

Narrator: Dave Hickling (DH)

Company Affiliations: Cargill Incorporated, Canadian International Grains Institute, Canola Council of Canada

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Interviewer: Nancy Perozzo (NP)

Recorder: Nancy Perozzo (NP)

Transcriber: Sarah Lorenowich (SL)

Summary: Animal nutritionist Dave Hickling discusses his career in the Canadian grain industry working for organizations and primarily being involved in feed nutrition studies, trials, and marketing. At Cargill, he describes working first as a field representative for a new dairy cow feed program, then as their nutritionist developing enhanced feed programs for broiler chickens, which he studied further in a PhD program. At the Canadian International Grains Institute (CIGI), Hickling discusses the organization's overarching goal of information exchange with foreign customers, and he shares stories of stand-out projects developing slow-dissolving shrimp feed, selling canola meal for fishy-tasting eggs, and selling feed wheat to Korea and Mexico. He details CIGI's interactions with the Canadian Wheat Board, grain companies, and other industry organizations. At the Canola Council of Canada, Hickling describes the history of canola, its growth as a profitable crop due to research initiatives, and the unique structure of the CCC that allows it to work effectively. Other topics discussed include regional specificities for animal feed components, the growing livestock export industry in Canada, the demise of the Wheat Board and its consequences, government versus private research, hybridization and genetic modification in canola and other crops, the issue of agricultural patents, and the growing use of canola meal in dairy cow feed.

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Time, Speaker, Narrative
NP: Nancy Perozzo conducting this interview in Winnipeg on November 26, 2015. And I'm going to ask our narrator to introduce himself and just make a general statement about your connection to the grain trade, and then we'll go into specifics as we go along.

DH: Okay. Thanks, Nancy. I'm Dave Hickling, and I've been involved with the grain trade and grain industry in Canada since about 1981. I started with Cargill, their Nutrena Feed division. I'm an animal nutritionist by training, and I was there for about nine years. I actually went back to school to get my PhD partly during my time with Cargill, but also a little bit after my time. Then I went to the Canadian International Grains Institute, CIGI, from 1990 through to 2002. And then from 2002 until 2011 when I retired, I was with the Canola Council of Canada [CCC].

NP: Great. Now I'll go back even further.

DH: Okay.

NP: Did you grow up in Manitoba?

DH: No, I didn't, but I have a family connection. Just very briefly, I was born in Montreal. My father was a salesman for MacMillan Bloedel, the lumber company, and his territory was eastern Canada. Then he was transferred back to British Columbia, which is more the head office area. So I did most of my growing up including my Bachelor's and Master's degree in BC. I went to UBC for a Bachelor's in biochemistry and a Master's in fish nutrition and poultry nutrition. Then it was after that when I graduated from that in 1981, I moved to Brandon. And there is a family connection there. My father was born in Brandon. I still have a number of relatives in Brandon. If you check out the Hickling name, there are a few still in the Brandon area. So in a sense, it was kind of like reconnecting with my Prairie roots.

NP: Were they farmers, the Hicklings in Brandon?

DH: No, they weren't. They were immigrants from England, and they had just a variety of jobs mostly in the city. I think they were involved in the building supply industry and a few other things like that.

NP: Yeah. What interested you in the field of study that you went into? You didn't go into forestry, following in your father's line of business. [Laughing]

DH: No. My connection was as much fishing and fisheries as anything. Growing up on Vancouver Island, we grew up right on the coast, and I'd go out fishing all the time. So I became interested in fish nutrition, aquaculture, and that's what led me into the Master's degree at UBC, but there was no fish nutrition department. In fact, I was the very first fish nutrition student to ever go through UBC. They've had hundreds since that time, but back in 1977, I think, when I started, I was the first one. Because there

was no fish department and there was no funding specifically for fish, I had to do a combined degree with poultry, and I did a comparative study with poultry and fish. They're very similar, actually. They have very similar metabolism.

NP: Hm!

DH: Surprisingly. So that led to some opportunities and connections with the feed industry both in BC and on the Prairies. So I'd interviewed with Cargill, whose head office was in Winnipeg. I was pretty green. I'd never had any experience, so they didn't hire me right away to be their nutritionist. They put me into the field for a year and a half in Brandon, from '81 to '83, and then I moved into the head office in Winnipeg.

NP: So tell me a bit about that first job as a field representative. What kinds of things did you do, and who did that put you in contact with?

DH: The feed mill is right in downtown Brandon, and it serves basically all of western Manitoba and a little bit into eastern Saskatchewan. Cargill has another feed mill in Winnipeg, but the territory was mostly split. Anything west of Portage la Prairie would be my territory. There was two salesmen out of that territory: One north of the Number 1 Highway, and one south. And my territory was north of the Number 1 Highway, and my job was basically to go around to customers and potential customers—whether they were dairy farmers or beef farmers or pig farmers or different poultry operations—and if we were selling feed to them, I would be providing sales support and technical support. My advantage was that I did have more of a technical background in nutrition than the typical feed salesman, so I was able to be relatively successful, I think, in making that support and technical support connection to customers.

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And so, I would talk to all sorts of customers. I had a number of Hutterite colonies, a number of independent farmers. It was just a wide variety of things. Most of the territory was within an hours' drive of Brandon, but every now and then I'd head up to the Dauphin area and maybe do some overnight trips. I think one of the areas that became very successful was on the dairy side. Cargill at the time was introducing a new dairy feeding program, an analysis and feeding program, and a lot of dairy farmers had never had that technology available to them. So I was able to introduce it to the farmers. We were able to pick up quite a few customers because of that.

NP: So what was unique about or revolutionary about that program? What were they doing before, and what were you encouraging them to switch to?

DH: Well. I think what they were doing was basically a detailed analysis of the feeding and management systems within a dairy. So first you have to go and talk to the dairy farmer and establish some level of communication and confidence that they're willing to share information. Then you would run it through an analytical system. This is back in the early '80s, so computers were just coming off the ground, and Cargill had some good computer technology, some good analytical technology. And these days, it seems fairly basic stuff, but at the time, analyzing all the different aspects of a dairy operation and fine-tuning adjustments on the nutrition was actually quite a breakthrough.

That was the thing about Cargill. They often talk about the "University of Cargill" where people go and work for them, and they learn a lot, and they either stay a long time or a short time. I kind of stayed more on the shorter time, like, eight, nine years. But you learned systems, and you learned the business, and you learned the practical nature, because Cargill has always been a very systems- and procedure-oriented organization, and they established a lot of focus and discipline around making business decisions. And that was something I didn't have a lot of background in when I started. So I really appreciated that.

NP: I think when I think—as a person who doesn't know anything about it—but when I think of, let's say, dairy, I just think the cows go out and eat some grass and then come in.

DH: They used to do it that way. [Laughs]

NP: What was changing? You had a nutrition system. So what was happening? What were the dairy farmers doing at the time? And you said you were bringing a new system or additional information to them, so tell me what the--.

DH: Well, they had already made the transition from the pasture type of environment, which was the old style of dairy farms, to where they're housed inside all year round and the feed is brought to them. Of course, the dairy ration is fairly complicated. You have the two basic components: the forage component, which is the hay and the silage, and then you have the concentrate component, which is the grain and the protein ingredients and the vitamins and the minerals. At around that time, the technology was changing towards what they called a total mixed ration where instead of feeding the forage component separately from the concentrate component, it was all being mixed together, and they're being fed one complete diet. That was one of the technologies that Cargill was encouraging people to use because it made it a lot easier to supply what the cow actually needed, rather than giving them a choice of how much concentrate they wanted to eat and how much forage they wanted to eat. If you put it all together, you take away the cow's choice in a sense, but the advantage is you give them exactly what they need.

[0:10:02]

NP: Did cows have preferences for one versus the other?

DH: Oh, of course, they did. Yeah. [Laughing] Well, dairy cows are quite amazing. They have about—oh, I don't know—about five times as many tastebuds as human beings do per square inch of their tongue surface or whatever, and so there's a lot of things that they can taste that we can't. And definitely they have preferences, and that's part of the challenge of feeding dairy cows is to find out not just the right taste, but also the right texture and particle size that's going to help them eat more, consume more.

