municipal governments, and private landowners is also imperative, both to further research that will identify water quality protection programs, and to access the resources required to effectively operate these programs.



► Breeding Better Beef

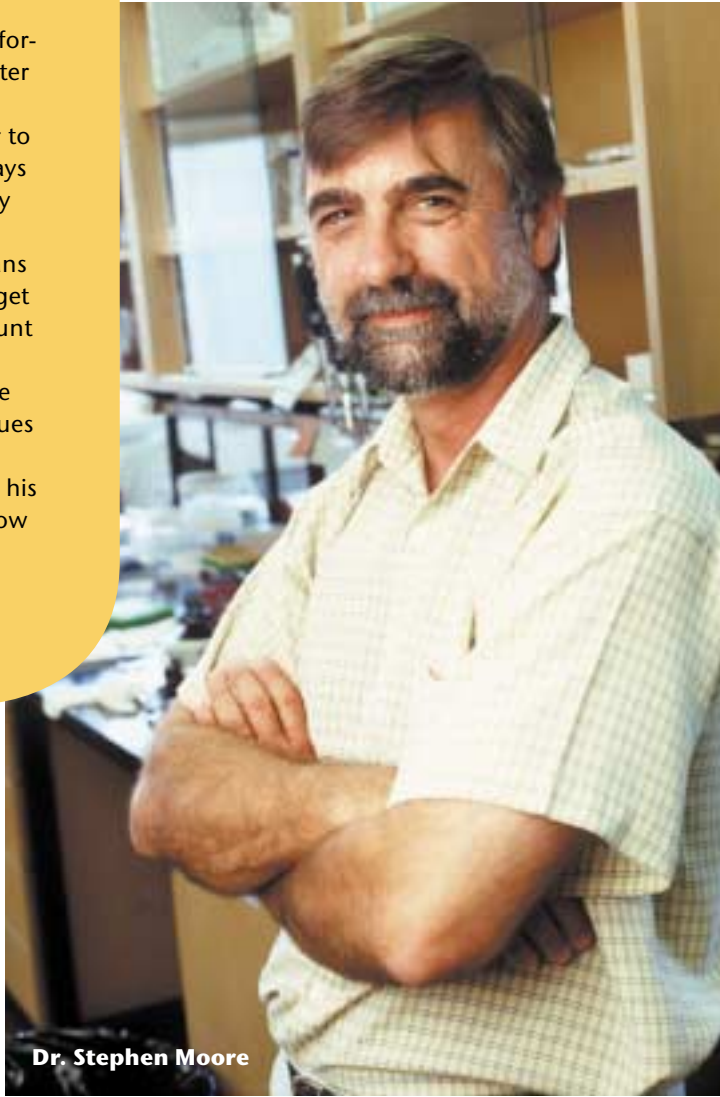
“Understanding how genes function in cattle can give us information not only about how better to breed cattle, but also how better to manage them in order to optimize their performance,” says Dr. Stephen Moore, the Industry Chair in Beef Genomics at the University of Alberta. “This means getting the maximum you can get out of them with the least amount of stress on the animal – and that’s becoming more and more important as animal welfare issues these days loom large.” Moore also hopes to discover, through his work on the bovine genome, how to increase nutrient uptake and feed efficiency in cattle.

Dr. Stephen Moore is the lead Canadian researcher on an international team devoted to sequencing the bovine genome, which means mapping and then discovering the function of all the different genes in cattle.

The work Moore is doing on the bovine genome will create a place for Canada at the international table, when it comes time to access and build on global genomic research. His project deals with sequencing the genome, and then eventually selecting genes to breed cattle that are efficient and yield a quality product.

“The priority for cattle farmers in Alberta at the moment is probably not genomics in the first instance – it’s getting through the year,” says Moore. “But we hope we can convince them, with the potential outcomes of this research, that it is worth investing in, in the long-term.”

Those long-term goals include determining what individual genes do, and how they are related to each other, so that breeders can begin selecting the genes in cattle which are responsible for product quality and efficiency. This research will lead to better breeds and will optimize the per-



Dr. Stephen Moore

formance of cattle, improving their welfare.

Originally from Australia, Moore spent 11 years with the Commonwealth Scientific and Industrial Research Organization working on beef molecular genetics, eventually leading the group for a year and a half. He came to Canada three years ago and heads up this country’s foray into an international initiative to sequence the bovine genome, which also includes researchers from the United States, the European Union, Brazil, Australia and New Zealand.

There is a network of scientists across Canada working on parts of this project. There are groups in Saskatchewan, Nova Scotia, and Ontario, as well as several scientists across Alberta. Moore hopes to make this network strong so that Canada has a place at the international table in order to

gain access to the research once it is released.

