

He served 29 years on the editorial board of Avian Diseases. Upon retirement in 2004 he was awarded emeritus status by the CFIA. Diversions have included: increasing proficiency in French and Spanish, gardening, bee-keeping and cross-country skiing. Lloyd and his wife Marilyn are parents of 5 children and have 20 grandchildren. Church and other activities that support families have always been priorities.

Introduction.

It is quite common in the biographies of those who have had enjoyable careers to find expressions suggesting “I was in the right place at the right time” and that has been my experience. Of course, along the way there was enough of worry, errors, frustration and disappointment to ensure a real work experience but thankfully, I have received the guidance and support I needed from the right kind of people to help me succeed. I particularly acknowledge the contribution of dedicated technicians, too many to name, who came to me with knowledge, skills and interest to do the work we have reported. They became friends and were a pleasure to work with.

The Early Years.

I was born on May 9, 1938 and raised in the small town of Magrath, Alberta, Canada. My parents were born in Utah and were babies when in 1899, they were brought with their families to Canada and to the arid prairies of southern Alberta where there was an interest in building an irrigation system to improve agricultural prospects. Many members of The Church of Jesus Christ of Latter-day Saints (Mormons), located in Utah, were encouraged to go to Canada to work on this project. The canal that my ancestors helped to dig, served its original purpose and is now a place of beauty and a wild life habitat in my hometown. In my childhood, the 2nd World War was raging and many from our town, including two of my uncles, were involved in the conflict in Europe. Towards the end of the war, German prisoners were sent to Alberta to work on farms. They wore blue coveralls with a big red patch on the back and a red stripe down each leg. As explained in the town history, these were not “the cast iron Nazis”. Some of these prisoners helped my father, who was putting a basement under our house. We enjoyed these men and felt comfortable with them. I was 7 years old when the war ended and our experience with these prisoners gave me a different perspective on the war.

My father was a farmer and while it was a struggle to make a living, he loved his work that included growing sugar beets for 43 years, raising sheep and feeding cattle. Mother worked hard at home and made our home life a joyful experience. I had an older sister and brother and our parents did all they could to encourage us to get a good education. My mother loved good literature and tried to motivate us with little quotes from the scriptures and other great authors. For example, I often heard parts of a poem by Edgar A. Guest that goes - “You are the person that has to decide, whether you'll do it or toss it aside - Whether you'll try for the goal that's afar, or just be contented to stay where you are.”

We had a small flock of chickens in our backyard and a mother hen with her baby chicks was an enjoyable part of springtime. When I was about 10, we purchased 50 Rhode Island Red baby cockerels from a hatchery and it was my project to raise them. It was

also my chore to drive two milk cows to and from a pasture that was on our nearby farm. I did this riding my pony with our dog trailing behind. When I was 13 years old I joined a 4H beef calf club and raised and showed a calf each year for 5 years. I enjoyed the activity and had some success in cattle judging competitions. In my early teenage years, I delivered the Lethbridge Herald, the newspaper of Southern Alberta. Big news items included the headline in 1952 - "THE KING IS DEAD." I think each letter in that headline was at least an inch high. Another big news item in 1952 was the outbreak of "Foot and Mouth Disease" in Canada. An exciting news item in 1954 was the announcement that Roger Bannister had made history by running the mile in a fraction of a second less than 4 minutes (he recently died, 2018). During my High School years I was fortunate to work on Saturdays and during the summer in the grocery department of my uncles store. My father could have used more of my help on the farm but my parents were anxious that I save all that I could to further my education. I was also active in the Boy Scouts and became a Queen Scout. In 1955 I travelled by train with a large group of scouts from Alberta to Niagra-on-the-Lake to participate in the 10th World Scout Jamboree. That was my first trip to Ontario and I was favorably impressed with all the trees and greenery.

I feel that some of the books I read influenced my career path. When I was very young I read a little book about an animal doctor and that stimulated my interest. In my last year of High School, the school board conducted a survey and we were asked to write down our first and second career choices. For my first choice I wrote "veterinarian" but since I didn't really have a second choice, I wrote "cowboy". When the school principal saw what I had written for a second choice, he was not amused. He sternly said "Spencer, can't you be serious for once in your life?" Years later, after I had completed my studies and was employed, I was in Alberta and met my old school principal. I reminded him of his concerns with my career choices. He was pleased and congratulated me on what I had achieved.

College Years

After High School I spent one year in an Arts and Science program at the University of Alberta in Edmonton. While at the university I completed an aptitude test that was to suggest a suitable career path. A counsellor interpreted my responses and suggested I might want to work in a store. I let him know "I have been there and done that." I explained that I was interested in a career in veterinary medicine and he encouraged me to follow my plan. In September of 1957, I enrolled in what was then a five year program at the Ontario Veterinary College (OVC) in Guelph, Ontario. At that time, OVC was the only English speaking veterinary college in Canada. Thus, our class included students from across the country. From the beginning, my hope was to have a career in research. Again, I think I was influenced by a book I had read in my youth about the research career of George Washington Carver.

I enjoyed my class mates and the courses but at the end of my first year at OVC, I left for two years to serve as a missionary for The Church of Jesus Christ of Latter-day Saints in Missouri, Kansas, Arkansas and Oklahoma. My mission was a wonderful experience and gave me an opportunity to study, reflect and talk to many people about things that are

really important in life. As for scenery in that part of the country, I particularly enjoyed the Ozark mountains. In 1960, I enrolled in the second year at OVC and a year later I married my sweetheart Marilyn Orr, the lovely girl I had corresponded with for 3 years, by slow mail.. She has willingly made our home wherever my schooling or work has taken us.