NP: I went to university in home economics, and we had human nutrition courses, and they had taste tests or taste preference labs. So did Cargill have cows on a panel? [Laughs]

DH: Well, they had a research farm just north of Minneapolis. Their head office is in Minneapolis, of course. And that was one of the advantages of working for Cargill is I went frequently to Minneapolis and visited the researchers there. And yes, they do. They did have a number of different--. They had their own dairy barn and their own systems where they could try different ration combinations and see how the cows liked it. So it was an interesting technology. The other thing that I remember learning a lot from them was, even at that time, Cargill was global in their operations. They had feed mills in Europe and in Asia and Latin America, all throughout the States.

And when I moved into Winnipeg to take the nutritionist position, I was only there a couple of months, and then they had a huge conference down in Minneapolis where they brought in their other nutritionists from all their other divisions from around the world. There was about 40 of us. Boy, that was a tremendous learning opportunity, and I remember very clearly that I picked up some good tips about feeding broiler chickens from one of their nutritionists based out of England. Just looking at what they were doing and how they were balancing some of their diets, and I was able to bring back some of their knowledge and apply it to a couple of the mills in western Canada. Their broiler chicken sales just shot up. The competition couldn't touch them. Nobody else in the area could get anywhere near as good a performance as we could get.

NP: And when you talk about performance, is that like size or taste or--?

DH: Well, for the broiler chicken farmer, they want to get to a certain weight in a certain number of days, so growth rate is important. But even more than that is the feed conversion efficiency. They want to get to that growth rate using as little feed as possible because obviously that saves them money. We could get a better feed conversion efficiency, a five to ten percent improvement.

NP: And what did they do differently? What is essentially the--.

DH: Well, we were formulating to very high levels of certain essential amino acids—lysine specifically was the one that we were looking at—and any meat growing animal, like a growing pig or growing chicken has a very high requirement for lysine. So we were putting in substantially higher lysine levels in the diets than the competition was. It was costing us a bit more to do it because lysine is an expensive amino acid, but the benefit in feed efficiency was definitely paying off. So even though we were charging a little bit more per tonne of feed, the farmer was getting a greater benefit. That was a technology I probably wouldn't have discovered on my own, but because this had been tried and applied in Europe—and they do a lot of very good nutrition in Europe—I was able to bring that technology to Canada faster than anybody else was. So.

NP: Because of that world-wide focus, I have a--. Just out of curiosity, when we look at human populations and various diets that are specific to areas of the world and the results of those diets on the people and their growth--.

DH: Yeah.

NP: So is a--. Maybe a cow's not the best example. You pick the one you want. So is there a difference between a Chinese cow and a Canadian cow as far as--?

[0:15:14]

DH: At one time, there used to be some real differences in the genetics around the world in how you would feed them, but that's becoming a lot more homogenized and stabilized in recent years with a few exceptions. The dairy cows that you find in China are the same that you find here. In fact, China buys a lot of its dairy genetics from Canada.

NP: The which?

DH: Buys a lot of its dairy-cow genetics—the semen and the embryos—from Canada. They buy the heifers too. They take the young cows over that are going to go into the breeding herd in China. So the genetics have stabilized quite a bit. There's one exception to that, which I find interesting. China has a traditional type, what they call the yellow chicken. It's kind of like a broiler chicken, but it's a pretty scrawny looking broiler, and it takes about four or five times as long to grow this broiler as it does a typical North American broiler chicken. But they like it because it has a stronger taste, which is not surprising. It's a little bit older. It doesn't have quite the same dietary background as a broiler chicken here would be, so for certain types of cooking dishes, it has a much more intense flavour. So we were trying to use Canadian feed ingredients—I'm jumping ahead to my CIGI days now—but

we were trying to use Canadian feed ingredients, and to feed those chickens, we had to make a whole bunch of adjustments to get the performance that they wanted.

NP: Can you isolate--. Like you said, the lysine was an example. In another case, can you isolate what would have been the major component that would make the difference?

DH: Well, they were on a much lower energy diet. They were just growing a lot more slowly, so we could use some things that we wouldn't typically use here, like a lot more higher fibre type of diets. In fact, they could use a barley- or an oats-based diet quite effectively.

NP: And what do Canadian chickens eat mainly?

DH: It's mostly corn and wheat, with a little bit or barley. Barley, depending on the area, it's still being used, but I would say mostly wheat and to a certain extent corn are the primary ingredients.

NP: Okay. I won't get too much into that.

DH: Too much detail.

NP: No, no. I won't get into that detail because I want to get into that later, so just not to take you off track.

DH: Just still keeping on the Cargill type of thing?

NP: Yeah.

DH: I enjoyed my time there tremendously, especially when I moved into the nutrition position because I had a chance to meet all these people from all over the world and try to apply different things. The other thing I probably learned the most from them was related to how to approach nutrition. When I came out of university, it was more, "These are the requirements for nutrients that a certain animal has, and this is what you feed." The approach I learned at Cargill is that nothing is written in stone. Because there's a business, there's a profit curve associated. So sure, you can feed more nutrients to an animal, and they'll grow faster, but it comes up to a point where you get to their requirement level, and you're getting diminishing returns. They're not going to grow any faster, and so there's no point in putting any more of that nutrient in. That's kind of obvious. So the question is do you feed to that maximum growth rate? Or do you back yourself off a little bit lower down on the curve where you might not get 100 percent

growth that the animal is capable of doing, but you'll be able to produce that animal at a much lower cost because the profit curve pushes you down below the peak of it.

And so, when I was a nutritionist in Cargill setting nutrient specifications for the different feeds that we were feeding, that's something that I had to learn how to do. Learn what the market wanted in terms of performance, and then try and adjust the nutrient levels and the combination of ingredients to meet that profit optimized performance. That was a really, really valuable lesson. And actually, it was the recognition that we needed to know a lot more about that, that sent me back to university to do my PhD. And actually, my PhD was in broiler chickens on varying nutrient levels and looking at the response. More than that, I was looking at how to model that. I spent most of my time behind a computer when I was doing my PhD just putting in different equations for different growth functions and parameters and what the animals required, to vary that response. So that was a very valuable lesson I learned about how to optimize value from a business perspective.

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NP: Did that also include substitutions because we know sometimes things are successful, it might be a good barley year and sometimes it isn't. So when you're looking at the cost factors, could you--?

DH: Using different ingredients.

NP: Yeah, substitutions that are possible.

DH: Yeah. That's what I spend most of my career on, that very specific subject. Again, jumping ahead a bit when I was with both CIGI and the Canola Council, my job was to go to different markets around the world and say, "Well, why don't you try to use feed wheat instead of corn? Or why don't you try to use barley instead of corn? Or why don't you try to use canola meal instead of soybean meal?" These are often going to customers who had never used any of these ingredients. I'd like to say that there is no requirement--. An animal doesn't have a requirement for an ingredient. An animal has a requirement for nutrients. So any ingredient, if it's used appropriately, can supply nutrients to meet that animals' requirements. Then it becomes a factor of cost. So it's all about deciding what combination of ingredients, what substitutions can you make to provide the level of performance that they expect that animal to have at the most economical feeding program.

NP: Your position or your time with Cargill—both the very short time out in the field and then the more nutrition field—can you think back to what the greatest challenge was that you faced there? Did you have your chicken BSE [Bovine Spongiform Encephalopathy] event or--? [Laughs]

DH: No, we didn't. I can't say that we had a major disease outbreak or anything like that. I think one of the--. We did have a swine contracting program within Cargill, and Cargill would contract with farmers to supply them feed and also supply them breeding stock, breeding animals, and even helped market the pigs. Then the farmers themselves would grow the pigs. So every now and then there were maybe differences between the expectations that the farmers had and the type of feed that we would be selling them. But I think that was as much of just an awareness and education thing as much as anything else. It's a competitive industry, and so you've always got the competition trying to sell feed to the same people that you're selling to. But I mean, that's nothing new.

NP: Would there be a great deal of difference between the feed, or did it come down to they liked you better than the other guy and--?

DH: [Laughs] No, there were differences. Certainly, the personal touch is always important in marketing and sales with every feed business. Because they'd be buying feed from you every two weeks, so you have to make sure that you're providing good service. And as mentioned earlier, one of my advantages was the technical background that I had that I could go out and speak knowledgeably about what their situation was and what needed to happen to make improvements.

NP: So when you were working in Brandon, you said there was another person involved?

DH: Yeah, handled the south side.

NP: Was that person the same background as you?

DH: No. He came up through the system. He was good. He was more what you think of as a salesman. Very personable, and his approach would be to spend more time talking, conversing. And he got along really well with the beef farmers especially, because the beef guys didn't need a lot of technology. There you just put the cows out and they eat. So you supplied them with a certain amount of grain or a certain amount of basic combination. It wasn't as much of a technical approach. But his sales were better than mine. [Laughs] Well, he was there before me, and he also was a more effective salesman than I ever was in terms of relating to the customers. Not that I didn't do it okay, but he did it really well.