“We need to know that we have full and early access to all that data as it comes out. If we don’t do anything now, we won’t be able to do anything with the information when it becomes available,” says Moore. “We need to make sure that we’ll be able to apply all this wonderful information that’s coming out of genomics projects across the board, and that we can apply that information to cattle here in Canada. That’s one of the real issues we have to face – maintaining our standing in the world.”

But this work goes beyond maintaining a presence on the world stage. It is relevant to Alberta beef producers as well. Moore says the nutrient uptake research in cattle is very exciting.

“The cost of feed is over 50 per cent of the total cost of production, so if we can reduce the cost of feed, incrementally we’re going to make big savings for the industry,” he says. “So the applied part in nutri-

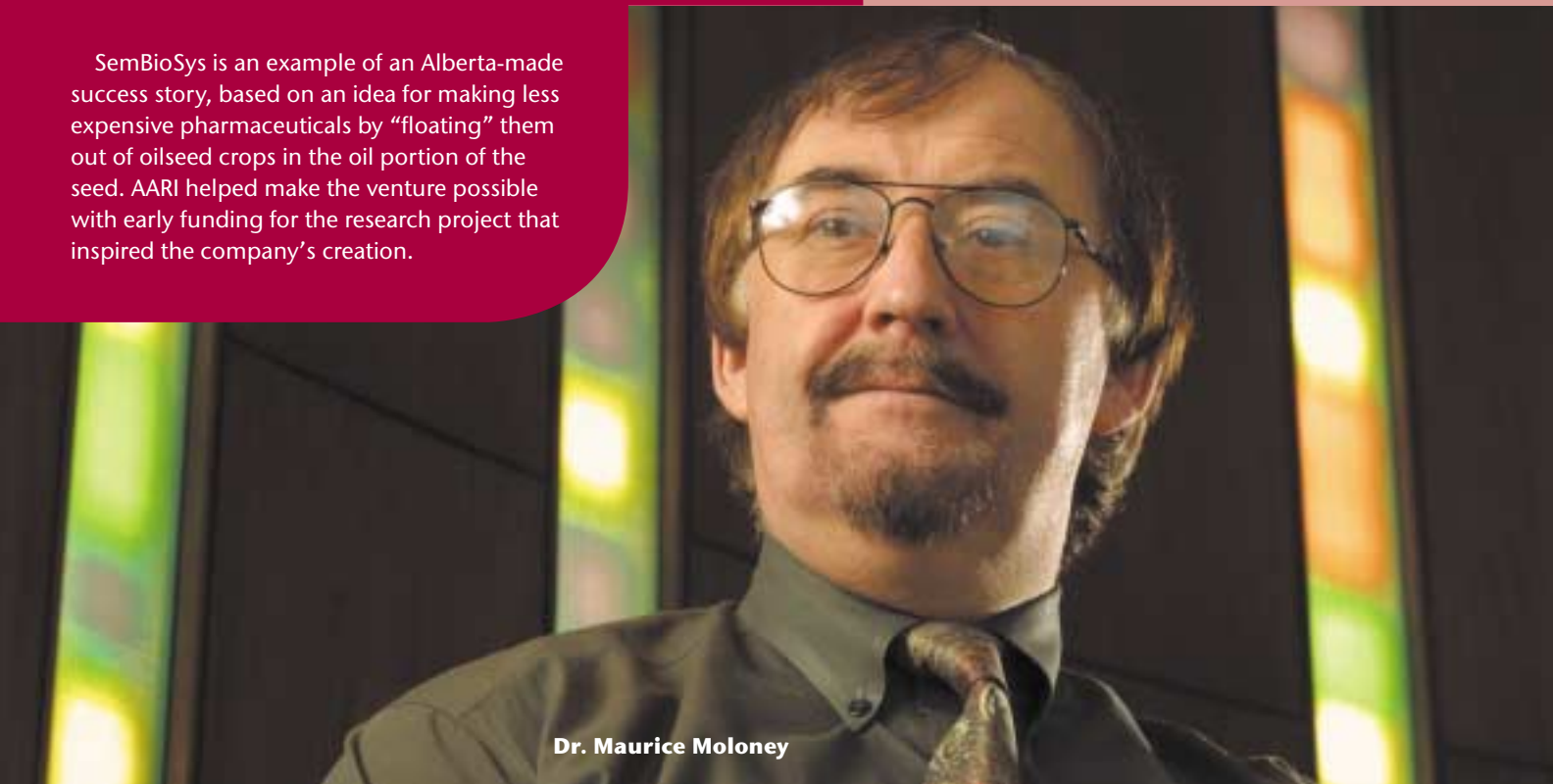
ent uptake and feed efficiency is a direct benefit to the industry.”