At the end of the 3rd year, I was fortunate to get summer employment working in the poultry diseases diagnostic laboratory at OVC. By far, the biggest disease problem encountered was what was known as the “avian leukosis complex.” I worked with two other class mates and we did a complete postmortem on every bird submitted and recorded our findings as neural leukosis, muscle leukosis, visceral leukosis, osteopetrosis, etc. We informed the owners that there was nothing they could do to prevent the disease and there was no treatment that would help. I asked our professor, Dr. Art Ferguson, if research was being done to control the disease and he told me that a laboratory in Michigan had been studying it for at least 20 years (that was the Regional Poultry Research Laboratory in East Lansing, Michigan where I would go 13 years later to do research on avian leukosis).

Veterinary Employment

In the summer of 1963, I worked in a veterinary clinic in Prince Albert, Saskatchewan. Most of the work was with large animals but if anyone submitted a sick or dead chicken, I was charged with the responsibility of making a diagnosis. I saw some diseases like avian tuberculosis and vitamin A deficiency that are rarely seen in commercial poultry.

My interest in research on infectious diseases was kindled by reading Selman A. Waksman's book “My Life with Microbes” and in my final year at OVC, I spoke with a few professors about the possibility of graduate studies. However, it was when looking through a file of job opportunities that I found a letter written by Dr. P.P. Levine, advertising a teaching assistantship in the Department of Avian Diseases at Cornell University. This opportunity really appealed to me, even though I had not previously considered a career in poultry diseases. My wife was supportive and I wrote a letter to Dr. Levine requesting that he consider my application. As few veterinary students showed an interest in poultry diseases, I wondered if I would find many associates with a common interest. Thus, it has been a real pleasure for me to participate with so many in the American Association of Avian Pathologists (AAAP) and the World Veterinary Poultry Association (WVPA).

Ph.D. Program at Cornell University

When I started graduate studies at Cornell in 1964, I soon realized that I was in the right place at the right time. Dr. Richard (Dick) Witter had held the department's only assistantship for four years. He was graduating and had accepted a position at the Regional Poultry Research Laboratory in East Lansing, Michigan. Thus, if I had graduated 2 years earlier, the position would not have been available.

Soon after I arrived, Dr. Levine, the Department Head, invited me into his office and asked what I would like to do for my graduate research project. I suggested the

possibility of doing something with Salmonella organisms (paratyphoids). He said they didn't have an active research program in that area and reminded me that I should work on something that would help me get employment when I graduated. He then gave me a ride in his car out to the research facilities on Snyder Hill and introduced me to Dr. Bruce Calnek. Immediately Dr. Calnek made it clear that he wished to be called "Bruce". In Bruce's biography, prepared for the AAAP, he mentions he was born in the shadow of the Hill Cumorah, a landmark important to Mormons. When he learned that I am a Mormon, he suggested I would be very familiar with his birthplace. He was right as Mormons believe that The Book of Mormon was translated from an ancient record taken from the Hill Cumorah that is located in Palmyra, New York.

Bruce's research was with avian tumor viruses and he explained that what had been known as the "avian leukosis complex" was at least two diseases - Marek's disease (MD) and lymphoid (or avian) leukosis. When I witnessed his enthusiasm and optimism, I felt confident that this could be an interesting and profitable field for research. Work was underway and the department already had a flock of White Leghorn chickens that were free of the avian leukosis viruses (ALVs). Losses from Marek's disease that occasionally occurred in that flock were evidence it was a different disease. As mentioned, Dick Witter was my predecessor and in his biography he mentions the primitive facilities for tissue culture that were available when he started his PhD research, just two years previously. Fortunately, when I started, we had good facilities and well established procedures for tissue culture.

On a calendar I was given for my office, I found a quote from Louis Pasteur that impressed me - "Chance favors only the prepared mind." My wise mother would have substituted "divine inspiration" for the word "chance". My contribution to research on Marek's disease at Cornell is mentioned in a book authored by Bruce W. Calnek entitled "A History of Avian Medicine at Cornell University 1898-2008. I quote: "One of the earliest projects addressed the need to store MDV-infected cells because the virus is so highly cell-associated. Intact viable tumor or blood cells were required to transmit infection. Dr. Lloyd Spencer, for his MS degree project, established methods for storing live infected cells in liquid nitrogen tanks. Later in his PhD project, Dr. Spencer developed fluorescent antibody reagents and techniques for detecting MDV-infected cells in tissues." Dr. Calnek then explained how my work had contributed to his and Dr. Hitchner's studies on virus localization in the feather follicle epithelium and had helped lay groundwork for understanding the pathogenesis of the disease. I will add a little more to the story. When I started this work, we really knew little about Marek's disease. Fluorescent antibody techniques were of interest to me but we needed serum with antibody against the virus. I studied up on methods for preparing what I hoped would be a suitable antigen and on methods for administering it to chickens. We then prepared conjugates for our tests with the serum from what we hoped were immunized chickens and from uninoculated controls. We first applied the conjugate prepared with serum from the "immunized chickens" to frozen sections of kidney and bursa of Fabricius. We were excited when we saw the fluorescence in the tissues from infected birds. However, when we tested the conjugate prepared with serum from uninoculated chickens, we got the same results. It was not anticipated that the chickens from our research facility would

have antibody to MD virus and particularly not at titers suitable for detection of the virus by both direct and indirect fluorescent antibody procedures. This was a significant finding even though my efforts to immunize chickens had contributed nothing. Subsequent to this discovery, Dr. Calnek had me present my findings in what I think was a workshop in Connecticut. Dr. Ben Burmester, who was the director of the Regional Poultry Research Laboratory in Michigan and a leader in the field, was at the meeting. He let it be known that what I reported was a new and significant discovery. This was encouraging as I had a thesis to defend.

