The Internet-First University Press

The Rise and Fall of the Cornell Poultry Department, 1903-1991

Malden C. Nesheim

James E. Rice (1865-1953)

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Published by The Internet-First University Press
Ithaca, NY, USA
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1. A Personal Introduction

This is a history of the once distinguished poultry department at Cornell University, which began as a sub department in the Department of Animal Husbandry in 1903 and closed as the Department of Poultry and Avian Science in 1991. The department was formed in recognition of the role poultry could play in improving farm income in New York State. The department fully succeeded in its roles of teaching the principles of poultry husbandry to a body of undergraduates, training researchers, providing technical assistance to New York farmers, and conducting research on topics of importance to the poultry industry. The results of the department's research eventually contributed to the industrialization of poultry egg and meat production in the United States and to the moving of centers of production to states where labor and climate conditions were most favorable. As a result, the poultry industry became a small and relatively unimportant part of New York State agriculture. I was a graduate student and faculty member in that department for 18 years from 1956 until 1974 when I left to direct Cornell's newly formed Division of Nutritional Sciences. Ironically, I was Cornell's Provost—chief academic officer—and presided over the department's closure. This history draws on my experience as a member of the department and what I have since observed.

My experience with chickens began early. I grew up in the 1930s on a family farm in Illinois, the seventh of eight children. My parents kept a flock of about a hundred laying hens. In the spring, they ordered baby chicks from a hatchery; these were delivered by our local mailman. We put the chicks in a small house in the apple orchard and kept them warm with a brooder heated by kerosene. As the chicks grew, we released them to range around the farmyard and roost at night in the apple trees. In the fall, we moved the young pullets to the laying house where they matured and began to lay eggs.

Our chickens were free range except in winter when we confined them. They foraged for grass, insects, and worms, and we supplemented this diet with grains raised on our farm and commercial feed. We also fed them table scraps and garden waste. This meant that their diets were varied enough to provide all necessary nutrients—years before the nutritional needs of chickens were fully understood.

One of my childhood after-school chores was to collect the eggs produced each day. These were a critical component of my family's livelihood. My mother used the eggs as part of our family meals and took the surplus to our local grocery store to exchange for flour, sugar, and other necessities. As the roosters matured, they ended up as Sunday dinner. The crowing of roosters in the early morning was a familiar sound on our farm. These methods of raising and using chickens were typical on Illinois farms of that time.

Unaware of other options, I went to the University of Illinois to study agriculture. I completed an undergraduate degree in Agricultural Science and a master's degree in Animal Science, and then did two years of active duty in the US Air Force. In the 1950s, the commercial feed industry was flourishing in the United States and many jobs were available for people with doctoral degrees in animal nutrition. My University of Illinois mentors advised me to go to Cornell to develop some expertise in poultry nutrition as a way to make me more employable in the feed industry.

I arrived at the Cornell poultry department in the fall of 1956 as a doctoral student. I worked in the laboratory of Dr. Milton Scott studying the role of vitamin E and selenium in growing chicks. By the end of 1958, as I was nearing completion of the research, I began interviewing for jobs in the animal feed industry in anticipation of completing my doctoral dissertation in the spring of 1959. But instead, the head of the poultry department offered me an assistant professorship, and I remained at Cornell[1]. As a faculty member, I began a program of research on the amino acid metabolism of chickens[2].

The poultry industry in the early 20th century

Much of what we know about the early poultry industry in America is summarized in the book, *Poultry Production,* written by W.A. Lippincott, Professor of Poultry Husbandry at Kansas State College, in 1914. In 1910, he reports, 5.5 million farms raised some kind of poultry, and these represented 88% of all US farms at that time. Most raised chickens; only a small percentage reported raising turkeys, ducks, geese, guinea fowl, or pigeons.

The largest number of chickens were on general farms in mid-Western states, but production was also concentrated in New York, Pennsylvania, and New Jersey, and in California around the major urban markets. As with my family's farm, most farms raising poultry were highly diversified. Few farms raising only poultry were able to stay in business. About two-thirds of poultry income came from eggs; only one-third came from meat. The broiler industry did not exist. Chicken meat came from discarded laying hens or males raised incidentally with young layers. Egg production was largely seasonal, with fewer eggs produced in the winter. Few farms used artificial lighting to stimulate year-round production.

There were a few exceptions. An area around Vineland, New Jersey, specialized in out-of-season eggs and meat for the New York market. The Petaluma, California, region did the same for San Francisco and Los Angeles. Rhode Island had specialized farms that produced brown eggs for New England markets.

This was the state of the poultry industry when the Cornell department was established.

1 Note that I was given the job through none of the formal search procedures—application, interviews, letters of recommendation, lectures to students—now routinely required. My job offer continued a pattern in which the department typically hired its own students. With few exceptions, most of its faculty over the years had trained at Cornell.

2 I describe my research career in Malden C. Nesheim, "An Unexpected Life in Nutrition," *Annual Reviews of Nutrition* 32(2012): 1-15.

2. Origins of Cornell's Department of Poultry Husbandry: Jimmy Rice

On April 27, 1865, Governor Reuben Fenton of New York State signed legislation establishing Cornell University as the Land-Grant Institution of New York State. Thus, in contrast to most states, a private university became responsible for agricultural education in New York State. Its early years have been described in detail in historian Gould Colman's *History of Agricultural Education at Cornell*[3]. Isaac Roberts, a Professor of Agriculture from Iowa State University, provided leadership to Cornell's relatively small agriculture program from 1874 to 1903. These were years in which the US struggled to develop policies to support agricultural instruction and research nationwide. Agricultural experiment stations were established in several states and the federal government began to support agricultural research and development.

In 1903, Liberty Hyde Bailey, Professor of Horticulture at Cornell, was named Dean of the College of Agriculture and Director of the Agriculture Experiment Station to succeed Roberts. Bailey and Cornell President, Jacob Schurman, worked to gain support of the New York State legislature for state support of agriculture. These efforts succeeded in 1904 when the New York State legislature officially designated the Cornell College of Agriculture as the New York State College of Agriculture to be fully administered by Cornell University but with State support for its facilities and programs. With this support, Bailey was able to expand the work of the college well beyond that of the Roberts days, recruit many new faculty, and create new departments.

The 1903 event that begins this history is Bailey's appointment of James E. (Jimmy) Rice as Assistant Professor and Head of a sub-department of Poultry Husbandry within the Department of Animal Husbandry. Rice was born March 12, 1865, on a farm near Aurora, Illinois. Some of his family wanted him to become a doctor, like his grandfather, but Rice's father urged him to go to Cornell to become an "educated farmer". Isaac Roberts, the Dean of the College of Agriculture wrote in his autobiography about a smiling young student who asked him why the college did not have a poultry department. Roberts said: "*I had seen so many persons go through the chicken fever and come out like a moulting hen sitting on one egg that I was in a critical frame of mind*[4]." But Rice eventually got Roberts interested and together they built a chicken house on the campus from a pile of lumber left from an old barn. When Rice graduated in 1890, he did so as the first Cornell student to present a thesis on a poultry subject for a B.S. degree. His thesis was entitled "The effect on fowls of nitrogenous and carbonaceous rations"[5]. Roberts immediately appointed Rice as a graduate assistant and assigned him to teach the first course in poultry husbandry at Cornell—ten lectures to about fifty students. According to the 1891-92 Cornell register, the course Agriculture 10 covered breeding and management and construction of hen-

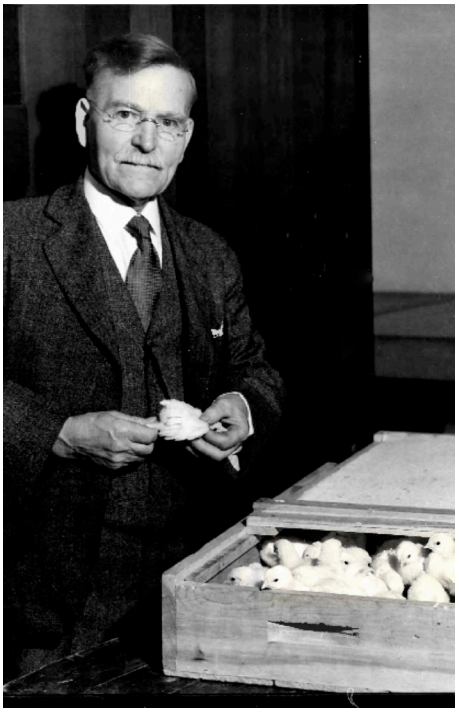

Figure 2.1. James E Rice

3 Gould P. Colman, *Education and Agriculture: A History of the New York State College of Agriculture at Cornell University* (Ithaca, NY: Cornell University Press, 1963).

4 Isaac Phillips Roberts, *Autobiography of a Farm Boy* (Ithaca, NY: Cornell University Press: 1916, reissued in 1946).

5 J.H. Bruckner Papers, box 12, Cornell University Archives.

neries[6]. But after 2 years as a graduate assistant, Rice wanted to return to the farm and left Cornell to establish a full-time general and poultry farming business—known as Mulford and Rice—in Bucks county Pennsylvania and later as White and Rice at Yorktown, New York, where he remained until returning to Cornell in 1903.

During his farming years, Rice actively promoted the poultry industry, claiming that he gave 393 lectures about scientific poultry raising to farm institutes in four states[7, 8]. For most farmers of that era, keeping poultry had mostly been a sideline business. As in my family, it was conducted mainly by wives and children for grocery money. Rice was convinced that egg production could become more than a sideline and that the poultry-and-egg business should command as much respect as other branches of agriculture.

Because Rice left his papers to the Cornell Archives, we know some details about how Bailey recruited Rice back to the college[9]. Bailey told Rice that New York State had provided $3000 a year for poultry research, and that he would pay Rice an annual salary of $1500, as any more than that would limit the money available to support the program. Because the future of state support was uncertain, Bailey recommended that Rice take a leave of absence from his farm business in case further support for the program did not materialize. He appointed Rice as Assistant Professor and Head of the sub-department of Poultry Husbandry under Hiram Wing, Head of the Department of Animal Science.

But the program flourished and in 1907 Rice was named Professor and Head of a separate, newly created Department of Poultry Husbandry. This made him the first Professor of Poultry Husbandry in the United States and, most likely, in the world. The department was the first to offer graduate work and to award doctoral degrees in Poultry Husbandry in the United States. Until 1944, the department enrolled more graduate majors than all other poultry departments in the US combined[10]. Over the years, Rice became recognized as the "Father of Poultry Husbandry," disseminating his influence through his students.

Poultry instruction was quickly established in agricultural colleges throughout the United States either in separate poultry husbandry departments or in animal science departments.

The Rice papers in the Cornell Archives cover his career from the time he was a student to the end of his life. Rice was a prolific correspondent and writer. His papers take up more than 50 boxes and have only been minimally cataloged. The finding aid is cursory and locating specific information is a daunting challenge. The papers document Rice's passion about the importance of poultry raising to farm income and his tireless promotion of poultry raising throughout the United States. F.B. Hutt, who succeeded Rice as head of the department, commented that if Rice had not been teaching poultry husbandry, he might have been a wonderful evangelist in the Billy Graham tradition[11]. Twenty-nine of Rice's students became heads of poultry departments throughout North America.

6 *Everybody's Poultry Magazine*, October 1966, p. 22, Bruckner Papers, box 12, Cornell University Archives.

7 This information is from the J.H. Bruckner Papers, box 12, Cornell University Archives. Some sources give the figure of 1134 lectures during this time but the figure of 393 seems more likely.

8 J.H. Bruckner, G.O. Hall, and G.E. Peabody, Cornell University Faculty Memorial Statement https://hdl.handle.net/1813/19125

9 Letter to Rice from Liberty Hyde Bailey, 24 August 1903, James E. Rice Papers, box 5, Cornell University Archives.

10 "Centennial Report to American Poultry Historical Society," Bruckner Papers, box 1, Cornell University Archives.

11 Frederick Bruce Hutt Oral Histories, #13-6-2082, Division of Rare and Manuscript Collections, Cornell University Library.

Rice's influence reached far beyond his role at Cornell. Along with W.R. Graham from the University of Guelph in Canada, Rice was one of the founders of the Poultry Science Association, the professional society of the field. They organized the association at a meeting at Cornell in July 1908. Rice's role in the association is outlined in a *History of the Poultry Science Association,* published in 1958 on the occasion of the 50th anniversary of its founding[12]. Along with several international colleagues, Rice also helped establish the World's Poultry Science Association in 1912 and was instrumental in organizing several World Poultry Congresses.

Rice was also a ready participant in the faculty politics at Cornell. Though the College of Agriculture had state financial support, its administration was left entirely to Cornell University. When Bailey retired as Dean of the College in 1913, the search for his replacement was of considerable concern. Some faculty, including Jimmy Rice, did not want the newly designated New York State College to be overly controlled by Cornell President Jacob Schurman, whereas Schurman wanted the college Dean to have the same relationship to the University as other colleges on campus. To replace Bailey, Schurman chose Beverley Galloway, who was then an Assistant Secretary at USDA. Rice was one of the leaders of the faculty and alumni opposition to Galloway. He was largely opposed because he was Schurman's choice and his appointment would reduce the independence of the College by the Cornell administration. Despite the opposition, Galloway was appointed to direct the college, but with little support from the faculty; he lasted only about two years.

Figure 2.2. Portrait of Jimmy Rice painted in 1929 by O.M. Brauner. The painting is displayed in conference room 109 in Rice Hall.

Rice generated enormous enthusiasm for his role as a teacher, advisor, and leader of the department. In February 1928, a group of former students met in Ithaca to plan a testimonial for Rice to recognize his 25 years as department head. The group decided to commission an oil portrait, and it solicited contributions; it received them from more than 300 of his students. The collection amounted to about $2000, enough to support the project. The commission went to Cornell art professor O.M. Brauner, who presented the painting to Cornell at a ceremony on February 12, 1929 (see Figure 2.2). When the portrait was unveiled, Rice was given a scroll:

To Jimmy Rice, pioneer teacher of instructors and investigators, friend and champion of poultrymen and lover of hen and man. The fact that you have completed a quarter of a century of brilliant service in the New York State College of Agriculture offers us, former students and friends, this appropriate occasion to acknowledge publicly this service, to show

12 http://www.poultryscience.org/docs/1st_50_years.pdf

our appreciation for the inspiration and help you have been to us as individuals and to testify to your many practical contributions to the poultry industry of the United States and the world. Your teaching fired us with enthusiasm, your immense energy and clear vision, your unbounded faith in the hen, and your still greater love for your fellow man have been an inspiration to us. We wish to convey to you not only our indebtedness to you for the efforts of your contributions to the material facts of poultry husbandry, but also our affectionate regard and our appreciation of the influence of the more intangible values as inspired by your philosophy of life[13].

Throughout his years as department head, Rice supported and was involved with department and college undergraduates. In 1928, he donated funds to establish what became known as the Rice Debate Stage, a contest to encourage students' written and oral defense of agriculture. The program survives to this day in the Department of Communication in the College of Agriculture and Life Sciences. Now known as the Eastman-Rice Stage speaking contest, it awards cash prizes for undergraduate winners.

After leading the department for 31 years, Rice reached the then-mandatory retirement age of 68 and had to end his academic career. The occasion of his retirement sparked events and tributes. The Poultry Science Association sponsored a dinner in Ithaca in Rice's honor on June 2, 1934. Among many speeches, one by Liberty Hyde Bailey detailed Rice's extraordinary influence on poultry science:

Of course I go back to the time when there was no interest in poultry husbandry except for the one who taught it. In general the idea of establishing a means of education under the name poultry husbandry was so unusual that the men in Albany hardly took the pains to criticize or refuse, but merely laughed at it. It is unnecessary to say anything about the success that has attended this department at Cornell. Its success was made possible by no less a person than James E Rice, who had the ambition to organize and the ability to utilize the material that came to hand[14].

