Raymond F. Baker, Plant Breeder

The Raymond F. Baker Center for Plant Breeding is named after an extraordinary leader in Iowa's agricultural history. Raymond F. Baker's scientific rigor, his commitment to crop improvement, and his skillful leadership helped to foster a revolution in farming. His extensive research in corn breeding led to unprecedented innovations in the farming industry.

A Growing Interest

Raymond F. Baker's interest in corn breeding began when he was attending Iowa State College, now called Iowa State University. In 1926, he met Henry Wallace who, working as a plant breeder, specialized in the development of high-yielding corn. Wallace persuaded Baker, then an agronomy student, to take some of Wallace's inbred lines and make some experimental crosses. Baker agreed and asked his father to plant the special seeds during the spring planting season when Baker would be in Ames attending classes. His father agreed, but, as often happens on the farm, time grew short and his father decided to skip Raymond's seeds in order to focus on planting the regular crop. Raymond's mother, however, knowing Raymond's interest in working with these plants, completed most of the planting herself, and helped to launch her son's brilliant career as a hybrid-corn breeder. In fact, the next year, Baker's hybrid crosses, developed from the seeds planted by his mother, won the highest honors in the Southern District of the Iowa Corn Yield Test.

Raymond F. Baker, Plant Breeder

A Pioneering Plant Breeder

During Baker's senior year at Iowa State College, Henry Wallace hired him to work for the company Wallace had started—Hi-Bred Corn Company, later named Pioneer Hi-Bred Corn Company. Baker agreed, dropped out of college, and began his career as a plant breeder. (He completed his degree at Iowa State College a few years later.) Wallace mentored Baker in his early years at the Pioneer Hi-Bred Corn Company, teaching him techniques and procedures that took Wallace years of painstaking research. In 1933, when Wallace left for Washington to become Secretary of Agriculture in President Franklin Roosevelt's administration, Baker was promoted to head Pioneer's research program.

Raymond F. Baker worked as Pioneer's lead plant breeder for 43 years, developing many of the company's first cultivars. His rigorous scientific methods helped to lay the groundwork that made Pioneer Hi-Bred, International the successful seed corn company it is today.

Far Ranging Pursuits

Baker's interests were far ranging. In 1934, he began working to develop the first hybrid chicken. Using many of the same techniques he learned from breeding corn, Baker produced chickens selected for increased egg production. The first hybrid chickens became available commercially in 1942. Trials proved that these chickens exhibited a 40%-50% increase in egg production over other chickens tested.

Even during his spare time, Baker's passion for plant breeding flourished. As a weekend experimental project, he set about to cultivate the perfect watermelon. He grew inbred lines of the melons and crossed them into some excellent strains of watermelon hybrids. He often gave out packets of their seeds as gifts to very lucky colleagues.

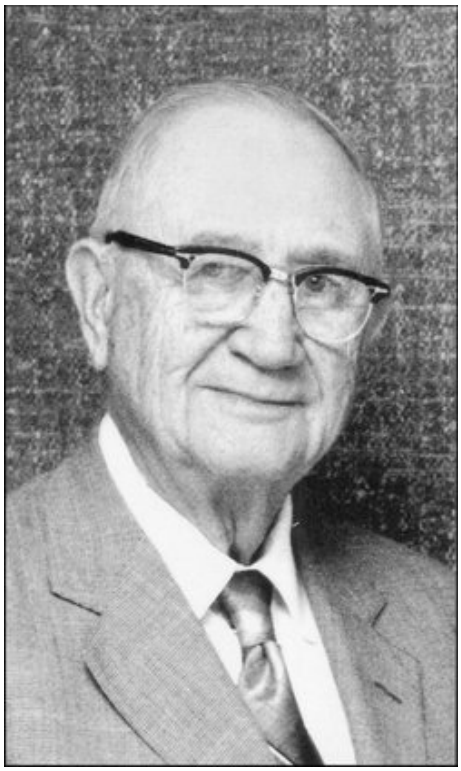
Corn, chickens, watermelon—Raymond F. Baker was a man who, through the use of advanced scientific techniques and an understanding of plant selection and genetics, worked to change the future of farming and food production.

Raymond F. Baker: *Meticulous Researcher, Dedicated Leader*

The Center is named for Raymond F. Baker, a corn breeder, researcher, and leader in the Pioneer Hi-Bred, International organization. His work was instrumental in developing the superior hybrid corn cultivars that made Pioneer one of the leading seed corn companies in the world. Under Mr. Baker's guidance, the research budget at Pioneer Hi-Bred grew dramatically from the $2000 allotted in 1932 to $54,484,000 in 1988, the year he stepped down from the Board of Directors. The success of the Pioneer's research department can be attributed both to Baker's commitment to scientific rigor and to his strong leadership qualities. Forrest Troyer said of Mr. Baker, "He was a knowledgeable, innovative corn breeder and a conscientious, progressive leader." Troyer reports that Mr. Baker was an excellent scientific investigator, particularly skilled at drawing essential inferences from pages of data collected from field trials. Arnel Hallauer wrote of Mr. Baker, "His personal development of outstanding hybrids and his ability to assemble and direct a high-quality plant breeding staff formed the base for rapid expansion of Pioneer Hi-Bred, International." Mr. Baker's research techniques were firmly founded on proven principles from successful plant breeding programs, and the success of Pioneer Hi-Bred can be directly attributed to his belief in those proven techniques. He believed that cultivars with high quality traits could be developed only through careful research and considerable hard work. He also fully understood the importance of hiring qualified staff and giving them the support and independence needed for success. In 1955, Mr. Baker wrote for the Proceedings of the Tenth Annual Hybrid Corn Industry Conference, "Corn breeders have continually experimented with some simpler way to evaluate the performance of new hybrids. I know of no substitute for the careful detailed work of planting and harvesting these hybrids under all types of soil and weather conditions. Here more than any place else, systematic detailed work by careful technicians is most important."