In 1967 (my last full year at Cornell), the Regional Poultry Research Laboratory in Michigan and the Houghton Poultry Research Station in England announced their discovery that the etiologic agent of MD was a highly cell-associated herpesvirus. Their discovery opened new opportunities for my thesis research. That year, at the Northeastern Conference on Avian Diseases held at Stony Brook, Long Island, NY, I met Dr. Alex Robertson from the Animal Diseases Research Institute (Agriculture Canada) located near Ottawa, in Hull, Quebec. He had come to the meeting with the assignment to look for someone to conduct research on Marek's disease in Canada. How fortunate I was to be at the right place and working on a disease problem that was important to Canada. While at Cornell I was given membership to two honor societies: Phi Zeta and Phi Kappa Phi.

Agriculture Canada

In October 1968 I began my career as a research scientist with Agriculture Canada. I was fortunate to collaborate with geneticists that were interested in breeding chickens for resistance to Marek's disease and there were excellent facilities for this work. Not long after we began our work, the Houghton Poultry Research Station announced the development of a vaccine to control Marek's disease. One of our early discoveries was that chickens with the highest levels of genetic resistance to the virulent Marek's disease virus, were best protected by the vaccine that we produced. The photo with me at the microscope was taken at about this time.



East Lansing, Michigan

As it became evident that Marek's disease could be effectively controlled by vaccines, I began looking for other research opportunities and was fortunate to be granted a work transfer to the Regional Poultry Research Laboratory of the United States Department of Agriculture (RPRL, USDA) in Michigan. I was interested in diseases caused by avian leukosis viruses. In the scientific literature, I was intrigued by electron microscopic studies that showed large concentrations of the leukosis virus in glands of the albumen secreting region of the oviducts of infected hens. This gave me the idea that we could

detect infected hens by testing for virus in the albumen of freshly laid eggs. I made a trip to East Lansing in June of 1975 and during lunch with Dick Witter and Ben Burmester, I presented this possibility. They agreed to make available a small flock of commercial chickens, some of which would be infected with the virus. I arrived for work in August and they had everything ready for me. My intent was to work with tissue culture methods for isolating the virus from egg albumen. With those procedures, it would take about two weeks to determine if a chicken was infected.

Soon after I arrived, I was in a laboratory where a technician was conducting the complement fixation test for avian leukosis (COFAL) to detect antigen of the leukosis viruses in extracts from tissue cultures. I had some albumen samples with me that I had collected from infected and non-infected hens. I asked the technician if she would test my albumen samples along with the other specimens she was testing. She was pleased to do so and about an hour later she gave me the results. The test had accurately identified the infected chickens. It was that simple. I showed the results to Ben Burmester shortly after I received them and he considered this to be a major breakthrough. It was the first rapid test for detecting the infection in chickens. Of course there was a lot to learn and the enzyme-linked immunosorbent assay (ELISA) soon replaced the COFAL test. Our findings were first published in *Avian Pathology*. Also, at the 1977 World Veterinary Poultry Association Congress in Atlanta, Georgia, I reported our findings from the RPRL in Michigan in a paper entitled "Evaluation of methods for eradication of Lymphoid Leukosis." At that time I felt there was only modest interest on the part of most of the poultry breeding companies. This was possibly because only a low percentage of chickens died from lymphoid leukosis and it was not known what the virus was doing to the apparently healthy chickens in their flocks.

Back to Canada

I had returned to Canada in 1976 and worked with my geneticist colleague, Jan Gavora and others, to apply the newly developed test procedures to detect hens that shed the group specific (gs) antigen of lymphoid leukosis virus into their eggs. Our studies, conducted on large numbers of chickens, showed that virus infected chickens matured sexually later, produced smaller eggs at a lower rate and the shells of their eggs were thinner. We also found that the infection reduced the growth rate of meat-type chickens. When this research was published, the industry became very interested in disease control.

Thus, our research in Michigan with the USDA showed that it was feasible to eradicate the virus from commercial flocks and our findings with Agriculture Canada showed that it would be profitable to do so. Accordingly, poultry breeding companies invested in disease eradication and were soon reporting success. I was particularly pleased to be invited to report our findings in 1980 at the Cold Spring Harbor Conference in Long Island, NY on "Viruses in Naturally Occurring Cancers." A bonus at that meeting was hearing a brief message from James Watson of DNA fame.

Our research on avian leukosis in Michigan was conducted in collaboration with Hy-Line International, one of the largest poultry breeding companies (egg layers) in the world. In 1991 that company reported they had eradicated avian leukosis virus at a cost of

\$2,764,370.00 US. They estimated the yearly financial benefits to industry from the total sales of 180,000,000 birds to be \$36,000,000.00 US. The benefit was based on an increase of 4 eggs per hen. It did not include reduced mortality in both grow and lay periods. (Chase, WB, 1991. Eradication of avian leukosis virus by breeder companies: results, pitfalls and cost benefit analysis. In: Avian tumor virus symposium, AAAP/AVMA, pp.5-7. Seattle Washington, July 28.) Shaver Poultry Breeding Company in Canada estimated that the yearly benefit to the Canadian industry from their eradication program (in terms of egg production) would be \$3,000,000.00. In the 1990's, the meat producing breeding companies were hit hard with the J-strain of ALV. The methods used to eradicate the J virus from meat chickens were those that had worked for eradication of leukosis viruses from egg layers. The economic savings continue to accrue.

