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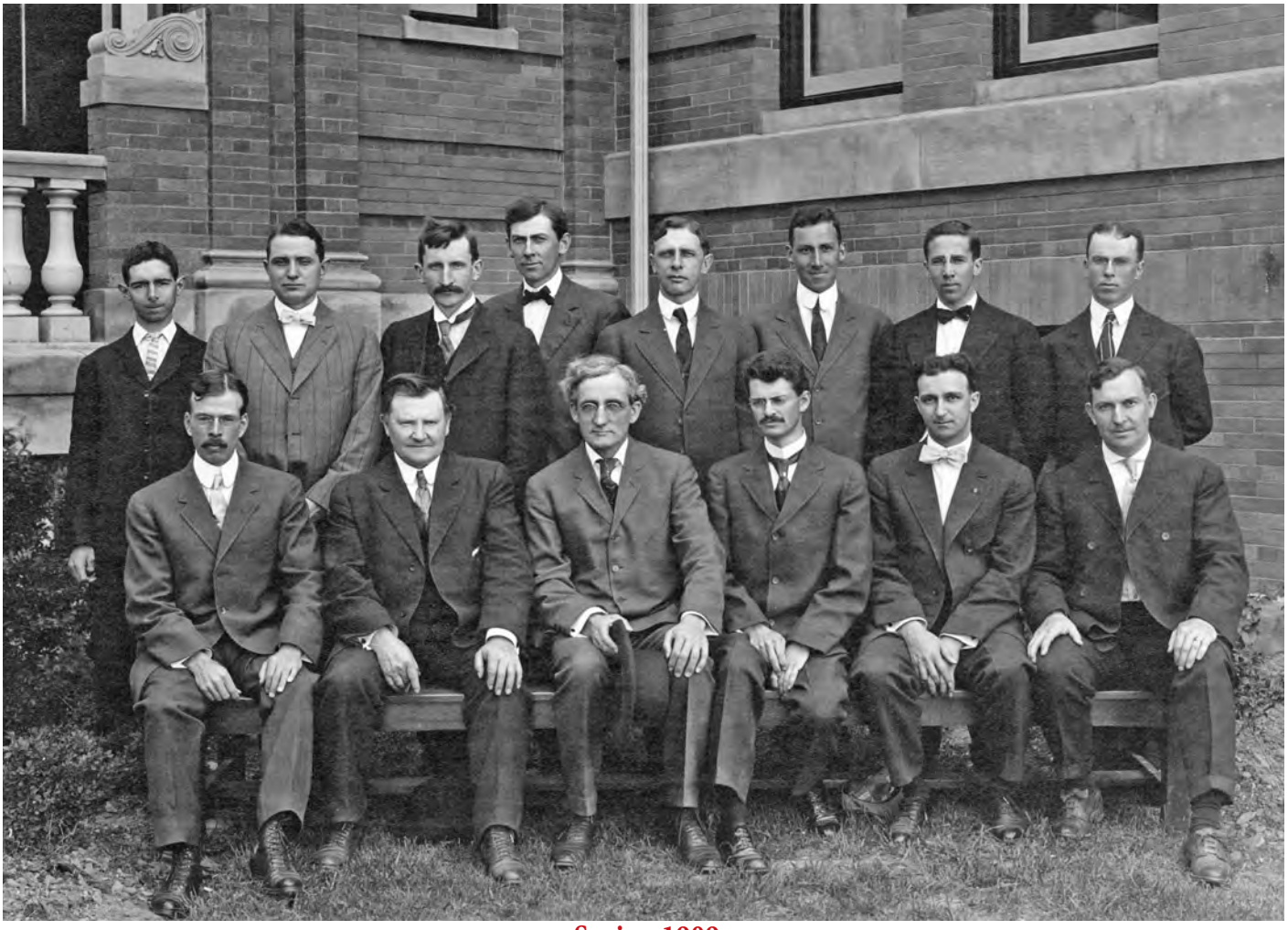
Evolution of Plant Breeding at Cornell University



Spring 1909

A Centennial History 1907–2006

Royse P. Murphy
with Lee B. Kass

Department Histories - Cornell University – http://ecommons.library.cornell.edu/handle/1813/14144
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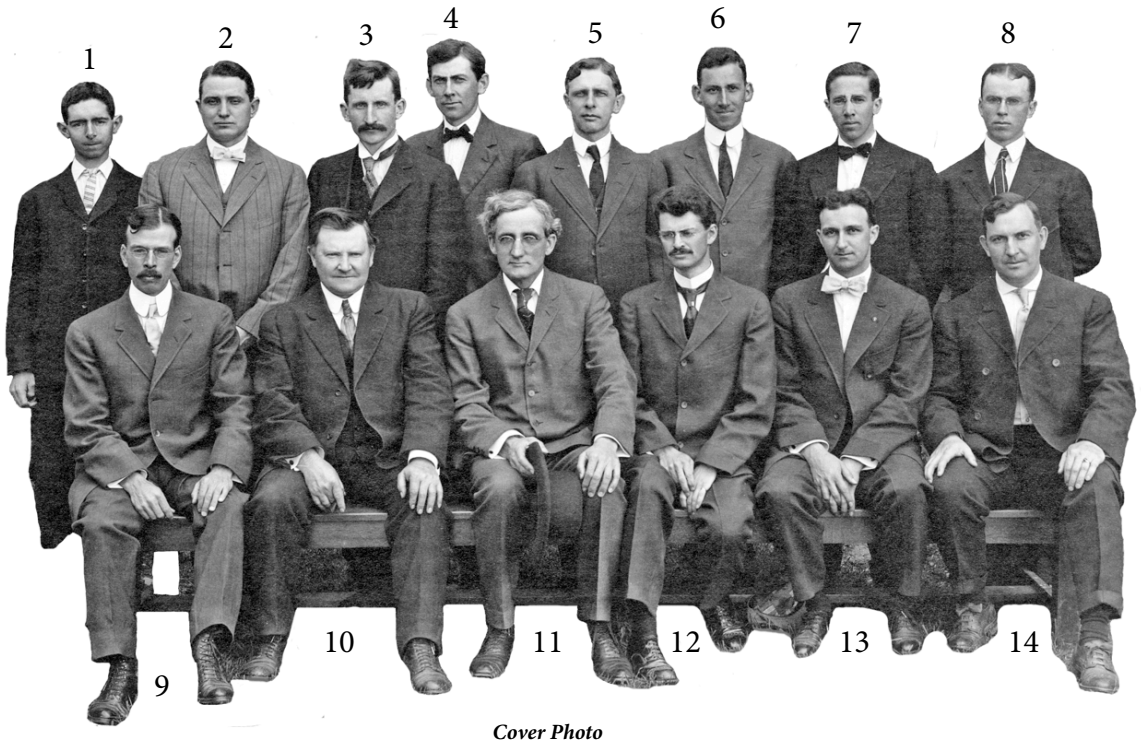
This book was written by Professor Emeritus Royse P. Murphy with Visiting Professor Lee B. Kass and released after the Centennial Celebration of the Department of Plant Breeding and Genetics in 2007.



Cover Photo

1. HB Frost, 2. CE Leighty, 3. LH Waldron, 4. HB Brown, 5. H Beckenstrater, 6. SF Willard, Jr., 7. LD Batchelor, 8. MJ Dorsey
9. CF Clark, 10. HJ Webber, 11. LH Bailey, 12. EP Humbert, 13. HH Love, 14. AW Gilbert

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EVOLUTION of PLANT BREEDING at CORNELL UNIVERSITY

Herbert J. Webber, Chair, Department of Plant Breeding (1907-1913)

EVOLUTION of PLANT BREEDING at CORNELL UNIVERSITY

A CENTENNIAL HISTORY 1907-2006

by

Royse P. Murphy

Professor Emeritus, Department of Plant Breeding

In cooperation with

Lee B. Kass

Visiting Professor, L.H. Bailey Hortorium, Department of Plant Biology

DEPARTMENT OF PLANT BREEDING AND GENETICS
CORNELL UNIVERSITY
Ithaca, New York

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Front Cover:
Synapsis Club, Spring of 1909, Department of Plant Breeding, Cornell University
Left to Right, Back Row: HB Frost, CE Leighty, LH Waldron, HB Brown, H Beckenstrater, SF Willard Jr., LD Batchelor, MJ Dorsey. *Front Row:* CF Clark, HJ Webber, LH Bailey, EP Humbert, HH Love, AW Gilbert
(Courtesy Department of Plant Breeding files)

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FOREWORD

CORNELL PLANT BREEDING 2007
CELEBRATING 100 YEARS OF CROP IMPROVEMENT

by
Mark E. Sorrells
Chair and Professor, Department of Plant Breeding and Genetics

The Cornell Department of Plant Breeding & Genetics and student/faculty club, Synapsis, have a rich history dating from 1907 when Dean Liberty Hyde Bailey employed Herbert J. Webber to head the Department of Plant Breeding. In 1914, Rollins A. Emerson succeeded Webber who had expanded the department activities to include research and teaching of plant breeding, genetics, and biometry. The period from 1920-1940, sometimes referred to as the Golden Era of Genetics, was remarkable for the large number of students who went on to become great scientists and leaders in plant breeding. Two students from that era, George W. Beadle and Barbara McClintock were named Nobel Laureates. Our department continues to lead the discipline through diverse research, teaching, and extension activities ranging from the molecular study of crop plant genomes to development and deployment of superior crop varieties. Our scientists collaborate with scientists around the world to integrate the knowledge, information, and expertise from a range of disciplines to produce new knowledge and unique germplasm. The essence of these achievements results from the extraordinary expectations, collegial atmosphere, and the exchange of ideas among great scientists in our institution.

It is customary, at the 100-year mark, to look back and celebrate our history, but it is also important to look forward, collect our thoughts, and craft a new vision for the future of our discipline. In our Centennial year we recognize the transformative contributions of all of our predecessors including former staff, students, post-doctoral associates, research associates, visiting scientists and faculty who have been a part of this organization and played a role in the advancement of our discipline. As articulated by Sir Issac Newton: *If I have seen further than others, it is by standing upon the shoulders of giants.*

This comprehensive document of the first 100 years of our history is a result of the knowledge, persistence, and dedication of Drs. Royse Murphy and Lee Kass. We are forever indebted to them for assembling this reference for future generations of plant breeders. We are also grateful to Drs. Coffman, Earle, Pardee, and Plaisted for accounts of their experiences as chairs of this great department.

I conclude with one of the greatest understatements in the history of human kind.

"The great power of this principle of selection is not hypothetical."
(Charles Darwin, *On the Origin of Species*)

PREFACE

The desire to have a history of the Department of Plant Breeding gradually evolved with the retirements of Rollins Adams Emerson and Harry Houser Love, both long time heads of the department. Professor Love felt that a member of the faculty should write the history. At a faculty meeting held on 16 March 1962, Professor Neal F. Jensen moved that the department invite Professor Emeritus Love to write a history for the department. Love accepted and wrote a short memoir of the early years (1907-1916). He based his unpublished manuscript on the records that were held in the department office (under lock and key). These records have since been deposited in the University Archives, and we have used them for our documented history.

Love then postponed writing the remaining history of the Plant Breeding Department and, instead, turned to working on *The Cornell Nanking Story*, a history of his years in China (published with John Henry Reisner in 1963 by the department and subsequently published in 1964 as a Cornell International Development Bulletin). Unfortunately, he could not continue writing the department history due to ill health.

In 1996, Professor Emeritus R.P. Murphy decided it was time to write the department's history. He began by organizing the department's records. These were then in storage at three temporary sites. He transferred many of them to the University Archives, where they were joined with previous departmental records. Thus, the department's combined archival records now collectively date from 1907 to about 1980. There are still files to be sent to the archives. All of these documents, plus those not in the archives, were used to write this current departmental history. Murphy began writing with a goal of having a book ready for the Department of Plant Breeding Centennial (1907-2006).

While researching the files and papers in the University Archives, Murphy met Dr. Lee B. Kass, who was conducting research in these same records for the life and career of Nobel Laureate Barbara McClintock. Kass had previously contacted Murphy to inquire about the 75th Synapsis reunion and about McClintock's career at Cornell. We had a phone conversation in which Murphy suggested that Kass examine the Plant Breeding records in the Archives. Thus, in August 1996, we met there fortuitously.

Murphy had first met McClintock at the University of Missouri in 1938. He had learned of her work as a student at the University of Minnesota and was familiar with the corn genetics research that she had conducted while a student, teacher and research associate at Cornell in the 1920s and 1930s. In November 1996, Kass interviewed Murphy regarding his career in Plant Breeding and Genetics and recorded his memories of McClintock, her associates, and the plant breeding department at Cornell. Kass also interviewed other members of Cornell's Plant Breeding Department.

Since then, we have had a continuing collaboration on both the history of the department, and on McClintock and the early years of maize genetics. We have shared documents, investigations and interpretations, in the spirit of cooperation long fostered by Emerson's example at Cornell. Kass published many papers on these subjects, all with Murphy's encouragement, guidance, and review (see Further Reading section).

Murphy found it quite interesting, even exciting, to write the history of the Plant Breeding Department up to 1953, when he was appointed head. At that point, he found it unusual to be writing one's own history, and the accounts of those persons still living. We therefore invited each succeeding Department Chair to write a brief memoir of their years as Chair, realizing that it is too early to write a historical perspective of their contributions.

Consequently, we present here a documented early history of the department and memoirs of its latter years. In short, this is the first edition of an on-going chronicle. There will surely be interest in a historical account of the latest years of the department. History is an ever evolving art.

We wish to acknowledge many people who helped us with this work: former Chairs of the Department of Plant Breeding, Robert Plaisted, William Pardee, Elizabeth Earle, W. Ronnie Coffman and Current Chair Mark Sorrells, for continued encouragement and support; we thank Carol Morehouse, and Flora Karasin for typing early drafts of

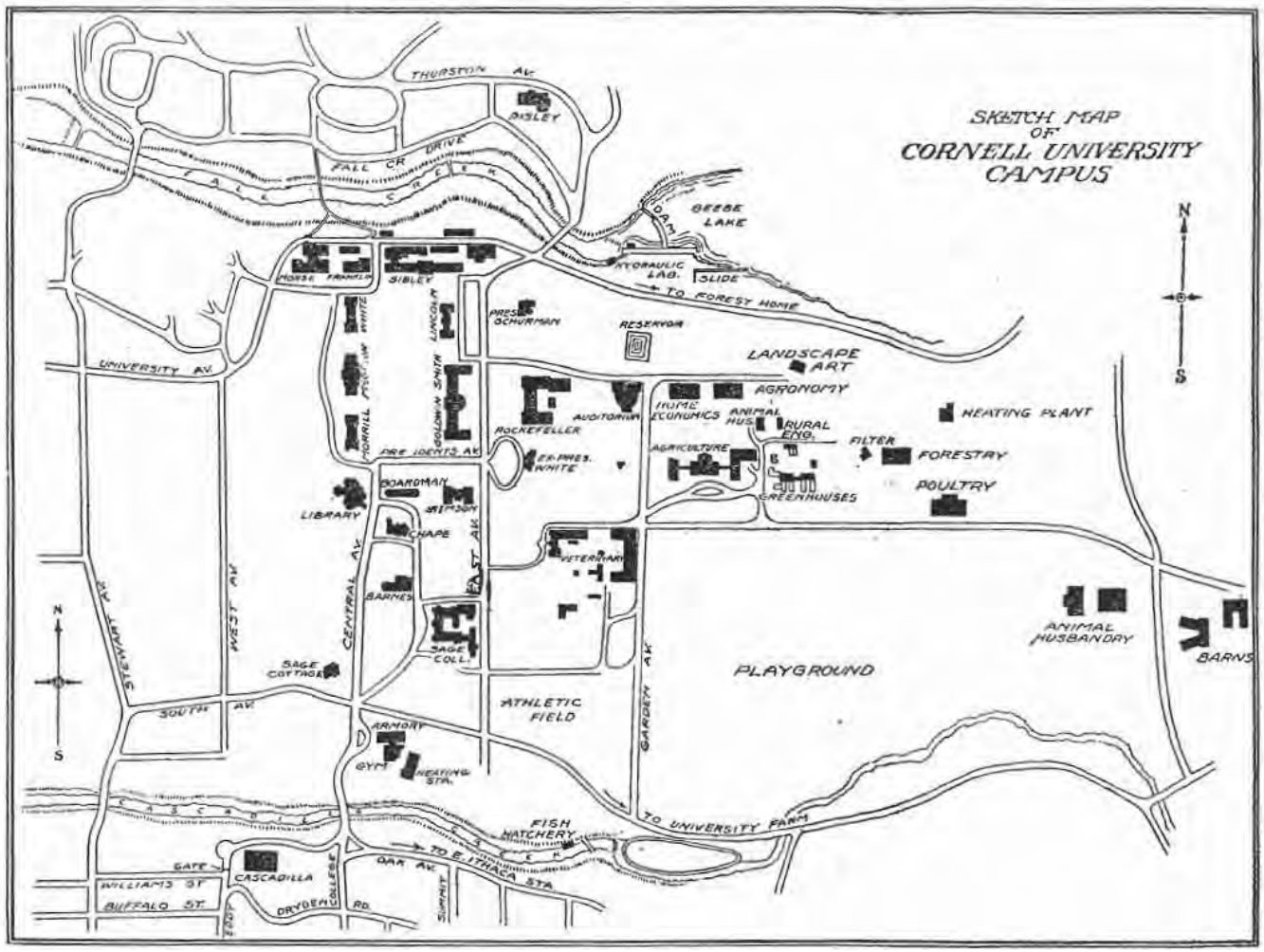
our manuscript; Kent Loeffler for scanning photograph images, and Ed Cobb for assistance with image formatting; special thanks to Judy Singer for formatting and co-designing the entire manuscript with LBK. We received much encouragement from Cynda Farnham, Marggy Vangeli and friends and colleagues in our departments. RPM gives special thanks to LBK for editing the manuscript. LBK thanks W. Ronnie Coffman for continued support, and for adopting her into the Plant Breeding Department and providing a place where she could "hang her hat;" LBK also thanks RPM for being a special friend and colleague. We thank University Archivists Elaine Engst and her staff in the Rare and Manuscript Collections, Cornell University Library, for always being there for us. LBK acknowledges the following for support of archival research, National Science Foundation grant SBR9511866 (with W.B. Provine) and NSF grant SBR9710488; Mellon Resident Research Fellowship at the Lilly Library, Indiana University, Bloomington, IN. LBK also thanks W.B. Provine for continued encouragement, and the Departments of Plant Biology and Plant Breeding and Genetics, for logistical support.