[0:25:43]

NP: Yeah. Did you see a shift over the time related to who they hired to do that type of job as time went on?

DH: Yes, very much so. Very much so, and it applies across the industry. It's not just Cargill. All the feed companies would want somebody with at least a bachelor's degree in agriculture and maybe even more—typically, more. A master's degree these days is required to effectively market feed because you do have to provide the technical support as well.

NP: Good. Any other comments that you'd like to make about that time with Cargill?

DH: Just that—it also applies to the time that I was with CIGI—but the livestock industry in Canada is very strong, and it became very strong based on the low cost of grain that we have here in the Prairies. The fact that we export most of our grain, and it has to go to Thunder Bay or to Vancouver, and it typically costs anywhere from \$30 or \$50 a tonne depending on where you're moving it to get it to an export position meant that the cost of the grain here on the Prairies at the source on the farm tends to be lower than other countries around the world, even in the States. Certainly, in Asia and in other countries where they are closer to being to a tidal water where they have the international price established. So that provided a tremendous advantage—and has provided a tremendous advantage—to the livestock industry, especially in western Canada, and really helped stimulate the export of beef and of pork to other countries around the world. [Telephone rings] And so the fact that it's a very economical place to raise animals, especially pigs and beef cows, it means that Canada has become a very strong exporter. And I think that's one of the driving factors behind trade in livestock products out of western Canada.

NP: So you decided to make a move. How did that come about?

DH: Yeah. Well, I went back to do my PhD.

NP: Right.

DH: And actually, that started in 1986.

NP: At the University of Manitoba?

DH: At the University of Manitoba. And the arrangement was that I would be a bit over halftime on my PhD—I think the original arrangement was actually 60-40—and then 40 percent of my time, I would still work for Cargill. In return, Cargill paid me half salary, and they also provided some funding to do the specific modelling research work that I was doing for a PhD. So I basically went in self-supporting into the PhD. I did that, but then just about a year before or six months before I finished, I sat down and had the conversation with Cargill about what comes next, and they wanted me to move to Minneapolis. I'd work out of their head

office. And at that time, I'd just met Karen a couple of years before—we had just gotten married, actually—and decided that we didn't want to move to Minneapolis. So I left Cargill and didn't have a job immediately, but about six months later, I went to work for CIGI, Canadian International Grains Institute. And I became their director of feed technology. I took over from Arnold Tremere. Do You know the name Arnold Tremere?

[0:30:11]

NP: I've heard the name, yes.

DH: Yeah. He passed away a few years ago, but he was the director of feed technology before me, and then he became executive director of CIGI. So I went in to fill his position at CIGI.

NP: So I'm going to just step back to your time at the university then.

DH: Yeah.

NP: Who were your advisors there? What kind of reputations did they have?

DH: Okay. My main advisor was Dr. Bill Gunter. He's a poultry nutritionist. I knew exactly what I wanted to do in this modelling and a little bit of experimental work with broiler chickens, so he was the obvious choice to be working with. Then fortunately, I had a couple of other people on my committee—or a few other people on my committee—that were really knowledgeable in the area of modelling and computers and statistics and the things that I wanted to focus on. One was Dr. Gary Crow, who's the beef geneticist in their Department of Animal Science. He was a statistical wiz. He taught me a lot. I learned a lot about statistics from him. Then another one was Dr. Niel Arneson. He was actually in the Department of Zoology. He wasn't in animal science. He came from zoology, but he was very much into modelling biological systems, animal systems. Then I had an external examiner from the University of Georgia, Gene Pesti, who is a fantastic guy. Tremendous amount of respect for him. It was some of his earlier research that gave me some guidance as to the type of things that I wanted to study. He had come up with his own model for broiler chickens, and I started to kind of work on that model, then I switched gears entirely and went to work more of a European-style model. But anyway, he was a tremendous advisor to all that work.

NP: And how was his last name spelled?

DH: Pesti, P-E-S-T-I.

NP: And how did you make contact with him, just by he was writing in the field and--?

DH: I met him at a conference, at a Poultry Science Association conference. It was in New Orleans. I was still a student. I was still in the early days of doing my PhD, and I had a poster where I did an experiment on feeding lysine and methionine into broilers and looking at these response curves. And he came up and read the paper, and I was there, and we talked and established a very good relationship after that. He provided a lot of very positive feedback on the work.

NP: And what was the difference between what he was doing and your eventual choice to move towards a more European system? How would you define the difference there?

DH: His was more of an empirical model, which means that you take data from experiments—like response curves—and derive equations from those response curves, and then plug them in and make a model around that. Whereas the Edinburgh model, which is what I used, was more of a mechanistic model rather than empirical. So it looked more at the biological processes that was happening inside the animal from more of a metabolic basis and more of a calculating chemical reactions, basically, in the animal, the quantities of nutrients required, amino acids required, and their efficiency of conversion to muscle protein and how the animal grows. There's a number of different equations. It's not the feeding experiments like the empirical models. It's more of a mechanistic approach, and that's the approach I ultimately settled on in my modelling because I thought it would have more widespread use in the long run. It would cover a wider variety of situations than something that just derived on the empirical experiments.

NP: What would you say was your major recommendations that came out of your doctorate?

DH: Well, I think one of the practical recommendations was that if you feed quite high levels of lysine, you will get a lot more breast meat yield for a broiler chicken. The whole industry in broiler chickens, in North America especially, is centred around white meat, and that's what the restaurants want, and that's what the consumer wants. There seems to be a major preference for white over dark. Myself, I prefer dark, but in the industry, the consumer generally prefers white. And so, some of the experiments that we did showed that you could increase the proportion of white, like get a much bigger breast on the broiler chicken from feeding these higher levels of amino acids. And we verified that both with the experiments and with the models that that was probably the major accomplishment coming out of that. And so certainly, the industry is going to these levels of amino acids and even higher.

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NP: I've often wondered whether they need little braces for the chickens now to keep them from falling into their feed. [Laughing]

DH: Well, that's an issue, you know. They're bred to grow so quickly that their legs haven't kept up, and they're falling down on their legs all the time. They throw out--. It's call tibia dyschondroplasia. Effectively, their knee joint, it goes out to the side. I mean, breeding companies are working on improving that, getting better strength. There's a number of nutritional things that you can do that affect that knee joint, the tibia joint. It's an interesting technology in that regard.

NP: Well, I have a personal interest in that because my husband just broke his tibial plateau.

DH: Oh, no!

NP: And he's having trouble with sort of reestablishing his--.

DH: I'm not sure if I can offer him any suggestions for how to fix it. [Laughing]

NP: Just some lysine pills!

DH: I could maybe suggest how to prevent it in the first place. [Laughs]

NP: Yeah. Well, closing the crawl space door would have been the major advantage in the first place. [Laughs] Okay, so you moved to--.

DH: To CIGI.

NP: Yes. So if you can put yourself back when you were the newbie coming into it, what were your first thoughts about the Canadian International Grains Institute?

DH: I was so impressed. If you've talked to anybody else from CIGI, they're going to give you probably a very positive story about the strengths and benefits of that organization. They really are unique in the world of how they can represent the broad interests of the grain industry as an independent organization and provide that technical support and service to customers around the world. As you know, they have a flour mill. Have you been through their facilities?

NP: Yes, quite a while ago though.

DH: So the flour mill, the bakery, the noodle plant.

NP: One doctor—oh, what was his name?—was there, from Wildwood Park. Anyway. Williams. So that goes way back, right?

DH: Oh, not Phil Williams?

NP: Yeah. Or he's at the Research Lab.

DH: He was at the Grain Commission. He was at the Research Lab, yeah. Yeah, I worked with Phil Williams quite a bit, actually, on a number of projects. The fact that they would bring in customers from around the world and take them up to the flour mill or the noodle plant or the bakery and show them how Canadian wheat can be used to make flour, to make the bread, to make the noodles, in combination with whatever else they were doing. People would come in and have a hands-on experience. "Okay, well, let's twist this dial, or let's change that dial." It was a good technology transfer type of organization. From the feed side, they don't have any feed processing facilities there, so my job was a little different in how I approached it. I would end up doing feeding trials in different countries. I would send over canola meal or feed wheat or feed barley or feed peas to different countries and have them test it in their diets there in combination with what they were using.