Awards and Recognitions

We have appreciated the awards and recognition received for our work as it helped us build our research program. Now, however, the certificates and plaques received are reminders of my blessings. In 1982, I received a "Public Service of Canada Merit Award for outstanding contributions to agriculture." The award was presented by the Honorable Eugene Whelan, who was Canada's Minister of Agriculture. The following year I received the Upjohn Achievement Award at the AAAP meeting in New York City. In 1985, both myself and Dr. Jan Gavora, received the Tom Newman Memorial Award from the British Poultry Breeders and Hatcheries Association for our research on Marek's disease and avian leukosis. I was in London, England for the award ceremony in the British House of Commons. It was presented by the Right Honorable Michael Jopling, Minister of Agriculture. In 1989, I was invited to the RPRL in Michigan to celebrate the laboratories 50th anniversary. In the brochure prepared for the event, the discovery of avian leukosis virus antigens in egg albumen of infected hens was listed as 1 of 11 of the laboratories milestones. The RPRL is now known as the Avian Disease and Oncology Laboratory (ADOL).

More Research

Other research yielded significant information on the pathogenesis of disease caused by avian tumor viruses. I initiated this work when I applied the fluorescent antibody technique to detect the p27 antigen of leukosis viruses in frozen tissue sections. In splenic tissue from infected chickens we observed fluorescence that was localized in ring like structures. As I was trying to identify the structures, someone suggested that I ask Dr. Frank Gilka. I didn't know Frank well but when he looked in my microscope he quickly identified the fluorescing structures as sheathed capillaries. Frank was an excellent pathologist with special skills in electron microscopy and when he saw the type of work I was doing, he became very interested. The timing was right and he was able to join me on my project. I will only mention a few of our studies. His publication entitled "Viral matrix inclusion bodies in the myocardium of lymphoid leukosis virus-infected chickens" gave insight into why subclinically infected chickens were less productive. His report on "Importance of the medullary macrophage in the replication of lymphoid leukosis virus in the bursa of Fabricius of chickens" was of interest as lymphoid leukosis was known to be a bursal dependent disease. New findings on MD were in his paper

entitled “Extravascular hemolytic anemia in chicks infected with highly pathogenic Marek's diseases viruses.”

Good Collaborators

Jan Gavora and Frank Gilka became my good friends and sadly, both have passed away. They had escaped with their families from Czechoslovakia in the late 1960's. Jan was a Slovak and Frank was a Czech. In 1988 I was on a work transfer to Saskatchewan when Jan called me on the phone. He was agonizing over a decision he had to make. He and his wife wanted to make a trip back to his home country for family reasons but to do so, he would have to pay a large sum of money to the communist government. He despised communism but he paid the money and made the trip. When the Iron Curtain came down, the names of communist informers were released. Jan was surprised and disappointed at some of the names he found on the lists. I also enjoyed Frank Gilka's account of how people were controlled under the communist regime in his country. One never knew who was spying on you. As he was telling me about this, I thought of biblical prophesy and said “Frank, some day it will change”. He responded “Lloyd, it cannot change.” The morning after it did change, I went to his laboratory and when he saw me he said with excitement “Lloyd, it is like a miracle.” He had been up in the night talking on the phone to his brother (also a veterinarian) in Czechoslovakia.

The Era of Composting

In 1987-88, I worked on tissue culture methods at the University of Saskatchewan. Dr. Federoff, who was head of the department was instrumental in getting me to serve on the Canadian Council of Animal Care, as a member of the “alternatives committee.” The intent of the committee was to promote alternatives to the use of animals in research. When I returned to our laboratory in Ottawa, the crisis with Salmonella enteritidis in chickens was raging. I was the head of the Microbiology Research Section and most of the staff were focused on developing methods for rapid detection of Salmonella in environmental specimens. Although it was not my field of interest or expertise, I had to get involved. I did and I enjoyed the work. A couple of approaches for disease control emerged. Colleagues that worked with me were interested in applying principles of competitive exclusion to increase resistance to intestinal colonization of Salmonella. We were also interested in developing methods for cleaning up the farm environment. When I expressed an interest in composting, I was introduced to Dr. Navine Patni, an Agriculture Canada scientist, who had expertise in “static pile, passive aeration composting” and he was pleased to help.

From the literature we knew that fresh manure from adult chickens, administered orally to newly hatched chicks, could give a high level of protection against intestinal colonization by Salmonella. We were in hopes that by composting the manure, we would have a more desirable product for our studies but we soon learned that the organisms responsible for competitive exclusion were killed by heat during composting. We then used earthworms to compost manure and found that the resultant “vermicompost” was very effective in providing protection.. The vermicompost was a stable product without offensive odors and could be sprinkled into the boxes holding newly hatched chicks. Even though it was easy to prepare, simple to apply and effective in protecting against

intestinal colonization of Salmonella, it has never found commercial application. However, I enjoy gardening and so I really enjoyed learning about the science of composting and how to produce vermicompost.

The possibility that composting could be applied to kill Salmonella in poultry litter and carcasses appealed to me. Our work focused on developing bio-secure methods for composting that would ensure heat production sufficient to kill Salmonella and other pathogens throughout the entire mass. In one study we composted two large cows and this study gave us confidence that we could compost large numbers of chickens and their litter, if needs be.