R.P. Murphy
Lee B. Kass
June 29, 2007

Home Economics Agronomy Main or Administration Dairy

Central Group of Buildings

College of Agriculture, Cornell University, 1914



The Campus of Cornell University

Chapter 1

CORNELL UNIVERSITY

The Idea

Cornell University was founded in 1865 as New York's Land Grant University. The Morrill Act of 1862 provided federal land to the states for the establishment of colleges for instruction in agriculture and the mechanic arts. The beginnings were the result of the hopes and desires of two very different men, Andrew Dickson White and Ezra Cornell. They became collaborators in the endeavor while members of the New York State Legislature. White was a Senator and Cornell was first an Assemblyman and later a Senator. Many communities, particularly in Central New York, sought the Land Grant University. In the end, the Bill that established it at Ithaca was signed in 1865 by Governor Reuben E. Fenton. The munificence of Ezra Cornell, 200 acres of land between two gorges (Fall Creek and Cascadilla), which overlooked the city to the west and a half million dollars of stock in the newly formed Western Union, carried the day. The lives of these two founders of Cornell are described in several books, three have been used here.[1]

Ezra Cornell was born in Westchester Landing, New York in 1807, and spent his youth in DeRuyter, New York. He was raised as a member of the Quaker Community. He left home to be on his own at age 19 and developed his career in Ithaca after brief stops in Syracuse and Homer, New York. He was first a carpenter, a mechanic, a millwright; then an inventor, a financial developer and, finally, a philanthropist. Soon after arriving in Ithaca, he worked as a mechanic and millwright for and with Colonel J.S. Beebee of Owego, New York. There were several mills, one on Cascadilla Creek and others on Fall Creek. In 1838 a dam was built near Ithaca Falls on Fall Creek to create a uniform water supply throughout the year. (In 1898 the current dam was constructed to form Beebe Lake as we know it today.) Cornell soon became involved nearby and later in the Northeast and Midwest in developing telegraph lines. By 1855, the multitude of lines and promoters of same were merged into the Western Union Company. Cornell was a major shareholder. He became a public servant and philanthropist. One of his first contributions was the Ithaca Public Library in 1863. His oldest son, Alonzo, as well as many partners in business, such as Hiram Sibley, who became the first president of Western Union, was a close collaborator. Alonzo was Governor of New York in 1880 and signed the bill that created the Cornell University Agricultural Experiment Station (established in 1879). Ezra died in December, 1874 in Ithaca. He had accumulated more land for the Cornell campus and much of the area known today as the Village of Cayuga Heights. The Village Office is in one of the Cornell houses. His legacies are evident today throughout the area.

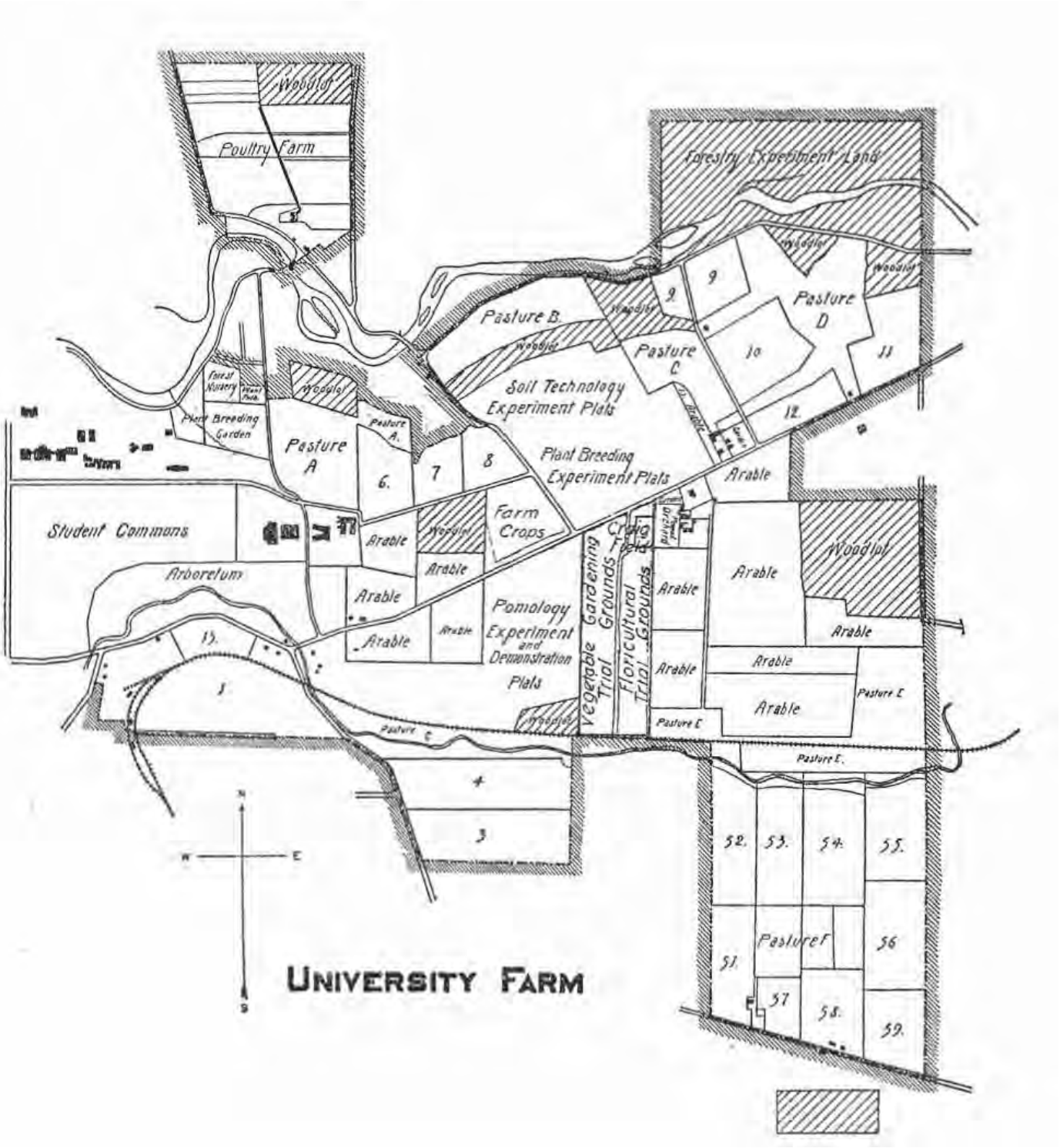
Andrew Dickson White was the academic architect of the University, tempered by infusions from Ezra Cornell of ideas as well as the physical elements. White was born in Homer, New York in 1832. Although, the towns of Homer and DeRuyter (Cornell's home) are only twenty miles apart, these men, too, were apart in other ways. Cornell was a generation older, and was the son of a farmer and potter. White came from an affluent family, had received a formal classical education at Yale, and had a brief career as a Professor of History and English Literature at the University of Michigan. He returned to New York and became a member of the State Senate in 1863. There he met Ezra Cornell, an Assemblyman from Tompkins County. White had not been pleased with the state of higher education. His experiences as a student, first at what is today Hobart College in Geneva, New York, and later at Yale, left him dissatisfied. He felt there should be more realism in classical and practical education unfettered by sectarianism and sexual segregation. In short, he was driven to organize a coeducational, non-sectarian university in upstate New York. Ezra Cornell felt likewise. After an uneasy year or two they became allies in the creation of the Land Grant University of New York at Ithaca. The history of this development is fascinating and should be read leisurely as a drama. The University was named Cornell at White's insistence and White was named its first president at

Cornell's urging. White gave Cornell full credit for developing the land grant fund and other resources. He states "He alone of all men in the United States was able to foresee what might be done by an individual to develop the land-grant fund, and he alone was willing to make the great personal sacrifice thereby required." White further credits him with the legend now surrounding his medallion portrait upon the University seal: "I would found an institution where any person can find instruction in any study." White continued as President for twenty years. He then moved to a career in national government diplomatic service. He died in 1918, at age 86. He had been with Ezra Cornell at Cornell's passing in 1874 at age 67.

The Reality

The ideas of White and Cornell became the reality when the Land Grant University was chartered in 1865. They had a site, the Federal Land Grant, and Cornell's gift of $500,000 in Western Union stock. They needed bricks and mortar, a faculty and, they hoped, students. All materialized in bits and pieces over the next twenty years. In 1885, White decided it was time for his successor, Charles K. Adams, to take over the presidency. White joined the nation's diplomatic service but continued to be a friend of the University. He contributed much to the library and related resources for more than thirty years. The University opened in 1868 with 405 students. Among the first faculty members were three who taught courses in Agriculture.

The early years saw few students, little research, and a limited number of faculty in agriculture. Agricultural education and research began to grow and develop with the passage of the Hatch Act in 1887 by the federal government and the support of the state, though modest, in establishing an Agricultural Experiment Station at Cornell in 1880. Isaac Roberts was named Professor of Agriculture in 1874. In 1888 he was designated as Director of the College of Agriculture and Dean of its Faculty. Soon after, the College Faculty admitted its students, recommended those eligible for degrees, and became responsible "for the academic work of the College." The University support came from endowments, federal grants, the sale of some of the Morrill Act land, and tuition for the most part. It was not until 1904 that the state chartered the New York State College of Agriculture at Cornell University and provided appropriations for teaching, research and extension.



Cross-sectioned areas indicate woodlots on university farm
1914

Chapter 2

THE NEW YORK STATE COLLEGE OF AGRICULTURE

The Implementation

Liberty Hyde Bailey was named Professor of Horticulture in 1888 and became Dean of the College of Agriculture in 1903 at the time of Roberts' retirement. Bailey in the next ten years was the architect of the College.[2] The departmental organization, many of its aims, and the stress on research, extension and teaching, much as it exists in this College today, bears the stamp of Bailey. He was a prodigious worker. He was very active publicly; he lobbied for and obtained the support of the State. He began these activities and developments upon his arrival at Cornell from a professorship at the Michigan Agricultural College, now Michigan State University. It was no chance event that the New York State College of Agriculture at Cornell was chartered with substantial support in 1904, the year after Bailey was named Dean.

Liberty Hyde Bailey was born in 1858 in South Haven, Michigan, which became an important orchard area. This and his early schooling in Michigan may have presaged his intense interests in botany, horticulture and farm life. He attended a one-room school and entered the Michigan Agricultural College in 1877. He studied with the botanist William J. Beal who, in 1878, suggested the use of F_1 varietal-crosses as a method of corn improvement. Before his college student years, Bailey had been influenced strongly by Asa Gray's books as well as those of Charles Darwin. He received a BS degree in 1882 and an MS in 1886. He was appointed Professor of Horticulture in 1885. This came after he had spent two fruitful years with Gray and others at Harvard University. In the memorial statement published by the Dean of the University Faculty at Cornell for 1953-1954, we find a statement attesting to the impact of Bailey on society in the early 20th century. The authors, Professors Lewis Knudson, George H.M. Lawrence and William I. Myers, describe him as an eminent botanist, horticulturist, and plant explorer; also an educator, administrator and rural sociologist; and more broadly an editor, lecturer and writer. His years as a scholar and administrator spanned 1888-1913. He retired at age 55 in order to have the opportunity to devote his remarkable energies full time to botany, taxonomy, and plant exploration. His scholarly career was to continue until his death 41 years later at age 96. In 1935 he donated his herbarium (125,000 specimens) and his library (3,000 volumes) to the College. By this consolidation of his activities in economic plants, the College and University established the L.H. Bailey Hortorium.

The growth and expansion of the College of Agriculture accelerated rapidly after the reality of the Hatch Act in 1887. It may be said this continued through World War I (1918). A renewed acceleration and expansion began at the end of World War II (1946).

The number of departments grew to 20 during Bailey's early years as Dean. He named a leading professor in each discipline and gave him a departmental home. This organization remained more or less constant through six decades while the number of faculty increased at least 10-fold, undergraduate students 4-fold, and graduate students 10-fold. In 1900, much of the research and scholarship came from descriptive and observational science. The 20th century began the era of accelerated experimentation and quantitative measurements and analyses. The College of Agriculture had become one of the largest of the Land Grant Colleges and probably the largest in graduate education. This activity led to a great diversity of ideas and, thus, areas for research and experimentation in the sciences that fall within the purview of agriculture.

Bailey had great concern for and empathy with rural citizens. He was the chairman of President Theodore Roosevelt's Country Life Commission. He was a leader in national agricultural societies and movements and a prodigious writer and speaker. These activities no doubt, led to his decision to initiate studies of evolution, heredity and

plant and animal breeding. This was stimulated not only by the obvious need for improved varieties and breeds, but by the exciting discovery of Mendelism, which described the laws of inheritance in living organisms. Gregor Mendel, an Augustinian Monk, had conducted studies in the gardens of a cloister in Brno, Bohemia. From the results of his studies with the garden pea, published in 1866, he developed Laws of Inheritance; unit characters, discrete segregations, and predictable patterns of same in succeeding generations. This is one of biology's great discoveries but it was not appreciated until later investigators had discovered his paper and had duplicated his findings in 1900.

The "Rediscovery of Mendel's Laws" was accepted with alacrity by many plant and animal breeders following the publication in 1901, by William F. Bateson in England, of the translated version in English of that 1866 paper. Within the next decade the biology community became familiar with such new terms as Mendelism, genetics, homozygote, heterozygote, allelomorph, phenotype, genotype, F_1, F_2 etc. Not all biologists, many in the descriptive sciences, were so quick to accept Mendelism as the universal explanation for heredity. Many felt that it may apply only to discrete character differences. Variation of quantitative characters did not seem to agree.

This explanation for the biological basis of heredity led Dean Bailey and contemporaries at other Land Grant Colleges and the United States Department of Agriculture to initiate expanded research efforts in inheritance studies. The more classical areas of science followed these initiatives soon after. It was with this background that Bailey established a new department of experimental plant breeding in 1907 (see brief Chronology).