There was one thing that we were able to do at CIGI, though, and it's an interesting story in that it related to shrimp feeding. You wouldn't necessarily think that a Canadian feed ingredient is going to be ideal for feeding shrimp in Southeast Asia, but it was one of the projects that I worked on very quickly after I got there. Recognizing that when you're feeding shrimp, they tend to be crawling along the bottom of these ponds. They're not actively swimming or anything like that. And so, the way you feed them, you throw the pellets into the water, they sink to the bottom, and then the shrimp come along and nibble away at the pellets. And it can take a couple hours for them to nibble through the whole pellet.

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Well, the technological challenge with that is how do you stop the pellet from falling apart and becoming mush in the water? Because if you were to take—and you can try the experiment yourself—if you take a hog feed or a chicken feed pellet and put it in a glass of water, I can guarantee you within ten minutes it would just fall apart. It would be mush at the bottom. And so, when you're feeding shrimp, you have to have a way of keeping that pellet firmly together. The solution is to tie it together with wheat gluten. It's the same thing that makes a loaf of bread rise. If you have a nice strong gluten content—which Canadian wheat does

have—and you get the yeast in the bread producing the gas bubbles, it helps the loaf rise, and you trap all those bubbles in. Well, if you apply gluten in the feed manufacturing and make a pellet, that same gluten which the proteins that tie it together can trap all the other components of the feed, all the other ingredients and nutrients, into this matrix. So if you squeeze it in your hand, you can probably press it, break it, with a certain amount of pressure, but hold it in the water, it's going to keep its in-tact state because it's held in this matrix of gluten.

So one of the things we wanted to do was test different types of wheat—if some wheats were better than others for shrimp feed—and we did some of that in the CIGI facilities. So they have a machine that measures something called a gluten index, which is a measure of how well the gluten in wheat can hold together. So we would make different types of shrimp feed. In fact, we worked with the fisheries laboratory out in west Vancouver. They actually pelleted the feeds for us using different types of wheat, then we brought them back into CIGI and tested them in water baths and just saw how long it took for the pellets to fall apart. We found that some of the best Canadian Red Spring wheats were better than any wheats in the world for holding these shrimp pellets together. So that was the information that we were able to take to customers around the world, and I visited a number of companies in Thailand and Indonesia and Philippines and China and places like that to talk about this technology. That's a kind of example of the type of services that CIGI was able to provide.

NP: Any other memorable visits? For example--.

DH: There was always the cultural--.

NP: We've talked to some people that went for other reasons, either from the Wheat Board or the Grain Commission, and they'd talk about the conditions in the countries and how that really had an impact on what you could sell or not sell, or even interacting with people. Do you have any other--?

DH: Well, I had the advantage and the pleasure to be able to go to many, many different countries. I've been to almost 50 different countries around the world, and probably about 30 of those would have been through my work with either CIGI or the Canola Council. So certainly, I've been in some places where conditions are challenging, are difficult. It was probably even more--. Like, my first trip to China, I think, was in 1991, which is quite a while ago now, I guess, 25 years ago—hard to think of that. But it was just starting to develop, and there was a lot of very basic conditions there. So I mean, you're definitely roughing it at times, and if you had a chance to get back into a nice hotel every now and then, you certainly would view that as a retreat as a way to get sane again from the day-to-day hustle and bustle.

NP: Did the interactions with the people, trying to interest them in things that were different from what they've done, did that always go smoothly?

[0:45:03]

DH: Not necessarily, because nobody--. Well, it depends how you do it. Nobody wants to be told what to do. The thing about CIGI it was always a very low-pressure type of sales. "These are the facts." You would never exclude facts. You would always say the good and the bad because nothing's ever perfect. You would always tend to speak very well of the competition too. And so if you follow those basic procedures, I think people would more or less go along with it. The situations were sometimes different. The one that just popped to my mind right now, one of the things about canola meal--. And when I was with CIGI, I was doing a lot of work on canola meal, and that really gave me a big introduction to the canola industry. I was in Indonesia, and we were doing some seminars on feeding canola meal. Well, one of the things about canola meal is that if you're feeding it to egg-laying chickens, it's fine. No problem if you're feeding it to an egg-layer that's producing a white shell. But if they're producing a brown-shelled egg, the genetics of those birds are a little different. They're lacking an enzyme that converts a substance called trimethylamine to trimethylamine oxide.

Trimethylamine comes from a couple of components in canola meal that are in fairly high levels. One is choline, and the other one is sinapine. The bird converts these to trimethylamine, and then converts them to trimethylamine oxide. Well, the trimethylamine is a volatile molecule, volatile compound. You can smell it. Trimethylamine oxide is a solid. It's very solid. So if you build up the trimethylamine from feeding a whole bunch of canola meal to the brown-egg layers, that aroma makes its way into the eggs. And trimethylamine is the same compound that makes fish smell like they're rotting. So you get fishy tasting eggs if you're feeding a lot of canola meal.

So I was all prepared at this seminar to give this whole story to the customers because I know they have a lot of brown-egg layers there, so they can only feed a certain amount. But then I went to breakfast in the hotel before we gave the seminar that morning, and I had eggs. And I tasted the eggs, and I said, "Boy, these eggs taste really funny." They tasted really fishy. But I know they're not feeding canola meal or rapeseed meal, which would cause this problem. Found out they're feeding about 15 percent fishmeal in those diets. So they'd been used to generations from having fishy-tasting eggs. So whatever I had to say about canola meal causing fishy-tasting eggs was totally irrelevant. They already had that problem. So that's the sort of thing, as an example, of the type of things you become aware of.

NP: And they didn't necessarily think of it as a problem.

DH: No, it wasn't a problem. They liked it.

NP: They probably tasted the other eggs and thought, "Something's missing here."

DH: They liked it, so they could feed as much canola meal as they wanted, and it would be totally fine. [Laughs]

NP: Hm! Interesting.

DH: Yeah. I remember I also had a McDonald's hamburger from there as well, and it also had a fishy flavour to it. That was back in the '90s when fishmeal was still relatively cheap, and it was very plentiful in Southeast Asia, and so they tended to feed a lot of it. They don't do that as much anymore.

NP: Mmhmm.

DH: You sure you don't want a cookie?

NP: Oh, I will! [Laughs]

DH: Help yourself.

NP: So when you were working at CIGI, what were the major challenges, changes, that were occurring over that time period?

DH: Well, there was always a balancing act between what the Wheat Board wanted and what the--. I mean, at that time, I would say there was a fair bit of conflict. It wasn't always the smoothest working relationship between the grain companies and the processors and the Wheat Board. So I would say when we were putting on courses to try to appeal to all sides, there was some competing interests at times.

[0:50:14]

NP: Can you give an example of a situation and why it would occur? I mean, obviously there's reasons behind it.

DH: Well, just--. Say I was doing a feed program where we bring in feed customers from around the world. The Wheat Board, obviously, has an interest in feed wheat sales and feed barley sales, and the canola industry has interests in canola sales, and Pulse

Canada has an interest in feed pea sales. The Dehy Association has an interest in dehydrated alfalfa. So the example would be just who gets space and who gets topics and who gets profiled—customer time. If I bring a customer in, do I really want the competition talking to them? There was that type of dynamic. I would say it was something that we just managed by having, “This is neutral ground, and everybody gets their shot at it, and that’s just the way it goes.”

NP: Trying to establish a fairness in the presentation.

DH: Yeah. And I don’t want to overstate it because I don’t think it was a huge problem. There was just the dynamic. But it’s like in any work situation. You’ve got competing interests.

NP: Now, am I correct in saying the Wheat Board was--. Was it the major contributor to the work?

DH: Oh, absolutely. Anything to do with the bakery and the flour mill and the noodle plant. Virtually every staff member other than myself was 100 percent devoted to the Wheat Board back at that time. I was the only one that had broader interests for the rest of the grain industry, and part of my job was to bring in money and interest and support from the canola industry and from the pulse industry and do programs for them. So that was maybe the only potential conflict at times, if the Wheat Board might have felt that there was too much emphasis being given to other organizations at the time. But I think that was just them looking out for themselves, so it was a totally natural and expected thing.

NP: Take me through how the genesis of interesting the industry in a project to the extent that you can get them to give you some money.

DH: [Laughs] Yeah, it’s all about money, isn’t it?

NP: Well.