A large number of his former students commented on the role Rice had played in their lives. One of the students, Professor A.M. Sherwood of Texas A&M, said:

I was thinking this morning that if we were to work out a pedigree of all the poultry workers in the United States, we would find that the first, second and third generation back, Professor Rice's name would appear in every one of them. In other words, he is the father, grandfather, or great grandfather of poultry instruction of practically every poultry worker in the United States[15].

As an additional honor, Rice (and W.R. Graham of the University of Guelph in Canada) were named fellows of the association at the dinner.

Under Rice's leadership, the department grew from two faculty—Rice and an assistant professor—in 1907 to one with 13 faculty members, several graduate students, a large undergraduate teaching program, a statewide extension program, a dedicated building, and a farm. When Rice retired, the Cornell poultry department was the largest and best-supported department of its kind in the United States.

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13 Rice testimonial and portrait, Bruckner Papers, box 7, Cornell University Archives.

14 L.H. Bailey in a talk at a testimonial dinner on the retirement of Professor Rice at a Poultry Science Association meeting, June 2, 1934, James E. Rice Papers, box 5, Cornell University Archives.

15 Rice testimonial dinner, J.H. Bruckner Papers, box 7, Cornell University Archives.

Following his retirement, Rice continued to be active in poultry organizations, particularly the international ones. He was president of the World's Poultry Science Association from 1939 to 1948, and was then made Honorary Past President. In the meantime, Rice's former students and colleagues led a campaign to have the Cornell Trustees name the poultry building in his honor. The Dean of Agriculture at the time, Carl E. Ladd, indicated that the Cornell Trustees were reluctant to name a building after a living person, but eventually they agreed. The poultry building was dedicated as Rice Hall on June 29, 1940, at a ceremony where Dean Ladd, Cornell President Edmund Day, and Liberty Hyde Bailey spoke (see Figure 2.3)[16]. Rice Hall would become the first college building named for a poultryman (see 3.4 in Chapter 3); it was added to the National Register of Historic Places in 1984. In 1948, Rice's wife, Louise, commissioned a sculpture of a bronze bust of Jimmy Rice by Edna Sortelle as a gift to Cornell University. The bust is still located in a niche on the main floor of Rice Hall (Figure 2.4).

Also in 1948, in recognition of Rice's 83rd birthday and the 8th World's Poultry Congress, Earl Benjamin, Rice's first PhD student, wrote a tribute to Rice, *He Reaches the Souls of Men*. Benjamin's short pamphlet is a personal

Figure 2.3. Jimmy Rice, Cornell President Esmond Day, and Liberty Hyde Bailey at the naming ceremony for Rice Hall June 29, 1940. Cornell University Archives.

16 *Cornell Daily Sun*, June 14, 1940, p. 18.

description that makes clear what made Rice an icon to the worldwide poultry industry. Here is a short excerpt:

> *On March 12, 1948, Prof, as we lovingly call him, was 83 years old. On these occasions he receives messages from all parts of the world. They pay tribute to the character and leadership of this "maker of men and women". Rice's students have become staff members of most of the land-grant colleges and experiment stations in the United States. Thousands more have become successful farmers. Others have become business men, editors, leaders of thought. How well, we who knew him remember occasions when he would hold up an egg before an audience and so expound on its beauty, symmetry, health qualities and the glorious processes in its production that, though you never heard a hen cackle, you were ready to start at once in the poultry business*[17].

Figure 2.4. Bust of Jimmy Rice in Rice Hall

In 1950, department alumni led an effort to raise a fund of $25,000 to be used to establish the James E. Rice Memorial Library in Cornell's Mann Library. Today, this collection is a major repository of information about poultry science.

When the campaign to raise funds for the Rice library was underway, F.J. Keiholz, Associate Editor of *The Country Gentleman*, wrote an article about Rice entitled *He Put His Faith in Hens and People*. In the article, Keiholz provided this caption for a photo of Rice: "Meet the Man Who Fathered our 3 Billion Dollar Poultry Industry, and now at the age of 84 is still leaving his mark on the industry all over the world." Keiholz describes how Rice invented the trap nest that would allow the ability to quantify the egg production of individual hens. This was a great advance for poultry breeding. He also invented a gasoline brooder that would allow up to 200 chicks to be kept warm in their early days after hatching. The brochure describing the library project had an illustration (Figure 2.5) outlining the growth of the industry over Rice's 50 years of contributions[18].

17 Earl W. Benjamin, *He Reaches the Souls of Men*, 1948, Cornell University Library.

18 Brochure from the James E. Rice Poultry Library Project Committee. J.H. Bruckner Papers, box 12, Cornell University Archives.

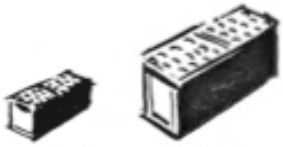
AN AMERICAN INDUSTRY IS BORN

. . . and has grown to Maturity

Measures of Growth of the Poultry Industry in the United States During Fifty Years of Active Participation by Professor James E. Rice

Egg production per hen has almost doubled.

1900—66 eggs
1948—129 eggs



Total egg production has increased three and one-half times.

1900—16,000,000,000
1948—55,000,000,000

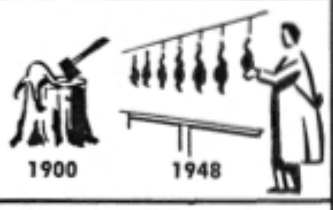
Commercial chick industry was established.

1900—0
1948—1,300,000,000

Hens and pullets on farms January 1.

Poultry is the only class of livestock which has increased as fast as the human population of this country.

POULTRY POPULATION	HUMAN POPULATION
1900—234,000,000	**1900—76,000,000**
1948—426,000,000	**1948—147,000,000**



Commercial broiler industry established.

1900—0 **1948—350,000,000**

The production of turkeys and ducks has also grown tremendously in this same time.

The Use of Feed by Poultry has More than Doubled

1900—11,932,000 tons
1948—25,732,000 tons

This doesn't fully measure the growth of the commercial feed industry for in 1900 most of the feed used was home grown and home mixed. But to-day a high proportion of poultry feed is commercially manufactured.

Figure 2.5. The growth in the US poultry industry, highlighting Jimmy Rice's contributions, 1900-1948.

3. Early Programs in Teaching and Extension

When Jimmy Rice returned to Cornell in 1903, there were few facilities to support the new Department of Poultry Husbandry. Jimmy Rice and Isaac Roberts had built a chicken house in 1890, during the period when Rice was teaching after his graduation, but a more substantial facility was needed. The new building (Figure 3.1) was thrown together in 1904 with the help of a $600 appropriation and income obtained from the salvage of material from an old copper building that housed the Physics department and the Cornell filtration plant.

Much of the labor for construction of the new building was provided by students. The completed building had a footprint of 30 by 40 feet and was two stories high with a basement. The basement housed the slaughter house, incubator room, and egg room. The ground floor had a feed room, locker and wash room, reading room, museum, carpentry shop, and faculty offices. Five of the six rooms on the second floor were occupied by student assistants who took care of the chickens kept in small houses near the new building[19]. Figure 3.2 shows the poultry building and poultry houses as they looked in 1907.

Figure 3.1. The original Poultry Husbandry building was constructed in 1904 from materials scavenged from buildings housing the physics department and a filtration plant (*Cornell Countryman,* October 1904).

Figure 3.2. The Cornell poultry building and plant in 1907. The original poultry building is on the right; chicken houses range behind the building. Courtesy of Edward D. Cobb, Section of Plant Biology, Cornell University.

19 James Rice, *Cornell Countryman*, October 1904.

In 1910, the department consisted of Jimmy Rice, Assistant Professor C.A. Rogers, and five student assistants[20]. The faculty taught general Cornell undergraduates, students in the two-year poultry program, and students enrolled in a 12-week winter poultry course. In 1909, 167 students in these groups took poultry courses, and the number grew to 696 by the 1912-13 academic year. The 1921-22 catalog of Cornell's New York State College of Agriculture listed 17 courses in various aspects of poultry husbandry taught by Rice and several other faculty members.

Use of the new facilities focused on research from the start. In 1910, the research was highly applied and aimed directly at helping poultry farmers. Projects included studies of the anatomy of various breeds, how to breed for vigor, when layers should be molted, the value of feeding oyster shells to laying hens, and the effects of adding milk to the feed.

In 1914, the faculty established two lines of chickens—one bred for high egg production and the other bred for low production. After 20 years, the line bred for high production produced twice as many eggs as the low production line under the same conditions of management and feeding (Figure 3.3)[21]. Research in the 1920s focused on feeding projects, efficiency of egg production, improvement in fertility and the hatching quality of eggs, mineral requirements, protein quality in feed, effects of sunlight on egg production, the provision of green feed (fresh grasses), and the vitamin and calcium requirements of poultry. There were also projects on housing design and several on artificial light as a stimulus to egg production.

Figure 3.3. Two lines of chickens bred for high and low egg production (Rice papers Cornell University Archives).

From its beginnings, the department engaged in extension work. In his 1913 annual report, Rice noted that the department had sent out 11,502 letters the previous year providing advice on poultry raising. The department's outreach efforts seem extraordinary. From October 28 to 31, 1912, it ran a farm train on the Auburn and Batavia branches of the New York Central and Hudson River Railroad (I haven't found references to this train in other years; whether it was a regular feature of the extension program is uncertain).

The train stopped at Syracuse, Auburn, Seneca Falls, Geneva, Canandaigua, Honeoye Falls, Le Roy, and Batavia. Remarkably, 2,100 people visited the train along its various stops. According to the 1913 annual report:

> *Two coaches were used, one was equipped for demonstration purposes; the other was equipped for lectures and discussions on the more important phases of poultry husbandry, including feeding for egg production*

20 James Rice, *Cornell Countryman*, October 1904.

21 Unknown author, Rice Papers, box 4, Archive 21/31/455, Cornell University Archives.

and for market broilers, grading of eggs, construction of poultry houses, principles of breeding and other items related to the raising of poultry for profit. The demonstration car contained exhibits of poultry appliances, including egg and poultry carriers, picking boxes, feeding hoppers, and trap nests; also photographic enlargements and charts showing methods of rearing chickens and caring for fowls, and the results of experiments with poultry[22].

The hastily constructed building of 1904 proved inadequate and in 1910, the New York State Legislature appropriated $90,000 for a new poultry building. Rice called for the new building to be located near other agricultural college buildings and to include ancillary buildings close by for teaching students about chicken brooding, fattening, and egg production. He argued that poultry husbandry could not be taught effectively by lectures, textbooks, and laboratory work alone; the students needed hands-on experience. Also that year, the University gave the department 50 acres off what is now Warren Road in Forest Home to use as a poultry farm. The new poultry building was completed in 1912 (Figure 3.4). By then, the University had added another 30 acres to the poultry farm. These farms were important not just for their teaching and research function, but Rice indicates that the income from the flocks on the farm was vital to the health of the department, especially as the Depression hit in the early 1930s.

Figure 3.4. The new poultry building after its completion in 1912 (James E. Rice Papers, Cornell University Archives).

22 Twenty-Sixth Annual Report of the NY State College of Agriculture at Cornell University and the Agricultural Experiment Station, Ithaca, NY, 1913, part 1, p. cxxix.

Rice observed that although the legislature had not appropriated funds for maintenance or equipment, the farm would be self-sustaining as far as operating expenses were concerned. Of the legislature's funding for the new building and the University's provision of 50 acres for a farm, Rice said:

> *Either of these events would be epoch making in this country in the development of a poultry department in a college of agriculture. The people of the state and of the college may well rejoice in this splendid evidence of a broad conception of the needs of a great agricultural industry—an industry, that until recently has been almost completely ignored by agricultural colleges and experiment stations. The benefits from this new building and new poultry farm will not be limited to this State. The Empire State and Cornell University have set an example the influence of which will be worldwide*[23].

Rice was prescient in this statement. Poultry departments soon flourished in other agricultural colleges in the United States, with graduates of Cornell's poultry department providing much of their early leadership. The new building provided about 26,000 square feet of laboratories, classrooms, and office space. It also had three dormitory rooms to house students who helped look after the poultry housed in facilities around the new building (Figure 3.5).

Figure 3.5. A view of the Poultry Building and the surrounding area sometime before 1920. The small white building was called the Feed House; it was used to store feed ingredients and mix experimental diets. The buildings in the foreground were called the F and G houses and were used for nutrition and genetics studies. The Feed House (now with offices and called Little Rice) and the F and G houses remained for years. Courtesy of Edward D. Cobb, Plant Biology, Cornell University.

23 Twenty-Third Annual Report of the New York State College of Agriculture at Cornell University and the Agricultural Experiment Station, Ithaca, NY, 1910.

Students lived in those rooms until 1958 when the lack of fire escapes on the building was considered to render it unfit for student housing[24]. The legislature appropriated $15,000 to equip the new building and another $25,000 for ancillary buildings that were basically houses for chickens near the main building[25]. The ancillary buildings were completed by 1915. These poultry buildings looked much as they did when I arrived on campus in 1956. The house in the left foreground was where I carried out experiments on selenium requirements of growing chicks for my PhD thesis.

24 J.H. Bruckner letter, June 3, 1958, Bruckner Papers, box 1, Archive 21/31/1326, Cornell University Archives.

25 Twenty-Sixth Annual Report of the NY State College of Agriculture at Cornell University and the Agricultural Experiment Station, Ithaca, NY, 1913, part 1, pp. xcvii-xcviii.

4. The Faculty of Poultry Husbandry: The Early Years

To strengthen the department, new faculty would be needed. The department accomplished this largely by hiring students it had trained, a practice now considered to be inbreeding and counter to demands for diversity of background, skills, and interests. The first to be so recruited was **Earl Benjamin** (1889-1972), who obtained his BS degree in 1911, an MS in 1912, and a PhD in 1914. His doctorate was the first to be awarded in poultry husbandry in the United States, perhaps the world. He remained on the faculty for seven years before moving to positions in the poultry industry. He was a specialist in marketing poultry products[26].

The second PhD, also hired by the department, went to **O.B. Kent** (1890-1956), who earned a BS in 1913, an MS in 1914, and his PhD in 1917. He stayed with the department through promotions from Instructor to Assistant Professor to Professor. He left in 1922 to join the Quaker Oats company's thriving animal feed business. He was interested in poultry feeding and the scientific culling of laying flocks[27].

The faculty grew slowly in the 1920s. By 1933, it consisted of Professors Jimmy Rice and G.F. Heuser, Assistant Professors G.O. Hall, L.C. Norris, and Alexis Romanoff, and Instructors Alfred van Wagenen, B.R. Davisson, J.H. Bruckner, and Arthur T. Ringrose. As an indication of the department's commitment to serve the state's poultry industry, the faculty also included six extension specialists: H.E. Botsford, L.M. Hurd, L.E. Weaver, R.C. Ogle, E.Y. Smith, and W.G. Krum[28]. Several of these faculty deserve more extensive introductions on the basis of their contributions to development of the Cornell department and to poultry science.

Gustave F. Heuser (1893-1981) earned the third doctorate in poultry husbandry in the United States, and was the third of its doctoral students to be hired by the department. His photograph is shown in Figure 4.1. He received a BS degree in 1915, an MS in 1916, and a PhD in 1918. Heuser was named Assistant Professor of Poultry Husbandry in 1918 and Professor in 1922. He remained at Cornell until his retirement in 1957 (he was still a member of the department when I arrived as a graduate student in 1956). While on the faculty, he wrote an important textbook, *Feeding Poultry*, published in 1946 and widely used. His career is described in a biography[29], published at the time of his death in 1981, and in a Memorial Statement of the Cornell Faculty[30].