Cornell University and the New York State College of Agriculture
A Brief Chronology 1862-1914

1862	Morrill Act passed by United States Congress and signed by President Lincoln. Justine S. Morrill, representative from Vermont, sponsored the Act that granted each state a federal land grant. This established the Land Grant College for education in agriculture and the mechanic arts.
1865	State senators Ezra Cornell and Andrew Dickson White sponsored the Bill in the State Legislature that established Cornell University as New York's Land Grant institution. The Bill was signed by Governor Ruben E. Fenton. Ezra Cornell provided land and financial support. White became President (1865-1885).
1868	Cornell University opened on October 7. Three faculty in the Department of Agriculture: George C. Caldwell (chemistry), Albert N. Prentiss (botany) and James Law (veterinary medicine).
1874	Isaac P. Roberts named Professor of Agriculture. He administered the Department of Agriculture, the University Farm and some research and extension activities.
1879	Cornell Board of Trustees charted a Cornell University Experiment Station but with no financial support until 1881.
1882	The State Legislature established the New York State Agriculture Experiment Station at Geneva as an independent unit. It became an integral part of the New York State College of Agriculture and Cornell University in 1923.
1887	The Hatch Act, named for Representative William H. Hatch of Missouri, was enacted by Congress. This act provided federal funding for agricultural research if the states organized such activities. The Cornell Board of Trustees organized the Cornell University Agricultural Experiment Station.

1887 The Association of American Agricultural Colleges and Experiment Stations was formally organized with the passage of the Hatch Act. This association and the USDA Office of Experiment Stations, created in 1888, led to the development of a cooperative and somewhat coordinated research policy for the Nation's agricultural research

1888 Professor Isaac Roberts designated as "Director" of the College and Dean of its Faculty.

1888 Liberty Hyde Bailey recruited to the College as Professor of Horticulture.

1890 The Morrill Act of 1890, sponsored by Representative Morrill of 1862 fame, was enacted by the Congress. It provided significant federal funds to the Land Grant Colleges and forbade racial discrimination in admission to colleges receiving the funds. A state could avoid this provision if separate institutions were provided for those affected in the Southern states. This led to the "1890 Colleges" in 17 states.

1894 The State Legislature enacted a bill, sponsored by Assemblyman S.F. Nixon which provided funds for Extension activities. (Support from federal sources did not come until the Smith-Lever Act of Congress in 1914.)

1896 The Faculty of Agriculture became responsible "for academic work in the College."

1900 The discovery of the significance of Gregor Mendel's 1865 paper which gave rise to the science of genetics by C. Correns (Germany), H. deVries (Holland) and E. Tschermak (Austria).

1903 Roberts retired as Dean and was succeeded by Bailey.

1904 The State Legislature established the College as the New York State College of Agriculture at Cornell University. The period of Bailey's years as Dean, 1903-1913 set the nature and organization of the College for the 20th Century and is reported in several references given here on the Life of Bailey.

1906 The Adams Act, named for Representative Henry C. Adams of Wisconsin, was enacted by Congress. This act essentially doubled the earlier appropriations from the Hatch Act but restricted their use to "original research" and the publication thereof.

1906 The Experiment Station Committee on Organization and Policy was created by the Association of American Agricultural Colleges and Experiment Stations.

1907 Herbert J. Webber, the most notable plant breeder and botanist in the USDA, was lured to Cornell by Dean Bailey to direct the Department of Experimental Plant Biology. The title, The Department of Plant Breeding, was finally adopted by 1909 and has remained such except for the period 1966-1997 when it was the Department of Plant Breeding and Biometry.

1912 Webber resigned in order to accept the Directorship of the expanded and consolidated Citrus Experiment Station at Riverside, California.

1914 Rollins Adams Emerson, Professor of Horticulture, University of Nebraska, accepted the Headship of The Department of Plant Breeding.

Chapter 3

THE DEPARTMENT OF PLANT BREEDING

The Webber Years, 1907-1914

Herbert John Webber was one of the leading figures in plant breeding in the early 20th century and it was he who Dean Bailey invited to the New York State College of Agriculture to establish a department with primary responsibility for research in breeding and inheritance. Webber was an active member of the American Breeders Association, the initial scientific society for those with interests in breeding and genetics, which was established in 1903. Activities of the Association and contributed scientific reports were published in the American Breeders Magazine. In 1913 these activities were reorganized as the American Genetics Association and the *Journal of Heredity*.[3] Webber's department was first named Plant Biology, then Experimental Plant Biology or Experimental Plant Breeding, and finally in 1909, Plant Breeding. As one reviews the correspondence of Bailey with Webber, and examines the Annual Reports of the College and the Agriculture Experiment Station for the Webber years, it is clear that both men viewed the subjects suitable for research and graduate training in a broad biological matrix. The nature of variation in natural plant species as well as in economic plants was an active research area for the first decade of the department. Consideration was given from time to time to initiating research with animals. No faculty or staff appointments were made in the Department but inheritance studies with animals were included in the formal courses in genetics. During this time, there were faculty in two animal science departments, Animal Husbandry and Poultry Husbandry, with research and some teaching interests in breeding and genetics. Graduate students in these departments often had a minor in Plant Breeding (genetics).

During this early period, an interest in research methodology and statistical treatment of quantitative data emerged. In a sense this was a "grass roots" development brought on by the interests of graduate students in Plant Breeding. The leader was Harry H. Love, PhD 1909, one of Webber's first graduate students. These activities evolved into a sub-unit defined as Biometry.

Webber was born in Lawton, Michigan on December 27, 1865. The family moved to Nebraska where he went to the University of Nebraska, and was awarded the BS (1889) and AM (1890). He was an instructor in Botany at Nebraska, 1889-1890. He then joined the United States Department of Agriculture in Washington, D.C. where he was a pathologist, 1892-1899, later plant physiologist in charge of plant breeding (1900-1907). Webber completed the PhD at Washington University in St. Louis, MO in 1901. He listed his area of scholarship in *American Men of Science* as plant physiology, and was starred in this field. In 1906, Webber described his active research interests to be in heredity, evolution and the principles of plant breeding, particularly with oranges, cotton, corn and pineapples. He was the official USDA representative to the International Conference on Hybridization in 1898 in London.

Webber came to Cornell soon after April 1, 1907, the date that the Department was established. He was the first of several Nebraskans of that time, who would be significant faculty members in the College. Among these were George F. Warren, Assistant Professor of Farm Crops in 1907 and then Professor of Farm Management in 1911, Edward G. Montgomery, Professor of Farm Crops in 1913; and Rollins A. Emerson, Professor of Plant Breeding in 1914. Warren became involved in farm surveys and developed a department of Farm Crops and Farm Management. These disciplines were soon separated and Warren headed Agricultural Economics and Montgomery headed Farm Crops in 1913. The latter department had a "checkered" career, although Bailey had outlined a great future for it in much the same terms he used in establishing Plant Biology in 1907 with Webber. In 1921, the Farm Crops Department was closed and its faculty and staff assigned to three different departments: Agronomy, Vegetable Gardening (later Vegetable Crops) and Plant Breeding (Professor Roy G. Wiggans). Some personnel

and research, notably timothy breeding and some variety testing, had been assigned to Plant Breeding in 1907. Montgomery resigned in 1919 and moved to complete his career in the USDA and US Department of Commerce. Emerson succeeded Webber in 1914 as Head of Plant Breeding.

It is appropriate at this point to enter comments from the early history of the Department that was prepared by Professor Harry H. Love in 1962. He discusses the history of the "Land Grant Colleges" and describes life in the Department for the period 1907-ca. 1920. Love was one of the first graduate students under Webber and among the first doctorates in 1909. Love was 82 when he began his history. He postponed this effort in order to join Dean John H. Reisner (University of Nanking, China) to write *The Cornell-Nanking Story* (1963 Department of Plant Breeding, Cornell University). Because of failing health, he was unable to return to his history of the Department. He died on 20 April 1966 at age 86.

Both of these documents are in the archives of this Department. Professor Love was a key member from the beginning. He became Head of the Department in 1944. It is obvious that he had the highest regard and warmest feelings for the two previous heads, Webber and Emerson, as scientists and, particularly, as administrators and colleagues.

Webber came to Cornell as a full professor at age 42 and was a nationally recognized leader in plant biology. The first year was one of transition from his many projects in plant breeding in the nation to the more specific one of developing a new department, and in a sense, a pioneering one. He brought Jesse B. Norton to the department from the USDA as an assistant professor with responsibility for small grains breeding, especially oats. Norton had developed a number of experimental field and nursery designs for small grains which became standard procedures nationally and world wide. He is credited with the rod-row nursery method. He returned to the USDA after one year and later worked with the Coker Seed Company, Hartsville, SC.

After establishing himself in Ithaca, Webber took a summer trip to make a final transfer of his research to others in the USDA. In a letter (8 October 1907) to Dean Bailey, he writes in some detail from Columbia, SC about some very positive results from experiments at the Coker Company[4]. A new long-staple cotton variety was outstanding. He commented on citranges, a new citrus hybrid. He indicated he would be back in Ithaca in three weeks. He was still to visit two stations in Florida. He urges Bailey to visit the Coker Company, which was developed after the Civil War by Major David Coker. At that time, it was involved in many activities, a large plantation of outstanding cotton and corn production and manufacturing with timber products. There were four sons, college graduates, involved. Several Cornellians worked as scientists with the Coker Company, which was just beginning in 1907. Webber, in a brief sentence in the letter stated he would be tempted to join them. He subsequently did for a year in 1920, while on leave from the Citrus Experiment Station in California. As mentioned earlier, Norton joined Coker in 1920 from the USDA. Later, J. Winston Neely (Cornell PhD 1935), Cornell Plant Breeding, was the Director of Research for many years). Neely first was a cotton breeder with the USDA in the early years of his career.

In 1908, the academic staff of the Department consisted of Professor Webber, Instructor C.F. Clark, and three graduate assistants, F.J. Pritchard, A.W. Gilbert, and H.H. Love. Clark had transferred from the Department of Agronomy with the timothy breeding project. By 1913, when Webber resigned to move to California, the academic staff had been increased by appointing his students, Love and Gilbert, as professors and Clyde H. Myers as an assistant professor.

Webber's research projects were many and usually had a graduate student as a collaborator. He encouraged them to take a leading role in the project. Love writes in a very approving way of Webber's effectiveness as a mentor. During the period 1909-1914, Webber directed 10 master's degree and 13 doctor's degree students.

In a brief review of the *Annual Reports* for the Cornell University Agricultural Experiment Station, we find a very extensive and dynamic research program in the Department. Bailey had conceived of the Department as one involved primarily in fundamental research and little teaching. On the other hand, he was most interested in providing practical information. Throughout Bailey's academic career he wished to improve the quality of rural life and farming. One of Bailey's first suggestions to Webber (29 October 1907) was to write a bulletin on plant

breeding for farmers. Thus, Bulletin 251 was published in February 1908.

A synopsis of the activities of the Department as prepared from the comprehensive report by Webber for the *Twenty-First Annual Report*, 1908 is given below.

1. Teaching - 13 graduate students.
2. Investigations.
   a. Timothy breeding, variation, rust resistance, improved varieties by selection.
   b. Corn breeding, earliness, improved varieties by selection.
   c. Oat breeding, improved varieties by selection.
   d. Wheat breeding, improved varieties by selection.
   e. Potato investigations, bud variation, tuber-unit selection.
   f. Forage investigations, vetch, clover, bromegrass, alfalfa.
   g. Root-crop investigations, mangels.
3. Studies of variation.

   "This line of scientific investigation is being given more attention than any other subject, as it lies at the foundation of all breeding work. It is desirable that we thoroughly understand all types of variation, their cause and use in breeding, and determine whether the breeder can by any means cause or force variations to occur."

   The investigations under way:

   a. Statistical studies on range of variation in wild and cultivated plants growing under different environments.
   b. Statistical studies of similar plants grown under artificial environments to determine if variation can be increased in any given direction.
   c. Determine the value of mutations in plant breeding.
   d. Determine the cause and meaning of mutation as distinct from other types of variation.
   e. Study of mutations in wild plants and their importance in the formation of new types and species in nature.
   f. Experiments to determine whether it is possible by chemical injections or other artificial stimulation, to produce mutations of use to the breeder.

   4. Investigations of the laws of inheritance in hybridization. Purpose is to extend our knowledge of the fundamental principles of breeding by further studies.

   a. General application of Mendel's Law of hybrids in different groups of plants.
   b. Relative influence of male and female on the offspring.
   c. Nature of transmission of characters in hybridization when nearly related and distantly related parents are used.
   d. The limits of possible hybridization.
   e. The origin of character correlations and their transmission in hybridization.

5. Investigation of the cumulative action of selection.

   Darwin's stress on value of continuous selection, DeVries' mutation theory in opposition to improvement by continuous selection.

6. Studies on the influence of environment in species and variety formation.

Dean Bailey provided a budget of $600 for research and experimental land in the Plant Breeding Garden and Caldwell Field, the latter jointly with the Department of Agronomy (variously organized as Soils, Soils Investigations and Farm Crops). The Garden (now Emerson Garden) is located near the current headquarters of the Cornell Plantations. In 1907, many departments utilized some of this small area - Farm Crops, Plant Pathology, Forestry,

Floriculture, and livestock pasture. In 1909, Bailey assigned the "entire garden" area to Plant Breeding. He hoped it would be one of the best laboratories at Cornell. He had always dreamed of a good outdoor laboratory. The area was most useful because it was close to the laboratories and the greenhouses. In addition, the area has a longer growing season due in part to well drained soil and lower elevation than other available sites to the east of the campus. In 1914, the map of the Garden indicates that 13 different economic or native species were grown. Very soon after this, the plantings were confined to economic plants. The Garden was named the Emerson Garden, ca 1949, and the field building associated with it has recently been named for Barbara McClintock[5]. The Department has often found it necessary to reiterate, sometimes rather vigorously, its need for this site for nursery use. As the campus grew in size and expanded its research, the site has been coveted for many uses. However, the College has retained it for its original use and as Professor Love has recorded in his "history": "Dean W.I. Myers and Director C.E.F. Guterman have been heard to say on more than one occasion that this is one of the most important laboratories the College of Agriculture has." The most significant uses have been for early generations of small grains genetics and breeding (F1 and some F2), corn genetics and vegetable crops breeding. A similar area known in the Department as the "hole" was used from the 1920s to 1960s primarily for corn genetics or breeding. This plot is east of the Garden and between Judd Falls and Caldwell Roads. The entire plot was transferred in the mid 1960s to the water filtration plant. Over the years the land for experimental purposes in the Ithaca vicinity for the Department has grown to nearly 300 acres, of which, approximately half is suitable for nursery and plot experiments.

Now back to the Webber years. Several university files have correspondence pertinent to this period and have been reviewed.[6] It seems clear that Bailey regarded Webber's judgment and experience very highly. He was chairman of a committee with Professors T.L. Lyon, E.O. Fippin, and Warren to consider the nature of cooperative research between the federal agencies (Experiment Station funds) and the state agricultural experiment stations. Bailey was "cool" to this proposal unless the research was equally beneficial to all involved.

Webber seemed most interested in research but soon recognized the need for formal courses. Professor Love noted in his "history" that the Department had 13 graduate students, all working with Webber, and this necessitated the presentation of several formal courses in genetics and plant breeding. Likewise, there was great interest in these subjects from the undergraduate students. In 1908, Gilbert was directed to teaching and presented two courses, plant breeding and genetics, and Love was directed to research but because of his and other students interested in biometry, he presented a course in biometry. These courses were continued through the Webber years even though funding for teaching was minimal.

Webber was called on by Dean Bailey to assume more and more "administrative duties." It was clear that Bailey turned frequently to Webber for his views and named him to act as dean when Bailey was not in residence. Bailey traveled widely, lectured often, and was involved in many "national committees," etc. In fact, Dean Bailey indicated his wish to retire as early as 1909. The Faculty, the President, the Trustees, the farm leaders, all were shocked by this turn of events and urged him to reconsider. This he did but took a year's leave of absence, 1909-1910. He named Webber as acting Director and Dean with what appears to have been with minimal consultation with faculty[7]. This period is covered in considerable detail by Professor Love in his "history."

On 24 May 1909, Bailey again asked President Schurman to relieve him as Director but was willing to defer final decision for one year, after he had taken a leave of absence. On November 18, Bailey wrote a letter to Dear Sir: (each Department Head) announcing that Webber would be acting Director while he (Bailey) was on leave. During this period, the letterhead of the College Stationery listed Bailey as Director, Webber as Acting Director, and Albert R. Mann as Secretary.