DH: Some of the organizations didn’t have a lot. The best model was if you look at CIGI’s spending model, it was almost half and half. I believe it was 60 percent government, 40 percent Wheat Board, and that was the operating budget. And then if we did something over and above that, it was expected to get—for other than wheat and barley—it was expected to get money from the Canola Council or somewhere else. But it didn’t have to be 100 percent of the money. If it came in on that 60-40 relationship, some of the 60 percent government money that was going towards Wheat Board programs could now be applied to a Canola Council program or something else just to try and keep it as fair as possible. My job was basically to go out and work with all these organizations, and I did that by basically going to their meetings, sitting on their committees, like the research committee, the

market development committees. I was on those committees for both Pulse Canada and the Canola Council. At that time, they didn't have any in-house expertise on animal nutrition, so in effect, I was supplying that to them. So I was providing a service to them as well. It's a process that you built up over time. I wrote publications for both Pulse Canada and the Canola Council, provided support in a number of different areas. Does that get at--?

NP: Yeah. I'm looking puzzled because I'm just thinking, "Well, where do I go from here?" Just a rapid-fire list of the various organizations that provide ingredients into feed that you would have been involved in.

[0:55:05]

DH: The main ones at the time, I'll probably give them in order importance of exports, the volumes and the dollars attached. At that time, the big ones, I think, were feed barley and feed wheat. From the Wheat Board perspective, feed wheat was only--. Some years there weren't any exports in feed wheat, and other years we could export as much as 4 million, 5 million tonnes of feed wheat. The years like, I think, it was 1994/1995, the early frost, a lot of the milling wheat was just downgraded to feed, much more than the Canadian industry could ever use. So we had to find markets for it in different countries around the world. But that happens once every ten years.

NP: Before you go on then to go to the others, what is degraded in the product that takes it out of milling potential and puts it into feed?

DH: It's degraded for a number of reasons. For one, the starch content seems to be a lot lower, and that means the flour yield will be a lot lower. If it's sprouted, you'll have some quality characteristics in how well the gluten performs. So there's just a whole number of quality related factors that will downgrade it from milling quality down to feed quality. But we found some good markets for it. Korea loved it. We sold a lot of feed wheat to Korea. We sold a lot to Mexico. We sold it to maybe half a dozen countries around the world that were interested in buying it.

NP: What was it about Korea and Mexico that were particularly interested in it?

DH: Well, it's interesting. Korea, because they could buy it cheap. It's interesting. Korea, of all the countries in Asia—and I did the comparison one time—they import all their ingredients because they don't grow anything locally, but they're like Japan or Taiwan or many of the other countries in the region. They have to import a lot of ingredients. If you just looked at the cost of, say, a tonne of hog feed, pig feed, in Korea, it would always be \$10 or \$20 per tonne lower than any of the other countries in the region. Lower than Japan, lower than Taiwan, lower than the Philippines. Same pigs, but they could always do it better because the Koreans were

probably—and maybe they still are—the best of any country I’ve seen about challenging the notions of animal nutrition, being willing to use lower quality ingredients effectively. Effectively is the key because they still have to get the animal performance. There’s expectations on that side, but they were always able to use more feed wheat, more cassava, more rapeseed meal than any of their competing countries in the region because they just—. And it was based on knowledge. They just have very good research. But it’s their approach to try and always save money that was driving it.

NP: And Mexico?

DH: And Mexico, it was as much a quality issue. They were selling a lot of their pork into Japan, the part of Mexico that we were selling it into, which is in Sonora up in the northwest side, up against Arizona, California. They’re big into hog production. They have a little bit of local wheat production, which they were using for feeding, but they sold it to Japan, and Japan has very rigid quality requirements for their pork there. You’ve probably heard the whole discussion about soft fat and yellow fat in pork?

NP: Mm-mm. No.

DH: Or barley-fed pork or barley-fed beef?

NP: No.

DH: Okay. Well, around the world, the most common feed ingredient for feeding animals is corn in terms of a grain. But in Japan, they’ve historically used barley and wheat. They haven’t grown much corn. And over time, the Japanese consumer has developed a taste for pork and beef with a very white fat and a very firm fat, like their wagyu beef which everybody talks about. It’s got a lot of fat in it, but it’s very white and very firm. They don’t feed corn to those beef cows. They don’t feed corn to the pigs in Japan because if they did, they would get a yellow fat, and it would be softer because corn oil is a very fluid-y oil. Corn has more oil than wheat or barley does. And so, because the Japanese consumer wanted a firm and white fat in their pork, and Mexico needed to export that pork to Japan, they had to use wheat and barley as ingredients rather than corn. So that’s why Mexico is buying wheat from Canada to go into pigs they’re growing in Mexico, then the pork would then be shipped to Japan.

[1:00:44]

In fact, one trip I was down there in Mexico. We were visiting the local pork producer’s association to talk about the benefits of using barley and wheat. This was in their early days before they started buying much in the pork production. And it just so happened that there was two of their Japanese customers in town at the same time, and they had that very same day been telling

their Mexican supplier, “Feed more barley and wheat to your pigs because that gives the type of quality we want.” Well, we showed up later on the same day saying, “Here we have barley and wheat to sell to Mexico,” and that helped the situation. It was a-

NP: Serendipity!

DH: Yes, serendipity. Well, good ideas do eventually come together.

NP: Yeah. Yeah. The move then--. Unless, is there anything else that you would like to say?

DH: With CIGI?

NP: Yeah.

DH: Oh, I mean, I could go on forever, but I think that probably covers--.

NP: The major highlights?

DH: Yeah. I just had tremendous respect for CIGI as an organization. You don’t find many organizations with that level of independence and professionalism in the agriculture industry, providing technical support.

NP: I don’t know if you’re able to answer this question, but with the changes in the Wheat Board—which would have been a major funder for it—what implications does that have?

DH: Oh, it has had big implications. This has been after my time because I left in 2002. But yeah, they’ve had to find alternative sources of funding. I mean, the government, they recognized that the Wheat Board funding was gone, and so the government provided some interim funding to get them through that transition period. The new funding model is to have money coming from the wheat check-off system. In a sense, rather than the wheat going to the Wheat Board and then the Wheat Board paying a certain amount of cash, the farmer check-off money goes through, I think, the Western Grain Stabilization or--. I can’t remember the name of the organization now, but anyway, they supply a certain amount of money to CIGI. I think what it has meant is that CIGI is doing a lot more wheat and barley funding because that’s where most of the money is now coming from. They do a little bit for pulses. I know that. Maybe Linda Malcolmson talked about that a bit because that was part of her role at CIGI. She was to look

after the pulse research side. But I think that's probably about the main change. They're an organization in transition. To the best of my knowledge, they're still finding themselves as to what the future is going to be best for them in terms of funding.

NP: Who would have taken over?

DH: Who's in charge of CIGI now?

NP: No. Who would have taken over--. As you said, the emphasis might be more towards wheat and barley because that's where the check-off is, or at least wheat.

DH: Yeah. Well, what happened with canola--.

NP: So what happened--.

DH: Is that when I went to the Canola Council? I basically took the CIGI expertise with me because I was the CIGI expertise. So the Canola Council did a lot more of that type of work in-house at the Canola Council rather than through CIGI. We still did some. You've probably heard the name Rex Newkirk?

NP: No.

DH: Okay. He took over from me. He was the director of feed technology when I left.

NP: How is that spelled?

DH: N-E-W-K-I-R-K. Rex Newkirk.

NP: Okay.

[1:05:00]

DH: He's not with them anymore. He's moved over to the University of Saskatchewan now. But anyway, he was doing a fair bit of the non-Wheat Board work, like the pulse work, and I gave him a fair bit of the canola work to do too because I was moving more into the management side for all canola utilization, and some of the stuff was better for Rex to do.

NP: Is there anybody doing that now then?

DH: No.

NP: Anybody replace Rex?

DH: Nobody has--. He hasn't been replaced. No. they're not doing anywhere near as much feed stuff now for a number of reasons. Barley exports from Canada have gone way down. Feed wheat exports have gone way down. And canola meal exports have gone up, but that's mostly handled through expertise of the Canola Council, because the Canola Council, after me and even before I left, we hired somebody to look specifically after canola meal at the Canola Council.

NP: Now you made a change. What attracted you to make the change from CIGI to the Canola Council?

DH: Okay. It was a couple of things. One, when Arnold Tremere retired, I applied for his job. I didn't get it, so I got ticked off, and that was one of the reasons for leaving. Again, serendipitously, there was change at the Canola Council. They wanted to revamp things, and they wanted somebody like me to come in and look after all their research and market development side of the equation.