During the course of these studies I became aware of the Inter-American Institute for Cooperation on Agriculture (IICA). This organization encouraged Canadian scientists to develop collaborative studies in Latin American countries. As I had family in Buenos Aires, Argentina, I was fortunate to be able to collaborate with Dr. Celina Buscaglia at the University of La Plata. She had been Dr. Bruce Calnek's graduate student, many years after I had finished at Cornell. I was awarded support from IICA in 1999-2000 to conduct collaborative research on "Composting manure and carcasses to prevent spread of poultry diseases." I received a letter of congratulations from the honorable Lyle Vanclief, Canada's Minister of Agriculture, concerning the award. I worked with Celina, her colleague and graduate students and was pleased with our success. On each of my trips to Argentina, Dr. Buscaglia arranged for me to present seminars on our research in Canada and she translated. I appreciated the growing interest in composting as a means for disease control and this was evident when I was invited to speak on the subject at an "International Workshop on Animal Disposal Alternatives" held in Winnipeg, Manitoba, Canada in 2000.

Early in the 21st century, mad cow disease and other prion diseases became of great concern. We reasoned that microbes capable of digesting the animal carcasses during composting, could also digest and destroy prions. I collaborated with Dr. Hongsheng Huang and his paper entitled "Evidence for degradation of abnormal prion protein in tissues from sheep with scrapie during composting" was published in 2007 in the Canadian Journal of Veterinary Research and has attracted considerable interest.

Not all of our work to prevent the spread of disease was limited to composting. A terrorist attack in the USA in 2001 put people at risk of contracting anthrax when *Bacillus anthracis* spores were aerosolized and released into the environment. At that time we were collaborating with an engineering company that designed equipment to filter the air and kill the trapped microbes with ultraviolet light. We conducted some studies to determine the efficiency of the company's apparatus in trapping and killing *Bacillus subtilis* spores, that served as a surrogate for anthrax spores. Dr. Andrei Soutyrine published our findings in a paper entitled "Efficacy of polarized fibreglass filters irradiated by ultraviolet light in capture and inactivation of aerosolized *Bacillus subtilis* spores." For our research efforts on several projects, in 2003 I received the CFIA "Laboratorian of the Year Award" for "outstanding contributions to animal health laboratory medicine."

It was known that temperatures that could be achieved during composting would be sufficient to kill avian influenza viruses. However, in the event of an outbreak of disease caused by a highly pathogenic avian influenza virus, the practice had been to burn the carcasses taken from infected premises. Furthermore, it was argued that composting could not be conducted on the scale that would be required during a major disease outbreak. In the spring of 2004, there was a major outbreak of disease caused by highly pathogenic avian influenza virus in the Fraser Valley of British Columbia. I remember one evening, while relaxing at home and watching the news, there was a report on the avian influenza outbreak. There were scenes that showed loads of chickens from the infected farms being trucked up into the mountains to be burned. I casually commented to my wife that I felt there was a better way of doing things but I did not expect we would be called on to assist. In fact, I was planning to be out of the country and was looking forward to the trip. Then a need arose and I remember receiving a phone call from British Columbia on a Friday asking when we could come. I said we could be there on Monday. The man emphatically said “we need you now.” Travel time to British Columbia is about 6 hours by airplane and we were there the next day. Our first assignment was to compost 60,000 broiler chickens that had been killed two days previously with CO₂ that had been pumped into the building. Brian Rennie, the technician who had helped me compost cows and chickens was with us and was particularly helpful in carrying out the work. Saturday evening we developed a plan and explained what equipment would be needed. Early Sunday morning everything was ready and the work began by spraying the interior of the building with water to settle the dust and moisten the litter to promote composting. There was a potential human health risk and those involved in the cleanup were encouraged to take an anti viral drug. I had an infection at the time and didn't enter the building but Brian oversaw the work and at the end of the day, all the chickens and their litter were piled up in long windrows in the building and these piles were covered with a layer of clean cedar wood shavings that gave off a pleasant odor. The owner felt that order had been restored to his premises and he was pleased. While the compost piles within the building were heating up and killing virus, preparations were made outside of the building for the second phase of composting, under bio-secure conditions. After 3 days, the compost within the building was removed and piled into the outdoor structure where composting was completed. There were no complaints about odor, flies, etc. Our methods became the preferred means for disposal of the wastes and more than 1/2 million chickens were composted. Following the disease outbreak in British Columbia, I received invitations to report on our experience and I did so in meetings held on every continent, except Antarctica. For our work I received the “President's National Award for Innovation and Best Practice.” from the Canadian Food Inspection Agency.

The concern for terrorist attacks continued to provide research opportunities. Following our experience in British Columbia, there was a recognized need for measures to safely dispose of large numbers of farm animals and their manure in the event that terrorists were to introduce a highly pathogenic foreign animal disease virus into the nations livestock populations. Although I had retired, I consulted in developing and carrying out a large project that involved composting large animals. This included the development of

rapid and sensitive molecular methods to monitor the destruction of viruses (surrogates for important foreign animal disease viruses) during composting. Dr. Jiewen Guan, who had been my post doctoral fellow and Dr. Brian Brooks led the work in collaboration with scientists from the University of Iowa in Ames and the Federal Research Station in Lethbridge, Alberta.

Professional associations and related work

Soon after receiving a veterinary degree, I joined the American Veterinary Medical Association (AVMA) and in 2015, I was awarded an “Honor Roll Member” status. When I began employment in Canada, I joined the the American Association of Avian Pathologists (AAAP) and attended the annual meetings that were held in conjunction with the AVMA. I regularly contributed an oral presentation or a poster to the programs. In addition, I served on the editorial board of Avian Diseases for 29 years and as a member of the Avian Tumor Virus committee, I organized a workshop at the RPRL in East Lansing in 1975 and participated in several symposia. I also became a member of the Canadian Veterinary Medical Association and was a speaker in some of their programs.