Figure 4.1. Gustav F. Heuse

In 1922, the Vice Director of Research in the College of Agriculture urged its dean, Albert Mann, to get Jimmy Rice to hire a biological chemist for his department. Rice was initially reluctant; he wanted a new hire to work under the immediate supervision of Heuser. But Dean Mann wanted the chemist to be independent and of equal rank to the best of Cornell's researchers, and he suggested **Leo Norris** (Figure 4.2), then a graduate student in the department of Animal Husbandry—

26 Earl W. Benjamin, 1974 Nunc Dimittis, *Poultry Science* 53 (January 1974), 445.
27 O.B. Kent, 1956 Nunc Dimittis, *Poultry Science* 35 (1 November 1956), 1400.
28 Proceedings of the Cornell University Board of Trustees, State College Council, June 17, 1933.
29 Gustav F. Heuser, 1981 Nunc Dimittis, *Poultry Science* 60 (1 October 1981), 2361-2362.
30 https://hdl.handle.net/1813/17918

another recruitment from within Cornell[31]. Norris was the first doctoral student of L.A. Maynard, who, though not a poultry scientist, merits a quick introduction. Maynard had joined the Animal Husbandry Department in 1915 after receiving his PhD in chemistry from Cornell. He had been hired by Elmer Savage, Professor of Animal Husbandry, who recognized the need to compliment feeding studies of cattle with laboratory work. Until his retirement in 1955, Maynard was a central figure in the development of animal and human nutrition and biochemistry at Cornell.

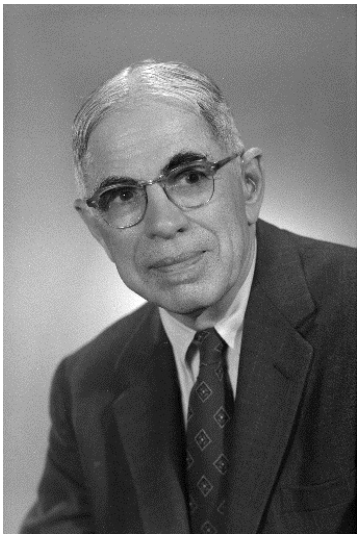


Figure 4.2. Leo Norris

To return to Norris: Taking Dean Mann's advice, Norris was hired by the department as an Instructor in 1923 and as an Assistant Professor in 1926. Together, Norris and Heuser built a nationally recognized basic nutrition science group within Poultry Husbandry.

Norris developed simplified diets to study the nutritional needs of baby chicks. Newly hatched chicks grow rapidly and their growth is highly dependent on nutrient levels in their diets. Because they are available in large numbers at low cost, baby chicks could be used as an experimental model for studying nutrient requirements. The research of Norris and his students was aimed at discovering the nature of factors in food ingredients that would improve the growth of chicks. Their studies contributed to the discovery and identification of several essential vitamins and minerals required to support life, and the results of their experiments were quickly applied to the formulation of commercial poultry feeds.

In the 1930s, Norris and his students observed that they could prevent a condition described as "curled toe paralysis" by including milk products in the feed[32]. Later, they found this condition to be caused by a deficiency of the vitamin riboflavin. The Norris group recognized that dried whey, a byproduct of cheese production, could provide a practical source of this vitamin. These observations led to the development of a spray drying process and to the founding of the Western Condensing Company in Wisconsin to provide dried whey as a feed ingredient in poultry rations that supplied a source of riboflavin. Norris developed a long-term friendship with David Peebles, the founder of the company. Norris's discoveries had ecological implications. Previously, the leftover whey had been dumped into local streams and rivers.

In 1936, Herb Wilgus, a student of Leo Norris, discovered that a condition of leg weakness in growing chicks, perosis, was caused by deficient intake of the mineral manganese[33]. This discovery, along with the work on riboflavin, contributed significantly to the development of the broiler industry by eliminating problems caused by nutritionally inadequate feed.

Norris also was instrumental in organizing the Cornell Nutrition Conference for feed manufacturers. In the 1930s, as understanding of the nutritional needs of animals grew, the manufacture of feed for chickens, dairy

31 Letter from Mann to James Rice, November 31, 1921, Rice Papers, box 4, Cornell University Archives.

32 L.C. Norris, G.F. Heuser, H.S. Wilgus Jr, and A.T. Ringrose, 1930, "The Occurrence in Chicks of a Paralysis of Nutritive Origin," *Poultry Science* 10: 93-97.

33 H.S. Wilgus Jr, L.C. Norris, and G.F. Heuser, 1936, "The role of Certain Inorganic Elements in the Cause and Prevention of Perosis," *Science* 84: 252-253.

cattle, beef cattle, and pigs became a major industry. The conference was a forum for feed manufacturers to learn of the results of recent research affecting their business. Cornell faculty and some invited speakers presented recent research relevant to the feed industry. This was a joint effort with the Animal Science Department, and it grew to be one of the most important meetings of its kind[34]. The first conference was held in 1934 and it has been held every year since. Recent conference programs say little about poultry feeding, however, but mainly deal with beef and dairy cattle.

Although Norris seldom taught formal courses to undergraduate or graduate students, his mentorship of graduate students won him a teaching award from the Poultry Science Association in 1957. He was a demanding mentor. He insisted that his students be well-grounded in chemistry, physical chemistry, and mathematics, but also told them to learn how to play golf and bridge to promote their success in the wider world. He was famously hard of hearing and wore a hearing aid. His students believed that whenever Norris tired of a conversation or an argument, he would just turn it off. He was also an enthusiastic hunter, and he had preserved heads of his trophies in his office; he also gave a large moose head to a local boy scout camp.

Norris was influential in the development of a wider nutrition community on the Cornell campus, and was appointed Secretary of the School of Nutrition upon its formation in 1941. Nationally, he served as Chairman of the Committee on Animal Nutrition of the National Research Council from 1945 to 1961, and he was elected President of the American Institute of Nutrition in 1958. Howard Kratzer (University of California, Davis) and I published a brief biography of Norris in 2005[35]. Norris retired from Cornell in 1959 when he reached the mandatory retirement age. He then spent the next 20 years of his life at the University of California at Davis where he continued to do research and mentor graduate students.

Goldan O. Hall (1897-1981) served the department from its early days (Figure 4.3). G.O., as he was called, enrolled as a graduate student in the department in 1922 and was appointed Instructor the next year. When he completed his PhD, the department appointed him as Assistant Professor in 1926, and as Professor in 1944. He was a faculty member in the department for 30 years, retiring in 1955. His main interests were in the breeding and marketing of chickens. He was involved in poultry judging at a time when poultry breeding was more of an art than a science. Judges rated chickens on the basis of their shape, plumage, and how well they conformed to standards of their particular breeds. Judges also used the external appearance of hens to try to estimate which ones were the best egg producers. Hall's undergraduate teams often won judging contests throughout the Northeast. He was an excellent teacher of undergraduates and deeply involved in the department's extension program. He left a legacy of two published books, *Judging Poultry for Production* (1930), and *Poultry Management* (1952)[36].

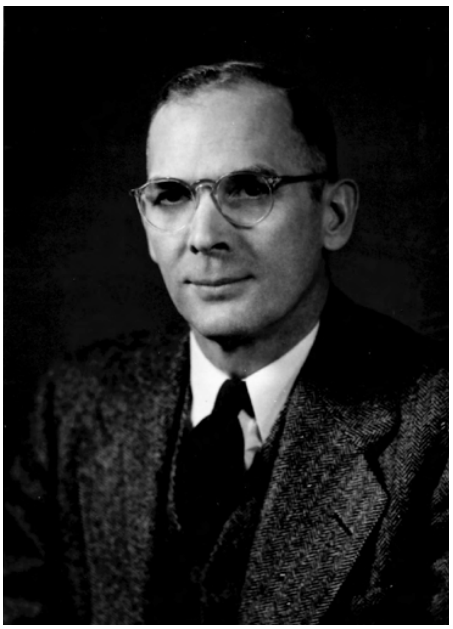


Figure 4.3. Goldan O. Hall

34 M.L. Scott, 1988, "Historical Perspectives of the Cornell Nutrition Conference," Proceedings of the 1988 Cornell Conference for Feed Manufacturers.

35 M.C. Nesheim and F.H. Kratzer, 2005, "Leo Chandler Norris (1891-1986)," *J. Nutrition* 135: 2079-2081.

36 R.K. Cole, E.A. Schano, and F.B. Hutt, "Goldan O. Hall," Cornell University Memorial Statement, https://hdl.handle.net/1813/17867

No discussion of the Cornell Poultry Department's history can be complete without discussing **Alexis Romanoff** (1892-1980). Romanoff (Figure 4.4) was a Russian émigré who fled during the Bolshevik revolution, first to China, and then to the United States. In Russia, he studied art at the Academy of Fine Arts, and chemistry and engineering at St. Petersburg Teachers College. He was required to serve in the Tsar's army and became a Lieutenant after training at the Nikolai Military Engineering Academy. He fought against the Bolsheviks in defense of Kazan City in August and September of 1918 where he commanded a company in a machine gun regiment. He eventually made his way to China and later to the United States.


Figure 4.4. Alexis Romanoff

After arriving in the United States in 1921, he eventually found his way to Cornell, where much to his chagrin he had to enroll as a freshman despite his previous education in Russia. He quickly earned his BS and MS degrees, and completed his doctorate in 1928. Romanoff caught the eye of Jimmy Rice, who gave him a scholarship to study avian embryology. This began his lifetime study of the egg, embryo development, and practical aspects of incubation and hatching.

Romanoff developed a method for making a window in an egg shell through which to observe the continuous development of chick embryos throughout incubation. In 1937, he produced a widely acclaimed educational film, "How Life Begins", showing these processes in color.

In 1949, Romanoff summarized his career in a book called *The Avian Egg*, an encyclopedic, 900-page volume about egg structure, composition, and embryo development. The book brought Romanoff enormous recognition and publicity. In 1949, *Science Illustrated* published an article about Romanoff's life and work entitled "The Professor and the Egg, a Love Story[37]." This was followed the next year by an article in the S*aturday Evening Post*, "Doctor Romanoff's One-Track Mind"[38]. In 1953, *The New Yorker* published a profile of Romanoff in two consecutive issues; its author, Arthur Kinkead, wrote a full biography a few years later[39].

Romanoff continued writing books about poultry development, producing *The Avian Embryo* in 1960, *Biochemistry of the Avian Embryo* in 1967, and *The Pathogenesis of the Avian Embryo* in 1972. His wife, Anastasia, collaborated with him on these books.

Beyond science, Romanoff was a talented artist who illustrated his books with his own drawings and illustrations. After he retired, he wrote and self-published *Diaries through War and Peace* (1977), based on notes of his time as a student and soldier in Russia, and his later travels throughout Europe and the United States as an academic. He also self-published numerous books of poetry and aphorisms: *Ithaca* (1962); *The University Campus* (1960); *Profiles of American Heritage* (1963); *Reflective Poems* (1964); *Vistas of Life* (1975); *The Artists-Poets Album* (1974); *Anthology of Ideas* (1977); and *Encyclopedia of Thoughts* (1975). These illustrate his range of

37 *Science Illustrated,* June 1949.

38 Arthur Behrstock, "Doctor Romanoff's One-Track Mind," *Saturday Evening Post*, November 15, 1950.

39 Eugene Kinkead, "Egg is All-I," *The New Yorker*, June 20, 1953; "Egg is All-II," *The New Yorker,* June 27, 1953; *Spider, Egg, and Microcosm*, New York: Knopf, 1955.

interests and prolific writing. *The Encyclopedia of Thoughts*, for example, contains 3,007 aphorisms, 187 pages of couplets, and 143 pages of epigrams. To give an idea of his writing style, here is one of his *Reflective Poems*, "Creative Thoughts."

Creative thoughts are God's desire,
They stand above all evil, mire;
They lend us help to fill the gaps,
To meet the greatest handicaps.
Creative thoughts are wisdom, fire;
They give us hope to live, admire.
Rebuild a dead or useless past;
Refresh, adapt… and make things last.

When Romanoff retired in 1960, the department held a dinner in his honor that I was privileged to attend. At it, he gave an account of his life before he came to the United States. He told about his time as a student in St. Petersburg, as a soldier in the Russian Army, and as an émigré fleeing to China. He explained how he made his way to America as an engineer on a tramp steamer and how he later got to Cornell. He published the details of this story in two volumes, *A Solemn Promise: A Biography in Verse, Volumes I and II* (1967). As you might guess from "*Creative Thoughts*", his decision to write his autobiography in verse was unfortunate, making the narration rather difficult to follow.

5. The Post-Jimmy Rice Poultry Department, 1934-1965

The retirement of Jimmy Rice in 1934 led to a new era in the department. It had grown considerably, as can be seen in a photograph taken sometime in the late 1930s (Figure 5.1).

Figure 5.1. Faculty of the Poultry Husbandry Department in the late 1930s. Front row: A.L. Romanoff, F.E. Andrews, L.E. Weaver. Middle row: G.F. Heuser, J.H. Bruckner, G.O. Hall, R.C. Ogle, L.C. Norris. Back row: L.M. Hurd, B.C. Botsford, E.Y. Smith, F.B. Hutt, E.I. Robertson. *Photo from James Rice Papers, Cornell University Archives.*

Knowing that Rice was retiring, Dean of Agriculture Carl Ladd was faced with the task of finding a replacement. He conducted a wide search, canvassing prominent names in private industry as well as academic leaders in poultry husbandry. Eventually, he narrowed the field to four candidates, all considered leaders in the field: Leslie Card from the University of Illinois, James Halpern from the University of Wisconsin, Frederick B. Hutt from the University of Minnesota, and Earl Benjamin from private industry. Eventually, Card, Halpern, and Benjamin decided not to leave their present positions and withdrew from the search. That left F.B. Hutt to take on the Cornell position.

Rice's Replacement: Frederick B. Hutt (1934-1940)

Figure 5.2. Frederick B. Hutt

Hutt (Figure 5.2) had strong academic credentials but was a controversial choice for Cornell. He did his undergraduate work in poultry science at the Ontario Agricultural College at Guelph paying his way by raising chickens. He earned an MS in genetics from the University of Wisconsin, and a doctorate, also in genetics, from the University of Edinburgh. He was elected President of the Poultry Science Association at the age of 35, the youngest person ever to hold that position. The Cornell faculty considered him to be a strong researcher but not to have had much administrative experience. He would be fine at improving the science base of the department but would be less likely to work closely with the state's poultry industry. And, unlike nearly everyone else in the department, he was not a former student of Jimmy Rice.

Hutt was not Rice's favorite candidate. In a letter to the editor of the *Poultry Herald* on May 9, 1934, Rice wrote "Dr. Hutt will not be the one to head the department"[40]. His prediction proved wrong; Carl Ladd offered Hutt the position. At first, Hutt turned it down. In an oral history interview with Gould Colman, Hutt said he refused the job because he was offered less money than Halpern or Card. When Ladd raised the offer, Hutt took the job[41]. When he accepted the position, Hutt made it clear that he intended to continue his research and would expect other faculty to take on some of the administrative duties. The Dean of Agriculture at the University of Minnesota explained that Hutt was leaving that institution to take over the largest poultry department in the United States, with the biggest budget, finest facilities, and a staff of 20[42]. To his credit, Rice sent a congratulatory telegram to Hutt assuring him of his support[43]. Hutt assumed his duties at Cornell in July 1934.

Hutt's term as poultry department head was relatively short, oddly because of changes in Cornell's Medical College. At the time, the first two years of medical instruction took place on the Ithaca Campus, whereas the next two clinical years were conducted in New York City. In 1938, the University decided to move the full four years of medical study to New York City. The transfer meant that some basic biological science faculty would remain behind in Ithaca. The University appointed Hutt to chair a committee to decide what to do with these faculty. His committee recommended forming a Department of Zoology in the College of Arts and Sciences as a home for these faculty members. In 1939, Cornell President Edmund Day chose Hutt to head the new department. In his oral history, Hutt mentioned that he had not been a popular choice, since he was considered a "chicken expert from a cow college."

40 Carl E. Ladd Papers 21/2/87, box 4, folder 4/54, Cornell University Archives.
41 Frederick Bruce Hutt, *Oral Histories 1984-1985*, Cornell University Library.
42 F.B. Hutt, Collection 24-4-3385, box 26, Cornell University Archives.
43 Letter dated June 22, 1934, Carl E. Ladd Papers, 1933-34, folder 4/56, Cornell University Archives.