Mr. Baker was committed to advancing plant breeding for future generations and supporting the organizations that foster that development. He was a Fellow of the American Society of Agronomy, the American Association for the Advancement of Science, and helped to organized the National Council of Commercial Plant Breeders. In 1946, he initiated, through funding from Pioneer Hi-Bred, a research assistantship for Iowa State University students studying corn breeding. He regularly participated in field days and conferences, interacting with scientists and farmers.

Mr. Baker recognized the advantages that improved crops could bring to the citizens of Iowa and to the world. He was a man who devoted his life to advancing his profession for the benefit of science and the larger community. Forrest Troyer wrote, "Mr. Baker often stated he enjoyed corn breeding so much he would pay for the opportunity to do it, and in a way he did. Corn breeding became his entire life." The Raymond F. Baker Center for Plant Breeding strives to continue the good work begun by him.



I know of no substitute for the careful detailed work of planting and harvesting these hybrids under all types of soil and weather conditions. Here more than any place else, systematic detailed work by careful technicians is most important.

—Raymond F. Baker

Raymond F. Baker: *Generating Seeds of Success*

by Marcia Minear

Raymond F. Baker was an remarkable leader in the history of Iowa agriculture. His work as a corn breeder, researcher, and leader at Pioneer Hi-Bred, International helped to launch a revolution in agronomy. Baker was the Lead Plant Breeder at Pioneer and, under his direction, developed the superior hybrid corn cultivars that catapulted the company toward enormous success. In 1988, the year Baker retired from Pioneer's Board of Directors, it was estimated that 25% of the corn grown in the United States was descended from varieties developed under his direction.

Photo courtesy of Iowa State University Library, Special Collections.

Raymond F. Baker demonstrating hybrid corn cultivars.

To understand Raymond Baker's impact on agriculture, we must look back at farming practices in the United States during the early 1900's. Farming was a very labor intensive endeavor. Horsepower literally came from horses, and farm chores started before dawn. Corn was hand planted and hand picked. At harvest, farmers selected their best looking ears of corn and saved those seeds for planting the next season. These open-pollinated corn plants exhibited heterogeneity for many traits and were more subject to lodging and more susceptible to biotic and abiotic stresses. Because the plants matured at different rates and grew to different sizes, harvesting with machines was impossible. Corn yields averaged about 30 bushels an acre. The economic livelihood of a farm family was precarious.

I feel that I have been especially fortunate in choosing a life-long vocation that I have enjoyed more than anything else I could do. For me, corn research has been both my vocation and hobby. It was Iowa State that made it possible for me to learn about, and get in on the ground floor of hybrid corn research, for which I will always be thankful.

—Raymond F. Baker

Buying corn seed, even hybrid seed, was considered folly, until, in the mid 1930's, a severe drought brought disaster to the Corn Belt. Drought-tolerant hybrid varieties, developed by Raymond Baker, proved the worthiness of hybridization and increased the demand for hybrid corn until, by the 1940's, nearly 100% of corn grown in the Midwest were hybrids. Under Mr. Baker's guidance, the research budget at Pioneer grew dramatically from the $2000 allotted in 1932 to $54,484,000 in 1988, the year he stepped down from the Board of Directors. The success of Pioneer's research department can be attributed both to Mr. Baker's commitment to scientific rigor and to his strong leadership qualities. Arnel Hallauer, Agronomy Distinguished Professor Emeritus at Iowa State, wrote of Raymond Baker, "His personal development of outstanding hybrids and his ability to assemble and direct a high-quality plant breeding staff formed the base for rapid expansion of Pioneer Hi-Bred, International." During his more than 50 years of corn breeding, Mr. Baker initiated the practices of comparison test plots, cold germination testing, and breeding for insect and disease resistance, procedures now standard in corn breeding and hybrid seed production.

Raymond Baker was committed to advancing the profession of plant breeding for future generations. He was a Fellow in both the American Association for the Advancement of Science and the American Society of Agronomy and was instrumental in establishing the National Council of Commercial Plant Breeders. The Raymond F. Baker Center for Plant Breeding was named in his honor and strives to continue and promote the art and science of plant breeding.