Moore says they are also studying the correlation between efficiency traits and quality traits. They are hoping to avoid a scenario where higher animal efficiency might mean, for example, a reduction in marbling, which would then reduce the grade of the end-product.

Funding from this project has come from a variety of sources, with AARI contributing \$1.2 million over the next three years. “It’s been very important to have both the AARI funding, and the industry funding,” he says. “It’s very heartening to see the industry get behind this, especially since some of the goals are rather long term, and I realize the immediate issues for the industry are pressing.”

► Floating Success

SemBioSys is an example of an Alberta-made success story, based on an idea for making less expensive pharmaceuticals by “floating” them out of oilseed crops in the oil portion of the seed. AARI helped make the venture possible with early funding for the research project that inspired the company’s creation.



Dr. Maurice Moloney

Before SemBioSys was even conceived, Dr. Maurice Moloney, founder and Chief Scientific Officer with SemBioSys, started with an idea. He believed that certain protein-based pharmaceuticals could be developed in, and easily extracted from, oilseed crops, making them far less expensive. The pharmaceuticals, including treatments for blood diseases, cancer, and multiple sclerosis, are also produced in animal cells, which is not only expensive but runs the risk of transferring viral contaminants to people using the drug.

However, in his work at the University of Calgary, where he is also the NSERC Industrial Research Chair in Plant Biotechnology, Moloney discovered a plant protein in canola that only associated itself with the oil portion of the seed. He theorized that he could introduce a pharmaceutical protein in the seed that could do the same, and then be easily extracted by “floating” the protein out of the seed in the oil, using the principle that oil is lighter than water. The extraction process would be simpler, far less expensive, and would remove the risk of viral contamination from animal cells.

Moloney sent a grant application to AARI to request funding to start the research, and after several years of study, he found

that the concept worked. The process is now estimated to cut the production costs of a number of pharmaceuticals by 50 to 90 per cent compared to other methods.

From the success of that project stemmed SemBioSys in 1994, which now works with 25 different proteins out of its 25,000 square foot corporate headquarters in Calgary. With nine U.S. patents, and other patents approved or pending in Canada and a number of industrialized countries, SemBioSys is finding success with this robust technology.

This success also brought significant investment into Alberta. Moloney says that Dow AgroSciences Canada was the first company to invest in SemBioSys, offering several million dollars in funding. Since that time, he says, funding has come from more broad-based companies, including Bay City Capital, Royal Bank Ventures Inc., Ventures West Capital Ltd., and the Business Development Bank of Canada, all of whom are considered the “elite” in life-science investment banks.

As for the other benefits for Alberta, Moloney says the project created “a significant number of positions”, including nine management staff with substantial technical training. He adds, “We are now one of the strongest companies in plant

transgenics to make difficult or expensive pharmaceuticals.”

SemBioSys is also increasing the potential for safflower, an oilseed crop of desert origin that SemBioSys uses for protein production. Safflower performs very well in drought conditions, such as the ones witnessed in Alberta and across the Prairies in recent years. It gives Alberta farmers another crop option for reducing production risk and improving their bottom line.

Moloney says that AARI took a risk on a concept with good potential. “AARI contributed before SemBioSys got started, and to AARI’s credit, they were willing to spend money on something that by no means guaranteed success. AARI invested in something that was truly ‘research’. They were able to see that investment in the early stage of somewhat risky research is a critical thing in agriculture.”

Moloney believes that this kind of investment will help build the agriculture industry in Alberta and across Canada, by not only diversifying the type of crops grown, but diversifying the markets that these crops serve. This diversity spreads the risk of production, helping to ensure the success of farmers and many others in Alberta, and beyond.

▶ Focusing on the Big Picture

AARI has been facilitating “big picture” thinking in some key areas of agriculture research. Innovative thinking within these areas will generate an overall vision for research in the sector. The results themselves have potential for further alignment.

Agriculture is a critical component of Alberta’s economy, one that connects rural and urban issues. The R&D system has laid the strong foundation of production excellence that Alberta enjoys today. That system must change with the changing times (environmental awareness, low commodity and high input prices, urbanization, global markets, etc.)...and the AARI Board put the leadership for that change forward through a concept of Networks. Three Networks were initiated early in 2002: Bio-Products Network, Food Value Adding, and Agri-Health, the latter two supported by the Sustainable Production Network.