NP: Now as you look back on this, having retired and being able to see--.

DH: The bigger picture.

NP: The broader picture. What are the pluses and minuses of having research done through the government—which is supposed to be trying to accomplish a balancing act—versus the various producer organizations doing it? So pros and cons.

DH: Okay. Yeah, the whole research side is quite complicated, as I'm sure you've gathered through your interviews. There's a place for everybody in the system. My own bias is more towards the industry itself conducting the research. And I'll use canola as a good example of that from a number of different aspects. Canola itself was invented or developed by Keith Downey and Baldur Stefansson back in the 1970s, and to all intents and purposes, that was government research. It was at the University of Manitoba in the case of Baldur Stefansson, but it was at the Ag Canada research station in Saskatoon in the case of Keith Downey. But in both cases, it was a government-driven improvement to the industry. So I can't at all discount the benefits of that very fundamental and basic research. I'm not sure if private industry would have come up with that on their own. They probably would have, but maybe not quite as quickly as it happened.

Since that time, again using the case of canola, the amount of government research has gone steadily down, and that's across the board—the breeding research, the agronomic research, the disease resistance research, the molecular genomics type research. The government role has been going steadily down, and the influence of the private companies via a Bayer, a Monsanto, a Dow, a Pioneer, any number of them, has gone steadily up. So the government itself doesn't do any--. I can't recall the last time they released a new canola variety, whereas wheat and barley varieties, they're still doing that. But they haven't released a canola variety in over ten years or maybe even longer. They still do a little bit of agronomic research, but not a great deal. Most of it's being handled by the private companies.

[1:09:53]

At the same time, since that has happened, the development of canola as a crop has improved exponentially. It's doubled the yields, much better disease resistance, much better stability, consistency, than it ever was back in the early days of canola. The very expensive technology that was applied, such as introducing herbicide tolerance so that it's Roundup ready or LibertyLink ready, or introducing—, which improves a whole bunch of things in terms of a farmer's ability to grow the crop successfully, weed-free, good yields, clean crop, as well as high yields, which largely came around as a result of hybridization. They're all hybrid varieties where it's not like the naturally pollinated crop anymore. They designed hybrid links to get the best genetics from the male and the female side—improved the yield tremendously. And that is the main reason why canola has become such a successful crop for Canadian agriculture, why it is the number one most valuable crop. It's that blend of--. It's primarily the breeding company technology. I believe quite strongly. There's been strong demand forces in the marketplace, like the demand for a healthy oil, demand for canola meal. So there's a demand for the products, but having the farmers being able to produce it profitably, probably the most profitably, is the driving force behind the success of the canola industry.

NP: Now, I obviously don't know anything about this, and my question will prove that. So you were talking about the type of development of new strains and so on. How does that fit in with genetic modification? Is it the same thing under a different name or is--?

DH: Half of it is because the herbicide tolerance trait where you can spray a field of canola with Roundup and it'll kill everything except the canola, that tolerance to the Roundup that the canola plant has was introduced by genetic modification. They brought in a gene from elsewhere, introduced it to the plant. So that's why canola is GM. The herbicide tolerance is GM technology. The hybridization is not. That's just a natural breeding program. There's a number of different hybridization programs. You'll find them in a whole bunch of crops. That's more of the yield side of the equation.

NP: And how would that compare to just the normal way or the earlier way of--?

DH: Growing canola?

NP: Of going out and getting the plants that show the best promise and interbreeding them.

DH: Well, they still do that. That's still a big part of the breeding program where they go out and pick the plants with the best characteristics, both disease resistance, stability under a variety of weather conditions—a whole number of factors that they look for. That's just natural selection. That hasn't changed, in effect, at all. It's a little bit--. They're not introducing genes from any of those things. It's all just selecting for the right varieties. The only thing that came in GM was the herbicide tolerance. The overall process itself is still fundamentally the same, and the herbicide tolerance, that was introduced in the mid-1990s, and that was the last time a new GM event was introduced to the canola crop. All the other improvements—and there have been a lot of them—since that time have been through things like hybridization.

NP: Now, so is there the three levels? There's the traditional selection that you mentioned. Is that actually a name for that type of product improvement? And then there's the hybridization, and then there's the genetic modification. Are they three different processes? Or the hybridization--.

DH: They go along side by side.

NP: I can understand the genetic modification, but the other two, I guess--.

DH: Well, it's very similar actually, just normal selection and hybridization. It's basically two parts of the same system.

[1:15:02]

NP: And what is it about the hybridization that led to rapid and pretty major improvements?

DH: Well, when you talk about hybridization, you're talking about hybrid bigger is that when you have two totally different parents, you put them together, sometimes the offspring is much better than either of the two originals. It's not two plus two. It can be a two times two. It's like in our case, our daughters are smarter than either my wife or myself. [Laughing]

NP: And it's not just that they think they are?

DH: No, no. [Laughing] They are. They are. So it's that type of improvement.

NP: Yeah. And how much of that sort of speeding up the system, if any, could be laid at the feet of just being able to identify genes now so much more quickly than--?

DH: That's exactly the case. They've got the analytical technology to look for genes, and so they know specifically what they can select for. It's not just what they can observe that looks good. It's they grew this thing. They measured it in the lab. It's got a high level of this gene expression. That's why we're going to select it. But it's still the same natural selection process, it's just done with a much better degree of technology. That's a good way of explaining it.

NP: And since we've entered into the field of genetic modification, did you want to comment on that at all? On that strange--.

DH: I'm a scientist. I approach everything from a science-based perspective, and as long as the science is sound, I support it. In the case of GM technology, the science to date has shown that it is safe and effective. There may be some environmental concerns on some specific things which we don't know completely yet, but in the case of genetically modified products, I'm pretty comfortable with the safety. I mean, the government does--. And research, you have to trust the science. They're not going to—despite what some people think—they're not going to intentionally mislead. And just thinking, we have over seven billion people in the world now. We need GM technology to feed the world and to do it sustainably. You can't do it any other way. There's going to be a lot more starvation and a lot of people going without GM technology.

NP: And of course, it's a political issue too.

DH: It's political. It's a philosophical issue. I've always thought that it's--. People can be against GM for very valid reasons which are more philosophical than factual. It's like people that have a strong belief in one type of religion or another. It's a philosophical-- . And as long as--. And that's why we have separation of Church and State. As long as you're not affecting what everybody else does, then you can believe whatever you want to believe. I think that's where it stands right now.

NP: The other thing, since we're on these more broad issues, is the issue of being able to patent seeds.

DH: Mmhhh. Patent gene technology. Yeah, I'm conflicted on that one because I actually still do some work for a company that's involved. One of the breeding companies is doing some patent work. Personally--. And I can recognize the need to give patents to companies to protect their intellectual property. They're the ones who have invested millions of dollars into some of these

advancements. At the same time, I think we have to be very careful about what is patented and what isn't. I think that's where the whole patent discussion in agriculture currently is. Is anything patentable as long as the company has touched it? Or does it have to have a more fundamental difference? How do you separate what's out there in the natural world versus what a specific company has done and should be patented? I think for a while there, the pendulum was swinging to anybody who applied for a patent got a patent, and it may now be swinging back towards you have to demonstrate that it's something that you have done, and you can't go out and patent the broad spectrum of genetic diversity. So my philosophical approach is to be very, very cautious about giving patents to certain types of things.

[1:20:26]

NP: Is there the infrastructure in place to--. Because these things happen outside, in many instances, outside of a regulated system, and it's only after the fact that people think, "Oh gee, maybe we should have worried about this."

DH: Should have worried about that. Yeah, retrospect is great.

NP: Is there any movement that you know on that part to recognize some of the possible misuses of--?

DH: Yeah, I can't cite specific examples or organizations. I just think in the courts itself. In the patent courts themselves, there's been maybe a greater level of caution about patenting willy-nilly. I hope that's the case anyway.

NP: Yeah. And as far as the producers are concerned because I'm only bringing up things that sort of have made it to the popular press--. So a drift of a seed into a farmer's field, and then the farmer's sued for growing. Any comments on those from a more knowledgeable base than mine?