Webber and Dean Bailey corresponded frequently during the Dean's leave. However, at other times, much of the interaction was verbal. One interesting report, from Webber to Bailey in England (April 29, 1910), indicated that the bills for state support had been passed in Albany, "much as they were modified by you before you left. These include three new buildings and it is expected the Governor will sign soon." He further stated "We are looking forward to the time when you can come back to take charge of the work so that it may be pushed along rapidly."[8]

If these arrangements had "worked out" it seems Bailey would have insisted on retiring upon his return and leaving the Deanship to Webber. However, it seems that the faculty was uneasy for two reasons; they wanted Bailey to continue as Director and Dean and they were not pleased with the move to Webber which seemed to many as a "prearranged deal" without consultation. Whatever the reasons, Webber did not push for a change but, instead wrote to Bailey before his return from leave telling him his plan was not going well. He urged him to continue as Dean and said he wished to return his full energy and activities to the Department of Plant Breeding.

Webber resigned (letter of November 20, 1912) in order to assume a new position as Director of the Citrus Experiment Station and Dean of the Graduate School of Tropical Agriculture at Riverside, CA. He did so regretfully but the salary and facilities were beyond what he could expect at Cornell in the near future. He was still reluctant to leave because of the great relationships that he had had with the Dean and his colleagues in Plant Breeding. Another likely factor was that Bailey was retiring, actually did so in June 1913, and Professor William A. Stocking, Jr. became Acting Dean and Director until Beverly T. Galloway was appointed in June 1914, as the successor to Bailey. Galloway came from the USDA where he had just been named Assistant Secretary of Agriculture, following several years as Chief of the Bureau of Plant Industry. Webber returned in March 1914 in order to complete an orderly transfer of his materials to others in the Department. Webber often returned to Cornell. He was a guest and speaker at Synapsis Meetings at least four times over the next twenty years.

At this time, the Department seemed to be at an uncertain stage. The Dean, who had shown foresight to initiate research in inheritance and breeding, was retiring and the Head of the Department was moving to California. The faculty and graduate students, who had come to the Department because of Bailey and Webber, were understandably uncertain of the future. Professor Love gave serious thought to accepting an appointment at the University of Minnesota. He finally decided to remain at Cornell and recommended Dr. T.B. Hutcheson who assumed the position for one year and then moved to his *alma mater*, Virginia Polytechnic Institute, as Head of the Department of Agronomy. Interestingly, the position at Minnesota was filled in 1915 by Dr. Herbert K. Hayes from the Connecticut Agricultural Experiment Station at New Haven (he completed a ScD degree under Professor E.M. East at Harvard in 1921). All three, Love, T.B. Hutcheson and Hayes, were to remain in these positions for their entire careers.

The position of Head of the Department was considered as soon as Webber resigned. Love, Myers and Gilbert urged Dean Bailey to name a new Head but he felt the matter should be left to his successor. Instead, he named Gilbert to be responsible for teaching and Love to be responsible for other activities; research, experimental lands, and extension. Again the faculty, led by Love and Myers, urged Acting Dean William A. Stocking, Jr. to proceed. Several men were considered but Professor Rollins A. Emerson, University of Nebraska, was clearly the leading candidate and he was invited for an interview. It seems likely that Dean Bailey was involved, at least, consulted about this action. According to Love, Professor Gilbert had aspirations to the position but he was unacceptable to the other faculty in the Department of Plant Breeding. This feeling may have existed elsewhere within the faculty of the College. This, in spite of the fact that he was one of the most popular professors with the undergraduate students and had been cited by Professor Webber as a notable teacher. He attracted many students to the beginning courses in plant breeding and genetics and was very interested in eugenics. Yet, there was criticism of the lack of substance in his teaching and research by the "serious" students, in particular, the graduate students. Professor Love in his "history" gives a rather detailed description of the "Gilbert matter."

Professor Emerson was well known to all in the Department of Plant Breeding. He had visited several times during the Webber years. He was a leading researcher in genetic research with beans and corn. He was very active in the American Genetics Association, the American Society of Naturalists and the Association of Land Grant Colleges and Experiment Stations. There was one personal factor for Webber in responding to Dean Bailey's request for suggestions for the Headship of the Department. Professors Webber and Emerson were brothers-in-law. Curiously, Professor Love does not mention this, although "nepotism rules" were a consideration even in these early years. They were quite rigid throughout the first half of the twentieth century.

Another obvious candidate for the headship would have been Professor Edward Murray East of Harvard. Emerson had received his ScD degree with East in 1913. This resulted in a significant paper on quantitative inheritance in maize (R.A. Emerson and E.M. East. 1913. *Nebr. Agric. Expt. Sta. Res. Bul. 2*. 120p.). Donald F. Jones, who wrote East's biography for *Biographical Memoirs National Academy of Sciences* (Vol. 22, 1943) stated that East had remained at Harvard, although he had been offered appointments at Cornell and Princeton. It seems likely that these were the professorships that were filled by the appointments of Emerson at Cornell and George H. Shull (formerly of the Carnegie Institution of Washington, Cold Spring Harbor, NY) at Princeton. No confirmation of this was found in the papers reviewed here, however, East was involved in the selection of Emerson. He wrote to Webber on December 3, 1912 (letter now deposited in Cornell University Archives):

HARVARD UNIVERSITY
BUSSEY INSTITUTION

ECONOMICS ENTOMOLOGY
W. M. WHEELER
C. T. BRUNS

GENETICS
W. E. CASTLE (ZOOL.)
E. M. EAST (BOT.)

COMPARATIVE PATHOLOGY
THEOBALD SMITH

FOREST HILLS, MASS

Dec. 3, 1912

Dear Dr. Webber:

I understand that you are going to shake the dust of Ithaca from off your feet, so I am full of curiosity as to your successor. Perhaps this is all arranged, but if not I hope you will not regard me as a cheeky "buttinsky" for writing to you. Anyway this is my reason for writing. Dr. Castle and myself as well as many other biologists of this country regard Emerson as the best available man in the country. We have no doubt that you appreciate the worth of Emerson, but thought that possibly you would feel some hesitancy about putting him up or backing his candidacy because he is your brother-in-law. If this should happen to be the case we thought possibly you might like the suggestion to come from the outside; and if you should, and will point out the way both Dr. Castle and myself will be glad to do anything in our power to help things along. Personally I think that Emerson has a comprehensive grasp of genetic problems second to none in the country. Also, I believe that his ability to carry out his ideas is simply great. And this appreciation of his abilities is not a narrow personal view either for I know that such men as Shull, Pearl, Jennings, Conklin in this country and Bateson, Baur, von Tschermak and others of Europe feel the same way. He is too good a man to stay at Nebraska. What do you think?

Very truly yours,
Edw. East

Webber replied immediately on December 5, 1912 (letter now deposited in the Cornell University Archives):

December 5, 1912

Dr. E.M. East
Bussey Institution
Forest Hills, Mass.

Dear Doctor East:

I am in receipt of your communication of December 3 with reference to Emerson. I am more than pleased with your suggestion. You have interpreted the matter exactly as I had seen it.

I had thought of Emerson in connection with the position here but from our relationship have not and could not urge his qualifications. Your letter gives me the opportunity of presenting this matter to Dean Bailey without the personal factor entering into the case.

You speak of Castle writing Dean Bailey regarding the matter. I should think this would have considerable weight. I have sent your letter to Dean Bailey with my hearty approval of all that is said.

Thanking you very sincerely for your kind statement, I remain,

Very truly yours,

HJW/A

On 9 December 1912, Dean Bailey acknowledged Webber's letter of December 5 (not reproduced) about Emerson. Webber stated "that he had not urged Emerson because of our relationship but, now he endorses East's recommendation." Dean Bailey is "much obliged" for the letters about Emerson and further requests that Webber present his notions as to how the Department of Plant Breeding ought to be organized and maintained. No reply to this was found in the Bailey papers. However, Gould Colman[9] gives an interesting aspect of Bailey's "uncertainty" about the direction of the Department:

> "At that time Bailey hoped to transform the Department of Plant Breeding into a department of genetics under Vernon K. Kellog(1), but was frustrated by his inability to offer Dr. Kellog better conditions than he already enjoyed at Stanford University.
>
> (1)This is probably Vernon Lyman Kellogg, zoologist and entomologist, who published books on evolution and Darwinism, some with David Starr Jordan."

This seems an unusual change in emphasis by Bailey. In 1907, he thought of the Department as involved in experimental plant biology but was immediately urging Professor Webber to teach all farmers to become plant breeders, to provide improved varieties of timothy and other crops posthaste and to develop an extensive extension program.

In summarizing the Webber years, it is clear that his contributions were in stressing research in biology with major emphasis on genetics and breeding and graduate student education. He was nationally known for his breeding research particularly with cotton and citrus before 1907 and with small grains, corn and potatoes while at Cornell. Much of the latter was done in cooperation with his students. One of the most notable, H.H. Love, remained at Cornell. By this time, field plot technique for the breeding and evaluation of small grains had been somewhat standardized. A number of these techniques not only included size and shape of plots, replication schemes, and check varieties but also small plot or nursery equipment, such as planters, harvesters, threshers, etc. for individually selected plants, nursery rows and small plots. The latter were designed by H.W. Teeter, farm manager, in consultation with Love and graduate students. Love also suggested appropriate statistical analyses of data. The nursery and field designs had wide application particularly to annual crops. The mechanical equipment was in wide demand from former students and contemporaries involved in plant breeding throughout the state experiment stations, the USDA, and in many other countries. Many urged Love to write a book on experimental technique and statistical analysis, which he hoped to do soon, but this did not happen until 1937 and 1943. However, the equipment was designed, manufactured and sold to many. A few were built by Teeter and others in the Department but the demand was so great that a local machine shop produced many. Blue print plans were prepared and provided to those who wished to build their own. No succinct summary of these exist but in reviewing the correspondence such equipment was provided to over twenty state experiment stations, and as many federal stations and other countries.

The graduate students who studied with Webber and his young faculty members, Love and Gilbert, became leaders in plant breeding and crop improvement at state agricultural experiment stations, the USDA, private companies and other countries. A summary of the careers of several students is given:

	Degree		
Student	**MSA**	**PhD**	**Career**
C.F. Clark		1909	USDA
E.P. Humbert	1908	1910	Texas A & M
M.J. Dorsey	1909	1913	U. of Minnesota, U. of Illinois
E.D. Ewing	1909		Delta & Pine Land Cotton Co.
C.E. Myers	1911	1922	Pennsylvania State U.
C.F. Noll	1911	1923	Pennsylvania State U.
R.J. Evans		1912	Utah State U.
C.H. Myers		1912	Cornell U.
C.E. Leighty		1912	USDA
R.Y. Winters		1912	North Carolina State U.
A. Atkinson	1912		Montana State U., U. of Arizona
O.W. Dynes	1912		South Dakota State U.
H.N. Vinall	1912		USDA
W.O. Whitcomb	1912		Montana State U.
A.W. Drinkard, Jr.		1913	USDA
R.D. Anthony	1913	1920	Pennsylvania State U.
T.B. Hutcheson	1913		Virginia Polytechnic U.
C.B. Hutchison	1913		U. of Missouri, Cornell U, U. of California
A. McTaggart	1913	1921 (Soils)	McGill U., Canada

Only two of Webber's students went into other careers. E.E. Barker (PhD 1914), went into landscape architecture after study at Harvard in 1918 and A.W. Gilbert (PhD 1909), went into government service after study at Harvard in 1916.

The Emerson Era, 1914-1942

At the urging of Professors Love and Myers, Acting Dean Stocking invited Professor Rollins A. Emerson, University of Nebraska, to the campus in 1913 for an interview. He accepted an offer to become Head soon after. At this time, the Department offices and laboratories were moved from the top floor of the Agronomy Building (later named Stone Hall) to the second floor and part of the third floor of the Forestry Building (later named Fernow Hall). This was a "temporary solution" for space since a plant industry building was in the offing. However, it seemed a rather "permanent solution" to others in the building since the Plant Breeders did not move until 1931 and then to the new Plant Science Building where they were joined by their former neighbors, the Department of Botany from Stone Hall as well as the Departments of Plant Pathology, Pomology, and Floriculture from other areas of the campus. This is of some interest since the corn genetics group over time became interested in cytogenetics beginning with the development of linkage groups in the late 1920s. Emerson's students usually minored in Botany with Professor L.W. Sharp. Those most intimately involved included George W. Beadle (PhD 1930) and Marcus Rhoades (PhD 1932), who worked closely with Barbara McClintock (PhD 1927) in the Department of Botany. Cytogenetics was one of the most exciting areas of basic research in genetics at this time. The laboratory was in Stone Hall. This led to some dichotomy between the "basic research group" and the "applied" plant breeding group in Fernow Hall.

In 1914, Professor Love went to Germany on sabbatical leave, which was interrupted somewhat by the declaration of war between England and Germany. There was much correspondence between Emerson and Myers and some between Emerson and Love, when the latter was on campus, about future plans for the Department and the organization and use of the space in Fernow Hall. Emerson arrived in mid 1914 as did the new Dean, Beverly T. Galloway. It seems likely that Emerson and Galloway knew each other from their association in the US Department of Agriculture, where Emerson had spent two years (1897-1898) as a Horticulturist in the Office of State Experiment Stations, and through the several agricultural research organizations. Galloway was Chief of the Division of Vegetable Pathology and Physiology at that time.

No correspondence that defined the "job description" for Emerson as Head, or the future of the Department, was found. No doubt much of this was done verbally during the interview and probably involved Acting Dean Stocking, Dean Emeritus Bailey, and the faculty in the Department (Love, Myers, Gilbert and Barker). There are several references indicating that the courses needed to be "upgraded" and that the selection of graduate students needed to be more rigorous. It seems likely that this problem arose from the students admitted by Professor Gilbert, of whom only a few completed MSA degrees. This led Emerson to make two very significant changes in the faculty. He urged Professor Gilbert to seek a career elsewhere and in a different scholarly area and recruited Professor Claude B. Hutchison, MSA Cornell 1913, from the University of Missouri. Professor Love in his "history" covers these moves in considerable detail. Gilbert had been granted a sabbatical leave, apparently with the understanding that he would not be returning to the Department of Plant Breeding. This all became moot when Gilbert moved to Boston, Massachusetts, where he studied economics briefly at Harvard University and then took the position of Agricultural Secretary in the Boston Chamber of Commerce for two years. In 1919, he became Commissioner of Agriculture in Massachusetts and then sought support for the position as Secretary of Agriculture in President Coolidge's' cabinet. There was serious opposition to this from some of his former colleagues at Cornell and contemporaries elsewhere. However, there was no further correspondence on this since it appeared that Gilbert was never a serious candidate. He continued as Commissioner in Massachusetts until 1936, when he became an advisor on state relations with the Agricultural Adjustment Administration in Washington, D.C. Gilbert was regarded as an entertaining lecturer and Webber and Bailey considered him an outstanding teacher. However, his colleagues and the graduate students in Plant Breeding and related areas urged courses with more substance. His research papers were not always approved by the Department or the Experiment Station Committee. Gilbert submitted a paper (Heredity of Color in Phlox) to the *Journal of Agriculture Research* in 1915. He did so by obtaining Dean Galloway's official approval. Love brought the situation to the attention of Raymond Pearl (University of Maine), Chairman of the Editorial Subcommittee for state experiment station papers for the Journal. Pearl replied on 29 April 1915, and agreed fully with Love that it should not be published, but said nothing could be done since Director Galloway had officially approved the submitted paper (after major editorial changes, it was published, by Gilbert in 1915: Heredity of Color in Phlox Drummondi. *J. Agric. Res.* 4:293-302; A reprint is in the Plant Breeding Laboratory Papers Vol. 3). Emerson, in his memorable letter of 7 January 1916, points out that the original manuscript, which was found to be unsatisfactory by him, was submitted unchanged. The editorial committee of the Journal insisted on changes that reduced the manuscript from over 60 pages to about 12 and eliminated a wholly irrelevant bibliography. Gilbert had also urged Dean Galloway to establish a Department of Genetics and appoint him as the Head. He did this without consultation with Professor Emerson or other colleagues in the Department or in the College. Apparently, Galloway looked favorably upon this request and it became one of many actions that led to a resolution of no faculty support for the Dean. This is a most unusual situation since the Dean with the strong support of President Schurman planned to reduce the number of Departments from 25 or 26 to 7 or 8. The Dean's proposal, never implemented, was in brief:

1. College Administration
2. Plant Industry:

   Botany, Farm Crops, Floriculture, Forestry, Landscape Art, Plant Breeding, Plant Pathology, Pomology and Vegetable Gardening.
3. Animal Industry:

   Animal Husbandry, Poultry Husbandry and Dairy Industry

4. Home Economics
5. Agricultural Technology:
   Chemistry, Drawing, Farm Practice, Meteorology, Rural Engineering and Soil Technology
6. Rural Organization:
   Farm Bureau, Farm Management, Rural Economy and Rural Education
7. Zoology and Economic Entomology:
   Entomology and Zoology
8. Extension
   Extension Teaching

Needless to say, this proposal received little or no support from the Faculty, particularly so, since they had not been consulted in a formal manner or given an opportunity to react. In a letter to President Schurman (12 June 1916) Galloway, as a matter of record, filed the following materials:

> 1. Copy of the minutes of the Agriculture Faculty meeting, by H. H. Wing, Chairman and R. H. Wheeler, Secretary, dated May 27, 1916, expressing a lack of confidence in the ability of the Dean to administer the College and the agricultural programs in New York State and stating that the best interests of the College would be served by an immediate change in the Deanship. The vote for this action was 72 in favor, 0 against and 2 non-voting. The eligible voters were the Professors and Assistant Professors. According to the Annual Report of the College for 1915-1916 there were approximately 90 eligible faculty members.
>
> 2. A memo from the Dean setting forth certain reasons why the College should be reorganized. In this rambling memo he suggests 7 or 8 departments. The Heads of these plus a Vice-Dean would serve as an administrative committee. He would choose as Heads, men of broad vision, training and experience who have a true spirit of loyalty, cooperation and democracy. He would eliminate such members of the staff who are known to be irreconcilable reactionaries and trouble makers who are crafty and engage in intrigue etc. He concluded that the reorganization plan would encourage research, reorganize teaching and redirect extension. On May 15, 1916 the Dean presented to President Schurman his view of the College faculty and some remedial suggestions for improvement. It is a five-page statement that begins "The College is not a College in the sense that it is an organized, coordinating, cooperating group of units working together with a common purpose and common aim. On the contrary, the College is more strictly an educational communism, whose communes have arisen largely as a result of internal political expediency rather than through any well defined, formulated place. The doctrine of self-determination or the individual is supreme etc. etc." This he noted has been the rule since the college was organized ten years ago (1904). He noted that the Faculty was highly inbred: 77% of Professors and 75% of Assistant Professors had Cornell degrees.

