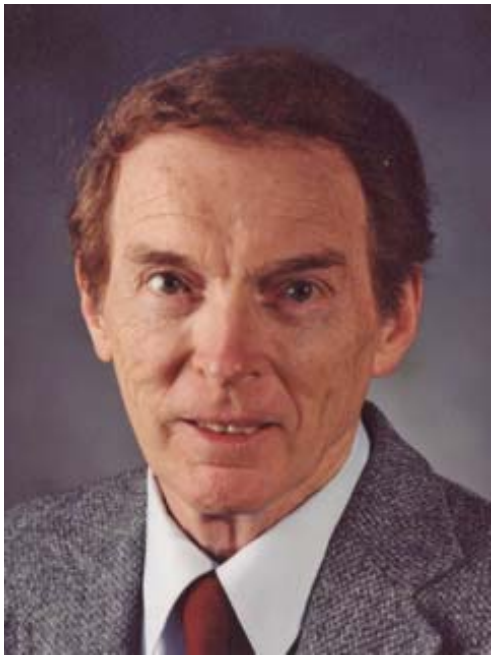
American Association of Avian Pathologists
Biographies of Professionals in Poultry Health

Charles H. Domermuth

1928 -



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Reflections – Research of Economic Significance

I came to Virginia Tech in 1954 with a shiny new Master of Science degree in hand. I suppose I was hired by Dr. E. P. Johnson because my master's thesis involved electron microscopy of avian infectious bronchitis virus. At Virginia Tech, I was assigned to do "research on poultry diseases of economic significance to both consumers and producers". In Virginia, in 1954, that meant work on mycoplasma infections. I obtained my Ph.D. degree in 1961 with Drs. E. P. Johnson and W. B. Gross as my major professors. Dr. Gross served in this capacity for virtually all of my studies. During this time (1954-1961), I was given complete freedom to choose research topics and to conduct research. Indeed, this situation prevailed throughout my career. Dr. Gross and I refer to this phenomenon as "being given enough rope to hang ourselves - or to succeed". After completing these studies, I continued to work with Dr. Gross, especially when experiments involved microscopic and gross pathology studies, and I have treasured this relationship for all of our years as research colleagues. Probably the most "economically significant" research I performed during this early period involved Mycoplasma vaccination studies and observing that Mycoplasma was involved in salpingitis of chickens. Since I had now become a Mycoplasma "specialist", I was accepted by Dr. Eyvind Freundt in 1962-63 for a one year post-doctorate study at Denmark's Staten

Serum Institute where we studied the ultrastructure of all Mycoplasma species then described. Because I had worked with "the international expert on Mycoplasma", I was then contacted by the U.S. Agency for International Development and asked to apply for a two-year assignment at the East African Veterinary Research Organization laboratory in Kenya to work on bovine pleuropneumonia. In this capacity, I developed a growth inhibition test for ascertaining the immune status of cattle. This was, I was told, the first accurate and reliable test of its kind.

While I was busy developing this test in Kenya (and also going on sample collecting safaris), Dr. W. B. Gross was busy at Virginia Tech using convalescent serum to shorten the course of hemorrhagic enteritis in commercial turkeys. He also determined that the disease could be experimentally transmitted by cloacal inoculation of susceptible 5 to 6-week-old poults with bloody feces from turkeys which were affected by the disease.

When my Kenya tour was over, I was again offered a position at Virginia Tech. When I arrived, Dr. Gross told me of his work with hemorrhagic enteritis and asked me to also work on this project. Little did I suspect that this "Research of Economic Significance" would last for the remaining 26 years of my career, but it did, and I am grateful that fate provided me with such a great opportunity and with Bernie Gross and others to intertwine minds with

The highlights of my hemorrhagic enteritis years included-but were not limited to-the following:

- Duplicating Dr. Gross' method of inoculating poults intercloacially with infectious fecal material to reproduce hemorrhagic enteritis (H.E.).
- Observing that spleens from these infected poults were enlarged and mottled prior to death and not merely reduced in size as was observed in poults which had died of H.E.
- Utilizing H.E. enlarged spleens as an antigen source to develop an agar-gel immunodiffusion test.
- Using this test to determine that hemorrhagic enteritis was endemic in commercial turkeys.
- Deducing that flocks which had seroconverted with no sign of disease may have been infected with an avirulant H.E. virus.
- Isolating an "avirulant or "less virulent" strain of H.E. virus from litter samples obtained from H.E. virus contaminated premises.
- Using this "avirulant" or "less virulent" strain of H.E. virus to protect (vaccinate) susceptible poults.