The primary function of Networks is threefold:

- 1) Identify the strategic focus and research priorities within the Network area**
- 2) Be a point of contact, communicator, and champion for the priorities**
- 3) Advocate for an integrated, collaborative R&D system**

Membership in all three of the Networks comes from a diversity of industry, research, funder, producer, and business sources. Six months of intense consultation has resulted in the Focus and Priority areas seen below:

Strategic Research Focus	Priority Areas
Agri-Health and Value-Added Research	<ol style="list-style-type: none"> 1) Food Ingredient and Fermentation Products 2) Value-Enhanced Meats and Meat Products 3) Health, Wellness, and Performance Products
Bio-Products Research	<ol style="list-style-type: none"> 1) Bio-Materials Products 2) Bio-Energy Technologies and Products 3) Bio-Industrial Chemical Technologies and Products
Sustainable Production Research Supporting Profitable Sustainable Production	<ol style="list-style-type: none"> 1) Sustainable Production Systems for Specific Traits in Crops and Livestock 2) Nutrient Efficient Systems in Integrated Crop and Livestock Production 3) Microbial Management Systems
Research and Development Infrastructure	<ol style="list-style-type: none"> 1) Build on Current Infrastructure Resources 2) Fill Infrastructure Gaps 3) Infrastructure for All Priority Areas
Due Diligence, Market Research, Regulatory	

The development of the present Networks were facilitated by Stewart Campbell (Food Value Adding and Agri-Health), Darrel Toma (Bio-Products), and Scott Wright (Sustainable Production). AARI will now establish Champions for the Networks to ensure an ongoing renewal process.

Program Teams in the strategic areas are emerging through a number of mechanisms. Proposals for work in these Network areas are under consideration by the entire funding consortium as part of the current funding round. In addition, AARI anticipates a targeted call for proposals, and are currently supporting the development of program proposals in targeted areas of focus.

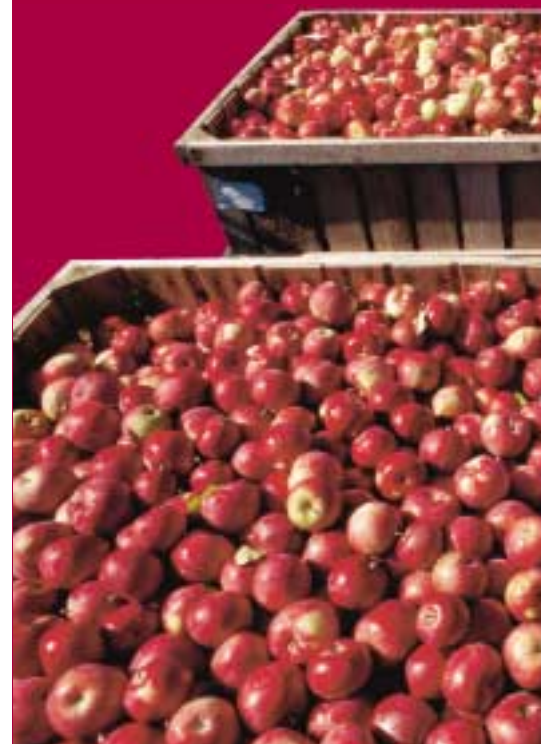
DID YOU KNOW...

Over 21,800 farms in Alberta used computers for farm management in 2001, a 62 per cent increase in just five years. Primarily used for bookkeeping, payroll, and taxes, nearly 15,700 farms also used computers for the Internet, and more than 14,400 farms used their computers for e-mail.

Things ARE bigger in Alberta, including the farms. The average farm size in Alberta in 2001 was 970 acres, a 10.1 per cent increase since 1996, whereas the Canadian average was only 676 acres.

Retail sales from Alberta supermarkets and grocery stores nearly doubled between 1990 and 2000. Sales reached nearly \$7 billion in 2000, compared to \$4 billion in 1990.

In 2000, the average Alberta household spent \$6,496 on food, representing 10.5 per cent of the average household budget. Of this, 76 per cent was purchased from stores. The remainder was purchased from food-service outlets (i.e. restaurants).



▶ New Beginnings from “The Road Not Taken”

Don Macyk, outgoing Executive Director of AARI, brings to light his perspective on the crossroads that research and development in Alberta’s agriculture industry has reached. Macyk offers his wish list of future accomplishments for AARI as it moves forward in the quest for greater knowledge and ever-better technology.