It is difficult to fully comprehend the changes in the administrative atmosphere and faculty morale from that which existed under Dean Bailey. The Alumni of the College strongly supported the Faculty. President Schurman, the Board of Trustees and the Agricultural College Council had supported Bailey and urged him not to retire in 1913. In 1916 also they urged Galloway not to resign. Galloway's resignation was effective August 1, 1916 and Albert R. Mann was named Acting Dean and later Dean in 1917.

It is also difficult now, 80 years later, to understand these diametrically opposite styles of administration and organization and to note the support for each by the top governing body of the University. History clearly shows that Dean Bailey's legacy provided the style by which the College would continue to evolve as one of the outstanding agricultural colleges of the 20th century.

This brief discussion is given in part to set the stage for the *Emerson Era* in the Department of Plant Breeding. Professor Emerson brought an open administrative style. He was direct, objective and fair. He recognized the need for upgrading the instruction level of courses in genetics and breeding, the need to be more selective in admitting graduate students, and the need for more support for extension activities. He was familiar with the Cornell scene. There exists much correspondence between Professors Webber and Emerson. This was augmented at times by references to letters between their wives, who were sisters, but these are not in the files in the University Archives.

During the Webber years, Emerson had presented seminars on occasion and had spoken at three or more meetings of Synapsis. Hence he was familiar with the faculty and graduate students. All the doctoral students and half the masters students had studied with Webber. The entire Faculty had studied with Webber. In fact, the Faculty, with the exception of Emerson, consisted of those with Cornell degrees until 1943-1944 when R.L. Cushing and S.S. Atwood were appointed. As mentioned earlier, Emerson's first move was to replace Gilbert with Claude B. Hutchison (Cornell MSA 1913), and Professor of Agronomy, University of Missouri. This appointment was unique in that he immediately requested a one-year leave-of-absence for Hutchison in order that he might study for a doctorate with E.M. East at the Bussey Institute, Harvard University (1916-1917). Hutchison's appointment became effective 1 October 1916 and with the understanding that he would immediately take a six months leave in order to study at Harvard

Emerson attracted graduate students, particularly those interested in genetics, to the Department. Two who came with him from Nebraska became distinguished geneticists; Ernest W. Lindstrom (Cornell PhD 1918) and Ernest G. Anderson (Cornell PhD 1920).

To understand Emerson's modus operandi, it is instructive to review the correspondence in 1916 with Dean Galloway and former graduate students in regard to the administrative organization for genetics and plant breeding. Earlier, Gilbert independently proposed that he be named head of a genetics department. The Dean apparently gave favorable consideration to this proposal without consultation with the departments concerned. Emerson was clearly opposed to this move as were the Faculty in Plant Breeding.

On 6 January 1916, Emerson wrote to Dean Galloway as follows:

> Dean B. T. Galloway,
> College of Agriculture.
>
> My dear Dean Galloway:
>
> I have sent to the former graduate students of this department who now hold positions of responsibility in this country a bare statement respecting the proposition you made the other day regarding the possible organization of a general genetics department. I have asked these men to write you regarding the matter if they care to do so. I am enclosing a copy of the letter I sent to all of these men, and a list of the men to whom the letter was sent. Except for one or two of these men, I do not have the slightest notion how they may feel about the matter. I feel, however, that their opinions, whatever they are, should have weight with you in reaching your decision. A full statement of my own position in the matter will reach you shortly.[10] I would have had the whole matter before you some days ago had it not been for the fact that I have been detained at home on account of illness.
>
> Very truly yours,
>
> RAE/F

Attached to this letter was a copy of Emerson's letter to former students dated, 6 January 1916, as follows:

> Dear Sir:
>
> A few days ago, Dean Galloway suggested to me the possible desirability of reorganizing the genetical work of the College of Agriculture at Cornell by the establishment of a department of general genetics independent of the Department of Plant Breeding with Dr. A. W. Gilbert at its head If you have an opinion concerning the probable effect of such a reorganization on genetical work at Cornell either from the standpoint of the general proposition of creating a department of genetics independent of the Plant Breeding Department or from the standpoint of placing Dr. Gilbert in charge of such a department, I shall be glad to have you write to Dean Galloway, giving him a frank statement of your views. I trust that my own position in the matter - which you may or may not correctly interpret from the fact of my having called your attention to the proposition - will not be allowed to influence you.

I am sending a copy of this letter to the former graduate students of this department who now hold positions of responsibility in genetical or other agricultural work in this country and am informing Dean Galloway of my action.

Trusting that your interest in Cornell is still sufficient to make it seem worth while to you to respond to this request, I am,

Very truly yours,

RAE/F

Emerson's letter went to 16 former students: 7 Doctoral and 6 Masters Degree students and 3 minor students in Plant Breeding. From a memorandum from the Dean to Emerson on 8 February 1916, he reported that he had acknowledged 10 or a dozen letters which he had received from these former students. These acknowledgements, by the Dean, took the following form:

My dear _____ _____:

I have received from yourself and a number of other Cornell men certain suggestions regarding our Plant Breeding Department. We want to see the department strengthened in every way, and we are greatly obliged for the interest you have manifested in its welfare.

Matters have, we believe, been adjusted satisfactorily. Dr. Gilbert will take his sabbatic leave shortly, and will enter upon a new field of work here upon his return. In the meantime, Professor Emerson will be giving careful attention to the future work of the department, with a view to broadening it and strengthening it whenever practicable.

Very sincerely,

Apparently all letters agreed with Emerson, and Galloway accepted these views. In the letter of 7 January 1916 (22 pages), Emerson went into great detail on the organization of the department and the need to retain and upgrade the teaching of genetics therein and to greatly improve the selection and teaching of graduate students. After 17 pages he stated, "Finally I desire to offer the following recommendations …" These are paraphrased here briefly.

1. He recommended that Professor Gilbert be provided responsibilities outside the field of genetics and "that a man of successful teaching experience and of reputation for substantial achievements in genetics be found to take charge of the instructional work of the department." He acknowledged Gilbert's qualities in communication and states he in no sense is attempting to run him out. His interests are elsewhere since his plan for study on his sabbatic is in areas of rural sociology.

2. A plan for a replacement for Gilbert by a temporary appointment to begin on 1 Oct. 1916, when his sabbatic begins. This would be unnecessary if his first recommendation is accepted. (This apparently was accepted since Hutchison was appointed. Emerson and Love apparently presented the course in Advanced Genetics while Hutchison was on leave. This seems to be the only time that Emerson presented a formal "class room" course. He was lauded often as a great teacher but this he did with his famous impromptu lectures in the garden, the greenhouses or laboratory. His relationship with his students and others was always on the basis of all were 'equals'.)

3. A recommendation was presented for one faculty member to work in animal genetics. With this addition, there would be three faculty with primary interest in genetics. He further recommended that the name be changed to Department of Genetics. He would expect the man to teach in animal genetics, have half-time for research and would endeavor to maintain "such cordial relations with the Departments of Animal Husbandry and Poultry Husbandry that, in some degree, cooperation could be arranged." He felt strongly that every teacher should be involved in basic research in genetics. There is so much to be discovered. However, he had one caveat; he did not wish this position to replace his earlier request for a position, urgently needed now, in plant breeding extension. He obviously felt the need to take the research to the practical agriculturists.

4. This was alternative to his recommendations 1 and 3, which apparently came to him when he realized that full funding might not be available to the Dean. Several scenarios were described and included the integration of Love's and Myers' responsibilities into the picture. These were somewhat fragmented. Love's

research included breeding and genetics with small grains and teaching and consulting in biometry. Myers' activities were in breeding of timothy and alfalfa and teaching. Both assumed some responsibilities for extension.

He ended his epistle with the following:

"In this long--I trust not needlessly long--discussion of problems connected with the genetical work of the institution, I am aware of having said many rather harsh things. But I have gone over my statements many times and I cannot see how I can soften them more and still say what I believe must be said. You certainly realize that I take no pleasure in having said them. I trust that you will accept them as a sincere effort on my part to clear up a disagreeable and dangerous situation.

Very respectfully submitted

[Postscript]

Since I feel that Dr. Gilbert should be informed at once of my position in the matters discussed here, I am furnishing him with a copy of this letter. Since I also feel that the other members of the staff of this department have a right to know what is going on and since these things are likely to affect their work as well as Dr. Gilbert's and my own, I am sending to them a statement to the effect that I have presented my views concerning the departmental reorganization to you and that a copy of this letter is in the general departmental file where it can be seen by them if they so desire."

Upon Galloway's resignation, Albert R. Mann was named acting Dean and then Dean in 1917. It is not clear how much attention was given to Emerson's plans as expressed in correspondence with Galloway. During Mann's tenure, Emerson requested, almost annually, faculty positions for extension and pure seed programs, animal genetics and vegetable crops breeding. The teaching in genetics was supported admirably by the appointment of C.B. Hutchison, however, this was a relatively short lived solution (1916-1922). Hutchison soon moved to the College of Agriculture, University of California at Davis.

Albert Mann, on leave from his Deanship, was Director of the International Education Board with offices in Paris for two years, 1924-1926. He recruited C.B. Hutchison from California in 1924 as an Associate Director. Hutchison became Director upon Mann's return to Cornell. The Board's activities were coming to an end and Hutchison returned to California after 1928. He became Dean, then, Vice President for Agriculture in Berkeley. At retirement in 1952, he became Dean of Agriculture at the University of Nevada in Reno. Upon his second retirement, he returned to the city of Berkeley where he was elected Mayor for two terms, 1955-1963.

Meanwhile, with little College support, Emerson continued the development of a Plant Breeding Faculty. New appointees came from his Department's academic program. A.C. Fraser (Cornell PhD 1918) an Assistant Professor, assumed the teaching of genetics upon Hutchison's resignation in 1922. He had experience as a Laboratory Instructor and Assistant Professor in the courses in genetics with Hutchison. F.P. Bussell (Cornell PhD 1919) was appointed as Assistant Professor in 1922 with responsibility for the departmental extension activities and seed certification. He had worked as an assistant in extension activities for seven years. The New York Certified Seed Grower's Cooperative was established in 1923. R.G. Wiggans (Cornell PhD 1919 in Farm Crops, minor in Plant Breeding) was accepted by Emerson to the faculty in 1921, upon the dissolution of the Department of Farm Crops. These new appointees joined Love and Myers to bring the number of professional faculty to six. The number was increased to seven in 1926, with the addition of R.D. Lewis (Cornell PhD 1926), who was a member for 5 years. At that time he moved to Ohio State University and then to Texas A & M University. His position was not filled; no doubt, the Great Depression contributed to this loss. J.R. Livermore (Cornell PhD 1927), was appointed Assistant Professor in 1929, with responsibility for potato improvement and teaching in biometry. No new appointments to the Plant Breeding faculty occurred again until 1942, when H.M. Munger was named as a joint appointee in the Department of Vegetable Crops and Plant Breeding, and R.L. Cushing was appointed in Plant Breeding in 1943, to teach genetics. He replaced Fraser following his untimely death in 1941. In a sense, Professor Emerson was not

able to make a modest increase in the number of faculty positions during his tenure (1914-1942). Even though he had made impassioned pleas for additional professorial appointments with outstanding scientists from outside Cornell, no appointments were made. Only C.B. Hutchison and H.M. Munger had had significant professional experience outside Cornell (see appendices S and T).

The Golden Age of Corn Genetics

With this brief description of the development of the Department during Emerson's tenure it is interesting to review the activities and individuals who were vitally involved. For the first two decades it was a premier department in plant-genetics research, in plant breeding (experimental methods and varieties) and graduate education (notably in plant genetics and breeding and, to some extent, in biometry). More specifically the major contributions were in maize genetics and oat, wheat and barley variety development. Extension activities and pure seed programs were corollaries to the breeding activities.

Basic maize genetics research was coordinated by Emerson and his students. C.B. Hutchinson (1916-1922) and A.C. Fraser (1917-1941) were collaborators from Emerson's department and L.W. Sharp (1914-1961), Lowell F. Randolph (1923-1984) and Barbara McClintock (1927-1936) were collaborators from the Department of Botany. In the late 1920s research in cytogenetics emerged as an important aspect of the program. Randolph and McClintock, major students of Professor Sharp, were the early leaders. Others, students of Emerson and Sharp, became active in cytogenetics; G.W. Beadle, M.M. Rhoades among others. They were joined by C.R. Burnham, a visiting fellow from the University of Wisconsin. All were "hands on" investigators. They worked together in the Plant Breeding Garden, later named the Emerson Garden, and the laboratories in Stone and Fernow Halls until 1931. At this time, four plant science departments, including Plant Breeding and Botany, moved into their new building (now the Plant Science Building) and the groups of faculty and students in genetics, cytogenetics and plant breeding were united. During the period, 1914-1931, the genetics and plant breeding students and faculty were in Fernow Hall and the botany students and faculty were in Stone Hall. However, all of the cytogenetics laboratory research was done in the botany laboratory in Stone Hall. The genetics students with research in cytology spent much of their time as a group with botany students with a similar interest. The students of corn genetics and cytogenetics felt that they were on the frontier of an area of new research and to some degree, were somewhat critical of those engaged in the more "practical research" of plant breeding and biometry. In interviews with McClintock and Rhoades they noted that in the excitement of discovery they were somewhat "arrogant" in comparing their research to others in the "applied fields." This dichotomy among the students seemed not to have carried over to the faculty. Rhoades prepared the following summary in 1982, on the occasion of the 75th Synapsis reunion celebration. It was titled "Golden Age of Corn Genetics at Cornell as seen through the eyes of M.M. Rhoades." This summary was not published but is presented here:

The Golden Age of Corn Genetics at Cornell as Seen Through the Eyes of M. M. Rhoades

"Maize Genetics at Cornell began in 1914 when R. A. Emerson came from Nebraska to head the Department of Plant Breeding. Emphasis in those early days was on such basic genetic problems as the location of numerous unplaced genes, factor interaction, establishment of linkage groups, linkage maps, pericarp variegation, the inheritance of gametophytic characters, the genetic basis of semi-sterility, etc. Emerson's masterful analysis of the inheritance of plant colors did more than any other single paper to place maize genetics on a firm basis. Much was learned at Cornell about the composition and architecture of the maize genome by Emerson, Hutchinson, Demerec, E. G. Anderson, Lindstrom, Eyster, Sprague, Phipps, Li, Brunson, Bregger, Fraser, among others. The importance of these early investigations cannot be over-emphasized. They set the stage for the remarkable advances in cytogenetics which followed. The cytogeneticists stood on the shoulders of their predecessors.