While I was a graduate student, Dr. Calnek made it possible for me to attend all of the annual Northeastern conferences on Avian Diseases (NECAD) and had me present our research findings. That was good training for what was to come. In 1983, my colleagues and I were able to host the 55th NECAD conference at Carleton University in Ottawa. Dr. Malcolm Peckham, who was responsible for the poultry diagnostic laboratory at Cornell, was at the meeting and after, he sent me a complementary letter. I had viewed Dr. Peckham as a perfectionist who was not easy to please and so it is a pleasure to quote from his letter: “You set a standard of excellence that will be a measure of comparison for years to come and you might say the Canadians treated us 'royally.’” I recall getting acquainted with Dr. Bob Eckroade at that meeting. He reported on concerns for an avian influenza virus of low pathogenicity that was circulating in poultry flocks in Pennsylvania. There was reason for concern as subsequent to the meeting a highly virulent strain of the virus emerged that caused heavy losses to the industry.

At the 1973 meeting of the World Veterinary Poultry Association (WVPA) held in Munich Germany, Dr. Peter Biggs invited me to serve as the corresponding secretary of the WVPA for Canada. In collecting membership dues, I learned that veterinarians specialized in poultry diseases in Canada were not well acquainted with the organization. I had an opportunity to raise this issue in 1987 when the WVPA met with the World Veterinary Association in Montreal. I participated in the bureau meeting of the WVPA and suggested that the association needed a newsletter. The executive agreed and without any discussion, I was asked to make it happen. I had not anticipated this outcome and tried to avoid the assignment by saying that I was going to be in Saskatchewan for a year but Bruce Calnek spoke up and said “they have typewriters in Saskatchewan.” He was right, they still had typewriters but they were being replaced by word processing equipment. I got some ideas from the newsletter of the Australian Veterinary Poultry Association called “Dander.” As dander is only one of many aerosols on poultry farms, I called the WVPA newsletter “Aerosols.” To make the newsletter a world wide effort, I

requested that corresponding secretaries send me news from their countries. As this was in the days before e-mail, news was slow in coming. "Aerosols" was published annually, in black and white, from 1988 to 2003. As I recall, the first issue was sent to corresponding secretaries and additional copies were made available to the general membership at the 1989 conference held in Brighton, England. It was my desire to send each member of the association a copy of the newsletter and to finance this, we began to sell advertising space to commercial companies. In 2002, eight companies advertised in the newsletter that was mailed to 1700 veterinarians and poultry health scientists in 56 countries. My two youngest children helped with the mailing and commented that their dad seemed to only have a few friends in Canada but had many in other parts of the world.

I was surprised at the 1993 meeting of the WVPA in Sydney Australia to be asked to serve as a vice president of the association. In 1997, in Budapest Hungary, I became the president, making me the third North American to hold that office in what is now (2018) the 59 year history of the association.. The other two presidents were Dr. P.P. Levine and Dr. Ben R. Burmester, both of whom had been high profile members of the AAAP and had made significant contributions to my career The WVPA has a silver chain of office and each president has his name on one of the sections. I felt humbled but greatly honored to be linked together with all of them. The WVPA held meetings every 2nd year but every other meeting was held in conjunction with the World Veterinary Association (WVA). As the meetings held with the WVA were poorly attended, it was decided that WVPA would hold its own congresses every 2nd year. I attended the last meeting with the WVA in Lyon, France in 1999. One of my pleasant assignments was to present the Bart Rispen Memorial Award to Jagoda Ignjatovic from Australia (for the best paper in two volumes of the journal Avian Pathology). I had first met her at the Regional Poultry Research Laboratory in Michigan in 1975. At the meeting in Lyon, it was determined that the next WVPA congress would be held in Cairo, Egypt in September 2001.

In the 1990's it was apparent that changes were taking place in China and veterinarians responsible for poultry health were anxious to increase their knowledge and expertise. They looked to the WVPA for help. News articles about the poultry industry in China appeared in the 1989, 1990 and 1991 issues of the newsletter "Aerosols" that were respectively written by Richard J. Julian from Canada, Paul Gilchrist from Australia and Hsiang-Pih Hu from China. As a visiting professor, Julian taught in China and provided technology updates. His observations support Gilchrist's comment that "the Chinese



poultry industry is probably the largest in the world, but little is known about it outside China.” Dr. Hu was anxious to help bring the Chinese poultry industry out of obscurity and to do this he was anxious for China to host a congress of the WVPA. He managed to have a goodly number of Chinese colleagues at the 1993 congress in Australia in 1993. After that congress, Dr. Hu thoughtfully sent me the photo included here with him in the center, my wife Marilyn and I to his left, and Mary Jeanne and Bruce Calnek to his right. It had been taken under the Chinese banner that was displayed at the congress.

In 1999, an international conference on poultry diseases was held in Beijing, China and Dr. Hu was a part of the organization. This meeting was in part to make preparations for a WVPA congress to China. Dr. Hu was included in the discussions on this topic and I was invited to participate. The atmosphere in Beijing was most welcoming and one of the social events at that meeting was an informal evening program. I was pleased when Clive Jackson from Australia invited anyone who had been to Australia to join him in singing *Waltzing Matilda*.

Chen Xiaoling was another Chinese national that was involved in the organization of the 1999 meeting. I was well acquainted with her as she had come to our laboratory in 1990 for a year of training. She was an associate researcher from the Institute of Animal Husbandry and Veterinary Science in Beijing. After leaving Canada she trained with Patrick Blackall in Australia. After the meeting in Beijing, Pat and I were invited to her institute in the outskirts of the city. While there we attended a seminar given by a Chinese scientist who worked in the USA but had returned to China to share his experience and research findings. I saw all of this as change and progress.