*“Two roads diverged in a wood and I –
I took the one less travelled by,
And that has made all the difference.”*
- Robert Frost

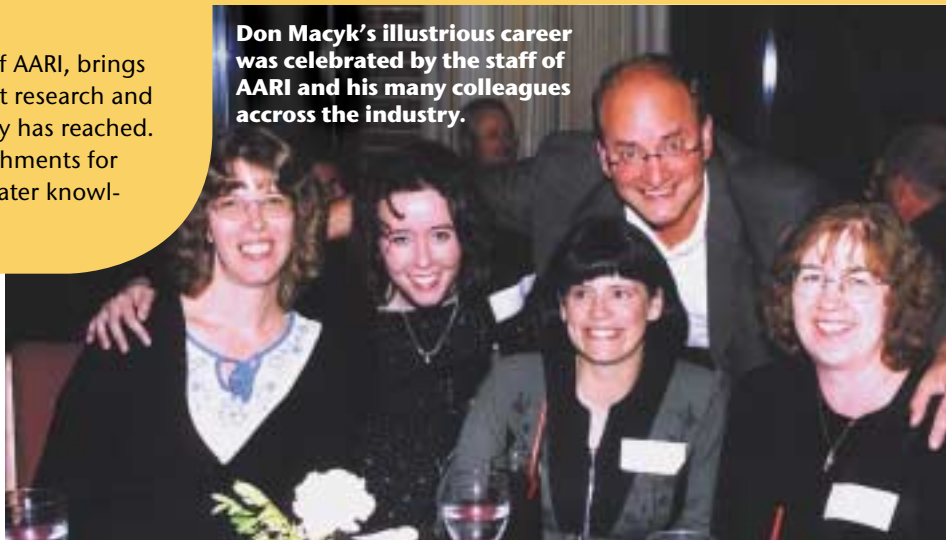
Current events and circumstances present a rare opportunity for Alberta’s research and development community under the leadership of AARI and partners to move forward in significant strides. The current transformation of the agriculture and food industry (here and elsewhere) is driven internally by economic, social, and natural events on a scale not seen by this writer. It is driven externally by opportunities and challenges arising from technology development, changing consumer preferences, resource limitations, and so on. We are approaching a crossroads and need to summon the will and courage to choose.

The emergence of an Alberta R&D Strategic Business Plan to harvest today’s capacities and build towards the outcomes needed for the future is the beginning of building an enhanced community. Never before has the power of science and technology been so central to outcomes – economic, social and environmental parameters – vital to a balanced quality of life.

To learn, to grow, to change, and to dream a little are all essential to moving forward. New possibilities can be very motivating. I name but a few on my personal wish list:

- A strongly functioning provincial R&D Strategic Business Plan complete with principles, goals, strategies. And a commitment to building toward the new R&D capabilities and capacities necessary to achieve the outcomes needed by our unique agriculture and food industry today and tomorrow.
- An “Alberta Life Sciences” initiative that

Don Macyk’s illustrious career was celebrated by the staff of AARI and his many colleagues across the industry.



creates new possibilities for agriculture and food to intersect with health, pharmacy, energy and forestry sectors in new products, technology, and sustainable practice development.

- The will and incentives to create the financial capacity and mechanisms needed for a \$20-30 billion agriculture and food sector. A new governance model is necessary to ensure direction and accountability requirements arising from the R&D Strategic Business Plan are met. The Funding Consortium can ensure stakeholder needs and research and development investments are aligned and serve as a mechanism for directing research funds to the highest priority uses.
- Enhanced research investment and commitment in at least four areas:

1. Creation of an animal research capacity integrating rumen microbiology, nutrition, genomic, metabolic, physiological, and human health research capacities. Alberta would host the capacity to assess all physiological, metabolic, behavioural, and resultant food quality, nutritional, and health impacts of our primary livestock sector.
2. An Alberta Renewable Resource Managed Network to: develop leading-edge systems approaches for agriculture and forestry sustainability; new products and technologies focused on integrating agriculture

and forestry raw material; by-products substituting for non-renewable raw materials; and (to borrow a concept from Bill Hunter, Alberta Forestry Research Institute Co-Chair) a “cellulosis R&D capacity” to advance value creation of this largely available, low-value biological output.

3. A socio-economic research capacity integrated into the assessment of science-based research undertakings, and as one of the multi-disciplinary components of research programs and models.
4. A partnership among the four western provinces (preferably nationally) to create the capacity to link food, nutrition, and health research in an innovative approach to enhance human health and wellness.

“New possibilities” abound, a result of more thoughtful approaches by all stakeholders, representing the public and their interests linked with a creative, innovative community. It all adds up to the will to “make a difference” – a huge difference in my view: Everyone making their contribution to an agreed plan with stretch outcomes developed through processes of inclusion, knowledge sharing, awareness, and the will to take the first step in the Journey of a Thousand Miles.

Don Macyk
Director Emeritus, AARI