

to the field of genetics by the published work of people like Bateson and Punnett. It was Bateson who proposed the name of the new science as "genetics." Had not Mendel's findings been recognized in 1900 we might know, as Hutt later would tell his students, the science as Batesonian genetics, because Bateson, starting in 1898, studied the inheritance of comb type in chickens and demonstrated dominance versus recessiveness, as well as 3:1 ratios in the F₂ generation. This was first reported in 1901.

He earned the M.S. degree in Genetics in 1925 from the University of Wisconsin. Because Dr. Hutt's interests were in genetics of animals, his advisor (Dr. Leon Cole) suggested further training in zoology. While serving as a lecturer at the University of Manitoba, he earned an M.A. degree in zoology in 1927. The book on animal genetics by Professor F. A. E. Crew (1925) drew him to the University of Edinburgh, Scotland, where he completed a Ph.D. degree in genetics in 1929.

Based on the quality of his research over the next 10 years, he earned a D.Sc. degree in genetics from the University of Edinburgh in 1939. This was his 5th earned academic degree. He would receive additional honorary degrees later.

Employment. In 1931, he joined the faculty of the University of Minnesota as Professor of Poultry Husbandry and Animal Genetics.

He was recruited to Cornell University in 1934 to succeed 'Jimmy' Rice as Chairman of the Department of Poultry Husbandry. President Edmund Day soon recognized Hutt's capabilities and moved him from the College of Agriculture to the College of Arts and Sciences as Chairman of the Department of Zoology, a position he held from 1939-1944. During this period, he continued his research at the Poultry Department and taught a course in Human Genetics.

In 1944 he returned to full time at the Poultry Department at Cornell, without any administrative responsibilities, so that his basic interests in genetics and breeding, as clearly demonstrated in research and teaching, could be continued and expanded. He retired in 1965, and continued to serve as an emeritus professor for many years.

Teaching. Professor Hutt's teaching career at Cornell began with a course in Poultry Genetics that continued for about 30 years

His long-term interests in genetics of domestic animals and resistance to disease led, with the approval of Dean Hagan of the College of Veterinary Medicine, to a course in genetics designed especially for veterinary students. The purpose was to teach them the role of heredity as it applied to their profession. He taught this basic course for 20 years. To demonstrate the basic principles of Mendelian genetics, he surveyed the literature and selected data that involved domestic animals. This stimulated the veterinary students' interest much better than if had he used the more common sources of such data involving fruit flies or plants. When it came to sex linkage, he used his data on hemophilia in dogs, which quickly aroused the students. This was the first time such a course was taught at any veterinary college.

Professor Hutt excelled in the quality of his teaching. He set very high standards for his students and associates. They had to know not only the genetics of the trait or character under consideration but also the biology involved. His lecture material was tremendous and included information and facts that he had obtained from the literature.

Textbooks. As an adjunct to his teaching, Hutt authored a number of important texts. . In 1949, after gathering research information over the years for his lectures from his own research and that from all over the world, he wrote the classic work, "Genetics of the Fowl," which soon became the "bible" for all those interested in poultry genetics and poultry breeding. Because of the importance of this text and its need all over the world, it was translated into Spanish and Polish.

In 1958 he wrote another book - "Genetic Resistance to Disease in Domestic Animals." This was followed in 1964 to another excellent text book, "Animal Genetics." After retiring in 1965, as was then required by Cornell University, a continuing request from many people for information on genetic traits of importance to dogs led to his "Genetics for Dog Breeders" in 1979. Then, in 1982 with the help of a former graduate student (B. A. Rasmusen) as junior author, he prepared the 2nd edition of "Animal Genetics." All of his books, like his scientific publications, were extremely well written in a form easily understood by laymen and scientists alike. He would cite the facts from the literature, rather than opinions or beliefs, and then state his interpretations of the information provided.

Professor Hutt in 1985 convinced the Poultry Science Association that the enormous amount of new information in the field of poultry genetics should be organized and made available in a comprehensive text, much as he had done in 1949. In this way he played a seminal role in the important text, "Poultry Genetics and Breeding", edited by Roy Crawford and published in 1990. Hutt prepared the Preface for this excellent book, a noble achievement for a man of 90+ years.

Research. His research in the field of poultry genetics involved many anatomical and physiological traits but concentrated on resistance to disease. He emphasized the need to combine selection for economic traits with that for resistance to disease and clearly demonstrated by his research that it could be accomplished. He created the first chromosome map for the chicken, with the traits illustrated by photographs. Among his 250± scientific publications was one concerning his discovery of the sex-linked gene that causes dwarfism. The *dw* gene is now used around the world to produce economically efficient mothers of broiler chicks.

Hutt was the originator of the procedure to measure egg production to a given age (500 days) rather than for a period of 365 days from first egg. This proved to be of special value to the breeder who used a long-term production period to evaluate performance by an individual or family. Because of its beneficial effects on the management of layers under test, this procedure was adopted by the random-sample tests world-wide as well as for the evaluation of pedigreed populations. It permits the effective use of limited laying house facilities because the test period can start at the same time each year and finish prior to starting records for the next year.

He originated the idea of “double-shift” for testing the value of young males as sires. This procedure results in the need for fewer dams in a breeding program. Those used can, therefore, be potentially the very best among the population from which chosen. This also demonstrated that two full-brothers, which were of equal value with respect to pedigree and family performance, could differ considerably in the quality of the progeny produced from the same dams.

He also strongly endorsed the concept of selecting breeders, especially sires, on the basis of the performance of a good sample of progeny. This procedure was shown to be extremely effective. Its use in the future is likely to expand as plateaus in performance seem to have developed under the technique of selection on the basis of individual and family performance, over a part-year period.