Prior to the mid 1920's, little cytological work was done with maize, which was not regarded as favorable cytological material. This was an erroneous conclusion. McClintock, using the carmine smear technique

invented by Belling, found that the pachytene chromosomes could be accurately identified by length, arm ratios, and heterochromatic knobs in specific locations. Maize was an excellent organism for both cytological and genetical studies and the combination of the two disciplines (cytogenetics) quickly led to a large number of significant studies. Maize cytogenetics may be said to have begun in 1929 when McClintock's paper on triploid maize appeared in Genetics. That progress was explosive in the next few years is evident from the following account of the advances made in the subsequent six years.

The status of maize cytogenetics by the mid 1930's was summarized in the paper by Rhoades and McClintock published in The Botanical Review in 1935. The accomplishments described below were largely taken from that paper although a few research findings, more genetical than cytogentical in nature, are included. The names of the investigators responsible for each advance are indicated in parentheses. Capital letters designate those individuals who were trained or were postdoctoral fellows at Cornell.

The Status of Maize Genetics in 1935.

1. The establishment of ten linkage groups corresponding to the 10 chromosomes of the haploid complement. (Cooperative studies by many, mostly American geneticists).
2. The association of each linkage group with a particular, morphologically identifiable member of the chromosome complement. (McCLINTOCK, Brink, and BURNHAM).
3. The placement of specific genes at definite positions within the physical chromosome (McCLINTOCK and others).
4. The cytological proof of genetic crossing over (CREIGHTON and McCLINTOCK).
5. Cytological and genetic proof of chromatid crossing over (McCLINTOCK, RHOADES).
6. Cytological determination of the physical location within the chromosomes of reciprocal translocation, inversions and deficiencies. (McCLINTOCK, BURNHAM, Brink, CREIGHTON, RHOADES, V. H. RHOADES).
7. The genetic control of chromosome behavior. (BEADLE, McCLINTOCK).
8. Proof that chiasmata are points of genetic crossing over (BEADLE).
9. Nonhomologous pairing and its genetic consequences. (McCLINTOCK, Stadler).
10. Instability of ring-shaped chromosomes leading to variegation. (McCLINTOCK).
11. Divisibility of centric regions. (McCLINTOCK).
12. Correlation of heteropycnosis with genetic inertness. (RANDOLPH).
13. Artificial production of polyploidy. (RANDOLPH).
14. Mutagenic effects of X-irradiation. (Stadler).
15. Cytological and genetical analysis of Zea-Euchlaena hybrids (EMERSON, BEADLE, Mangelsdorf and Reeves).
16. Cytological studies with Zea-Tripsacum hybrids. (Mangelsdorf, Reeves).
17. Cytoplasmic male sterility (RHOADES)."

[Rhoades (1984) later published a more extensive review of the contributions of Cornell researchers to maize cytogenetics, in the Annual Review of Genetics.]

Rhoades's brief summary, as presented above, indicates the prominent role that Cornellians played in the development of maize cytogenetics. The period from 1929-1935 was truly the Golden Age of Maize Genetics at Cornell. The achievements of the Cornell group in the 1920's and 1930's was unrivaled by any other constellation of plant geneticists and was comparable to the famous Drosophila school under Morgan at Columbia.

Adding to Cornell's reputation was the establishment at Ithaca of the Maize Genetics Stock Center for the maintenance and distribution of genetic stocks and the founding of the *Maize Genetics Cooperation News Letter,* in which appeared unpublished data unselfishly contributed by geneticists at many institutions. This unique cooperative effort was so successful that it became widely copied.

The Emerson Era, a "Golden Age of Corn Genetics," was the theme for the first day of the 75th Anniversary Celebration of the Department and its Synapsis club, in 1982. William B. Provine, a noted Professor of Evolutionary

Biology and History of Science, joined with the Department to produce a one day program on the "Golden Age of Corn Genetics." On the first day of the celebration, many of the students who were responsible for Cornell's "Golden Age" had been invited to reminisce about that unique time in their lives. The notable speakers were Barbara McClintock, Marcus M. Rhoades, George W. Sprague, Harold S. Perry, Harriet Creighton and Charles R. Burnham. Unfortunately, George Beadle was not able to attend. Provine, who has written a superb biography of Sewall Wright, also interviewed many of these and other important students and associates of that time, and taped the conversations[11].

The second day was devoted to the 75th Anniversary of the Synapsis Club. Barbara McClintock presented a paper on genetics and development. Three graduates of the "sixties," Edwin T. Bingham, Richard R. Hill and Charles A. Francis, gave papers on genetics, breeding, and crop improvement in international agricultural food production.

Emerson and his students published many papers on maize genetics and cytogenetics, as noted by Rhoades above. Maize (*Zea mays L.*) was the primary plant species for genetics research during the Emerson era and the vinegar fly, *Drosophila melanogaster*, was the primary animal species. The center for maize genetics was Cornell, led by Emerson, and the center for Drosophila genetics was led by T.H. Morgan (Columbia University until 1928 when his group moved to the California Institute of Technology in Pasadena). Emerson and Morgan often visited each other's laboratory. E.G. Anderson, one of Emerson's first students, worked at Columbia University and the University of Michigan. He published several significant papers on Drosophila even though he is best remembered today for his extensive research on reciprocal translocations in maize. The latter was a continuation of research initiated by R.A. Brink, D.C. Cooper, and C.R. Burnham at Wisconsin. Burnham continued his work as a post-doctoral fellow at Cornell in 1929-1930. He learned his cytogenetics skills under the tutelage of Barbara McClintock as did many of the corn genetics students of that time. The Sixth International Congress of Genetics was held at Cornell University in 1932, and Morgan was President. Emerson was chairman of the local committee and major host. It was a most successful Congress. Emerson was elected as the United States representative to the next Congress, which was held in 1939, in England and Edinburgh, Scotland. The Congress was curtailed by the beginning of World War II.

It is difficult to select the most cited research papers of the "Emerson Era" but any listing would include:

Emerson, R.A. and E.M. East. 1913. The inheritance of quantitative characters in maize. *Nebr. Agric. Expt. Sta. Res. Bull. 2.*

Emerson, R.A. 1921. The genetic relations of plant colors in maize. *Cornell Univ. Agric. Expt. Sta. Memoir* 39:1-156. (Eleven colored plates).

McClintock, B. 1931. The order of the genes C, Sh, and Wx in Zea with reference to a cytologically known point in the chromosome. PNAS 17:485-491.

Creighton, H.B. and McClintock, B. 1931. A correlation of cytological and genetical crossing over in *Zea mays. PNAS* 17:492-497.

Emerson, R.A., G.W. Beadle and A.C. Fraser. 1935. A summary of linkage studies in maize. *Cornell Univ. Agric. Expt. Sta. Memoir* 180:1-83.

The results reported in McClintock's 1931 paper (listed above) are necessary for an understanding of Creighton and McClintock's crossing-over paper, which followed directly in the Journal and were issued as one reprint. In a sense, the latter two papers were end pieces for the period. The Creighton-McClintock paper and one on Drosophila by Curt Stern, published in the same year, clarified the genetic and cytological consequences of genetic segregations of linked genes. The Emerson-Beadle -Fraser Memoir (# 180), provided a comprehensive update of maize genetics from all sources. This was possible because of the open and cooperative exchange of research results from all researchers nationally and world-wide. A somewhat similar program developed simultaneously or perhaps a bit later for Drosophila.

The organization of the cooperative research in maize was clearly the work of Professor Emerson. In the early 1920s, at any scientific meeting he attended, he would schedule a planned or *impromptu* gathering of those interested in maize genetics (sometimes called cornfabs or cornfests). Apparently the decision to begin the *Maize*

Cooperation Newsletter was made in 1928, at the American Association for the Advancement of Sciences-Genetics Society of America meetings in New York. Mimeographed reports were distributed frequently and by 1937 an annual bound report was prepared and distributed to maize geneticists worldwide and to many science libraries. The publication has continued on an annual basis. The Newsletter was edited and printed in the Department of Plant Breeding until 1956, when the Department of Agronomy, University of Illinois and later the Department of Botany, Indiana University, assumed the responsibility under the leadership of M.M. Rhoades who had moved to Illinois from Columbia University. In 1929, maize geneticists maintained many genetic stocks and freely distributed them by request. This was done worldwide and led to the development of a Maize Genetics Stock Center at Cornell. This, too, was continued in the Department of Plant Breeding until 1956, when it was gradually moved to the University of Illinois. Most of the stocks were early in maturity and many, probably, were weak from some degree of inbreeding. The program at Illinois, begun in 1952, was designed to convert the stocks into more vigorous genotypes of a later maturity.

The genetic stocks were used widely in teaching laboratories throughout the world. Emerson and his colleagues, especially Fraser, distributed these stocks if available. A number were given to biological supply companies who produced and marketed them to educational institutions.

Initially, financial support for the Newsletter and Seed Stocks was hard to find. This development coincided with the stock market crash of 1929 and the drought and depression of the 1930s. Emerson received great moral support for these activities but limited financial support. However, he was able to get support from the Rockefeller Foundation in 1934, and these activities were supported by the Foundation until the responsibility shifted to the University of Illinois. In 1975, the editing, printing and distribution of the Newsletter were assumed by the University of Missouri under the leadership of Dr. E.H. Coe, Jr. The Stock Center continues today at the University of Illinois.

The Great Economic Depression, 1929-1939

In the last decade of his career, Emerson increased his activity in plant breeding. The great depression (1929-ca. 1939) and the great drought (ca 1932-ca. 1939) resulted in reduced funding for research, but increased the need for improvement in agricultural production. The emphasis was clearly on practical economic results from research. Emerson, from his childhood days and pre-Cornell experience at the University of Nebraska and the USDA, was most interested in horticultural crops.[12] His research involved breeding of improved varieties of beans, melons and celery. Important varieties of melons and celery were released and disease resistant populations of beans were of value to plant breeders. Cornell colleagues reported that one of the most gratifying experiences of his life was the recognition given him by the growers of the improved celery varieties (Cornell 19 *et al*., see appendix H). Several of his last students were noted for plant breeding, in particular H.M. Munger.

Carl E. Ladd became Dean of the College of Agriculture in 1931, and he urged the Department to renew its efforts to contribute to the improvement of agriculture in the state. This was in the face of reduced budgets. It was clearly a difficult time for any administrator as well as project leaders. Varieties of winter wheat and F1 hybrids of silage corn were, it seems, the significant contributions. Some increase in the use of certified planting stocks for small grains (wheat, oats, barley) and potatoes also developed during this period.

A major effort was made to develop improved varieties of cabbage beginning in the 1920s, but none were very successful. There is much correspondence in the departmental files that involve Professor C.H. Myers (project leader), Professor Emerson and Dean Ladd. Emerson was critical of the project but Myers defended his activities vigorously and all was forgiven. Nevertheless, little use of successful varieties emerged.

Another personnel problem emerged during this period. Ernest Dorsey (PhD 1924) was an instructor (1924-1948) during the early years. He was supported on funds from the USDA for cytogenetics research with the small grains. He presented a comprehensive thesis for the doctorate in 1924, and publication was expected soon because many USDA researchers were interested in his project. He continued research on cytogenetics with materials from the Department and collaborators with the USDA in some other states. As an Instructor, Dorsey had an important

part in genetics teaching and assisted in all laboratory sessions including the summer session courses. The materials used in the laboratories consisted primarily of maize and Drosophila stocks but also pelts of guinea pigs, rabbits, etc. He maintained the maize and Drosophila stocks and, if available, filled requests for them from other teaching schools. He was an important teaching faculty member and had good rapport with students. His home residence was an "apartment" in the graduate student house, Gamma Alpha on Oak Avenue near the campus. Most years, some graduate students in Plant Breeding resided there.

But there was a serious problem. He published few of the results of his research in scientific journals. Only brief mention in the annual reports of the Department to the Experiment Station appeared and those ceased in his later years. There is much correspondence on the matter by Emerson and Love. The USDA ceased support of his salary in the mid 1930s. He became reclusive but continued as a Laboratory Instructor throughout Professor Fraser's teaching career (ca. 1940). He maintained contact with students,[13] who found him helpful for hybridization and cytological techniques. Fraser considered him essential in the genetics teaching laboratory. In his later years he worked at night. He died in the early morning in the greenhouse 23 April 1948, at age 56.

Returning to 1914, we find the major breeding projects were with the small grains, corn and timothy. In the beginning Webber had been involved with all of these crops including the timothy project inherited from "Agronomy." The activities in breeding were initiated by Webber and his graduate students for all other crops. C.F. Clark transferred to the Department with the timothy project. The materials -- clones, seedlings, varieties -- were a very large collection and came from national and international origin. There were many books of field notes, pictures, and large glass slides, representing the results of his efforts. Although Clark resigned after four years, his materials were maintained for several years, and came under the purview of C.H. Myers, who had several other responsibilities. Apparently, the breeding involved maintenance of selected clones and their evaluation from selfed-progenies in rows and, occasionally, plots. By 1946 two varieties remained, each of which consisted of the one-year inbred progenies of a selected clone (1777 and 4059). The first generation was designated as Foundation seed and subsequent generations as Registered and Certified seed. At various times small quantities of seed were released to "seed growers," who sometimes harvested the crop as hay. A few other states encouraged seed production of these varieties in the late 1920s and 1930s, but with little success.

The major crop improvement programs during this era were with wheat, oats, and silage corn. Up to 1920, all faculty members spent some effort on these crops. Soon after Emerson's arrival, Professor Love assumed responsibility for the small grain project, Professors Hutchison and Wiggans were responsible for the corn project and Professor Myers was in charge of the projects on timothy, alfalfa, and cabbage. These soon expanded somewhat with work on barley, rye, buckwheat, grain corn, beans, and potatoes. Professor Bussell assisted on several of these projects. He assumed major responsibility for extension and certified seed production by 1924. Bussell and Myers had been involved in many activities, including teaching, research and extension, but had not been primarily responsible for any one.

The most significant projects were corn genetics, under Emerson, and small grains breeding, under Love. Accomplishments from these two projects were the "highlights" of the Era, 1914-1942. The corn genetics project did not involve crop improvement. Several open-pollinated varieties had been developed earlier by ear-to-row selection and included the first successful grain variety that developed early enough to produce mature grain. Emerson was clearly aware of the potential for hybrid maize but did no research related to this problem. In 1920, he realized research was needed on this important question and named Wiggans to take charge. C.B. Hutchison, whose primary responsibility was genetics teaching, was quite involved with research. He initiated inbreeding with corn, along with Wiggans, and conducted research with fiber flax, which was not continued after his resignation. All faculty were energetic and expanded field research, none more so than Wiggans. He had a full schedule of research from "Farm Crops," which he brought into the department, and initiated a large inbreeding project with emphasis on silage corn. He conducted many agronomic studies with forage crops, notably red clover, alfalfa, timothy and soybeans, studied multiple cropping systems, i.e., soybeans and/or soybeans with corn for silage and investigated the establishment of perennial forage crops in small grains. Wiggans published several Cornell bulletins and re-

ports on these studies. In addition to corn he did breeding with soybeans and released two early varieties that were used in New York and other early production areas for grain and/or forage.

With the early success of hybrid corn at the Connecticut Agricultural Experiment Station, by D.F. Jones in the mid 1920s, and the earlier papers by G.H. Shull, E.M. East and H.K. Hayes, it became clear that there existed great potential for hybrid corn. Wiggans shifted much more effort to hybrid corn but continued his other research throughout the era. With the expansion and revitalization of the Department under Professor Love in the 1940s, primarily following the end of World War II, Wiggans assumed full responsibility for corn breeding and terminated his activities in other crop production areas.

J.R. Livermore continued research on potato breeding as did several in the Department of Plant Pathology. The programs in these two Departments were somewhat separate. The potato improvement programs did not become integrated until several retirements occurred. Professor Robert L. Plaisted in Plant Breeding and Lester C. Peterson in Plant Pathology were able to integrate the projects in the late 1950s, which resulted in a nationally and internationally recognized crop improvement program. Considerable research on production and utilization existed in other Departments - Vegetable Crops and Nutrition. The results contributed to the overall crop improvement programs.