In 2001, prior to the Cairo meeting, I was invited to be on the program of “The First World Poultry Science Symposium” of the Iran Branch to be held in Tehran, Iran on September 2-3. When I was invited to this meeting, the Iranians offered to help me obtain a visa to enter their country. I thought this was unnecessary as our laboratory secretary had been very efficient at obtaining visas and the Iranian Embassy was located in Ottawa. However, the day before my departure, the visa had not yet arrived. An Iranian colleague, who was in our administration, offered to go with me to the Iranian embassy in hopes of getting the visa. Before leaving my office, he suggested I take something with me to show my importance to the meeting. I picked up an issue of *Avian Pathology* because at the top of the inside cover it gave my name as president of the WVPA. We spoke with a clerk at the embassy and after much speaking, it was evident they had no intention of issuing me a visa that day. Finally the clerk suggested he might be able to get me a visa in a few days. At that point I said “if I don't go tomorrow, I am not going.” My Iranian colleague then spoke up and said “that is too bad because this man is president of the World Veterinary Poultry Association.” The clerk asked if I had proof of that and I showed him the *Avian Pathology* journal. Without hesitation, he said “we will have your visa ready in 30 minutes”. I was amazed. The trip to Iran was wonderful. Prior to the conference several of us were flown south to the city of Shiraz and then to Isfahan. The sites we saw included the ruins of Persepolis and the tomb of Cyrus the Great. I was surprised at the amount of Biblical history there is in Iran.

I returned from Iran a few days before the 9/11 terrorist attacks on the USA, including the destruction of the twin World Trade Towers in New York. This, of course, impacted on our plans for the WVPA congress in Egypt. After phone calls to my friend Dr. Ahmed Ali Sami Ahmed, who was the congress chairman, it was agreed that the meeting in Cairo be postponed until early 2002. Unfortunately, a large delegation from China was not notified in time and arrived in Cairo on the originally scheduled date. My term as president of the association ended in Cairo and then I served for another 4 years as a vice president. I was on the program of the next three WVPA meetings that were held in Denver, Colorado in 2003, Istanbul, Turkey in 2005 and Beijing, China in 2007. Sadly, our dear friend, Dr. Hu, passed away before this congress was held in his country. I became an Honorary Life President of the WVPA in 2005. I was surprised in 2012 to receive a phone call from my friend Trevor Bagust in Australia informing me that I was to be inducted into the WVPA Hall of Honor at the 2013 WVPA congress in Nantes, France. My wife and I attended the banquet in Nantes and it was a special pleasure to be with so many friends.

There are a few other WVPA meetings I will mention. In 1995 I spoke on competitive exclusion of Salmonella at the WVA congress held in Yokohama, Japan. At the WVPA congress in Jerusalem, Israel in 1985, I participated in a symposium on Oncogenic viruses. In Oslo Norway in 1981, Jim Payne, from the Houghton Poultry Research Station in England, chaired the session when I spoke on the adverse effect of ALV infection on growth of meat-type chickens. Jim was always interested and supportive of my work. In fact, that is what made the work so enjoyable. There was a healthy competition between laboratories to make discoveries but there was real friendship and support among the scientists that helped all to fit pieces into the puzzle that resulted in control of avian leukosis and Marek's disease.

The last International Symposium on MD that I attended was held in the summer of 2004 in Oxford, England. One of my presentations was the work of Ali Mohammadi, a graduate student from Iran who had worked with us for about 6 months. At the banquet, Dr. Peter Biggs asked who had attended all of the 6 previous symposia. I was pleased to have participated in all of them - Berlin, Germany in 1978, Ithaca, New York (Cornell) in 1984, Osaka Japan in 1988, Amsterdam, Holland in 1992, East Lansing, Michigan in 1996 and Montreal, Quebec, Canada in 2002. The meeting in Berlin was held in the old German Reichstag Building. From the window in our meeting room we looked over the Berlin wall and could see the guard towers and barbed wire barriers that were intended to keep people from escaping across the wall. Although our research on MD in Canada decreased as we took on new projects, our laboratory was designated as the OIE (World Organization for Animal Health) reference laboratory for Marek's disease from 1992 until my retirement.

Second languages

I am not a gifted linguist but when I started my PhD program, Cornell required candidates acquire proficiency in reading two foreign languages. I started with German and by the time I had passed the exam, the requirement for a second language was dropped. This was probably because of the increasing global use of English. I didn't

use the German and eventually lost it. However, I had an enjoyable experience with the language in 1973. After the WVPA congress in Munich Germany, my friend Dr. Vicco von Bulow gave my wife and me a ride to the town of Marilyn's ancestors. We met the Lutheran minister who was custodian of the records that included the names of Marilyn's "Hornberger" family. The minister then introduced us to a Hornberger family. Vicco departed and we spent the evening visiting with Karl, a distant relative who spoke no English. Despite the struggle to communicate in German, we enjoyed the visit. Karl came to the train station the next morning to wave goodbye. Our hearts were touched.

When we moved to Ottawa in 1968, I worked for a number of years in Quebec where I was surrounded by colleagues that spoke both French and English. About 10 years into my career, I became a section head and with added administrative responsibilities, my position was designated "bilingual." I was offered French language training that was done in a classroom at our laboratory and so I was able to continue my work. However, to achieve the level of proficiency expected, I lived for a total of 4 weeks in the Chateau Frontenac Hotel in Quebec City, where a small group of us were immersed in French language training. My efforts to speak in French were rewarding at work and continue to enrich my life in retirement..