In the mid-1930s, Hutt began a program of breeding for resistance to disease in chickens, with special emphasis on the then uncontrollable lymphomatosis (now known as two viral diseases, Marek's disease and avian leukosis). The program involved selection of breeders on the basis of the performance by their progeny. Combining selection for either resistance or susceptibility to disease with that for economic traits led to the development of three strains—two disease-resistant and one highly susceptible—of White Leghorns that still exist and are being used for research purposes by many scientists. The role of heredity in nutrition was proven by his strains selected for high or low requirement for arginine. He also showed that resistance to a bacterium (*Salmonella pullorum*) involved the chick's ability to develop a higher body temperature and that this trait was under genetic control. Wherever feasible, he stressed genetic resistance to disease as a hereditary factor the animal breeder should take advantage of when selecting parents to be used to improve economic traits in domestic animals.

At seminars and scientific presentations by others, he would often ask very specific and incisive questions. They would often force the speaker to come to some conclusion or to recognize that other information had not been considered. A common question involved the extent to which heredity might have played a part in the findings when the subject being discussed was not one of genetics.

Professor Hutt enjoyed using examples to illustrate the strong influence of genetics on resistance to diseases. On one occasion, he lectured to animal scientists on the potential value of selecting for resistance to mastitis in cattle. He suggested that if oysters could develop resistance to a specific disease, as they had done at the Malpeque Bay in Canada, so might cows. He was also very responsive in a similar manner to some questions. At an evening banquet in England, Dr. Hutt was introduced to a famous Englishman, Dr. J. B. S. Haldane, who responded - "you must be the chicken geneticist." The answer was -"no, I am the fowl geneticist - but please make sure you spell that word correctly."

Professional Societies. Fred Hutt took an active part in the Poultry Science Association. In 1931 he was elected Vice President at the time "Jimmy" Halpin became President. Because of the great depression, Professor Halpin could not attend the 1932 meeting of

the Association in Amherst, Massachusetts. Thus, Dr. Hutt presided over the 1932 meeting and again, as President, at the 1933 meeting in East Lansing, Michigan. At the age of 35, he was the youngest person ever to hold that position. He was also the first member to receive the Association's Research Award in 1929. Later, in 1946, he received the Borden Award and then, in 1947, was made a Fellow of the Poultry Science Association.

Dr. Hutt served on the Editorial Board of the Journal of Heredity for 25 years. He was a visiting lecturer at many universities in the United States and elsewhere. He also served as a consultant to commercial poultry breeders in England and the United States. He was a member of 10 or more scientific societies or associations.

Graduate Students. Hutt trained some of the very best and most important contributors to the field of avian genetics. Included in this list (chronologically) are Welford F. Lamoreaux, Randall K. Cole, Paul D. Sturkie, John C. Scholes, Robert F. Ball, Clyde D. Mueller, Dean G. Jones, Robb F. Gowe, Benjamin A. Rasmusen, Cecil E. Howes, and Roy D. Crawford. Most of these persons are well known for their contributions to the development and improvement of the poultry industry.

Awards. Hutt received many awards for his outstanding accomplishments. He received the Poultry Science Association Research Award in 1929 and later the Borden Award for Research in 1946. He received the Tom Newman International Award for Poultry Husbandry Research in 1960 for his discovery and detailed study of the sex-linked gene for dwarfism in chickens. The awards he appreciated most were being made an Honorary Fellow in the Royal Society of Edinburgh in 1975 and his elections to the American Poultry Hall of Fame in 1980 and to the International Poultry Hall of Fame in 1988. He also received an Honorary Doctor of Science degree from the University of Brno (Czechoslovakia) in 1965. This was especially significant since it was at this institution, then listed as in Bruun, Austria, that the science of genetics had its origin under Mendel. His alma mater, the University of Guelph, bestowed the Honorary Doctor of Science degree on Dr. Hutt in 1974.

He was also named as Honorary Member at the first International Congress of Genetics Applied to Livestock Production Madrid (1974) and was a Fellow of the American Association for the Advancement of Science and also of the Poultry Science Association.

Character. Dr. Hutt set an excellent example of neatness and orderliness in all his research records and other material, including that used in classes, and encouraged his graduate students to do likewise. His critiques of seminars and of papers being written by students bore forewarnings that these be not only factual but also correct in diction, spelling, and grammar.

His office door was always open to anyone who wanted help, advice, or information. Many times it did not involve genetics, but, if in the field of biology, he often could provide an answer. His memory of what had been done and by whom many years ago provided answers to many questions.

Family. At the time of his death on September 6th, 1991, Professor Hutt was survived by two sons, Bruce and Robert, and a daughter, Margaret, as well as 13 grandchildren and 12 great-grandchildren. There are many others, not genetically related to him, who will continue to remember Professor Hutt for his wit and for his contributions to their erudition, education, training, knowledge, and careers related to poultry science and the poultry industry.

Revising author's note: This biography was compiled from several short biographical documents provided by Dr. R.K. Cole in 1997, most of which he had authored. Cole was a student and long time colleague of Hutt and was dedicated to preserving the personal story of his mentor. Cole's own biography will shed additional light on Hutt's story (see AAAP website and archives). Jointly and individually, Hutt and Cole have left an important legacy. In the present biography, all of the ideas and most of the words are Cole's

This biography was edited by Larry D. Bacon.

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

Photo reproduced by permission from Iowa State University Library/Special Collections Department.

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

Iowa State University

Ames, IA 50011-2140

Phone: (515) 294-6648

Fax: (515) 294-5525

WWW: <http://www.lib.iastate.edu/spcl/index.html>