DH: Well, there's ways to control it, and I mean, there are more knowledgeable people than me working in that. In fact, I know Keith Downey, one of the fathers of canola, his consulting business, he spends a lot of time working with the companies on helping them work with farmers to avoid and correct these genetic drifts. Because certainly, if you were spraying Roundup on a field and it drifted over to a neighbour's field that didn't have any Roundup resistance or tolerance, then those plants would die. So you've got to be careful about that sort of stuff, but there's ways to get around that. And the even more fundamental question, like what about canola? Say you've got some Roundup-tolerant canola, and it starts being grown somewhere else, and you want to get rid of it. Well, you can't spray it with Roundup because the plant is tolerant. It won't respond to Roundup. So you have to use--. But there's other herbicides you could use that would kill the plant. So there's ways of managing these accidental events where something gets where it shouldn't be. So far, I don't think we've run across a situation that's out of control.

NP: Are we in danger of something occurring or situations occurring similar to the conflict—that may not be the right word—but conflicts, say, in patented and not patented drugs and the cost to society, and in this case more limited to the farmers in having--.

DH: Yeah. I worry more about that in agriculture. [Laughs] I know with the trans-Pacific trade deal now they're talking about patent protection. Pharmaceuticals was a big part of that. I'm a little mistrustful of some of the Big Pharma companies and what they're trying to do. I don't think they're always working in the best interest of peoples' health.

NP: So the Canola Council, we sort of drifted off into--. [Laughing]

DH: Into the canola, yeah! Very unique organization.

NP: Yes. Tell me about it.

DH: Well, unlike any of the other commodity organizations, the whole value chain is in membership. So you've got farmers, the various farmer groups as members. You've got the grain companies. You've got the canola crushers. You've got the seed companies, the breeding companies. They're all members around the table, and that's highly unusual because around that table there's a lot of competing interests. The farmers tend to mistrust the grain companies.

[Audio pauses]

NP: It's on now.

[1:24:55]

DH: Okay. So just to finish up on the Canola Council structure. They're unique in that they have everybody in the industry, basically, around the table. That's not the same as it is with the Pulse Canada or the various other commodity associations, which tend to be more farmer focused. They've got farmer organizations, but they don't have the processors and the marketing companies and the grain companies there. So the advantage of the Canola Council structure is if you're trying to make a policy for the good of the industry, you've got everybody that can put their views forward. Whereas you tend to get more of a biased or a one-sided if you just have a limited membership.

The challenge, of course, is you have all these competing interests, and the farmers say, “Well, just pay me more, and I’ll grow it.” The crushers are saying, “Well, just grow more and maybe we’ll pay you. We just want more supply, and this is what we want.” The crushers say, “We want the canola,” and the exporters say, “No, we’ve got customers in China who want the canola.” So you’ve got a number of competing interests, so the only way an organization like that works is if people check their hat at the door and come in and agree to work for the best interests of the industry. And it hasn’t always been that way in the history of the Canola Council. I’ve been to meetings—especially some of the ones back in the ‘90s—where you’d have a meeting, and then the different groups would go off on their own and caucus and then come back with their position. It’s not a good way to do it.

So that was one of the things when I joined. They had a new president, Barb Isman. She joined at the same time. That was the rule that she laid down to all of them is that, “You are here as a board member representing not your company, but representing the industry.” So that’s one of the reasons the canola industry has been so successful in its growth is that it’s spoken with a common voice.

NP: And why do you think others haven’t followed suit? Is it oftentimes because there’s not the availability of the different players in one geographical area?

DH: Yeah. They’re trying, and I know the Special Crops have tried. Canadian Special Crops Association was a trade organization, all the different companies involved in marketing. Then they had each provincial grower organization that would grow special crops or pulse crops. It wasn’t until they formed Pulse Canada when they tried to bring them in together. But even there, it’s been with very limited success.

NP: It would seem to me too that the leadership of the organization would be critical.

DH: Oh, absolutely.

NP: In order to keep--.

DH: Yeah. And you need goodwill from everybody. I think one of the advantages canola had is that it’s an exciting crop. It’s great quality, great demand. Everybody wanted more production. That was in everybody’s best interests. So there was enough common ground, enough initiatives that had consensus, and that proceeded. And the way that it focused on research and focused on ways of making canola better as a product as opposed to the politics. So the Canola Council itself doesn’t get into transportation issues, doesn’t get into politics or grain policy issues. There’s another organization called the Canadian Canola Growers Association [CCGA] that tends to handle more of the political things.

NP: Maybe that's the group I was in touch with.

DH: CCGA?

NP: It might have been, now that you mention it.

DH: Rick White, was that the--? Yeah. That's who you talked to?

NP: Mmhmm.

DH: Yeah. Talk to him. He's a good guy. He knows his stuff too, so he could give you some perspective on some of their issues too.

NP: Would you say that you've already had a chance to answer these questions to your satisfaction? Have you covered the major changes that you've seen occurring over your time in the industry?

DH: I think so. Certainly, the changes have--. The industry has had to become more self-reliant. Overall, it's had less government support. With the Crow freight rate disappearing, that's forced industries to become better able to stand on their own two feet rather than relying on any government support system. Those were all good changes. We've had the strongest prosper. Like the canola--. I've been fortunate to be in industries that have been on the rise. It's a totally different situation, and I've seen a number of people where they're industries are in decline. And one of the things that I feel very lucky for is that I haven't had to face much of that. I've had to face a bit of it. With CIGI, there were some pressures because the Wheat Board was already trending down a little bit when I was still at CIGI. But overall, it's good to be part of a positive organization.

[1:30:48]

Although, when I first joined the Canola Council in 2002—I don't know if you remember that crop year—it was a bad crop, a real failure of the crop, and there wasn't a lot of canola produced. The Canola Council is entirely industry-sponsored. For its core funding, it gets money from a check-off system for exports and for crushing. So with a lot less revenue coming in, one of the first things we had to do was cut a bunch of programs and cut some research and breeding programs. I remember, I think I was on the job a month, and I had to call up Rachel Scarth at the University of Manitoba—she was a canola breeder—saying, “Sorry, we just don't have the money to continue to support you in the program.” That was a bit of a challenge when you have to make those sort

of decisions. But since that time, we went from 4 million tonnes up to 18 million tonnes type of things. It's been a tremendous growth.

NP: And one of the other changes is bringing canola crushing plants in the area.

DH: Yes. Canola started in the '70s, and it went up like that, and then it kind of plateaued in the '90s. And then some of these breeding developments, like the hybridization and the herbicide tolerance came in, and then it started to take off as profitability went way up. Plus, there was really strong demand for canola oil from the United States. There was a real strong drive to get rid of trans-fats, and canola oil fit into that solution really, really well. So tremendous demand, higher prices. The biodiesel effect in Europe, again higher prices for canola. That drove a lot of the profitability improvements that canola experienced. That caused pretty much all the crushers to decide, "Okay, we've got two crushing plants. Let's build a third. Or we've got three crushing plants. Let's build another one over here or let's double the size of this one." Yeah, so we almost doubled our crushing capacity in the last six or seven years, which has helped a lot.

NP: Any downside to increases in canola production?

DH: Well, you do run across some barriers in terms of crop rotations, and you still need to have a crop rotation system. You can't grow canola after canola because there is disease issues. So the standard recommendation is to grow canola one year in four. Well, nobody does that. They'll grow one year in three. Some of them grow one year in two, but that's inviting trouble. The breed companies are working on it to try and make the proper disease resistance and other things to get a more frequent rotation, but I think one in three is basically where we are right now. So we're kind of up against that limit. And so, the industry still wants to grow and still has potential to grow because the demand for the product is there and the crop is profitable. But for now, for the short term, I think the improvements are going to have to be continuing improvements on yield and maybe some of the quality characteristics so they can get the higher value.

NP: What diseases and pests are--?

DH: Oh, there's any number. There's black leg, club root, Scleractinia. There's a number of types of insects that--. I can't remember them all, and I'm not even going to try and list them because it's not something I would do justice with. But there's just a number of diseases and pests that have to be controlled.

[1:35:02]

NP: Are they all indigenous or have--?

DH: Oh, pretty much they're all indigenous, yeah. They've been here.

NP: Just looking for the chance to grab those nice little plants!

DH: Exactly, yeah, everybody likes canola, [Laughing] including the bugs.

NP: In your mind, what were the most significant events that happened during your time on the job? Covered that?

DH: I think we've more or less covered it. Anecdotally, I've talked about some of the things that--. I tend to think of these things as much in some specific projects that I've been able to work on that have been successful, and I think we've covered a number of those things.

NP: Good. So, I'm going to just ask a question that relates your experience to our ongoing project because in the letter you received, you'd noticed that we hope at some point--.

DH: Yeah, the project at Lakehead.

