

1st Section,
PRELIMINARY REPORT
OF THE

AMERICAN ASSOCIATION OF AVIAN PATHOLOGISTS (AAAP) COMMITTEE
"The History of Avian Medicine in the United States"

The history of avian medicine should create pride in the achievements of today and appreciation for the pioneers who, with limited knowledge and inferior tools, paved the way for succeeding generations to follow. It should guide us away from the mistakes of the past and steer us into more fruitful avenues. History is like a benchmark or a compass bearing that gives one a sense of direction for the start of a journey over the winding roads and hills and dales of destiny. A look at the past is not a backward turn - it could lay the foundation of future progress.

In September 1975, Harry W. Yoder, Jr., President of AAAP, pursuant to the suggestion made by Dr. Henry VanRoekel that the AAAP initiate a special project for the 1976 Bicentennial of recording "The History of Avian Medicine", appointed a chairman to organize a committee to accomplish this. The objectives in general are to chronologically accent the leaders and their major contributions of historical significance. Emphasis will be placed on the development of pioneer conferences, such as the Northeastern Conference of Laboratory Workers in Disease Control, now Northeastern Conference on Avian Diseases (NECAD), and its influence on the origin of other regional poultry disease conferences and the AAAP, the poultry disease sections of the U.S. Livestock Sanitary Association, now U.S. Animal Health Association (USAHA), and the American Veterinary Medical Association (AVMA), and the specific roles of the Bureau of Animal Diseases (BAI) of the United States Department of Agriculture (USDA) and major state University departments in advancing the knowledge of poultry diseases.

The committee consists of:

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Special assignments have been made to certain members of the committee because of the area of their expertise. However, there is no intent to limit the efforts of the committeemen, because useful contributions from all sources, including those not on the committee, are welcomed and encouraged.

General assignments to date include the following:

Dr. C. A. Bottorff - the contribution of commercial companies, and assist Dr. A. S. Rosenwald in assessing the work of poultry disease workers in the far western states. Dr. Kenneth Bullis will specialize in the field of pullorum disease control and other Salmonellas. Dr. Tevis Goldhaft will explore the early development of commercial poultry vaccines. Dr. Harold Chute will provide us with a summary of the study and control of major

respiratory diseases and the Specific Pathogen-free Flock (SPF) programs. Dr. William Hinshaw, with his outstanding background in poultry diseases and experience as author of Dr. Fred Beaudette's biography, will search the files for historically significant accomplishments of the early days, and the impact of poultry disease workers organizations as they developed and functioned over the past century. Dr. Frank Kingsbury will evaluate historical references which come to his attention as he reviews poultry disease literature. Dr. Ben Burmester will construct a sequential history of research in the area of Leukosis-Marek's Disease. All of these committee workers will appreciate direct contributions from others. Sometimes a personal contact, a letter or photograph of a person or group will supply an interesting and valuable contribution to this on-going project.

American Poultry History 1823-1973, published by the American Poultry Historical Society, Inc. 1974, gives "an anthology overview of 150 years". It includes a chapter on Disease by Sivert Eriksen, D.V.M., retired from a lifetime experience in college teaching and research and top management positions with six commercial companies engaged in the poultry business.

The first generation of American avian veterinary micro-biologists included such outstanding scientists as Veramus A. Moore of Cornell University, Leo P. Rettger of Yale, D. E. Salmon, Theobald Smith, H. W. Graybill and Cooper Curtice, all of USDA, BAI, A. R. Ward of California, and Leland D. Bushnell of Kansas. Perhaps no one teacher in the U.S. exerted more influence on the training and

inspiration of leaders in avian disease research and teaching than did Dr. L. D. Bushnell, who graduated from Michigan State College in 1905 and became head of the department of bacteriology of Kansas State College in which there was a Division of poultry bacteriology. Outstanding among his students were J. G. Jackley, Fred R. Beaudette, William R. Hinshaw, E. H. Barger, Carl A. Brandly, Charles B. Hudson, James Black, George E. Cottrel and Sivert Eriksen. It is of interest that Dr. Bushnell started his work on poultry diseases because the Veterinary College - he was in General Science - would have nothing to do with chickens.

Contemporaries in poultry microbiology and medicine during this first quarter of the twentieth century included J. R. Beach of California, F. B. Hadley and B. A. Beach of Wisconsin, E. E. Tyzzer of Harvard, Raymond Pearl, Frank Surface and M. R. Curtis of Maine, G. E. Gage of Massachusetts, L. VanEs of North Dakota, Philip B. Hadley of Rhode Island and B. F. Kaupp of North Carolina. H. J. Stafseth of Michigan State was better known as a microbiologist and as a great teacher who influenced many students who subsequently worked in poultry diseases and microbiology. He published in Poultry Science, Vol.37, 1958, "Advances in Knowledge of Poultry Diseases Over the Past Fifty Years". His leading sentence is, "Most of what we know about poultry diseases has been learned in the last fifty years". This profound assessment will undoubtedly be reflected in the work of this AAAP history committee.