Hutt held this appointment until 1944, when he returned to the poultry department as a faculty member. He had a long and distinguished career in the department, training graduate students, and teaching courses in poultry genetics for 30 years. He also taught the first course in human genetics on the Cornell Campus. He authored several text books, including *Genetics of the Fowl,* a classic in the field. In 1962 I was privileged to co-author a paper in *Science* with Hutt as I began my academic career[44]. For many years after his retirement in 1965, Hutt continued his research and publishing as an emeritus professor[45,46].

In his short period as department head, Hutt recruited three faculty members: W.F. Lamoreux, A.Z. Hodson, and Randall Cole. Lamoreux received a PhD from the Department in 1938, and stayed on the faculty until 1943 when he left to become geneticist for Kimber Farms. Hodson received his PhD in 1937 as a student of L.A. Maynard in the Animal Husbandry Department. His stay in the department was brief.


Figure 5.3. Randy Cole

As for **Randall (Randy) Cole** (1912-2006): Hutt recruited him as a graduate student in poultry genetics (Figure 5.3). After Cole obtained his doctorate in 1939, Hutt appointed him as Assistant Professor of Animal Breeding and Poultry Husbandry, and worked with him on projects to breed lines of chickens for resistance or susceptibility to avian leucosis. Other researchers used these lines to work out how viruses caused avian leucosis and Marek's disease, and to develop vaccines for Marek's disease. Cole also was interested in the study of embryonic lethals and other genetic abnormalities in chickens, such as dwarfism and hypothyroidism. Cole carried out post-mortem examinations of chickens dying as a result of projects led by other faculty; these led to the discovery of further genetic abnormalities. Cole retired in 1973 but continued to write and remain active in the department. When the department closed in 1991, he transferred to the Department of Avian Diseases in the College of Veterinary Medicine[47].

The Bruckner Era: 1940-1965

When Hutt left Poultry Husbandry to become head of Zoology in 1940, Dean Ladd was again faced with recruiting a new department head. He chose to appoint **J.H. Bruckner** (1905-1970) as Professor and Acting Head. Bruckner had an undergraduate degree from Purdue University in poultry husbandry and a doctorate from the Cornell department. His research focused on genetics and breeding. He had been appointed as an instructor in 1931, and later was moved up through the professorial ranks. In the 1930s, he spent two years managing the state's Game Farm in Ithaca. Two years after appointing Bruckner as Acting Head, Ladd had to decide whether to make his job permanent. The department was split, with several favoring the appointment

44 M.C. Nesheim and F.B. Hutt, 1962, "Genetic Differences Among White Leghorn Chicks in Requirements for Arginine," *Science* 137: 691-692.

45 R.K. Cole, *The Life of Fred Hutt, Poultry Geneticist.* https://www.aaap.info/assets/documents/Bio%20hutt.pdf

46 Frederick Bruce Hutt, 1991, Cornell University Memorial Statement http://hdl.handle.net/1813/18824

47 Randall Knight Cole, 2006, Cornell University Memorial Statement. https://hdl.handle.net/1813/18679

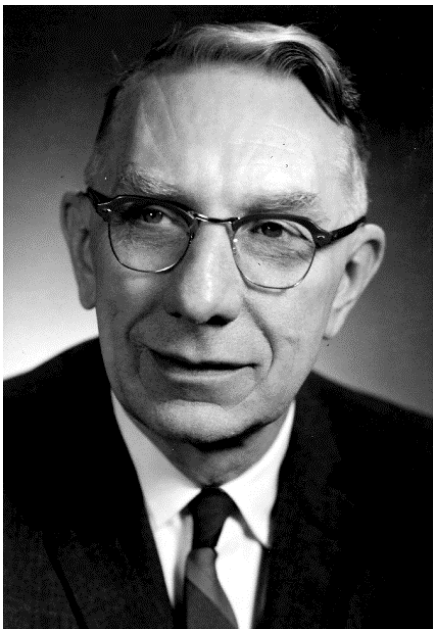


Figure 5.4. Jacob H. Bruckner

of Heuser (discussed in the previous chapter), but others giving Bruckner a slight edge. Rice, however, strongly opposed Bruckner's appointment and wrote Ladd a 14-page letter saying so. Rice felt that Bruckner was too autocratic and was academically undistinguished. Instead, he recommended other candidates: Earl Benjamin, a former student who was in industry, G.O. Hall, and Herb Wilgus, a former student who was at Colorado State. But while he was Acting Head, Bruckner had improved relations with the state poultry industry, which had deteriorated somewhat under Hutt. On June 4, 1942, Ladd wrote to the poultry department that he had appointed Bruckner Professor of Poultry Husbandry and Head of the department. Bruckner held this position until 1965.

Bruckner's accomplishment as department head was an almost complete renewal of the faculty. When he began the job in 1940, the faculty consisted of four professors (F.B. Hutt, L.C. Norris, G.F. Heuser, and H.E. Botsford); one associate professor (G.O. Hall); six assistant professors (A.L. Romanoff, J.H. Bruckner, W.F. Lamoreux, L.M. Hurd, E.Y. Smith, and L.E. Weaver); along with three Instructors (R.K. Cole, A.Z. Hodson, and L.H. Belmont). With the exception of Hutt, whose recruitment I explained earlier, and Hutt's appointees – Lamoreux, Cole, and Hodson – these faculty had been in the department since the era of Jimmy Rice. By the time Bruckner stepped down as department head in 1965, all except Cole had retired or left.

The Memorial Statement of the Faculty published after Bruckner's death in 1970 summarized these and other contributions[48]. Although he had not had a particularly distinguished teaching or research career, Bruckner had greatly facilitated the work of department faculty. He understood the need for more basic research into problems experienced by the poultry industry, as farms were consolidating and growing in size, and the industry was becoming more integrated. Under Bruckner, the department had developed four major areas of emphasis: nutrition, genetics, physiology, and food science. He chose faculty trained in these disciplines to study problems of avian biology that fit with Cornell's breadth in biological sciences. Although faculty in these areas worked on many applied problems associated with the poultry industry, they also were concerned with more general biological issues. The department still maintained a strong group of extension faculty, who worked directly with the state's poultry industry. Bruckner was also a concerned University citizen who was deeply involved in faculty governance; he encouraged department faculty to do so as well.

The Poultry Industry in the 1940s

In the 1940s New York State was optimistic about the future of its poultry industry, and so was the department. As W.D. Termohlen, then director of the poultry branch of the USDA, explained in a talk to the New York State Poultry Advisory Committee in 1944, the poultry industry was the third largest contributor to gross farm income in the United States after dairy cattle, and cattle and calves[49]. The industry was still highly disbursed among a great many small producers; 4,750,000 farms housed fewer than 200 laying hens each, but produced

48 J.H. Bruckner, 1970, Cornell University Memorial Statement. https://hdl.handle.net/1813/18118

49 W.D. Termohlen, USDA, 1944, Paper in Report to the New York State Poultry Advisory Committee, J.H. Bruckner Papers, box 5, Cornell University Archives.

52 percent of the eggs in the United States. The broiler industry was beginning to expand; 60,000 farms with no egg production accounted for 12 percent of the chickens raised for meat. This was a sharp increase from one percent in 1934. In a report to the New York State Poultry Advisory Committee, Robert Ogle of the department's extension faculty painted an optimistic picture of the poultry industry's future. In 1944, poultry represented the third-largest source of farm income in the state, behind dairy and vegetable crops. There was a burgeoning turkey industry in the state, and a flourishing duck industry on Long Island. There was support in Albany for providing additional resources to support poultry research at Cornell.

In the mid-1940s, Cornell had taken over the poultry farm off Warren Road in Forest Home to build the first nine holes of the Robert Trent Jones University golf course. Although an existing plan was to have the poultry farm take over the New York State Game Farm, it was instead relocated to a nearby area on Game Farm Road. This move offered opportunities for department expansion. On November 7, 1946, Bruckner told the department that plans were underway for construction of several buildings at the new poultry farm, among them a new service building. He also announced plans for a new building behind Rice Hall and facilities for turkey and duck farms[50]. The legislature agreed to fund development of a turkey farm on Turkey Hill Road, basic research on turkeys and ducks in the Poultry Husbandry department, and disease research on turkeys and ducks in the Veterinary College. This happened as the result of intense lobbying of the legislature by the New York State Turkey Association and Long Island Duck Growers. These plans came to fruition in 1961, with completion of a new 16,500-square-foot laboratory building behind Rice Hall, half for nutrition research and half divided among food science, physiology, and genetics research. In 1966, the building was given the name Bruckner Laboratory of Poultry Biology in honor of Jacob Bruckner's retirement as department head (Figure 5.5)[51]. During this era, Rice Hall was also renovated extensively and new service buildings were constructed for the poultry and turkey farms.

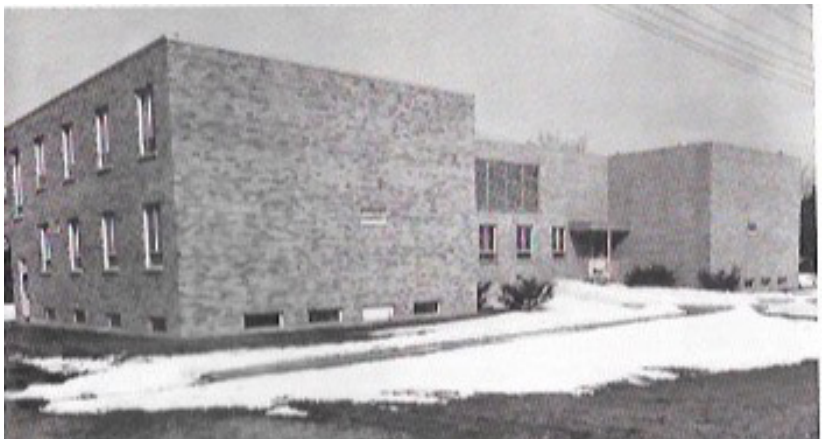


Figure 5.5. The Bruckner Laboratory after its completion in 1961.

State funds also enabled the 1946 appointment of **Milton Scott** (1915-2001) as an assistant professor of animal nutrition (Figure 5.6). Scott, a student of Leo Norris, was to carry out research with turkeys and ducks to support the industry in the state. His appointment strengthened the nutrition faculty at a time when the results of studies of vitamins and minerals were improving poultry rations.

In 1949 the College of Veterinary Medicine and the College of Agriculture at Cornell joined with the duck growers on Long Island to develop a laboratory to conduct duck research at Eastport, as the U.S. duck industry was then heavily concentrated on Long Island. Scientists at the new laboratory had developed several vaccines against duck diseases. Scott became involved

50 Letter to faculty, November 7, 1946, J.H. Bruckner Papers, box 5, Cornell University Archives.
51 Proceedings of the Cornell Board of Trustees, January 20, 1966.

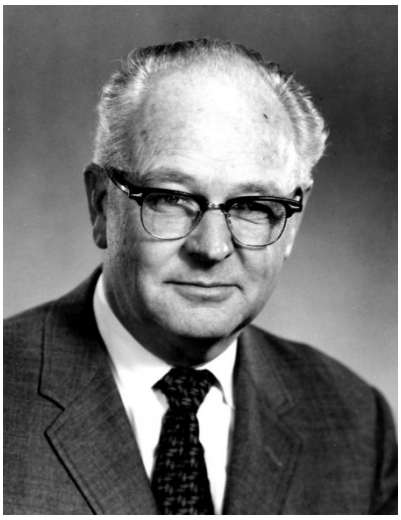


Figure 5.6. Milton L. Scott

with some of the first duck nutrition studies carried out at that laboratory. Later, Bruckner recruited **W.F. Dean** to lead duck nutrition studies there. The duck laboratory still exists as a component of the New York State Diagnostic Laboratory, even though only remnants of the duck industry remain on Long Island today[52].

Scott went on to have a distinguished career in research and service to the poultry industry. His work with turkeys and ducks demonstrated the need for the vitamin niacin, to prevent a specific type of leg weakness, and for vitamin E in breeder rations. He was involved in work that eventually led to the identification of folic acid and vitamin B-12 as critical nutrients for growing chickens. He extensively studied vitamin E in chickens and turkeys and contributed to the discovery of selenium as an essential nutrient. He worked with the New York State Game Farm in Ithaca to determine the nutrient needs of pheasants and quail. In 1969, with me and Bob Young as co-authors, he published *Nutrition of the Chicken,* with new editions in 1976 and 1982. Through his research and work with the industry, Scott became the best known and most respected poultry nutritionist in the world by the time he retired in 1979. Post-retirement, he wrote *Nutrition of the Turkey* in 1987, *Nutrition and Management of Ducks* with W.F. Dean in 1991, and *The Nutrition of Humans and Selected Animal Species* in 1986. Several biographical articles provide details of his career[53].

Bruckner's Other Key Appointees

Figure 5.7. Frederick W. Hill

In 1948, Bruckner appointed **F.W. Hill** as associate professor in the nutrition group (Figure 5.7). Hill was a student of Leo Norris. He worked for a few years for the Western Condensing Company in Appleton, Wisconsin. This company had developed the process for drying whey recovered from cheese-making and using it as a source of riboflavin in poultry rations, as discussed earlier. The company was founded on the basis of research carried out by Norris in the 1930s. At Cornell, Hill studied the energy requirements of chickens and determined how to measure the useful energy in feed ingredients for poultry. This measurement, termed "metabolizable energy," was most useful for feed formulation[54]. Using his methods, Hill and his students published the metabolizable energy values of a broad range of poultry feed ingredients; these are still widely used in tables of food composition for feeding poultry.

Ruth Renner, one of the few women trained in the department, carried out much of the laboratory work associated with the energy measurements. When Ruth left Cornell, she became a faculty member of the Nutrition Department at the University of Alberta in Canada. Hill left the department in 1959

52 https://ahdc.vet.cornell.edu/sects/duck/about.cfm

53 Malden C. Nesheim, 2003, "Milton Leonard Scott (1915-2003)," *J. Nutrition* 133: 4074-4076.

54 F.W. Hill, D.L. Anderson, Ruth Renner, and L.B. Carew, 1960, "Studies of the Metabolizable Energy of Grain and Grain Products for Chickens," *Poultry Science* 39: 573-579.

Figure 5.8. Ari van Tienhoven

to chair the poultry department at the University of California, Davis, where he later organized and chaired a department of nutrition[55]. Bruckner brought **Ari van Tienhoven** to the department in 1955 to start a program in reproductive biology (Figure 5.8)[56]. He was a native of the Netherlands who came to the United States in 1949 as a graduate student at the University of Illinois; he received his PhD in 1953. I had known him there when I was a student in the animal science department. After a short time at the University of Mississippi, he was recruited to Cornell in 1955. He established a highly successful program that served campus biology programs, as well as those of the poultry department. Van Tienhoven was interested in the neuroendocrinology of egg production, and temperature regulation in hens, and he developed an atlas of the avian brain. He also became interested in animal welfare issues affecting the poultry industry, and studied some of the neuroendocrine responses to housing conditions in fowls. He was an avid user of the Cornell library system and was a strong supporter of the libraries. He was active in the department for more than thirty years. In 1983, he published *Reproductive Physiology of Vertebrates*. In 1987, the year he retired, he received two teaching awards from the College of Agriculture and Life Sciences.