Concurrently, while attending an avian disease conference, I observed in a slide presentation on marble-spleen-disease (M.S.D.) of pheasants that the infected spleens shown and described seemed visually indistinguishable from spleens of H.E. virus infected turkeys.

Subsequently, antigen from M.S.D. spleens, kindly supplied by the Pennsylvania State Diagnostic Laboratory, was tested by our agar gel immunodiffusion test and found to be indistinguishable from H.E.V. antigens.

Virus samples from both sources were then tested in laboratory experiments and found to be "avirulent", or less virulent, and to protect turkey poults against infection with virulent field strains of H.E. virus.

Finally, both the pheasant and turkey strains were tested in commercial flocks and found to be protective. The pheasant strain produced no mortality and became the "vaccine strain" which has been used for the past 23 years to protect turkeys from hemorrhagic enteritis. (Economic Significance). The turkey strain has been similarly used for the past 23 years to protect pheasants from marble spleen disease.

I have always enjoyed telling this story because the parts fell so neatly and logically in place, but there is more to it. Many spin-offs and details have been described in the "Hemorrhagic Enteritis" section of Diseases of Poultry. Iowa State University Press, the 7th, 8th, 9th, and 10th Editions. All of my wonderful co-authors' names can also be found there. Among these findings were:

- Identifying the causal agent of H.E. as a group II avian adenovirus.
- Determining that a group II avian adenovirus similar if not identical to H.E. virus affected commercial chicken flocks producing an "atypical Marek's disease".
- Reproducing this disease in experimental chickens.
- Determining that H.E.V. is immunosuppressive, associated with and exacerbates colibacillosis; and, my good colleague Dr. Cal Larsen, and others, have advised me that H.E. vaccination appears to be causally associated with a significant reduction in colibacillosis of turkeys (Economic Significance).

Finally, one of the most satisfying happenings of my career was that a graduate program in avian disease medicine was initiated at the Virginia-Maryland Regional College of Veterinary Medicine at Virginia Tech; and, that I have had the pleasure and privilege of working with its' first two Ph.D. candidates, Dr. Bill Pierson, M.S., D.V.M., Ph.D., Dip. ACPV, and Dr. Ken Opengart, M.S., D.V.M., Ph.D. Dip. ACPV. Both of them have significantly extended our knowledge on hemorrhagic enteritis and associated diseases. My only regret is that I have not worked with many more wonderful, independent thinking scientists just like them!

Dr. Domermuth retired in 1992 as Professor Emeritus from the Virginia-Maryland Regional College of Veterinary Medicine, Virginia Polytechnic Institute and State University. He enjoys discussing ongoing avian disease research with his colleagues, cattle farming, hiking, travel, and visits by his 3 children and 7 grandchildren and, he is eternally grateful to his wife Dorothy for encouragement in all of the above endeavors.

Addendum: Charlie was born on November 16, 1928 in St. Louis, MO. As of 2007, he is living in a home for Alzheimer patients. His wife, Dorothy, still resides in Blacksburg, WV. (contributed by R.L. Witter)

Biography solicited by the Committee on the History of Avian Medicine, American Association of Avian Pathologists.

Additional biographical materials may be available from the AAAP Historical Archives located at Iowa State University. Contact information is as follows:

Special Collections Dept. & University Archives
403 Parks Library
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Fax: (515) 294-5525
WWW: http://www.lib.iastate.edu/spcl/index.html