The era of these earliest teachers dated back to the last quarter of the 1800s. This was the height of the small farm flock period when each farmer felt obliged to keep a flock of chickens and a few other farm fowl such as turkeys, ducks, geese and guinea fowl.

There were few poultry houses and the birds ran free about the farm yard, roosting on the farm machinery, picking up most of their food from the environment and living to a ripe old age. The "setting hen" would lay her clutch of eggs in a secluded spot under the corn crib or the wagon shed and eventually emerge with her brood of chicks to face an environment full of the perils of predators on the ground and in the air, to mingle with adult carriers of disease, which had over the years seeded the area with parasites and pathogenic fungi, bacteria and viruses. It was no wonder that the expectant mortality was as much as 80%, nor that it was such a treat for the entire farm family on those Sundays when the minister came to a dinner of chicken and hot biscuits covered with gravy.

Poultry diseases as late as 1900 were poorly classified and little understood. Eriksen cites from a book by William E. Lewis published in 1871, which lists such poultry diseases as apoplexy, rheumatism, vertigo, curly toes and roup. The Pennsylvania State Department of Agriculture Bul.No.17 on "Diseases and Enemies of Poultry" by Leonard Pearson, State Veterinarian, and B. H. Warren, M.D., State Zoologist, printed 1898, gives some excellent drawings of poultry parasites and describes "pneumonia caused by moulds of three varieties of Aspergillus and one of Mucor". I. K. Felch in his book "Poultry Culture", 1902, refers to Aspergillosis as "mycosis of the air passages. The fungus grows on dead and decaying matter, moldy grain or litter and is inhaled".

Pearson and Warren describe "Catarrh of the Nasal Passages (Pip) as a discharge from the nose, mouth, swelling of eyelids, depression

of spirits, head drawn down and feathers ruffled". The earlier book by Lund, referred to by Eriksen and quoting Aldrovande on Chickens (1600), describes "Fip" as "a flow of liquid or humbr from the brain to the nostrils". "Fip" was a widely used term, sometimes facetiously applied to human ills, but usually referring to a common sequel to a catarrhal affliction of the head and nostrils causing the bird to breathe through its mouth. The tongue would dry and harden on its tip, like a horny growth. This was the "pip" and the "horn" was commonly removed with the point of a penknife. Leonard's Pennsylvania bulletin suggested isolating the sick birds, providing "a warm dry coop, clean water in clean vessels and adding a little onion or garlic in the food".

"Colds were common and often given symptomatic designations such as bronchitis and laryngitis which of course have carried over to be applied to specific viral diseases today. Vague terms like "Lung Fever" were used to describe more serious forms of pneumonia.

Roup (croup, diphtheria) was considered a very common and serious malady. Leonard lists "two forms, one caused by bacteria and the other by protozoa - but in all cases it is a contagious, catching disease spread from flock to flock by the interchange of birds. H. H. Stoddard, Editor of Poultry World, in his book "Poultry Diseases - Methods of Curing Them", published in 1885, describes roup as "a disease of the lining of the beak extending through the tear duct to the eye. After death the gall bladder and liver are full of pus and the flesh has a bad odor and is soft". He considered the cause "anything that lowers the tone of the fowl", such

as bad food, housing, filth, lice and exposure to cold and wet. It was more common in autumn and winter. He, like other writers who followed him, considered roup to be contagious. Nasal discharges, swollen facial sinuses, eyes closed, and the fetid odor were diagnostic signs. Treatments were numerous and varied. "German Roup Pills, Kunkle's Original Recipe" (Stoddard was the sole proprietor in the U.S.), "well tried and proved. They will cure roup whenever and wherever anything will". The "Douglas Mixture" which originated in England was highly recommended and used for a variety of ills, including cholera. It consisted of 1 oz. of sulphuric acid and $\frac{1}{2}$ pound of sulphate of iron mixed in two gallons of water in "an earthen crock. Add one or two tablespoonfuls to each pint of drinking water". David W. Judd in his book "Profits in Poultry", 1887, writes, "The use of kerosene is a handy and sure cure. By holding the bird so it can't swallow and filling the throat with kerosene -- later injecting kerosene into the nostrils -- the effect is magical". There was much confusion amongst the early poultry pathologists regarding the cause of Roup. First, it was confused with pox which often occurred along with Roup. Secondly, it was always accompanied by a great variety of secondary invaders - or contaminants, the isolation and identification of which added to the dilemma. John G. Jackley, one of Bushnell's first assistants, published his "Study of the Etiology of Roup in Birds" in 1917 (Tech. Bul.No.4, Agricultural Experiment Station, Kansas State Agricultural College) in which he reported that in Kansas 70% of the poultry diseases was Roup, 15% Cholera and 9% white diarrhea. He combined roup and contagious epithelioma (pox) as one problem and he attempted unsuccessfully to isolate a specific causative agent. It was not

until the twenties that Roup was identified as Coryza, and the causative agent was not found until the early thirties.