Raymond F. Baker: *Planting Seeds for the Future*

As a young man, Raymond Baker recognized the advantages that improved crops could bring to the citizens of Iowa and to the world. He was a man who spent his life advancing the profession of plant breeding for the benefit of science and the larger community. Dr. Forrest Troyer wrote, "Mr. Baker often stated he enjoyed corn breeding so much he would pay for the opportunity to do it, and in a way he did. Corn breeding became his entire life." His contributions to the art and science of plant breeding are well recognized. His work led to unprecedented improvements in corn, including yield, disease resistance, and drought tolerance. But these successes do not tell the entire story. He was also a man devoted to his family, his community, and Iowa State University.

Raymond Baker was born near Beaconsfield, Iowa in Ringgold Country, but lived most of his adult life in Johnston, Iowa, near the headquarters of Pioneer Hi-Bred. He had two sons, Lee, born in 1930, and Laurence (Larry), born in 1933. Lee joined the Marines as a young man and then farmed the Beaconsfield farmstead with his grandfather, the same land that his father, Raymond, used to plant his first hybrid seeds. Larry graduated from the University of Minnesota with a Ph.D. in statistics. He established a very successful career in computer systems and died, tragically, at age 49. The Laurence H. Baker Center for Bioinformatics and Biological Statistics at Iowa State was established in his memory.

Mr. Baker's wife, Mary Morrison Collier Baker was born in 1904 in Fremont, Iowa. She was a gifted student and earned a degree in mathematics and science from Des Moines University in 1927. After graduating, she taught business at high schools in Spirit Lake and Greenfield. She also worked part-time in the actuarial department of Bankers Life Insurance, where, because of her gender, she was discouraged from pursuing a career in actuarial science. This bias prompted her toward a life-long interest in expanding opportunities for women. Later in her life she worked for the Department of Agriculture in Washington D.C. and Des Moines. Mary and Raymond Baker were married in 1967 and enjoyed spending time with friends and family and traveling. Their honeymoon was spent in Hawaii, with a part of the time devoted to touring the islands looking at possible sites for growing corn. Mrs. Baker was active in the American Association of University Women and served as President for the Des Moines University Alumni Association. Mary and Raymond were both quite active members of their church.

Photo courtesy of Iowa State University Library, Special Collections.

Raymond and Mary Baker

Raymond Baker was committed to advancing the profession of plant breeding for future generations. He was a Fellow in both the American Association for the Advancement of Science and the American Society of Agronomy and was instrumental in establishing the National Council of Commercial Plant Breeders. In 1946, he initiated, through funding from Pioneer Hi-Bred, a research assistantship for Iowa State University students studying corn breeding. In addition, Mr. and Mrs. Baker were generous benefactors to the Lion's Club of Iowa, Variety Clubs International, and, through several initiatives, Iowa State University. The Raymond F. Baker Center for Plant Breeding, a part of ISU's Plant Sciences Institute, was named in his honor and strives to continue and promote the art and science of plant breeding.

Raymond F. Baker: Preeminent Corn Breeder

by Dr. Arnel Hallauer, written for the 2002 Baker Council Meeting

Mr. Raymond F. Baker is considered one of the preeminent corn breeders of the 20th century. Mr. Baker, along with Henry A. Wallace, laid the foundation for developing superior hybrids for what has become the world's largest hybrid seed corn company.

Mr. Baker's career began when he joined Henry A. Wallace in 1928. For nearly 45 years he played an active role in developing hybrids for Pioneer Hi-Bred International, Inc. Today his impact is felt by corn breeders everywhere. His personal development of outstanding hybrids and his ability to assemble and direct a high-quality plant breeding staff formed the base for rapid expansion of Pioneer Hi-Bred International, Inc. in recent years.

During his career, Mr. Baker emphasized the need for cooperation and for reciprocity between industrial and public plant breeding programs. He always had time to show and to discuss his corn-breeding programs with plant breeding students and faculty at Iowa State University. He was committed to training students in plant breeding; in 1946 he initiated funding by his company to establish a research assistantship in corn breeding in the Department of Agronomy. Mr. Baker was a regular participant in field days and conferences at Iowa State University.

Mr. Baker was a firm proponent of field research to develop lines and hybrids with consistent performance across environments. He incorporated new information and techniques when available to increase the effectiveness of plant breeding methods. Genetic advances in corn yields have resulted from effective field-breeding methods based on genetics, statistics, experimental design, and computers. Advances continue to be made in those areas, and new sources of information continually emerge from developments in science and technology. The new information must be integrated with conventional field plant breeding methods to develop superior cultivars. The need for field-trained plant breeders, therefore, will continue to be as important, or more so, in the future. The infrastructure and support for training and education of plant breeders have diminished over the past 30 years in the United States and elsewhere. The Raymond F. Baker Center for Plant Breeding is focused on the education of graduate students and professionals in plant breeding who will continue the legacy of Mr. Raymond F. Baker.

Photo courtesy of Iowa State University Library, Special Collections.

Left to right: Lloyd A. Tatum, George F. Sprague, Marcus Zuber, and Raymond F. Baker
Photo taken during the 1939 American Society of Agonomy meetings in New Orleans.