NP: To actually have a centre, and just recently we've made a connection with Science North, which is a group, provincial, major science facility in Sudbury, Ontario.

DH: Yes. You mentioned that they might have a satellite in Thunder Bay.

NP: Yes, might do something in Thunder Bay. That's why I really enjoyed listening to your thing about the shrimp and other experiments that you can do that brings life into the information. If we look at it from a historic perspective—because our main objective for going into the project was to preserve the history because we could just see it disappearing—what part of the history of the feed industry, not just canola, would you like to see represented in a centre such as that?

DH: There's some features of Canadian ingredients that are distinctly Canadian, that there is a Canadian identity to. Canola is the prime example of that because it was a crop invented in Canada. We're the world's largest producer. We're still leading the way of innovation. It's added tremendous profitability to Canadian agriculture. So I think there should be or could be a canola exhibit associated with that, and it could encompass both the oil and the meal because those are the two value propositions there. On the

feed side, again, I think the feed wheat and feed barley story—especially the feed barley story—is a product that has been accepted around the world. Canadian barley goes into the weirdest sort of places. Saudi Arabia was one of our largest customers there for many years. In fact, they still buy barley, and that was mainly to feed their sheep. They'd have the Bedouins, which were the--. The Saudi ruling family, they all come from the Bedouin nomadic existence, so there's always been very strong support for that portion of the population. It's hard to grow things in Saudi Arabia. And they traditionally have these sheep, but what are they going to feed on? So they bring in barley at a subsidized rate to the Bedouins to feed, and Canadian barley has been a big part of that over the years. But Canadian barley has also gone into Japan for feeding wagyu beef. It's gone into California for feeding dairy cows. It goes all over the place.

NP: Now, what is it about Canadian barley? Is that a--.

DH: Well, we're just one of the world's largest suppliers.

NP: Okay. A lot of the others are--?

DH: Well, Australia is a supplier of barley as well, and they also export into some of these same markets, but Canada has traditionally had that role. It's one of the crops that have been under pressure recently because barley is not the most profitable crop for the Canadian farmer to grow anymore. Canola is. [Laughs] So there is--. And we also have a very strong malting barley story. Some of the best malting barley in the world comes from Canada. That stimulated a lot of the initial barley production. But both the feed and malting barley industries are under pressure from profitability. They need some better varieties.

NP: And who would do the work do you think?

DH: Well, this goes back to--. It's been a lot of the government labs, and they haven't been as well funded or as well supported. They're not making the big improvements that, say, canola has made on the breeding side. The same thing applies to wheat too. That's what I see as one of the main challenges going forward is getting some of the really good genetics into the other important crops in Canada like wheat and barley.

[1:40:34]

NP: So transferring canola's success into research.

DH: And it doesn't have to be GM. I mean, there's been talk of putting some of the herbicide tolerant traits into wheat and barley, but a lot of resistance because it's hard to get a new trait approved. But you can introduce some of the other genetics, and hopefully the system evolves. This is not something that only I'm aware of. This is a whole bunch of very smart people that are working that recognize the problem, and so hopefully the companies will get involved and develop the right varieties.

NP: And looking at the model of the Canola Council--.

DH: Yeah. They're trying to have that integration, that vertical integration, across the different parts of the value chain as part of their organizations. I think when the Wheat Board was here--. I mean, all in all, I'm a Wheat Board supporter. I always have been. I think they've been a very good organization, and I was sad to see them go. One of the things, though, that may happen with them not being there is that the private companies will have to take a greater role in some of the research and market development side. They can be represented on some of these industry organizations. So I think there is an opportunity to restructure the wheat and barley organizations in Canada away from just producer organizations towards more vertically integrated value chain organizations.

NP: What would you say you were most proud of when you look back at your career?

DH: Well, I certainly enjoyed all the interaction. I think I can look back at almost all three places that I worked and identify one thing that I'm really proud of at each of them. For Cargill, it was the work that led into my modelling work, the work with the lysine and the broiler chickens that led to some of the improvements, I think, in feeding broiler chickens. And that carried into the modelling work which I did at university which I just loved. I absolutely loved going back for my PhD. I did stuff that I never imagined that I'd be doing. I came out of it with a really, really good understanding of statistics. I hated statistics as an undergrad. I didn't do well in the courses at all. But then I had to learn it, and Gary Crow, who was the prof at University of Manitoba Animal Science, he--. I had one course I was the only student. It was just basically a conversation between the two of us, and he would give me projects, and I didn't know where he was coming from part of the time. But looking back on it, he knew exactly what I needed to know and was giving me the right sort of guidance to learn on my own. I would say, "I don't understand. I can't do that." "Well, go back and think about it some more."

Eventually, with statistics, the lightbulb clicked on, and I started thinking about it from a whole different aspect. I know for quite a bit of time after that, I started thinking about almost everything in terms of statistics. Like I would be out camping and canoeing and stuff, and I'd be thinking about regression analysis, and what were the different independent variables that I should be putting in, and how would I weight them, and all that sort of stuff. It just changed my whole approach to thinking of things. So that was a good experience.

At CIGI, there was a whole variety of things. I certainly liked the work we did with the shrimp and the gluten index. I think that was a good research advancement. But I mean, we did a lot of canola meal work. I basically wrote the books on canola meal for the feed industry. I put out two or three editions when I was at the Canola Council, or while I was at CIGI. I think that really helped a lot of feed trials and things like that. With the Canola Council, probably, again, a lot of things. It's a very export-oriented industry. The work I did with feeding canola meal to dairy cows, I think, was probably the main accomplishment. You might not have heard of it, but feeding canola meal actually increases milk production when you--.

[1:45:30]

NP: 20 percent, I think, I read.

DH: Oh, you have heard of it! [Laughing] Well, the phrase I think of is one litre more milk per cow per day if you feed canola meal, and I was the one that came up with that. I was the one that basically--. And again, it was an offshoot of my statistics that I learned at university. I went and looked at all the research trials that had been done on feeding canola meal to dairy cows, and I put them together in a meta-analysis, and nobody had done that. So that's when I pulled together 30 different studies going way back to the '70s when canola was first developed up until the '90s when I first started doing this work, and showed, yeah, one litre more milk per cow per day. So getting that message out in publications and meetings and stuff like that, establishing research programs to get it verified, that's probably the most impactful thing that I did at the Canola Council.

NP: Good.

DH: Because it's a huge part of the industry. Over half of the canola meal that's exported from Canada goes to California to feed to dairy cows. It's about 800 or 900,000 tonnes per year just going--. No, my mistakes. That's what it used to be. Currently, it's around about 1.5, 1.6 million tonnes of canola meal leaving Canada just to go to California. There's a number of other states that also feed it to dairy cows, but California is the big one.

NP: You've even, I think, made your way to Thunder Bay because where we have our camp out on Lake Superior, in order to get there, we go through something called the Slate River Valley.

DH: And there are some dairy farms there.

NP: And there are dairy farms there, and for the first time this year, I saw canola fields.

DH: Huh! Really?

NP: Yes.

DH: Well, I'll have to tell you, they've been consuming canola in those dairy operations for years. When I was a nutritionist for Cargill—this goes back into the 1980s—they had a dealer down in Thunder Bay, and every week the Cargill feed mill in Winnipeg, in St. Boniface, would ship a couple of railcars, several railcars, of dairy feed down to the dairy farms in Thunder Bay. And there's a real pocket there. I was formulating the diets, and believe me, there was canola meal going into those diets. So dairy cows in Thunder Bay have been consuming canola meal for many years now. [Laughing]

NP: Besides the nutritional connection and the fact that their cows can eat homegrown canola, the beauty of the flowering canola against the green mountains is just gorgeous. [Laughing]

DH: Oh, it's nice, isn't it? It's a gorgeous crop.

NP: It is a very nice crop. Any questions I should have asked that I didn't?

DH: No, I think we've pretty much covered it.

NP: I have a question about if we do have success with moving forward with the science centre aspect, can I call upon you?

DH: Oh, yeah. Sure. For some suggestions or advice on how to set things up.

NP: Yeah.

DH: Or if you need contacts even.

NP: Exactly.

DH: Yeah.

NP: That would be wonderful.

DH: No problem at all.

NP: Yeah. I'm going to end this off with my great thanks. I'm so glad that Linda gave me your name.

DH: Oh, it's been a pleasure, Nancy.

NP: It's been wonderful. I just now have to take your photograph before I forget.

DH: Oh, okay.

NP: So, thank you.

End of interview.