Figure 5.9. Robert Baker

Bruckner appointed **Robert Baker** (Figure 5.9) as assistant professor in 1949, initially in the extension program[57]. But after taking a leave to obtain a PhD in food science at Purdue University, Baker returned and developed the department's food science program. As he later explained, the poultry industry had a problem with what to do with hens that were no longer producing eggs. He recognized that their meat, if deboned, could be useful. He wanted to "expand the market for fowl with the goal of increasing the salvage value of the laying flock at the end of its productive life"[58]. Baker and his group devised and test-marketed more than fifty products using poultry meat and eggs, many of them precursors of mass-marketed products today: chicken hot dogs, chicken bologna, bake-and-serve chicken loaves, chicken hash, chicken chunk rolls, and chicken sticks, and the invention of what is now a McDonalds' mainstay, chicken nuggets[59]. He did not patent any of them, but made them freely available to the poultry

55 University of California, Davis, 2003, https://www.ucdavis.edu/news/professor-emeritus-fredric-hill-founded-uc-davis-nutrition-department/

56 Ari van Tienhoven, 2014, Cornell University Memorial Statement https://cpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/3/6798/files/2016/08/COMBINED-T-1rf712j.pdf (scroll); W.J. Kuenzel, 2009, "A Landmark Contribution to Poultry Science--A Possible Mode of Action of Sulfamethazine on the Reproductive System of Leghorn Cockerels," *Poultry Science* 88: 824-831.

57 Robert Carl Baker, 2006, Cornell University Memorial Statement. https://hdl.handle.net/1813/18237

58 R.C. Baker, L.B. Darrah, and J.M. Darfler, 1966, "The Use of Fowl for Convenience Items," *Poultry Science* 45: 1017.

59 Maryn McKenna, "The Father of the Chicken Nugget," *Slate* (US), December 28, 2012.

Figure 5.10. The Baker food laboratory

industry. A photograph of his laboratory is shown in Figure 5.10.

Baker also developed a chicken barbeque technique and a Cornell barbeque sauce popular throughout the Northeastern states for large gatherings and fund raisers. He published these methods in Cornell Extension Information Bulletin 862 in 1953[60]. Still popular, they were the subject of an article in the *Washington Post* in 2017[61].

The Baker family barbeque chicken stand remains a constant feature of New York's annual State Fair (Figure 5.11). Baker led Cornell's Institute of Food Science, which united campus efforts in that field, and eventually became chair of the poultry department in the 1980s.

A graduate student colleague of mine, **Roland Leach**, became a staff member of the US Plant Soil and Nutrition Laboratory on the Cornell campus. Bruckner appointed him as an adjunct faculty member of the nutrition group in the department in 1959. Leach remained there until leaving for Penn State in 1968, where he had a distinguished career as a professor in the Poultry Science department there.

Figure 5.11. Barbequing Chicken Baker Style

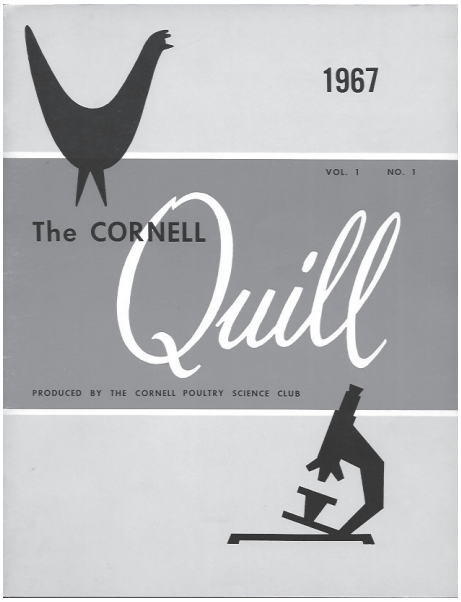


Figure 5.12. The Poultry Science Club magazine published in 1967

60 https://hdl.handle.net/1813/2652

61 J. Shahin, "The Grilled Chicken Recipe So Brilliant Its Got an Ivy League Name," *The Washington Post*, September 26, 2017.

Hill's departure from the department in 1959 made a position in the nutrition group available. Bruckner offered the appointment of **Robert Young** (1923-2010), another former student of Leo Norris (see Figure 6.2), who was working at the time for Procter & Gamble's research organization. Later, Young succeeded Bruckner as department head.

G.O. Hall and eight undergraduate students organized an undergraduate poultry club in 1939, which became a member of the National Collegiate Poultry Club. The Cornell club disbanded during World War II, but Hall and Bruckner revived it in 1947.

In 1967, the Poultry Science Club published its history in Volume 1, Number 1 of *The Cornell Quill* (Figure 5.12). If the club ever produced another issue, I have not been able to find it. According to this history, a Rice Poultry Club had existed prior to 1930, but it was more of an educational organization than a social club and included local poultry farmers. In the 1960s, the club included both undergraduate and graduate students and held monthly meetings at which the agenda included a chicken dinner (of course), a guest speaker, and club business. Hall and, later, Robert Baker were faculty advisors to the club in those years.

The Bruckner-Era Extension Program

The department had long maintained an active extension program working closely with the New York State poultry industry, but in the 1950s, extension faculty of the Rice era all retired within a short time of each other. These, with their years of service, were L.M. Hurd (1910-1953), H.E. Botsford (1918-1952), L.E. Weaver (1921-1951), R. Ogle (1924-1953), and E.Y. Smith (1931-1955). **E.Y. Smith** supervised the turkey farm. His breeding program led to development of the Empire White turkey from a cross between the Broad Breasted Bronze and the White Holland. The Empire White was the first truly broad-breasted white turkey, making it a prototype for today's commercial turkeys. Smith was a pioneer in developing artificial insemination in turkeys[62].

Bruckner recruited their replacements: **Glenn Thacker**, **Charles Ostrander**, **Scotty Johndrew**, and **Ed Schano**, whose photographs are shown in Figure 5.13. When I joined the department in 1956, they constituted the extension group. They continued to work with poultry producer groups and youth programs throughout the state.

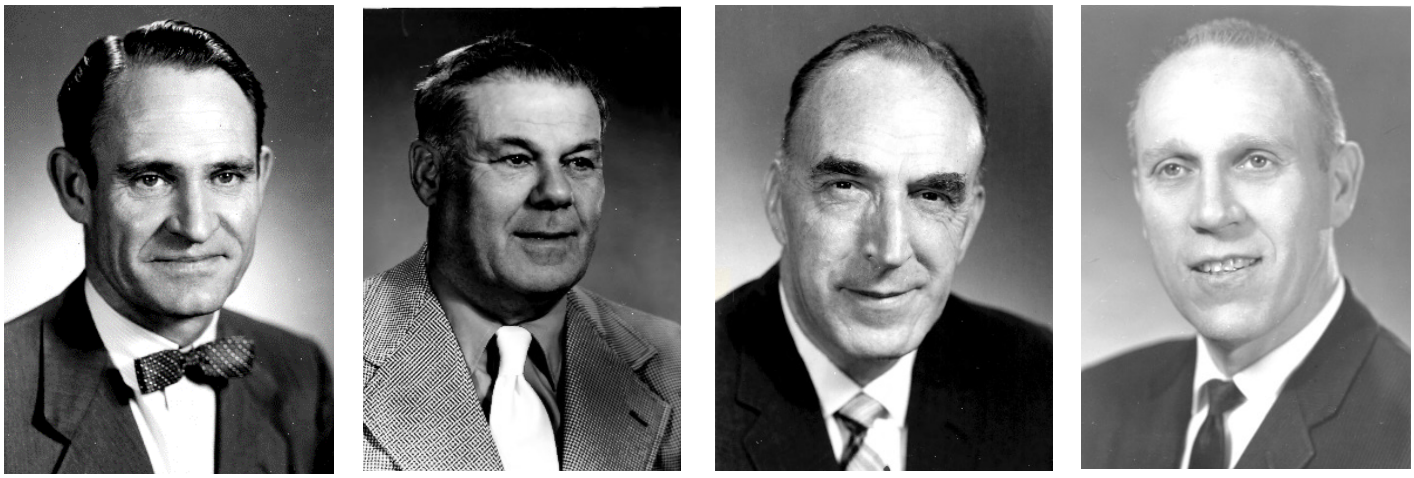


Figure 5.13. Extension faculty in the 1950s. From left to right: Glenn Thacker, Charles Ostrander, Scotty Johndrew, Ed Schano

62 https://hdl.handle.net/1813/18760

Ironically, Thacker in 1962 called attention to the decline of poultry production—both meat and eggs—in New York State, noting that producers needed to increase their efficiency if they were to survive.

The department supported random sample tests of commercial breeding stock to compare the productivity of strains of chickens from various breeders. Eggs would be sampled by a third party and hatched at Cornell; 100 pullets from each strain tested would be sent to a test site in Horseheads, NY. The productivity results would be made available to the public and to the industry. This effort was supervised by **Dean Marble** (1902-1966), who was a professor in the department from 1952 until his death in 1966. He also taught undergraduate courses in the department. He was an author of two books, *Judging Poultry for Production* with Jimmy Rice and G.O. Hall, and *Commercial Poultry Production* with F.P. Jeffrey from the University of Massachusetts.

Support for the poultry industry on campus extended beyond the Poultry Husbandry department. The Agricultural Engineering department had a program in poultry housing and waste management and the Agricultural Economics Department had a specialist in the poultry industry on its faculty. The Veterinary College housed a strong department of Avian Diseases and New York State had several poultry diagnostic laboratories in various locations. Poultry farming was an important enterprise and an important contributor to the state's economy in those years.

The End of the Bruckner Era

In 1965, after 25 years as head of the department, Herb Bruckner wrote to then Dean of Agriculture Charles Palm that he wished to be relieved as head of the department by October 1 that year. Palm and Associate Dean Keith Kennedy polled the faculty for recommendations to replace Bruckner. Some faculty were concerned that the department's contact with the poultry industry was inadequate. One said that the department was standing still and needed an "educated Jimmy Rice." But others complained that the department was tending to emphasize more basic science. One commented: "The chicken is more than a tool for human disease," a complaint that the department's research was moving further away from direct support of the poultry industry and becoming more focused on basic biological science[63].

As internal candidates, faculty mentioned Milton Scott and Bob Young. They also mentioned Cecil Howes, then department head at Virginia Polytechnic Institute (VPI). Nearly everyone wanted to bring Fred Hill back from California, Davis. But Hill was heading up a human nutrition program there and not interested in returning to poultry science. In the event, the dean picked Bob Young to succeed Bruckner.

63 Charles Palm Papers, box 20, folder 10, Cornell University Archives 21/2/1478.

6. My Personal History with the Poultry Department, 1956-1974

As I mentioned earlier, I arrived in the Department as a graduate student in 1956. By 1965 when Bruckner stepped down as department head, I was an associate professor and had developed a research program with several themes. I was interested in genetic variation in nutritional requirements and I had been developing strains of chickens that responded differently to deficiencies of the amino acid arginine and the vitamin nicotinic acid. My students and I carried out extensive studies on the metabolism of arginine. I also was interested in the physiological effects of the trypsin inhibitors that are found in unheated soybean meal. I had NIH grants that supported both areas of research. I also carried out studies on some practical aspects of poultry feeding supported by department funds. My teaching load was light, although I eventually co-taught an upper-level course in animal nutrition with colleagues from the animal science department. I covered the nutrition of monogastric animals while the animal science faculty taught the section on ruminants.

Upon his retirement, Bruckner told the dean that he intended to continue as a department faculty member and would teach the introductory poultry course, which he did for the next several years. But in spring 1970, while he was teaching his first class of the semester, Bruckner had a heart attack. He died a few weeks later. Since by then I was a co-author of the textbook used in the class, *Poultry Production*, I was tapped to teach the course that semester, and I taught it the following year as well.

It might be useful to say something here about *Poultry Production.* It was first published in 1914 and last issued as a 13th edition in 1990. Table 6.1 summarizes the authors of these editions. Figure 6.1 shows the cover of the 10th edition, which I co-authored.

Table 6.1. The thirteen editions of *Poultry Production*

EDITION	YEAR	AUTHORS
1	1914	Lippincott
2	1916	Lippincott
3	1921	Lippincott
4	1927	Lippincott
5	1934	Lippincott & Card
6	1939	Lippincott & Card
7	1946	Lippincott & Card
8	1952	Card
9	1961	Card
10	1966	Card & Nesheim
11	1972	Card & Nesheim
12	1979	Nesheim & Austic
13	1990	Austic & Nesheim

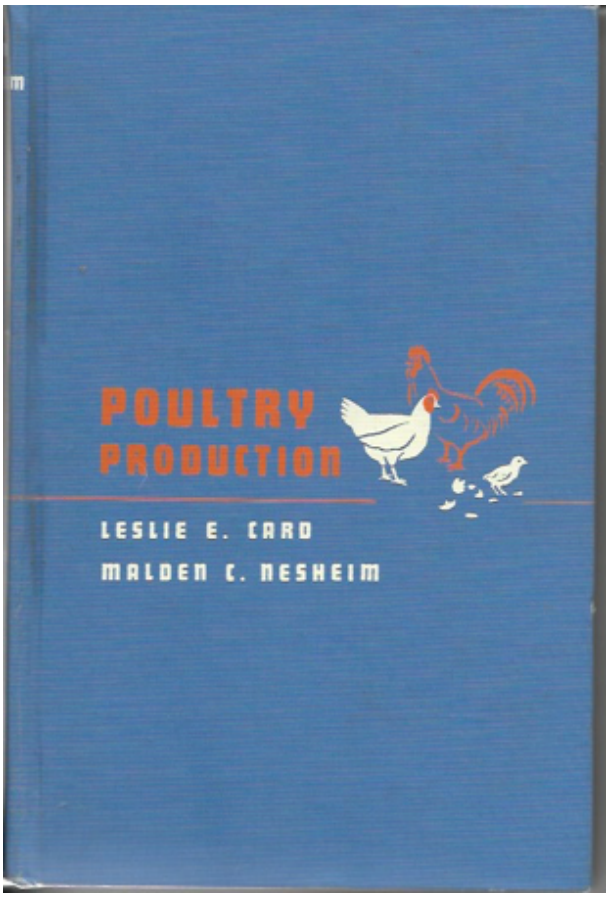


Figure 6.1. The 10th edition of *Poultry Production*

I was asked to co-author this book in 1965 when L.E. Card, then at the University of Illinois, invited me to help him prepare the next revision. As a student of Jimmy Rice, Card was the fifth scientist to obtain a PhD in poultry husbandry in the United States. But the book's first author was W.A. Lippincott of Kansas State University, who revised it through four editions by 1927. Lippincott spent a year studying with Jimmy Rice for an MS degree in 1906-1907; he then received his PhD from Iowa State. Lippincott chaired the poultry department at Kansas State University and later at the University of California. When Lippincott died in 1931, Card took over the fifth edition in 1934 and maintained it as Lippincott and Card through the seventh edition. He became sole author of the eighth and ninth editions. I joined Card for the tenth edition in 1966 and the eleventh in 1972. When I left the department in 1974, my colleague Richard Austic joined me for a twelfth edition in 1979, and took lead responsibility for the thirteenth and last edition in 1990. This ended a textbook with a publishing record that spanned nearly the whole of the twentieth century and the lifespan of Cornell's poultry department.

I found the department to be a welcoming place from the perspective of a student and, later, a faculty member. The department was like a close family. Under Bruckner's leadership, it continued to maintain a familial atmosphere that had been established by Rice. Consider, for example, the Poultry Wives Club, consisting of the spouses—all female—of the nearly all-male faculty, graduate students, and senior staff. The club met regularly; it sponsored department dinners during the academic year and a summer picnic, as well as a family Christmas party each year, complete with a visit from Santa Claus and gifts for the children. My children remember those times fondly.

Part of the departmental tradition was that no alcohol was served at its events. Jimmy Rice had been a strict teetotaler who never smoked or drank alcoholic beverages. In later years, some younger members of the group would start the evenings by heading to the restaurant bar for a pre-dinner cocktail, a practice that induced raised eyebrows among some of the older faculty.

The department arranged for group seating at Cornell football games for faculty and staff and many attended the games together. The department had an official softball team made up of faculty and graduate students; the team competed in Cornell's summer softball league, and the Poultry Department team won the summer league championship in the early 1960s.

Several of the faculty and staff would take a fishing trip to a lake in Canada in late May or early June each year, a custom that survived the department's demise for some of the former staff.

For many years, the department had a sales room in Rice Hall for fresh eggs available to the public, and also sold fresh turkeys at Thanksgiving. Revenues were used to support department programs. Unfortunately, no records exist of the amounts of money collected from those sales.