The career of Professor Harry H. Love was a paramount one during this era. He was the most significant member of the Plant Breeding Faculty in 1914. Love had spent a sabbatical in Germany in 1914, although the trip was abbreviated somewhat by the beginning of World War I. As noted earlier, he strongly urged the appointment of Emerson. He regretted the loss of Webber to California and feared at times that Emerson might be recruited by others. Love often wrote to the Dean and President with his suggestions for the support and growth of the Department. In particular he felt the need to keep Emerson as Head of the Department.[14] On 1 September 1916, he wrote Dean Mann urging a substantial increase in salary, since no change had been made since he came to Cornell. He stresses that Emerson's salary was low, that he ranked very high as a leading genetics investigator here and abroad, and compared him as an equal of Bauer in Germany and Bateson in England, and that he had cleared up the "situation" in the Department and demonstrated that he was an able administrator, even with limited funds. On 26 April 1920, Love again wrote to Mann urging the very highest possible salary for Emerson. He considered him as the very best geneticist in this country, outranking the great foreign scientists.

At this time, Love could be described as a peer of Emerson's as a scientist in small grains breeding and genetics and in biometry (experimental design and analytical methods of data analysis). He had many invitations to lecture at national meetings and other agricultural colleges on one or both topics. He lectured frequently at the "Graduate School" programs organized by the USDA. He was invited to lecture on biometry at a number of state agricultural colleges. Many were urging him to complete "his book" on experimental methods and statistical analyses. He always replied that he expected to do so soon but it was 20 years before it was published. By this time several similar books on the subject had been published. His book was completed while he was on assignment in China (1934) and was most useful there since an edition in Chinese was published. His "statistical assistant," Miss Francis Feehan, joined him in China to assist in the final preparation of the text. She had been in this position since 1913, when she began part time while a student at Ithaca High School. When Professor Love became acting Head in 1942, until her retirement and death in 1953, she was the Department Secretary, Finance Officer and Manager. Even with all these duties she was able to supervise and participate in the analyses of Love's research data. She was a remarkably able and productive employee. She could have written perhaps the most insightful history of the Department.

Love's career can be compartmentalized into three different unique stages. In the beginning (1907-1924) his activities were in plant breeding with open-pollinated corn and small grains, interaction of genotypes and environment, development and teaching of biometry, and in community affairs. He was active in missionary work of churches, in service clubs, in high school activities, in international student activities at Cornell and much more (see below).

A second stage (1924-1942) might be called his China Interlude. The Nanking years, as mentioned earlier, are recorded in some detail in *The Cornell-Nanking Story* by Love and J.H. Reisner. This program was supported by

the University of Nanking and the International Education Board, a Rockefeller Foundation funded organization. Dean Mann (1924-1926) and C.B. Hutchison (1924-1928) had directed the Board's activities from Paris, and its activities came to an end about this time. In 1930, C.H. Myers made the final report of the contribution of Cornell Faculty to the University of Nanking. The University published it as Special Report (No. 1, 1934). Love, and others involved, proposed a continuation of the Nanking Project but Dean Mann was "cool" to this since he felt that the Cornell Faculty needed to give more time to Departmental research programs. Actually, Love's small grains program was continued by able assistants, W.T. Craig, experimentalist, E.J. Dorsey, cytologist and hybridizer and F. Feehan, data analyst.

The programs of Myers and Wiggans were clearly curtailed during the Nanking period. Myers had an experimentalist, W.I. Fisher, who was able and notable as the Departmental photographer. Wiggans did not have the continued service of an experimentalist. He rarely had good relations with the support staff until his last years of service. In the 1950s, he finally developed good relations with an experimentalist and excellent relations with his last three graduate students, R.I. Jackson, E.S. Horner, and U.S. Grant.

As mentioned above, both Myers and Wiggans were given and/or assumed many responsibilities, which made it difficult to develop a "specialty." Both men, similar to Love, were active in Community Affairs. Emerson, and Deans Mann and Ladd, were at times, critical of Myers' cabbage (*Brassica oleracea L.*) breeding program. Myers defended his program rigorously and with some merit. He had listened to the growers and developed varieties with small heads including the red-colored forms. The growers, however, did not accept the new varieties because of low yield. They also learned they could produce the small heads by use of denser stands. Myers often volunteered or was co-opted to handle many chores. He was named a secretary of the Faculty in the Department and was authorized to sign vouchers and to care for other routine matters. He was frequently asked to manage the allocation of experimental plot land and greenhouse use. He had projects of breeding timothy (*Phleum pretense L.*) and alfalfa (Medicago sp.) but little resulted from them. In 1946, two timothy varieties (Cornell 1777 and Cornell 4059) and one alfalfa line (USDA A-196) remained. The timothies probably were first identified in 1907 when the project was moved from "Agronomy" by Dean Bailey. The alfalfa line had little merit. It was a selection for *M. sativa* characters (purple flower color and erect plant type) from nurseries of *M. sativa x M. falcata* crosses and USDA *M. sativa* sources. When visiting Myers, T.E. Odland(Cornell PhD 1926 with Love), noted some interesting materials. He asked Myers for these, which Myers gladly gave to him. Odland was interested in the hybrids and at the University of Rhode Island developed a vigorous population with variegated flower color and excellent stand establishment. It was tested by the USDA as A-197, named "Narragansett," and was the source material for several varieties developed by R.P. Murphy and D.R. Viands in later years.

Wiggans developed the first double cross corn hybrid, released by Cornell in 1932 (Cornell 29-3) and used primarily for silage. He developed several hybrids for grain but none were successful until Cornell M-4 in 1954. The seed production program with 29-3 was slowly developed during the 1930s. Inadequate support and staff contributed to problems. The development of an innovative Pure Seed Program and a Foundation Seed Program in 1946 finally solved the matter of production of "adequate" supplies of pure seed of high planting quality of varieties developed and/or recommended by Cornell. This program was the outstanding contribution of A.A. Johnson and H.H. Love. Prior to 1946, seed of varieties were released in rather limited quantities to farmer-seed growers in the New York Seed Improvement Cooperative. They produced seed that was sold at retail to farmers and at wholesale to seed markets. Several generations of increase was permitted, which often resulted in some decline in genetic purity. The conditioning quality of the seed varied from grower to grower. The use of pure seed was low for most field crops. Love was well aware of the need for a much more comprehensive program and it was a major component of his plans for the future, which followed from Emerson's retirement in 1942. Cornell went through many gyrations before they finally named Love as Department Head in 1944. That turned out to be a fortuitous event.

Other faculty members in this era (1914-1942) included F.P. Bussell, J.R. Livermore, A.C. Fraser and R.D. Lewis. Only Lewis (1925-1930) served for a short time. The others retired as Professors Emeriti. Lewis was very able and served primarily in Extension but also taught genetics when Fraser was on sabbatical and continued Hutchison's early inbreeding program with corn. Emerson, and particularly, Love, made strong pleas to keep him at Cornell

but the Depression budget stress probably negated this. Lewis moved to Ohio State and soon became head of the Department of Agronomy and then on to Texas A&M University as Director of Research.[15]

Bussell was an extension professor dedicated to crop improvement through the use of certified (pure) seed of improved varieties. During his first years in the position, he aided the development of the New York Certified Seed Growers Cooperative in 1923. He taught Methods of Plant Breeding from 1922 through 1926, at which time C.H. Myers assumed this role. A more detailed discussion of the Pure Seed Program will be given later. As noted above, Lewis was active but when he left in 1930 no faculty was named to this position. Instead a position of Seed Technologist was created and W.D. Swope was appointed. He became an assistant to Professor Bussell and to the secretary of the Seed Growers Cooperative, Bruce P. Jones, a farmer-seed grower, in Hall, N.Y. He came with high recommendation from Washington State University and was admitted as a doctoral candidate in the Graduate School. For reasons not clearly understood, he made little progress toward a degree and in the end became a bit of a recluse.

Fraser was a dedicated teacher. He made a great effort to be knowledgeable in the genetics of animals - guinea pigs, rabbits, rats, mice, etc. -- and fungi as well as plants. On a sabbatical leave and General Education Board Fellowship (1928-1929), he spent over a year in the Animal Genetics Institute in Edinburgh, Scotland, to become more knowledgeable in animal genetics. He was very well informed, of course, in maize and Drosophila genetics. He was described as one of the best teachers in the College and the first course in Genetics was considered one of the best. Succeeding teachers of the course were compared to the Fraser years (1920-1930s), even though the science was producing new information at an accelerating pace. He died in 1941, at age 51.

From the foregoing, it is clear that research and graduate education were primary goals, but undergraduate teaching and pure seed production were also important. The number of advanced degrees in the Department averaged 6 per year during this period. This suggests that 12-15 major graduate students were in residence at any one time. No precise records on minor students are available. Since most attended the Synapsis Club it seems that 20-30 per year is a likely number. The major departments most often represented in this group include Botany, Plant Pathology, Vegetable Crops, Agronomy, Pomology and Animal Sciences. Descriptions of the Genetics courses can be found in Announcements of both the College of Arts and Sciences and the College of Agriculture's course list.

Chapter 4

INTERESTING PLANT BREEDING PERSONALITIES, 1914-1942

Rollins Adams Emerson, Professor

All biographers described Emerson as a person of robust stature and very active physically. He was the first to arrive and last to leave the corn nursery during the growing season. He annually went on deer hunting trips in the Adirondack Mountains for the purpose of sponsoring a venison dinner for the Synapsis Club. In the earlier years, he was often joined by others from the Department, in particular, Professors Wiggans and Myers. Synapsis Club was a very integral part of the graduate and faculty fellowship. It was started by Professor Webber in 1907, and heartily encouraged by Emerson. Initially the dinner meetings were hosted often in the several faculty members' homes, occasionally in the plant breeding teaching laboratories or in public restaurants. Emerson was a great walker. He did not purchase an auto until the 1930s. On two occasions, at least, he organized the Synapsis dinner meetings at Rogue's Harbor Inn, South Lansing, NY - a trip of about 8 miles one way. Members were invited to join him in the walks. Fourteen men made the trek on 2 April 1915, and eight men on 27 November 1915. On the latter occasion the trip took one hour and forty-five minutes. No mention is made of the return trips. It is assumed they returned to Ithaca on the trolley line. Another activity in the Department that was encouraged by Emerson was bowling. The team was known as the University Team; five of the six members were from the Department. The team usually won several awards at season's end. The most notable members were John J. McAllister, Experimentalist, for standard bowling and Roy G. Wiggans, Assistant Professor, for duck pins. Emerson, in his mid years, took up golf and occasionally offered a few frustrating comments in correspondence with contemporaries. He sponsored a tournament at the Sixth International Congress of Genetics (1932) held in Ithaca. Emerson was Dean of the Graduate School for six years, 1925-1931, and a Faculty Representative on the Cornell Board of Trustees, 1925-1928. At this time he urged collaboration between biologists (geneticists in particular), physicists and chemists. He noted more interest in collaboration at Cornell than he had sensed at many other institutions, in particular at Cal Tech; although, he felt that Morgan's move there in 1928, from Columbia University, might change the attitude. His son, Sterling, and one of his cherished students, E.G. Anderson, joined the group at that time.

On occasion, he commented with some frustration that administrative duties took him away from his research. Several have reported that he empowered his secretaries (Department and Graduate School) to answer "routine" mail and to sign documents for him. Only the most important letters and documents required his personal signature. An interesting letter is in the files from the Dean of the Graduate School to the Head of the Department of Plant Breeding requesting the material for the Graduate School Announcement that was past due and urgently needed. It was addressed to Emerson as Head and signed for Emerson as Dean by Miss Qutterson, secretary in the Graduate School.

Emerson was a most charismatic figure - scholar, teacher, a common man with prodigious energy coupled with his absolute integrity and objectivity, the latter phrase emphasized by M.M. Rhoades.[16]

It seems that with the publication of Emerson, Beadle and Fraser (Cornell Memoir 180) in June 1935, "A Summary of Linkage Studies in Maize," his research interest broadened somewhat. The genotype of maize for qualitative characters was described well but the nature of inheritance of quantitative characters was less well understood and he continued research in this area until his passing in 1947. His data on the latter with some additions were published in 1950 by Emerson and H.H. Smith as Cornell Memoir 296, "Inheritance of Number of Kernel Rows in Maize." The 1930s was the decade of the Great Depression and some severe droughts even in the Northeastern States. During those years, Emerson turned more of his activities to plant breeding with horticultural crops. From

his days as an undergraduate student, his agricultural interest was with horticultural crops in contrast to field crops. He continued breeding with beans and initiated breeding in celery and muskmelons. The latter programs produced Cornell 19 celery and Iroquois melon, the latter in collaboration with one of his last students, H.M. Munger. In all these projects, the cooperation with faculty and graduate students in Plant Pathology and Vegetable Crops was very close. To follow one of today's administrative jargons, these projects were really "team efforts" by interested scientists from any field or department.

William F. Friedman, Student

Friedman was born in Kishinev, Russia on 24 September 1891. His family immigrated to Pittsburgh, PA in 1893. He received a BS in 1914 from Cornell and began graduate study in genetics as an assistant. He spent the summers of 1912 and 1913 at the Carnegie Institution of Washington's Laboratory at Cold Spring Harbor, as an assistant to C.B. Davenport and G.H. Shull. He had been recommended by Professor Love. Soon after Emerson's arrival at Cornell he received a request from "Colonel" George Fabyan for someone to do research in genetics at his Riverbank Laboratories, Geneva, IL, a suburb of Chicago. Fabyan was a scion of a Boston family engaged in the cotton exporting business. Fabyan's epithet as a Colonel was an honorary political one. He was a business man in Chicago and a member of the Board of Overseers of Harvard University. Emerson suggested Friedman go to Chicago as a summer job opportunity for 1915. He readily accepted because of the salary. Upon his arrival at the Laboratories, he began genetic research with corn but found that Fabyan's greatest interest was in cryptology. Fabyan sensed that genetics would be interesting but his primary effort was in using cryptological analyses in an effort to solve questions about the true authorship of Shakespeare's works. A major hypothesis was that Francis Bacon was the real author. Several people were working on this latter project and Friedman became particularly interested in the work of Elizabeth Smith. They soon married and she became a coworker with him throughout his career. Friedman did not return to Cornell but continued at the Riverbank Laboratories. In 1917, he joined Colonel Fabyan who had volunteered their cryptology expertise to the War Department. Thus Friedman began a distinguished life long career with the Government and its Military Units in cryptology. Information on Friedman can be found in his Deceased Alumni Files (Rare and Manuscript Collections, Cornell University Library, 41/2/877 Box 201) There are several books on his career. Several citations include:

Clark , Ronald. 1980. *The Man Who Broke Purple*. Little Brown & Co., Boston.
Kahn, David. 1967. *The Codebreakers*. Macmillan, New York.
Stevenson, William. 1976. *A Man Called Intrepid*. Ballantine Books (Random House)

Professor Love, in his early history of the Department, eulogizes Friedman as a great patriot. He maintained contact with him throughout his career. Friedman was proud of his days at Cornell and especially his ties with the Department of Plant Breeding. He visited the campus on several occasions and spoke to the Synapsis Club. His career accomplishments were TOP SECRET so he could not say much or patent his coding "machines." On 14 March 1944, the War Department awarded him the *Exceptional Civilian Service Award*. Two years later, on 8 February 1946, President Truman awarded him a *Medal for Merit*. In 1956, the United States Congress granted him $100,000 as partial compensation for his inventions, which because of security, had been kept secret. He died on 2 November 1969. This is an interesting story of where an interest in genetics and biometry may lead.

Kenneth C. Livermore, Cooperator
J(osiah) Randall Livermore, Professor

The Livermores were each born in Watertown, MA in a family tree that originated from the immigrant John Livermore in 1684.[17] Neither claimed any close relationship to each other. "K.C." received a BS, MSA and PhD at Cornell in farm management, with a minor in Plant Breeding. He was an active member of the Synapsis Club in its early years and was involved in its organization, by-laws and ritual activities. He became an Assistant Professor and soon Professor of Farm Management. He resigned in 1920 and moved to his "Quaker Hill" farm, Honeoye Falls, NY. He was a certified seed grower and regional retailer of seed and other farm supplies throughout his life.

K.C. Livermore was one of the founders of the New York Certified Seed Growers. He died on 20 September 1987 at the age of 101.

"J. Randall" Livermore received the BS degree in 1913 and the PhD in 1927 after which he became a staff member in the Extension activities of the Department of Plant Breeding. He soon became an Assistant and then Associate Professor with primary activities in potato breeding and teaching and consulting in Biometry. He died 22 April 1982 at the age of 91.