It was about 7 years before retirement that I was motivated, by an interest in family, to study Spanish. At just the right time, I was given an opportunity to serve for 5 years in the Spanish branch of our church in Ottawa. My Latino friends helped me to learn. My efforts to speak Spanish made the collaborative work in Argentina with Dr. Buscaglia and her colleagues more enjoyable and productive. I will add several other experiences during my career that sparked my interest in the Spanish language and the associated cultures. From 1980 to 83, I served as a member of a Canada - Cuba poultry working group. Two Cubans made a brief trip to Ottawa to become familiar with our laboratory equipment and research on control of Marek's disease. Subsequently, myself and Dr. Bob Gowe (an Agriculture Canada director and poultry geneticist) spent a week in Havana. I gave seminars and we were given guided tours of the city and taken to see farms and research facilities in the surrounding area. In 1993 I was pleased to receive a phone call from Dr. Tom Jeffers at Lily Research Laboratories in Indiana. Tom and I had worked together during my first year with Agriculture Canada. The purpose of his call was to invite me to speak on control of Marek's disease to a group of poultry industry people from Spain who were to meet in Bangkok, Thailand. The meeting was sponsored by ELANCO and I spent several days with these people. In 1998 I enjoyed participating in a symposium on Avian Leukosis in Barcelona, Spain that was sponsored by Expoaviga 98 and the World Poultry Science Association. In North America, I frequently participated in the Western Poultry Disease Conference that was usually held in Sacramento, California and had many attendees from Mexico. I also attended one of the conferences held in Mexico.

Hobbies and Retirement

Dr. P.P. Levine at Cornell was the first to make me aware of the early development of a vaccine for Infectious Laryngotracheitis. He was impressed with the ingenuity of those that applied infectious material taken from the respiratory tract of infected chickens to the

cloacal mucosa of healthy chickens, in order to immunize against the respiratory disease. Early in retirement the lesson taught by Dr. Levine came to mind and it occurred to me that some of the human respiratory viruses might be capable of infecting mucosal cells at the terminal end of the human digestive tract and if so, they might stimulate a protective immune response. I also considered that allergens, responsible for allergic rhinitis, might induce protective immune responses, if applied to the same region. I found some support for these ideas in the literature and prepared a manuscript entitled "Immunization via the anal mucosa and adjacent skin to protect against respiratory virus infections and allergic rhinitis: A hypothesis." It was published in Medical Hypotheses in 2009. While the idea may never contribute to the well being of mankind, it stimulated my thinking and I found pleasure in the project.

I enjoy a luncheon each month with retired veterinarians, some of whom were friends and colleagues at Agriculture Canada. Throughout my career, my bicycle was my principle means of transportation to work, weather permitting. However, following retirement I have largely replaced biking with walking. In the winter I have enjoyed cross country skiing. I have always enjoyed gardening and in the 1980's I kept a few hives of bees. Following retirement we acquired a property about 45 minutes south of Ottawa where I have planted fruit trees and have mowed a lot of grass. It is my "Field of Dreams," a playground for grandchildren. Sometimes they come.

Our church has given Marilyn and me opportunities to be of service and this has included helping with an addiction recovery program and making frequent trips to Montreal to serve in our temple there. Also, for many years I have represented our church on the Capital Region Interfaith Council and have developed friendships as we have met and served the community together. My wife and I have been blessed with 5 children and 20 grandchildren and they continue to bring joy to our lives.

When the Canadian Food Inspection Agency (CFIA) was founded in 1997, the institute where I worked became a part of that agency. After retirement, I was honored to receive the first CFIA Emeritus Research Scientist Award.

It is now 2018 and a half a century has passed since I completed my studies at Cornell University and began my career as a research scientist with Agriculture Canada. As I look back, my greatest satisfaction comes from my association with so many good people and for the friendships that have endured. I am thankful that I got involved with our professional associations and made an effort to create a newsletter for the WVPA.



AEROSOLS

Newsletter of the World Veterinary Poultry Association

June 2009, Number 12

President's Message	1	President's message
WVPA	2	I am pleased to announce that the WVPA now has a website on the internet. Dr. Kales, secretary-treasurer for WVPA, has overseen this project and our homepage can be reached at http://www.wvpa.net . In September of 1999 members of the WVPA participated in the 26th World Veterinary Congress held in Lyon, France. Lyon is a beautiful and historic city and was an excellent venue for what proved to be a large and successful congress. However, the poultry sessions were poorly attended and the decision was made in the luncheon and business meetings of the WVPA to discontinue our affiliation with the World Veterinary Association. As previously announced, in the future, WVPA congresses will be held every 2 nd year. Plans for the 12th congress to be held in Cairo, Egypt in September of 2001 are well underway. Please see the announcement in this newsletter. Approval was given to the USA to organize the 13 th congress of the association in Denver, Colorado in July of 2003. The venue for the congress in 2005 will be determined at the meeting in Cairo. The membership of WVPA now exceeds 1400 with 33 national branches. Recently, branches were formed in the Czech Republic, India and Slovakia. We encourage other countries to form branches. Presently we have no national branches in Latin American countries, even though abstracts of all papers published in both Avian Pathology and Avian Diseases are translated into Spanish. We intend to make a greater effort in bringing these and other countries into our association. The news received from various countries for this newsletter is greatly appreciated and gives a global view of needs in poultry diseases and their control. We wish you success in this new millennium and look forward to seeing you in Cairo.
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Biography solicited by the Committee on the History of Avian Medicine, American Association of Avian Pathologists.