As was typical of the College of Agriculture and Life Sciences at that time, the department was primarily a male preserve. There were no female faculty members in the department until the very end of the department's life. There were women graduate students, but only a few.

Figure 6.2. Robert J. Young

In 1966, to replace Bruckner, Dean Charles Palm appointed **Bob Young** as head of the department (Figure 6.2). At that time, the faculty asked that the department's name be changed from Poultry Husbandry to Poultry Science. Thus, Young became the first head of Cornell's Department of Poultry Science[64]. Faculty asked for the name change for two reasons. They were doing research in basic science, not poultry husbandry, and they also wanted more respect for their work as part of mainstream science. Membership in a department called Poultry Husbandry conferred low status at a place like Cornell. I well remember being teased as a "chicken plucker" by nutrition colleagues from other departments.

Young continued Bruckner's process of reshaping the department by appointing faculty with interests more focused on basic biological science to replace older faculty as they retired. One of his first appointments was **Andre Bensadoun,** a biochemist and physiologist who joined the department in 1966 (Figure 6.3).

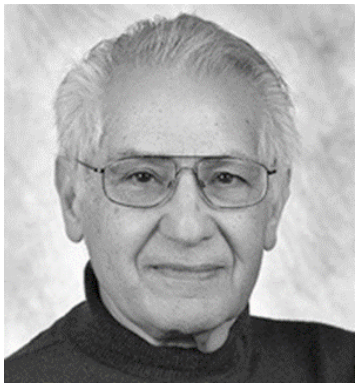


Figure 6.3. Andre Bensadoun

When Bensadoun finished his doctorate in Cornell's Department of Animal Science in 1964, he moved to a faculty position at the University of Illinois. The Poultry Science department recruited him back to Cornell two years later. Bensadoun developed a strong program in lipid metabolism and became well known for his work on lipoproteins and the enzyme lipoprotein lipase. Ironically, I was Acting Chair of the department in 1966 when Bob Young was on sabbatical leave and when negotiations for Bensadoun's appointment were finalized. We were recruiting him away from the University of Illinois Animal Science department chaired by my brother Robert Nesheim.

Figure 6.4. Steve Bloom

In 1968, Young recruited **Steve Bloom**, a cytogeneticist, to replace F.B. Hutt in the department's genetics faculty. Bloom carried out research in animal and human cytogenetics, cell biology, and experimental mutagenesis. Bloom also had a joint appointment in the Biology Division. He became a leader of toxicology programs on the campus and taught a course in animal cytogenetics. Young invited **Richard Austic** (Figure 6.5) to join the faculty in 1970. Austic had graduated with a BS degree from Cornell in 1963, obtained his PhD in nutrition at the University of California, Davis, and then came to work with me as a postdoctoral student studying

64 Dean Palm's letter is dated August 24, 1965. Charles Palm Papers, box 23, folder 23-41, Cornell Archives 21/2/1478.

Figure 6.5. Richard Austic

arginine metabolism. As a faculty member, he researched dietary amino acid imbalances and excesses throughout his career. Austic also demonstrated the effects of the balance of dietary minerals on growth and bone mineralization in broilers and on eggshell quality in laying hens. He collaborated with other faculty members within and outside the department. He taught the introductory course on poultry production for the department and a graduate course on proteins and amino acids for nutrition students. Later, he would go on to chair the department.

My relationship with the poultry department ended in 1974. That year, Cornell decided on a major reorganization of the human nutrition programs on the Ithaca campus. It combined two existing entities, the Department of Human Nutrition and Food in the College of Human Ecology, and the Graduate School of Nutrition, then an independent academic unit that received some state funding through Cornell's College of Agriculture. Cornell called the new two-college unit the Division of Nutritional Sciences, a name it bears to this day. The division was to be responsible for undergraduate and graduate teaching, research, and New York State extension programs in human nutrition (my account of the history of the nutrition programs at Cornell is available online[65]). Early in 1974, I was asked to assume the directorship of the new division. I accepted and became director on April 1 that year. After fifteen years on the faculty of Poultry Husbandry and then Poultry Science, I would now be Professor of Nutrition and Director of the Division of Nutritional Sciences.

When I became division director, I was offered the opportunity to bring other campus faculty with appropriate research interests to the new unit. I invited Andre Bensadoun to join, given his work in lipid metabolism and its relation to human health. Thus, the new Division of Nutritional Sciences caused the Poultry Science Department to lose two faculty members.

65 M.C. Nesheim, 2010, "A History and Personal Reflections," Division of Nutritional Sciences at Cornell University, https://hdl.handle.net/1813/14711
See also: Malden C. Nesheim and Norman R. Scott, 2012, "A Conversation with Malden C. Nesheim" (56 min.) https://hdl.handle.net/1813/31529 ; and D.W.T. Crompton and M.C. Nesheim, 2016, "Survey of the Avian Alimentary Tract" http://hdl.handle.net/1813/44697

7. The Department's Waning Years, 1975-1991

Bob Young continued to appoint faculty to strengthen what was then called the Department of Poultry Science.

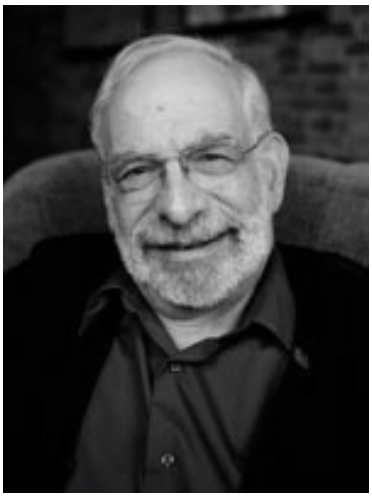


Figure 7.1. Joe Regenstein

In the early 1970s, **D.V. Vadehra**, who had joined the department's food science group in the 1960s, left his position, creating a faculty vacancy. This enabled Young to appoint **Joe Regenstein** (Figure 7.1), a biophysicist from Brandeis University, as a replacement in 1974. Regenstein was interested in factors involved in the production of processed meats from poultry and fish products. He taught courses in food science involving the physical chemistry of foods and the chemistry of food proteins.

Also in 1974, Young appointed a developmental geneticist, **Harris Brotman**, as Assistant Professor of Genetics. He had obtained his PhD from the University of California, Davis. He was on the faculty for only a short time as he soon left to go to law school.

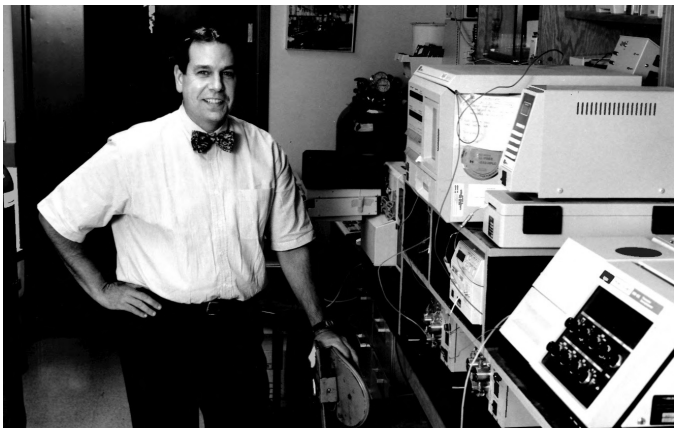


Figure 7.2. G.F. Combs Jr.

In 1975, Young recruited **G.F. Combs Jr.** to the faculty of the nutrition program (Figure 7.2). Combs completed his PhD in the department the previous year under the supervision of Milton Scott. He had even closer ties to Cornell. His father also had received his PhD in the department, working with L.C. Norris in the 1940s. Combs' research involved trace element metabolism, particularly that of selenium.

By this time, the number of students taking poultry science courses had declined to the point that department faculty were having to move their teaching to other departments on campus. In 1975, the department's poultry science courses merged with courses in the Department of Animal Science and were given animal science course numbers. For example, Richard Austic's 1975 introductory poultry science course, with an enrollment of 30 students, was now called Animal Science 230. Only a few courses remained devoted specifically to poultry. Poultry Science faculty were now teaching their specialties in courses called animal science, nutritional science, biological science, or food science.

In 1976, as a result of considerable turmoil in the Animal Science Department, the dean of the College of Agriculture and Life Sciences, Keith Kennedy, decided to replace its chair. The Dean asked the department to consider Bob Young, since he was an experienced administrator who had no "axes to grind" from department politics and who knew Cornell well. He moved to Animal Science on November 1, 1976, and continued to serve as chair until his retirement in 1983[66].

66 John Murray Elliot, *Animal Science at Cornell University 1963-2000: Observations and Reflections of an Insider*. Internet First University Depository: https://hdl.handle.net/1813/318

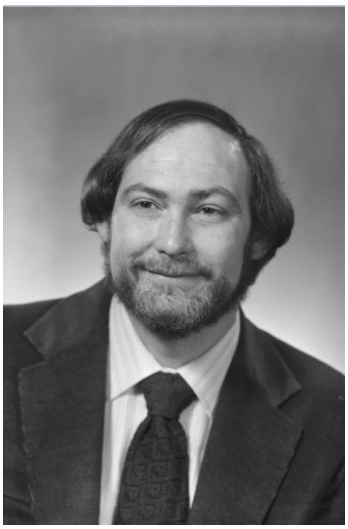


Figure 7.3. James Marsh

While Young's move from Poultry Science to Animal Science was underway, the administration made it clear that it had no intention of combining the two departments. Instead, Milton Scott became chair of Poultry Science toward the end of 1976. His tenure as chair would be short. When he took the position, Scott indicated that he wanted to retire as of December 31, 1979 (he actually retired on November 28). But during his brief chairmanship, he was able to appoint several new faculty. He appointed an immunologist, **James Marsh,** in 1978 (Figure 7.3). Marsh had trained in developmental biology and immunology with a PhD from Northwestern University. His research focused on developmental immunology and physiological factors affecting immune function. He taught a course in immunophysiology with an Animal Science course number each year. He collaborated with Combs to study the effects of Vitamin E and selenium on immune response in chicks.

Figure 7.4. Rod Dietert

Rod Dietert (Figure 7.4) became an Assistant Professor of Immunogenetics in 1977, after receiving his PhD at the University of Texas. He taught a course in immunogenetics and later developed a graduate course in immunotoxicology. He developed a strong interest in the effects of the environment on immune function and played a major role in the development of toxicology programs on the campus. Also during this period, Scott appointed **George Ketola** and **Gary Rumsey** as adjunct faculty. They worked at the Tunison Laboratory of Fish Nutrition, a U.S. Department of the Interior unit in Cortland, New York. Both had obtained their doctorates in the department. Scott was interested in fish nutrition and wanted to expand the department's research beyond poultry.

Scott also appointed **Dan Cunningham** to the extension program. Cunningham had an undergraduate degree in poultry production from Texas A&M, and a PhD in genetics from Virginia Polytechnic Institute (VPI). His research program at Cornell was oriented to poultry management and focused on cage design, bird density, and the effect of feed restriction on the performance of pullets raised for laying flocks. He taught a course in commercial poultry production under an Animal Science course number.

Scott was proud of the accomplishments of students who had studied nutrition in the department. In a paper he entitled *A Might Oak from a Tiny Acorn,* he discussed the accomplishments of the nutrition program. He compiled a list of about 122 nutrition graduate students, post-doctoral fellows, and visiting scientists who had studied in the department, along with a summary of their careers[67]. This is a remarkable list showing a wide variety of career paths for the department's alumni. Many of them had distinguished careers in the poultry industry, but also in other pursuits in academia, industry, and government. From today's perspective, it is notable that there are only six women on the list. Scott's introduction to the list of students is reproduced in an appendix to this history.

67 Department of Poultry Science records #21-31-1760, Cornell University Archives.

Figure 7.5. Charles McCormick

Figure 7.6. Kavous Keshavarz

Figure 7.7. Patricia Johnson

To deal with Scott's impending retirement, the department established a long-range planning committee to consider its future directions; this was chaired by Richard Austic[68]. One of the committee's recommendations was to once more change the name of the department, this time from Poultry Science to the Department of Avian Biology and Poultry Science, consistent with the faculty's current heavy emphasis on "science" in all of its programs. The committee did not intend the proposed change to reflect a diminished emphasis on poultry; instead, the proposal aimed to attract a broader range of undergraduate and graduate students and to expand into other areas of avian biology in the future. An unspoken reason behind the change was to make faculty more competitive for external research grants by emphasizing avian biology (basic science) rather than poultry husbandry (applied science)[69]. But the dean of the College of Ariculture and Life Sciences, David Call, was uncomfortable with reducing the emphasis on poultry science and agreed on a name change—but to Poultry and Avian Sciences.

Upon Scott's retirement, Robert Baker became chair of the newly named Department of Poultry and Avian Sciences. He served in this position from 1980 to 1987. As a result of faculty retirements, he too was able to recruit new faculty. To replace Scott, he appointed **Charles McCormick** as assistant professor in the nutrition group in 1981 (Figure 7.5). McCormick's PhD was from North Carolina State University where he worked with Charles Hill, a Cornell PhD. His research interests were in trace element metabolism, particularly zinc, and he worked on the relationship of zinc nutrition and immune function.

Soon after, two long-term members of the extension faculty retired, **Charles Ostrander** in 1981, and **Ed Shano** in 1986. Ostrander specialized in poultry management. He was replaced by **Kavous Keshavarz**, who had a PhD from the University of Georgia (Figure 7.6). He was a specialist in poultry management and nutrition, and taught the course in commercial poultry production. Shano had led 4-H youth programs in the state. His vacant position was changed to an extension associate to which **Christina Winstead**, with a PhD in nutrition from Clemson University, was appointed in 1986. At long last, a woman on the faculty!

Because keeping backyard chickens had become more popular, she also was involved in helping small flock owners. She produced a useful extension publication for small flock owners[70].

68 David Call Papers, box 4, Cornell University Archives.

69 Richard Austic, 7/20/2017, personal communication.

70 Christina Winstead, 1990, "Chickens, Chickens, and More Chickens," Cornell Cooperative Extension, https://hdl.handle.net/1813/12252

When Ari van Tienhoven retired in 1987, his position was filled by one of his doctoral graduates, **Patricia Johnson**, who continued the department work in physiology, reproductive physiology, and endocrinology (Figure 7.7). She had spent the previous four years, from 1983 to 1987, in a postdoctoral program at the University of Illinois. Remarkably, she became the first woman to be appointed to a professorial position in the department. Another young assistant professor, **Paul Aho**, a specialist in business management was also added to the faculty at that time in the extension program.

When Baker retired in 1987, he was replaced as chair by Richard Austic. Austic was confronted with a greatly diminished poultry industry in New York State. The 1987 Census of Agriculture reported only about 3.6 million laying hens on New York farms. Nearly all (97%) were on just thirty farms, and 75% were on just ten farms. The state's egg industry accounted for only about 1% of laying hens in the United States, and the state's broiler industry sold 1.3 million broilers in 1987, compared to 6.7 billion nationally.

By 1990, the Agriculture College's administration recognized that it had to consider whether the Department of Poultry and Avian Science should continue as a separate entity. In addition to the decline of the state's poultry industry, the department's faculty had research interests that differed greatly from those of poultry husbandry faculty in the days of Jimmy Rice. Most current faculty had little direct experience with the poultry industry. Instead, they were specialists in scientific disciplines which they applied to basic problems of avian biology. The trend began with Hutt's leadership, but subsequent leaders also replaced faculty from the Rice era with basic scientists. In September 1988 Austic sent a 5-year plan for the department to Dean David Call. The plan called for 2 new positions for the department. One was for a biotechnology position for a microbiologist with a focus on the microbiology of poultry meat and eggs. The other position would be for an animal molecular biologist who would contribute to a department focus on animal biotechnology. The plan also called for strengthening the extension program and stressed the need for renovation of laboratory facilities in Rice Hall and the Bruckner Laboratory[71]. I found no record that the proposed plan was seriously considered by the college administration.