Gout was a common term of that day and was said to occur in "Fowls of heavy breeds when kept in high condition and allowed but little exercise". Treatment consisted of "cutting off the joint enlargements with a knife and adding bicarbonate of soda to the drinking water - about a teaspoonful to the pint".

Gape worms were a constant problem in these farm flock days. Stoddard reports in his book that Dr. Andrew Wisenthal of Baltimore, Maryland, in 1797 "appears to have first published an account of this malady". The worms were removed by introducing into the trachea a "loop made by doubling a horse hair", or a feather selected for suitable size, or a timothy head. Any of these "instruments" were made more effective by dipping them into turpentine or kerosene. "In some cases it is advisable to place the birds in a closed box and blow tobacco smoke into it from a pipe". Dr. Leonard was years ahead of his time when he added this sage advice, "The worms in this way are stupefied, but unless care is used the fowls will also be stupefied and perhaps suffocated". Stoddard advises in severe cases to "open the windpipe, by cutting into it from the outside, to remove the worms. Sew up the hole taking care to stitch only the external skin". Internal treatment was crushed corn soaked in alum water or kerosene.

Cholera had been recognized in Europe since the late 18th century and its transmissibility had been demonstrated before Italian and Russian workers described a bacterium found in the tissues of in-

fected fowl. This was confirmed by the French veterinarian, Toussant, in 1879, and in 1880 Pasteur performed his classic experiments in the attenuation of the Fowl Cholera organism. Dr. Daniel Elmer Salmon of the BAI, USDA, in 1880 is said to be the first to study this disease in the U.S. although there were earlier reports of outbreaks recorded in the USDA Monthly Reports of 1867. Pearl, Surface and Curtis report in their book, "Foultry Diseases and Their Treatment", Maine Agricultural Experiment Station, Feb. 1911, that Dr. Salmon, "owing to the lack of proper bacteriological methods at the time, was not able with certainty to identify the disease with European Cholera".

A. W. Ward, California Agricultural Experiment Station, published Bulletin 156 on Fowl Cholera in 1904. Confusion between Fowl Cholera and Fowl Typhoid was indicated by Bulletin 87 from the Rhode Island Experiment Station, 1894, by R. Curtice and Smith titled, "Fowl Typhoid, A Disease Sometimes Mistaken for Cholera". Philip B. Hadley, Rhode Island Experiment Station, published in 1910 Bulletin 144, "Fowl Cholera and Methods of Combatting It". He attempted to protect fowls which he inoculated with Fowl Cholera organisms by injecting them with 2-4 cc. of 5% solution of carbolic acid. "This did no harm and it protected the artificially infected birds". Judd in "Profits In Poultry", 1887, writes that Fowl Cholera got its name from human Asiatic Cholera because it was "accompanied by violent diarrhea and is rapidly fatal". Stoddard in his book "Poultry Diseases" 1885 was not aware of Salmon's work five years earlier as indicated by his reference to the cause of Cholera as "a specific poison generated on the premises". Treatments included all the usual household chemicals - camphor, cayenne pepper, pulverized rhubarb, laudanum, castor oil and Douglas' Mixture with scalded sour milk.

Dryroup, Canker or "Chicken Pox" was associated with the roup complex. Judd describes his treatment of an exhibition bird with its "mouth full of canker, head swollen, eyes closed, face and comb broken out with dry canker - chicken pox. By use of a large syringe I injected the bird's crop full of milk. I then gargled the mouth and throat with kerosene". The treatment lasted four days and finally the bird opened its eyes and began to eat. F. B. Hadley and B. A. Beach reported research on "Controlling Chicken Pox, Sore-head, or Contagious Epithelioma by Vaccination" in the Proceedings of the American Vet. Med. Assoc. Vol.50, pp 704-712, 1913.

Drs. Theobald Smith and Veramus A. Moore (Bul.No.1, Cir.No.5, BAI, USDA) in 1895 described the cause and symptoms of Blackhead - Infectious Entero-hepatitis of turkeys which had been recognized in the New England States for a long time. The designation "Blackhead" was not considered a good choice at the time, yet it has persisted to this day. Dr. Smith thought the causative agent was an Amoeba and named it *A. meleagridis* which Tyzzer in 1920 changed to *Histomonas* after he verified the parasite was a protozoan. F. B. Hadley and Kirkpatrick of Rhode Island Experiment Station contended the cause was a coccidium. Cooper Cutrice of the USDA in 1907 wrote one of the first bulletins on the rearing of turkeys "With Special Reference to 'Blackhead' Disease". The transmission of Blackhead by Heterakis embryos was reported by H. W. Graybill and Theobald Smith in the Journal of Experimental Medicine, 1920, Vol.31, pp. 647-655. This discovery was fundamental to the implementation of successful control programs of this most devastating of turkey diseases.