The department was no longer teaching much about the poultry industry. The extension staff was much reduced. Research grants no longer came directly from the poultry industry, as faculty were successfully competing for federal grants for basic research. The economic downturn in 1990 resulted in significant reductions in New York State support for the Statutory Colleges at Cornell. The College of Agriculture and Life Sciences looked for places to make budget cuts. Dean Call asked the department to consider alternatives. Austic proposed a merger between his department (Poultry and Avian Science in the College of Agriculture) and Avian and Aquatic Animal Medicine in the Veterinary College[72]. The department faculty supported the merger and said they opposed dispersing faculty to other departments[73]. But the Agriculture College administration was unenthusiastic about the idea of a joint department. Instead, Dean Call offered to move faculty to their preferred units on campus.

On October 22, 1990, Dean Call outlined the disposition of the Avian and Poultry Science faculty[74]. He transferred Rod Dietert and Jim Marsh to the department of Veterinary Microbiology and Immunology;

71 "Department of Poultry and Avian Sciences 5-year Plan"; copy provided by R.A. Austic in a personal communication.
72 Austic letter to Dean Call, August 31, 1990; David Call Papers, Cornell University Archives.
73 Austic Letter to Dean Call, September 26, 1990; David Call Papers, Cornell University Archives.
74 Dean Call's letter to department faculty, Oct 22, 1990; David Call Papers, Cornell University Archives.

Combs and McCormick to Nutritional Sciences; Austic, Keshevarz, Aho, and Johnson to Animal Science; Regenstein to Food Science. These moves were to take place by July 1, 1991, after which the Poultry and Avian Science Department would be closed and cease to exist. Call appointed committees to deal with the disposition of facilities and farms where faculty were still conducting research. Once the faculty moved out, Rice Hall was used to headquarter a new Center for the Environment. These actions closed the books on nearly a century of operations by a department that was the first of its kind in the world and that had enormous influence on an industry through its research, teaching, and graduate training.

Some concluding thoughts

In the mid-1900s most land-grant universities in the United States housed separate poultry departments, but in 2018 as I write these remarks only six Departments of Poultry Science remain in the United States, all located in states in which the poultry industry is heavily concentrated[75]. Many poultry departments at other universities met the Cornell department's fate or were merged with Departments of Animal Science.

Figure 7.8. The poster from the Mann Library's exhibit in 2010

In 2010, Cornell's Mann Library celebrated the history of chicken raising in New York State with an exhibition of artifacts and materials illustrating the trajectory from the small poultry farms of the late 1880s through the industrialized chicken production of the mid-1990s, to today's return to backyard chickens as a cultural phenomenon[76]. The exhibit, curated by librarian Liz Brown, drew heavily on the collected papers of Jimmy Rice. The poster from the exhibit is shown in Figure 7.8.

Today, the Cornell Animal Science Department is chaired by Pat Johnson. Her former colleagues from Poultry and Avian Sciences, Austic and Keshevarz, retired and were not replaced. Aho had left earlier for private industry before coming up for tenure. Not one course in poultry science is taught in the Cornell's College of Agriculture and Life Sciences.

In his catalog of former nutrition students in the department (see Appendix), Milton Scott closed his description with this statement:

> *The oak tree that resulted from a tiny acorn planted by James E Rice over 80 years ago, flourished and grew into a mighty tree which has spread thousands of other acorns throughout the world. Apparently, in the end it had outgrown its usefulness, and so was cut down.*

75 In 2017 Poultry Science Departments are found at the University of Arkansas, the University of Georgia, Mississippi State University, Auburn University, Texas A&M University, and North Carolina State University.

76 "Backyard Revival: American Heritage Poultry," January 2010, Mann Library, Cornell University; Virtual Exhibit: http://exhibits.mannlib.cornell.edu/backyardrevival/

8. Afterword: Reflections on the Current Poultry Industry

The poultry industry has undergone enormous changes since Liberty Hyde Bailey recruited Jimmy Rice to start a Poultry Husbandry department at Cornell in 1903. The changes in the industry from a small, highly dispersed farm sideline, tended largely by farmers' wives, to the industrial complex it is today would have been hard for even such a visionary as Jimmy Rice to contemplate.

It is useful to consider the industry today in light of its history. USDA food disappearance data show that in 1909, chicken meat availability (boneless retail weight) was about 10 pounds per person. This compares to the 63 pounds per capita recorded in 2015[77]. This huge increase cut into beef availability to the extent that chicken supplies now exceed those of beef (54 pounds per capita). The increase in poultry meat availability was the result of the development of an industrialized broiler industry that did not exist at all at the time the Cornell poultry department was founded.

The production of chicken meat is now heavily concentrated in Southern states, where Georgia, Alabama, Arkansas, North Carolina, Mississippi, and Texas account for two-thirds of total broiler production in the United States (see Figure 8.1)[78]. Chicken producers are no longer independent farmers. The production of broilers is controlled by highly integrated companies that own and tightly oversee breeding flocks, hatcheries, processing plants, and feed mills, all of which used to be carried out by separate companies. Today, these fully integrated companies contract with individual growers who actually raise the broilers[79]. The companies supply the day-old chicks from their breeding farms and hatcheries, and supply the feed from their own mills. The company also processes and markets the finished broilers. The integrated companies are large; eight US companies control about 80% of the broiler meat produced in this country[80]. Under this system, the contract grower invests

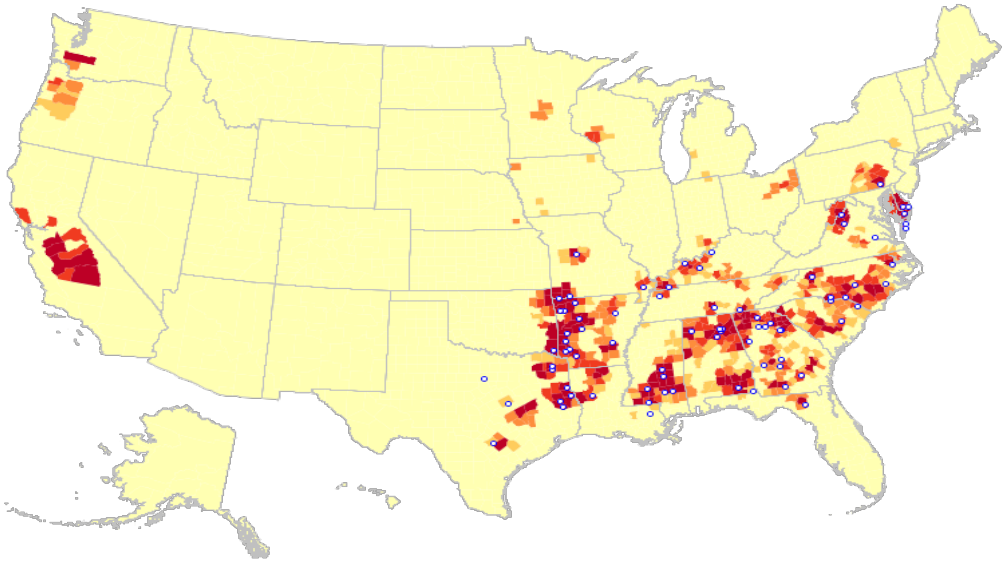


Figure 8.1. Broiler production areas in the United States. Color shows areas of high density.

77 USDA Food Availability Data System, 2015
https://www.ers.usda.gov/data-products/food-availability-per-capita-data-system/

78 Food and Water Watch Factory Farming Map, 2012, Data from USDA Census of Agriculture
https://www.factoryfarmmap.org/#animal:broilers;location:US;year:2012

79 James M. McDonald and Nigel Key, 2012, "Market Power in Poultry Production Contracting? Evidence from a Farm Survey," *J of Agricultural and Applied Economics* 44: 477-490.

80 Tomislov Vukina and Xiaoyong Zheng, 2015, "The Broiler Industry: Competition and Policy Challenges," *Choices* 30(2).

in the housing and supplies the labor needed to raise the chickens to market weight. Company specialists provide the technical assistance, instead of local county extension agents or private veterinarians as in the past. Companies pay the grower an amount that depends to some extent on how efficiently they raise the broilers to market weight—a competitive "tournament" system.

How big is the US poultry industry today? According to the 2012 agricultural census, 32,935 poultry farms sold 8,463,194,794 broilers and other meat-type chickens that year[81].

Nearly half of those farms, 15,334, produced more than 100,000 broilers each and accounted for 99 percent of broiler production. This industrial model has been transplanted to broiler production throughout the world. In 2018, world production of broiler meat is estimated to be 92.5 million metric tons, of which 19 million metric tons will be produced in the United States[82].

The US egg industry is also concentrated. In 2017, 276 eggs were produced per capita in the United States[83]. The 2012 US Agricultural Census said 198,272 farms housed 350,715,976 laying chickens that year. Of these, 97 percent were housed on 3,134 farms with more than 10,000 layers each. Fewer than 20,000 farms produce most of the chicken meat and eggs in the United States, compared to 5.5 million in 1910.

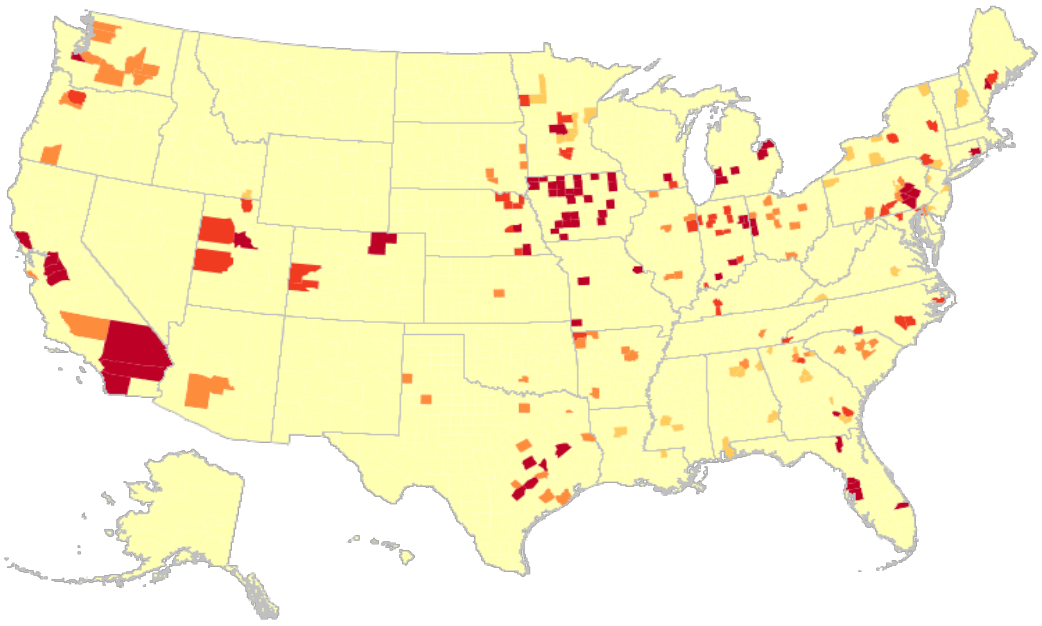


Figure 8.2. Egg production areas in the United States. The colors show areas of high density.

Egg production also is concentrated in relatively few states. The top egg-producing state is Iowa, followed by Ohio, Indiana, Pennsylvania and California (see Figure 8.2)[84]. Together, these five states produce 51 percent of all US eggs, and the top ten states produce 70 percent. Only a few companies produce eggs. According to the American Egg Board, 59 companies with one million layers each account for 87 percent of total production. Of these, 17

81 USDA Census of Agriculture, 2012 Census, Vol. 1, National Level Data. Data from the 2017 census is not available at this time.

82 USDA Foreign Agricultural Service Livestock and Poultry: World Markets and Trade https://apps.fas.usda.gov/psdonline/circulars/livestock_poultry.pdf

83 USDA Food Availability (Per Capita) Data System https://www.ers.usda.gov/data-products/food-availability-per-capita-data-system/

84 Food and Water Watch Factory Farming Map, 2012; Data from US Census of Agriculture https://www.factoryfarmmap.org/#animal:layers;location:US;year:20122

own more than 5,000,000 layers[85]. About 175 companies owning flocks of 75,000 hens or more account for 95 percent of all layers in the United States. Remarkably, the average production per laying hen was 279 eggs in 2016[86]. This is a sharp increase over the average of 121 eggs per layer recorded in 1929. It is also a far cry from my family's free-range egg production in the 1940s, sufficient to feed our family and provide grocery money.

The research performed in Jimmy Rice's and other poultry departments in agricultural colleges of the early 1900s fueled this industrialization. Researchers' discovery and analysis of nutritional requirements, the nutritional value of feed ingredients, breeding techniques, methods of disease prevention, housing and management practices, optimal conditions for artificial incubation, new product development, and product storage and marketing were largely carried out in poultry departments in land-grant universities throughout the United States. The few remaining poultry departments continue to provide research and training to support the needs of their state's poultry industry.


A Chicken for Every Pot

THE Republican Party isn't a "Poor Man's Party!" Republican prosperity has erased that degrading phrase from our political vocabulary. The Republican Party is emphatically the party—

Under higher tariff and lower taxation, America has stabilized wages, employment and dividend rates.

Republican efficiency has filled the workingman's dinner pail—and his gasoline tank besides—made telephone, radio and sanitary plumbing standard household equipment. And placed the whole nation in the still richer class.

During eight years of Republican management, we have built more and better homes, owned more skyscrapers, passed more beneficiary laws, and more forces to regulate and justly investigate, inaugurated more conservation measures, more measures to standardize and increase production, expand export markets, and reduce industrial and human junk piles, than in any previous quarter century.

Republican prosperity is written on fuller wage envelops, written in factory chimney smoke, written on the walls of new construction, written in savings bank books, written in mercantile balances, and written in the push of stocks and bonds.

Republican prosperity has restored hours and increased earning capacity, silenced discussion, put the proverbial "chicken in every pot." And a car in every backyard, to boot.

It has raised living standards and lowered living costs.

It has restored financial confidence and enthusiasm, changed credit from a evil man's privilege to a common utility, generalized the use of time-saving devices and released women from the thrall of domestic drudgery.

It has provided every county in the country with its concrete road and knitted the highways of the nation into a unified traffic system.

Thanks to Republican administration, farmer, dairyman and merchant can make deliveries in less time and at less expense, can borrow cheap money to refund exorbitant mortgages, and stock their pastures, canyons and shelves.

Democratic management impoverished and demoralized the railroads, led packing plants and tire factories into receivership, squandered billions on impractical projects.

Democratic maladministration issued further billions on mere "scraps of paper," then encouraged foreign debtors to believe that their loans would never be called, and bequeathed to the Republican Party the job of mopping up the mess.

Republican administration has restored to the railroads solvency, efficiency and par securities.

It has brought rubber trades through panic and chaos, brought Steam, the prince of crude rubber by stimulating monopolistic rivers, put the nation's banks in the black and secured from the European powers formal acknowledgment of their obligations.

The Republican Party rests its case on a record of accomplishment and performance.

The Presidential and Congressional candidates stand for election on a platform of sound practice. Federal significant, high tariff, Constitutional integrity, the conservation of natural resources, honest and constructive measures for agricultural relief, sincere enforcement of the laws, and the right of all citizens, regardless of faith or origin, to share the benefits of opportunity and justice.

Wages, dividends, progress and prosperity say,

"Vote for Hoover"

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Those wishing to see similar advertisements in other New York papers may send cheques to the Republican Business Men, Inc., 4 West 40th Street

GENERAL COMMITTEE

George Henry Payne, Chairman.

Figure 8.3. A poster from Herbert Hoover's campaign in 1928

This industry has succeeded in producing chicken at a rate and cost that anyone can afford—a far cry from Herbert Hoover's 1928 campaign promise of a then relatively expensive chicken for every pot (Figure 8.3)[87].