Tuberculosis in fowls was a very common disease and it was then considered that "higher animals" could not acquire it from fowls. It was some 30 years later before the spread of avian tuberculosis to swine was verified. The avian tuberculin wattle test was never considered practical as ^{an adjunct to} a national control program. The demise of the farm flock system and the fast turn-over of modern flocks has almost eliminated this disease. Now it is most commonly found in aged fancy birds kept for exhibition.

There was much sentiment about the value of exhibition birds. Stoddard says, "We believe the sorrow that a person feels at the loss of a valuable bird is much greater than for a large animal". "Common dung hill fowls are not valued highly, but an exhibition bird may sell for as much as a horse". There is no question but that the bird fanciers set the standards for individual bird treatments. It was a "trial and error" system of home remedy use, not too different from the practice of physicians at this time. The popular trend was to treat with every known household remedy. There was very little science in the use of these remedies. Cayenne pepper was supposed to stimulate birds to lay better in winter. Stoddard writes, "gum camphor is worth trying for the reason that it may perhaps give the needed fillip to the liver and put an end to the congestion of that organ". Paradoxically, each author of the old texts would write a convincing paragraph that all poultry ills are "preventable". It is almost useless and rarely ever worthwhile to treat sick poultry", says D. W. Judd in "Profits in Poultry" 1887. Then in the next paragraph he lists the usual treatments of the day for all the ailments of poultry he contended could be prevented.

In these times only a few bacterial pathogens were known, many of the common parasites were identified but their life histories were vaguely understood, viruses and useful vaccines were unknown. Veterinarians were not concerned with poultry disease problems and the only sources of help were the BAI, USDA, and the State Colleges and Experiment Stations. Unfortunately, this situation continued well into the thirties.

Yet there was much common sense in many of the recommendations of the day. Leonard Pearson stated in 1898, "Contagious diseases and parasites are usually introduced by new fowls brought into the flock and it is worthwhile to place all new acquisitions in quarantine from the flock for a few days until it has been shown that they present no evidence of disease". Thorough physical cleaning, followed by disinfection was recommended procedure - all sound principles that represent the nucleus of our modern "Specific Pathogen-free Flock" techniques.

The enormous mortality in chicks and adult poultry stimulated the use of many remedies. In 1915 Rettger, Kirkpatrick and Card in Connecticut made a comparative study of the value of feeding sweet and sour milk on growth and mortality in chickens. In 1924 Kaupp and Dearstyne in North Carolina were experimenting with the use of lactic acid on disease-producing germs in fowls. Milk, buttermilk and sour milk were used extensively as "flushes" to treat digestive upsets and coccidiosis up until the advent of the sulfa drugs in the forties. Epsom salts and sodium bicarbonate were also employed as "flushes" to control a wide variety of diseases. Copper sulfate was

frequently recommended for intestinal disorders. The rapid growth of the poultry industry in the twenties stimulated a tremendous demand for remedies to reduce mortality. Family formulas were passed on to the entrepreneurs who, supported by a national advertizing campaign and armed with a good sales pitch and a secret formulation, could sell almost anything to poultrymen with no better source to turn to for help. Valco Tablets consisting mostly of potassium permanganate were added to the drinking water, and the attractive purple color convinced many a flock owner that chicken health hinged on the faithful application of this treatment. Eriksen cites several companies and their favorite products which poultrymen bought and used in lieu of more effective methods of control. Some of the products had distinct merit, such as those which helped to control parasites. However, as knowledge of the cause and prevention of poultry diseases increased and effective vaccines, sulfa drugs, antibiotics and insecticides came into use, most of the poultry remedy companies were either dissolved or absorbed by the big drug and biologic corporations.

Much of the progress in avian medicine has occurred since the early twenties. This period is concomitant with the beginning of the use of large incubators, the change in U.S. Post Office policy allowing the parcel post shipment of baby chicks, and the success in developing pullorum-free flocks for producing hatching eggs and chicks.

The use of chickens in research has contributed many historical "firsts" which have been valuable to both medical science and nutrition. Landmarks such as the discovery of the B vitamins, the

unveiling of the missing links of human malaria transmission, the use of chick embryos for growing viruses and for vaccine production, the transmission of the first tumor virus, and the immunization against viral tumors are examples of the enormous impact of poultry in biological research.

Succeeding reports of this AAAP history committee will highlight the accomplishments of the past fifty years and the poultry pathologists who did the work. Hopefully this will generate increased veneration for those who are responsible for our heritage and also serve to stimulate current scientists to higher standards of achievement.

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