But cheap chicken comes at a cost, and the current configuration of the poultry industry is not without its critics. The effects of concentrated broiler and layer populations on air pollution, odors, working conditions, and waste disposal has raised any number of environmental issues related to current industry practices[88]. The egg industry has come under fire by advocates for animal welfare concerned about housing laying chickens in crowded cages, and the destruction of male chicks and hens past their prime. In 2008, California voters passed a proposition requiring that by 2015 producers provide egg-laying hens enough room to lie down, stand up, fully extend their wings and legs, and turn around without interference of other hens in the cage. This has led to the design of cage systems to meet those requirements or the design of cage-free housing to provide more humane conditions for the hens. A discussion of the animal welfare issues affecting the poultry industry was published by Ian Duncan in 2001[89]. The use of antibiotics as growth promoters for broiler production has also come under heavy fire for contributing to the development of antibiotic-resistant microorganisms harmful to human health.[90]

85 aeb.org

86 USDA Dairy and Poultry Statistics, 2017 https://www.nass.usda.gov/Publications/Ag_Statistics/2017/Chapter08.pdf

87 "A Chicken in Every Pot," political ad and rebuttal article in *New York Times*, 10/30/1928.

88 Institute of Medicine, 2015, "A Framework for Assessing Effects of the US Food System," Washington, DC: National Academies Press

89 Ian J. H. Duncan, 2001, "Animal Welfare Issues in the Poultry Industry: Is there a lesson to be learned?" *Journal of Applied Animal Welfare Science* 4: 207-221.

90 Maryn McKenna, 2017, "Big Chicken: The Incredible Story of How Antibiotics Created Modern Agriculture and Changed the Way the World Eats," Washington, DC: National Geographic; Ellen K. Silbergeld, 2016, *Chickenizing Farms and Food*, Baltimore, MD: Johns Hopkins University Press; M. J. Gilchrist, C. Greko, D. Wallinga, et al., 2007,

Several recent books address the industrial model of poultry meat and egg production. Bryant Symon, a professor of history at Temple University, describes in *The Hamlet Fire* the human and environmental costs of industrially produced cheap chicken meat[91]. His book explains how the loss of manufacturing jobs in parts of the United States made surplus labor available to produce cheap chicken meat and fast food products. Using a fire in a chicken plant as a focus, he demonstrates how the costs of cheap food are borne by the workers who produce it and the communities in which they live. The anthropologist Steve Striffler worked as a participant observer in a chicken plant and provides similar descriptions of the difficult conditions experienced by workers in the poultry industry[92]. These books reveal the substantial social, health, environmental, human, and bird welfare costs of industrial chicken production.

The backyard chicken and clean egg movements arose in response. Segments of the American public demand free-range meat and cage-free eggs certified by a variety of third parties. Animal welfare groups have pressed state legislatures to pass laws banning cages for laying chickens. The industry, in turn, pushes for laws to prevent outsiders from exposing growing conditions. These groups argue about regulations of line speed in poultry processing plants (currently 140 birds per minute), with food and worker safety at issue.[93]

Finally, I must say a word about the backyard chicken movement. It is difficult to get information on the number of small flocks in the US. The USDA census of agriculture listed 145,615 farms with 1 to 49 layers in 2007 and 174,211 such farms in 2012[94]. Small backyard flocks with a few chickens in urban centers are difficult to quantify but there seems to be a consensus that these are growing in number[95]. According to the *American Veterinarian,* one large hatchery in Iowa sold 3 million chicks in 2016, and a community forum, BackYardChickens.com, has half a million members.[96] State cooperative extension web sites provide numerous resources with advice about how to deal with small flocks or backyard chickens. Books about raising backyard chickens are widely available.[97] In New York, extension specialists refer to a leaflet from Washington County[98]. The City of Ithaca has been testing an ordinance permitting backyard chickens in response to requests from residents. But Cornell's Animal Science Department has nothing to say about the topic.

"The Potential Role of Concentrated Animal Feeding Operations in Infectious Disease Epidemics and Antibiotic Resistance," *Environmental Health Perspectives* 115: 313-316.

91 Symon Bryant, 2018, *The Hamlet Fire: A Tragic Story of Cheap Food, Cheap Government, and Cheap Lives*, New York/London: The New Press.

92 Steve Striffler, 2005, *Chicken: The Dangerous Transformation of America's Favorite Food*, New Haven and London: Yale University Press.

93 Nicole Erwin, 2017, "Too Fast for Safety? Poultry Industry Wants to Speed up the Slaughter Line," National Public Radio. https://www.npr.org/sections/thesalt/2017/10/27/559572147/too-fast-for-safety-poultry-industry-wants-to-speed-up-the-slaughter-line

94 https://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_1_US/st99_1_032_033.pdf

95 Andy Schneider, 2015, "The Backyard Chicken Movement," http://www.acreagelife.com/articles/backyard-chicken-movement

96 Beth Thompson, "ACVC 2016: Poultry as Pets - A Fad with Legs?" *American Veterinarian*, February 22, 2017. https://www.americanveterinarian.com/journals/amvet/2017/february2017/poultry-as-pets-a-fad-with-legs

97 A particularly good one is Kimberly Willis and Robert T. Ludlow, 2015, *Raising Chickens for Dummies*, Hoboken, N.J.: John Wiley & Sons Inc.

98 http://washington.cce.cornell.edu/agriculture/backyard-chickens

What would Jimmy Rice say to all the developments that have occurred in the last 115 years since the founding of Cornell's Poultry Department? I am guessing that the industrialization of the industry as it is today would even be beyond his vision for the future of the industry he loved.

Acknowledgments

Cornell University has a wonderful collection of Archives and Special Collections that preserve much of the university's history. I am grateful for the help I have received from the library staff to find much of the information about the poultry history at Cornell. The photographs I used are primarily from the Cornell Archives, but I thank Ed Cobb for pointing me to some of the early Cornell photos. Several individuals have read drafts and provided suggestions. Richard Austic provided annual reports and information about the latter days of the department and he read the manuscript. Roland Leach read the manuscript at an early stage and made useful suggestions. Marion Nestle edited the manuscript and provided important suggestions as to organization and presentation of the matter. I am especially grateful to J. Robert Cooke, who organized the manuscript and arranged to make it available through Cornell's eCommons.

Appendix

After Milton Scott retired from the department, he wrote his books on turkey, duck, and comparative nutrition. He also was extremely proud of the students who had studied nutrition in the department, and he tried to account for all of them in a paper he wrote in 1992. Through department records and by direct contact with former students, he compiled a listing of 120 former graduate students, post-doctoral fellows, and visitors who had studied in the nutrition group during the department's lifetime. He summarized what he found in an introduction to the listing of the students, their biographies, and their known addresses in a paper he entitled "A Mighty Oak from a Tiny Acorn". For privacy reasons we have not included individual information here but Scott's introduction that follows describes what he found in his survey and shows the pride he felt on the department's accomplishments. The complete paper is to be found in the Cornell University Archives.

A Mighty Oak from a Tiny Acorn

M.L. Scott
The Jacob Gould Schurman Professor Emeritus,
Nutrition Division, Poultry Section,
Department of Animal Science, Cornell University

It was the "Turn of the Century"— the beginning of the 20th Century. A young Cornell professor named James E. Rice approached the famous Dean of Agriculture, Liberty Hyde Bailey, with the idea that poultry, which up to that time had consisted of farm flocks of 10-20 hens, could become an important agricultural industry. He had discussed the subject with several students who agreed with him and indicated a desire to learn more about poultry husbandry.

Knowing that Ezra Cornell had adopted the premise that "(He) would found an institution where any person can find instruction in any study", Liberty Hyde Bailey agreed to the establishment of a Department of Poultry Husbandry and gave Jimmy Rice the go ahead to hire some good, practical assistants to help him in the endeavor.

During the next few years, emphasis was laid on selection of "good stock" and the teaching of good poultry management practices. Prof. Rice and his fellow Extension Professors traveled to all parts of New York State, culling out poor egg layers and preaching sanitation and other good husbandry. Rice also taught courses in Poultry Husbandry, one of his first students to show an interest in feeds and feeding of chickens was Gustave F. Heuser.

By about 1920, Prof. Rice realized that he needed technical assistance, especially in the field of nutrition. He first hired Dr. G.F. Heuser to teach feeds and feeding, and soon afterward hired Dr. L.C. Norris as professors in a Division of Nutrition in the Department of Poultry Husbandry. Norris had obtained his Ph. D. degree under the famous Professor L.A. Maynard.

Good progress occurred over the next few years. A far-sighted Governor and State Legislature decided to formally recognize this upstart department and to grant the funds to build a good, solid stone building to house the Department of Poultry Husbandry. The building was completed in 1920. According to one who was there at

the time, the building was named "Rice Hall" and so dedicated during the Poultry Science Meeting held there in 1940.

During the years, professors also were hired to teach and undertake research in genetics, physiology, incubation techniques and food science. These professors and their students made many great accomplishments in poultry breeding, management, food science and incubation, and in the basic sciences of physiology, bacteriology and biochemistry. This article, however, will be restricted to the achievements made by the students in the Division of Nutrition of the Poultry Department. The Staff of that Division, originally, only L.C. Norris and G.F. Heuser, grew to four members in the mid-1940's by including the author and F.W. Hill. However, during the next 15 years, many changes occurred. In the mid 1950's, Dr. Heuser retired, leaving the number of staff members at three.

When Dr. Hill moved to the University of California as Head of the Poultry Department for that institution, Dr. M.C. Nesheim replaced him. Later, when L.C. Norris retired, Dr. R.J. Young replaced Norris, keeping the staff of the Division at three members. When M.C. Nesheim was asked to become Director of the newly-formed Cornell-wide Division of Nutritional Sciences, Dr. Richard Austic replaced him. A little later, when R.J. Young was asked to take over Chairmanship of the Department of Animal Science, he was replaced by Dr. G.F. Combs Jr. The author then became Head of the Poultry Science Department and was replaced in the Division of Nutrition by Dr. Charles C. McCormick. Each faculty member in the Division directed about three graduate students at any particular time. Also serving as members of this faculty were Dr. Gary L. Rumsey and Dr. H. George Ketola of the USDA Tunison Laboratory of Fish Nutrition; and Dr. Roland Leach of the U.S. Plant, Soil and Nutrition Laboratory on the Cornell campus. All were Adjunct professors in the Department. All acted as Co-Chairmen on Graduate Committees of several graduate students.

Little did anyone dream that this small "division" of a department of poultry husbandry would not only teach young people the science needed to convert the raising of chickens into a multi-billion dollar industry, but also would rank as one of the top educational groups in the world, producing leaders in all of their chosen fields of endeavor.

During the period from 1918 to 1988, over 70 students obtained Ph.D. or M.S. degrees in this Division of Nutrition. In addition, 10 or more graduate scientists studied in the Division as Post-Doctoral Research Associates or as Visiting Scientists.

The graduate students were taught

1) to learn all known concerning the subject of nutrition;

2) to obtain all knowledge possible in the supporting fields of inorganic and organic chemistry, of biochemistry, of biology including radio-biology, of physiology, including anatomy and histology;

3) to broaden their perspectives with courses in economics, public speaking and writing and other subjects of interest to them;

4) to read the pertinent literature so as to have all possible knowledge concerning the background of research in their field;

5) to always undertake their research using the truly scientific approach with adequate numbers of test animals and replications of treatments, adequate controls, statistical analysis of all data, and even then not to believe a result unless it was repeatable;

6) to learn to present their reviews of the literature and the results of their experiments in a professional manner;

7) to be able to "think on their feet", drawing on their knowledge to answer any reasonable question concerning nutrition;

8) that on completion of the Ph.D. degree in the Division they will be authorities in their field, and will be looked to by others as such; and, most of all,

9) to diligently and enthusiastically work on projects that are worthwhile—to use the basic approach to find answers to practial problems.

In this way, the students have learned

1) to be original thinkers;

2) that nothing worthwhile comes easily; and

3) that true happiness is in the knowledge that one is working at something worthwhile.

This is the story of the outstanding achievements of these students[99]. The records submitted at the request of the author, tell a fantastic saga of achievements by this group of individuals who received their advanced educational training in a department considered by most as a lowly institution whose only preoccupation was to help in the "husbandry" of the chickens of New York State. Space here does not permit a complete review of the works of each individual. Each deserves to be forever remembered in the pages of *Who's Who*, and many are members of that distinctive group. Each will receive in this dissertation, minimal coverage of essentials plus comments concerning some of their most outstanding accomplishments.

An overview of the activities of these students shows that many of them became University Professors with outstanding records of achievement in both research and teaching. These students taught nutrition in the Universities of 21 different States from Maine to California, and in Canada, Mexico, Colombia, Peru, England, Japan, India, Israel, the Philippines, a number countries of Europe, Africa, and in other countries. Several have received awards as the "best" teachers in their respective universities. Many were able to instill in the students such enthusiasm for nutrition that their classes grew from only a few students to over 500 students per year. A number of these professors reported that many of their students became so enthused that they decided to change to "Nutrition" as their major subject of study. These teachings of thousands of undergraduate and graduate students has greatly multiplied the educational trainings that these few graduate students received in the Nutrition Division of the Poultry Department. These teachers and researchers have not been satisfied to rest cozily in an "Ivory Tower", but most have also acted as consultants to industry in the United States and other parts of the world, thus keeping abreast of all pertinent events in nutrition, and thereby becoming better informed for their teaching and for new research.

99 Department of Poultry Science records #21-31-1760, Cornell University Archives

Many of these students have been elected as Heads of their departments, some have become Deans or Associate Deans, and one student from this Division has become one of the highest ranking officials in the administration of one of the best Universities in the land—Cornell University.

Those who have taken permanent positions in "industry" have gone to the top in their fields of specialization. They have become Directors of Research or Executive Directors of the institutions. Two were Executive Vice Presidents of large companies, several are Directors of Research, one of these being the Director in the largest feed company in Asia, having mills and offices in Thailand, Hong Kong, Indonesia, Taiwan, Turkey, Portugal and mainland China.

An excellent field for several students has been as Technical Service Directors for large companies. Still another became Director of Public Relations for one of the largest companies in the world (Coca Cola) and was stationed first in Japan, then in Brussels.

Some have found their niches in Government positions of great importance to their respective countries. One became Agricultural Attache to India, another became Director of the several Laboratories of Fish Nutrition of the United States Department of Interior. Three others became research scientists in Government laboratories—several in the United States, one in Canada, one in Kenya and one in England. All of these have made discoveries that will not only help feed these countries but perhaps will help feed the entire world. Many of these students served in the United States Armed Forces overseas. Several received medals and citations for Distinguished Service during World War II. One student is a heroine of the Gulf War.

Three have conducted important work as Food and Drug administrators; one as Assistant Deputy Minister of Health in Canada and was Canadian representative in the World Health Organization; one held a similar position in Colombia; another as Chief, Experimental Nutrition Branch of the Food and Drug Administration of the United States in Washington, D.C.

Several students came to the Nutrition Division with definite objectives toward making a better world for certain underprivileged factions of society. Among these was a young man from Mexico who had already studied as much as he could about the flora and fauna of the sea. He wanted to make better use of such materials as kelp and kelp products; and of mussels which could be produced in abundance in the brackish waters in various bays of Mexico. Another had been a missionary in the very rural areas of Haiti where malnutrition was rampant. He wanted enough nutritional knowledge to be able to give these rural Haitians the help that they needed. He came to the Nutrition Division of Cornell's Poultry Department to get that knowledge.

Five others came from the Philippines. They conducted their research on problems that would help animal and human nutrition in the Philippines. The same was true of a student from rural Thailand, another from Peru and several students from Korea; from Taiwan and mainland China.

Closing note by M.C. Nesheim

As you can see from reading Scott's paper, he was extremely enthusiastic about the nutrition program of the department. His enthusiasm was inspiring to his students and it characterized his teaching, research, and his industry consulting. This program attracted the largest number of graduate students to the department. In addition, there were a significant number of students trained in genetics, physiology, and food science in the course of the department's history who also had distinguished careers.