Ernest G. Anderson, Graduate Assistant

Emerson brought two graduate students from Nebraska with him to Cornell. They had begun thesis research on corn. Ernest W. Lindstrom completed his doctorate in 1918 and went to the University of Wisconsin as an Assistant Professor of Genetics and then to Iowa State College, as Professor and Head of Genetics in 1922. He was noted for his teaching as well as research in genetics and breeding of corn. Anderson completed the doctorate in 1920 and had a very broad career in genetics before being appointed to a "tenure-track" faculty position at the University of Michigan in 1926. Subsequently, Morgan recruited Anderson for his research group at the California Institute of Technology in 1928. At that time, he continued genetics research with corn with emphasis on the use of reciprocal translocations in corn breeding, and after World War II, on the cytogenetics of corn exposed to the Bikini Atoll atomic bomb tests. Both Burnham and McClintock spent part of their NRC Fellowships with Anderson at Cal Tech in the 1930's.

In the Cornell archives, one finds voluminous correspondence between Emerson and Anderson. Emerson always was positive in comments and recommendations for his students. But among his many letters of recommendations he compared them to Anderson and later to Barbara McClintock, as the best of the best. Anderson had six years of varied experiences and McClintock nine years before a "permanent" appointment was realized. Both held fellowships, temporary appointments and managed to return to Cornell almost yearly for the corn growing season. Before completing his thesis in 1920, Anderson spent time at Columbia University in 1918, conducting research with Drosophila, and studied *D. virilis*, with C.W. Metz, during the summer of 1919, at Woods Hole Marine Biological Lab. Anderson had appointments with the support of the Carnegie Institution of Washington (1920-1922) at Columbia and Cold Spring Harbor. During the academic year, he taught genetics at The City College of New York (1922 and 1923). He then held a National Research Council Fellowship at the University of Michigan (1923-1926). His research involved Drosophila (Columbia U. and Michigan U.) and Oenothera (Michigan U.), as well as corn in collaboration with Emerson at Cornell. While at Michigan, he observed a bright student, Marcus M. Rhoades, whom he recommended to Emerson for graduate study. He noted that Rhoades had a slight speech problem but that he was much better speaking than A.H. Sturtevant of the Columbia Drosophila group. While at Michigan, Anderson collaborated with Sterling H. Emerson, Professor Emerson's son, on Oenothera, which Sterling had studied for his doctoral research. On 17 December 1924, Anderson wrote to R.A. Emerson noting that research on Drosophila "is booming" and it is more useful for genetic research than corn. This seems not to have harmed their close relationship but the correspondence dropped off after both Anderson and Sterling Emerson were recruited by Morgan for his research program at Cal Tech in 1928. Emerson always visited Anderson when he was at Cal Tech but Anderson no longer returned to Emerson's summer garden genetics group. It was a bit crowded, one may recall, with McClintock, Sprague, Beadle, Randolph, Burnham, Rhoades, Perry and Stadler (one summer) usually in the corn nursery in the Plant Breeding Garden.

The narrator takes a paragraph to describe his interaction with Anderson. I began my graduate study at the University of Minnesota on 1 July 1936. I worked with Professor A.C. Arny for one year as a graduate research assistant and then as an Instructor with H.K. Hayes obtaining a doctorate on 14 June 1941. Hayes was on leave in 1936, at the University of Nanking. The University of Minnesota was on the quarter-system. E.G. Anderson was a Visiting Professor of Genetics during the winter quarter. During this time an advanced course in genetics was given and a joint seminar in genetics was organized by Hayes (Anderson in 1936-1937) and Professor C.P. Oliver from the Medical School on the Minneapolis Campus. I took my first advanced course at this time. It was an ex-

citing introduction. Anderson, although not a flamboyant lecturer, was most stimulating. He was very popular with students, as was Oliver and his graduate students. He taught by presenting us the raw data and requesting the student to analyze and interpret it. He did not teach by summarizing an experiment and then requiring a memorization of the summary. It was very effective. We became thoroughly involved in the cytogenetics of reciprocal translocations in corn but were also introduced to the cytogenetics of Drosophila, Oenothera, Datura etc. In the seminar, I was assigned the papers by Beadle and Ephrussi on eye transplants in Drosophila which they had done in Ephrussi's Lab in Paris, and the paper on attached Xs in Drosophila by Anderson, which I believe, was done primarily at Michigan U. but may have involved earlier research at Columbia U. It was a remarkable introduction to genetics. Anderson had early nicknames of "Andy" and "Little Andy" as noted in the correspondence. We dubbed him "E.G." at Minnesota in order to differentiate him from Edgar Anderson at Washington University in St. Louis, who had just developed his theory of introgressive hybridization, which was of great interest. "E.G.," although at first rather quiet and retiring in demeanor, became very popular with students and staff. He always brought in a sly bit of mirth and excitement to a lecture, which was usually presented as a bit of a task. He presented me with a mass of data from a population testing the nature and origin of suspected reciprocal translocations. I tried as many possible solutions as I could formulate. I had had other such problems and had been rather successful in analyzing them. This time I failed. I described several hypotheses and then said I give up - I am "stumped." "E.G." found this highly interesting and said he had come to a similar conclusion. He gave me a satisfactory grade and made the point that many experiments may result in such data. He then announced it was time to plan our next foray to a "Swedish Smorgasbord" dinner with the student group, on occasion as his guests. He was still unmarried at this time and he enjoyed one extracurricular activity. It was to visit every smorgasbord in the Twin Cities area and frequently with the students. Our next intensive introduction to genetics and cytogenetics, other than the Winter Quarter Seminars, came from C.R. Burnham when he joined the Minnesota faculty as Associate Professor of Genetics in the summer of 1938.

Franklin D. Keim, Graduate Student

"F.D." Keim was the renowned teacher of the first course in genetics and advisor to students at the University of Nebraska, particularly in the Department of Agronomy. He was a crop production agronomist, 1918-1956, and Head of the Department, 1930-1952. His doctorate was completed under Professor Love, at Cornell in 1927. Much of his thesis research on wheat breeding was done at Lincoln, NE. In his doctoral dissertation, he acknowledged the assistance of two undergraduate students, George Sprague and George Beadle. He had urged them to study with Professor Emerson. This highlights one of his greatest accomplishments. He interested bright students in genetics and encouraged them to continue in graduate study and research. It has often been said that he "sent" his best students to Cornell to study corn genetics with Emerson. This reasoning, no doubt, came about because George Sprague and George Beadle came to Cornell in 1926, and excelled as students of Emerson's. While a graduate student, Sprague was also an employee of the Bureau of Plant Industry, USDA, as a junior agronomist in corn breeding at North Platte, NE. Frederick D. Richey, Head of corn improvement at Arlington Farm, USDA, Washington D.C. urged Sprague to continue graduate study with Emerson. Richey and Emerson corresponded often and made a joint trip to Peru in 1924, and nearby areas to collect corn germplasm. They were especially interested in cold tolerant germplasm. George Beadle came to Cornell (1926) to study crop ecology and his appointment was as a teaching assistant in field crop production in the Department of Agronomy. He had been influenced at Nebraska not only by Keim but also by John E. Weaver, a renowned plant ecologist. Weaver, as did Keim, encouraged many undergraduate students to continue their education. Beadle received his MS in 1927 at the University of Nebraska on the ecology of grasses. Upon his arrival at Cornell Beadle became aware of the excitement in corn genetics and moved to a thesis problem with Emerson. It may be noted that Sprague and Beadle came at the same time, the fall of 1926, and, no doubt, knew each other as undergraduates. One of Keim's earliest students, Howard B. Sprague, an older brother to George, was sent on to graduate study at Rutgers University in 1923. Another of Keim's best students was Adrian M. Srb, who he sent to Stanford University in 1941, to study with Beadle. Srb accepted an appointment at Cornell in 1947 (see below).

(I believe he encouraged students to go where they could get financial support in a "good" department. Thus, few came to Cornell after 1930 because there was little financial support available.) His son, Wayne F., came to Cornell in 1947 to work with Srb and completed the MS in 1949 on Neurospora genetics. He studied for his PhD (1952) with Murphy on interspecific hybridization within species of Trifolium and Lotus. W.F. Keim became a teacher of genetics at Purdue University and encouraged many students to go to graduate school. He later became Head of Agronomy at Colorado State University and continued his great interest in undergraduate students. F.D. (Frank) Keim was President of the American Society of Agronomy in 1943. Wayne Keim, his son, was President of the Crop Science Society of America in 1984.

Frank P. Bussell, Professor

Professor Bussell was born in Abilene, KS on 3 September 1878, but grew up on a farm in Illinois. He received the BA degree from Colgate University, Hamilton, New York, in 1901, and taught in high school in Geneva, NY for two years. At that time, he was awarded a Sage Fellowship in Philosophy at Cornell. After one year of study, he returned to manage the home farm in Illinois until 1915. However, during these years he managed to complete some graduate studies at the University of Chicago and the University of Illinois. He was always on the move since he also did some teaching in high schools in Minnesota and California. The subjects were history and the classics--clearly his scholarly interests dated back to his days at Colgate University.

By 1915, Bussell had developed an interest in plant breeding, including the need for pure seed of improved varieties of crop plants. He enrolled as a graduate student in the Department of Plant Breeding. He was appointed an assistant in extension activities and completed his doctorate in 1919 with Professor Love. A major activity in extension was the seed certification program. Other activities in extension with crop production involved all of the field crops and several vegetable crops, in particular, potatoes and dry beans. Personnel from allied departments, Agronomy, Vegetable Crops and Plant Pathology, were involved in developing recommendations to farmers. Contrasting views were expressed from among representatives in Extension from these departments. In particular rather "knotty" differences existed for silage corn and planting seed stocks for potatoes. But, in due course, these were resolved by much more involvement of plant pathologists in developing improved planting stocks of potatoes and the acceptance that the grain portion was the most important component in corn silage. The latter led to the use and rather rapid acceptance of earlier varieties of corn for silage in the 1940s, and earlier hybrids thereafter, although the idea that immature corn possessed a "factor" that produced silage with some unexplained nutritional value to milk cows reappeared from time to time. This led to periodic reevaluation of corn silage quality by several groups: Agronomy, Animal Husbandry, Plant Breeding and County agents.

Professor Bussell developed a rather complete history of the extension activities in the Department for the period 1907-1944, dated 1 July 1944. He had been involved in Extension in the Department beginning in 1919. Upon receipt of a copy from Bussell, Dean William I. Myers replied by thanking him for such a comprehensive report but he had "one small point of criticism, which I would like to raise."[18] The Dean felt that Bussell had ignored the assistance of some of our cooperative organizations, especially the G.L.F. (Grange League Federation). It was first organized in part to get good seed, for example, red clover, for farmers. He felt that GLF could take the lead and others in the private seed trade would come along. This suggestion coupled with Professor Love's vision for greatly increased use of high quality seed of superior varieties led to greatly expanded activities in extension and pure seed production and use. Love initiated this with the appointment of Alvin A. Johnson from Michigan State University as an Associate Professor on 1 July 1946. Bussell retired on 31 August 1946 and later moved to California. He died in 1956. He was greatly respected by the certified seed growers. An anecdote from Professor Love is appropriate here. Bussell was likely the only extension agronomist who read the Greek Tragedies in Greek for relaxation at home and "on the road."

Benjamin H. Duddleston, Graduate Student and Hybrid Corn Breeder

B.H. Duddleston was born on 24 February 1889 in Wisconsin. He earned a BS at the University of Wisconsin in 1917, and MS at Iowa State University in 1918. By 1925, he was an Associate Agronomist with the USDA working

in collaboration with Purdue University on corn breeding. He wrote to Emerson in reference to graduate study for the doctorate. He stated that he had permission from the Office of Cereal Investigations in the USDA to go on half-time salary in order to continue graduate study at Cornell. Emerson replied with a favorable response describing the formal courses by Fraser, Bussell and Love and noting, "I personally give no formal courses of instruction." By 8 November 1925, Duddleston had presented a thesis project and noted he was classifying seedlings in the greenhouse. He and Mrs. Duddleston were in residence in 1926 and 1927 but he kept his program going at Purdue. He was a contemporary in the USDA with G.W. Sprague at North Platte, Nebraska and Arlington Farm, Virginia and J.R. Holbert at Bloomington, Illinois (in cooperation with the Funk Seed Co.). All were intensely active in inbreeding the best open-pollinated varieties in order to isolate inbred lines as parents of double cross hybrids. All were noted for isolating widely used inbreds. In a sense, Duddleston "hit the jack pot" first, with the Indiana inbreds (Wf9 and 38-11) from the Reids Yellow Dent open-pollinated variety."[19] During the year at Cornell, Duddleston became very interested in the agriculture of the area. When a beautiful house and farm (the Halsey "mansion" near Trumansburg at the junction of Highway 96 and Taughannock Creek Road) was offered for sale the Duddlestons made an offer. They returned to Purdue in the spring in order to spend the summer in the corn breeding nursery and to do further work on his thesis project. Soon after returning, he received a somewhat unexpected acceptance of his offer. He returned and the Duddlestons became the pleased owners of the beautiful Halsey farm. Thus, his career in academia ended. The family developed the farm into a seed producing one for hybrid corn and other field crops. Their son, John, and son-in-law, Winton M. Baines, became partners in the seed business in 1952 known as Halsey Seed Co. They produced seed of corn hybrids released by Cornell and some of their own formulations. The Duddlestons were active in the Synapsis Club beginning with their arrival at Cornell on 4 October 1926. During the 1930s they hosted the spring picnic on at least one occasion and attended some regular meetings. The company was eventually sold in 1995, upon the retirement of John Duddleston and Baines who had ended his career as Manager of the NY Certified Seed and Foundation Seed Cooperatives (1965-1984). Mr. and Mrs. Duddleston continued to live in the Halsey home. Mrs. Duddleston died in 1985 at age 92 and Mr. Duddleston in 1991 at age 101.

Harold S. Perry, Graduate Assistant

Perry was born on 17 December 1900, near Corning, in Steuben County, New York. Following graduation from Corning High School, he attended Union College (1918-1919). He returned to Steuben County and farmed for three years and taught school for one year. At this time he entered the New York State College for Teachers, Albany, NY, graduating in 1927 with an AB degree. He enrolled at Cornell University as a graduate student in plant breeding (genetics) in the fall of 1927. He became a graduate assistant in the Department of Plant Breeding in 1928 and earned the doctorate in the spring of 1932. Perry was a member of that remarkable group of students in genetics and cytogenetics: McClintock, Beadle, Sprague, Li, Rhoades and others. The "Great Depression" began in 1929. Job opportunities were few and most in academia involved much teaching, which left little time for research. This group was intensely interested in basic research. Only three obtained "tenure track" appointments. H.W. Li returned to Formosa, Sprague remained with the USDA and Perry accepted an assistant professorship at Duke University teaching botany and genetics. The others held various temporary appointments (fellowships, post-doctorates, experimentalists etc.) before obtaining appointments with major responsibility in research. It seems likely that Perry's previous experience and undergraduate education led him to a career dominated by teaching.

Nevertheless, Perry continued some research with corn. He returned for the summers of 1933 and 1934 to Ithaca to participate in the activities in the Emerson garden. He then developed a small research garden at his home in a rural area near the Duke campus where he continued working on corn projects, even past retirement in 1970. This provided an experience in research for students and some associates. A major activity was to breed a high quality sweet corn for the southeastern states. He introduced the dominant "Ga" gene into sweet corn. This gene, discovered by Jones and Mangelsdorf in 1925, is useful in preventing cross pollination from normal recessive stocks (95-99% control, Emerson 1934).[20] Thus one could grow sweet corn adjacent to field corn with little contamination. Today, sweet corn breeders do not use this method but it is used in popcorn varieties.[21]

Perry continued to work in his garden after retirement in 1970, and until the early 1980s. He returned to Cornell and the Department in 1982, to join his contemporaries at the "Golden Age of Corn Genetics" Symposium and 75th anniversary of Synapsis. As that program was developed, M.M. Rhoades urged the organizers to be sure and invite Perry; "he was an integral member of our group" (see photo section). The record shows that he was president of Synapsis, always attended the meetings and was the best man at the marriage of Marion Hill, graduate student in botany, and George Beadle in 1928.

Harold Perry died on 22 April 1984 in Tallahassee, Florida, where he and Mrs. Perry had recently moved to be near their daughter, Jane Perry-Camp, Professor Emerita, School of Music, Florida State University.[22]

Chapter 5

THE LOVE ERA, 1942-1949

As Emerson approached retirement, the Department and Dean Ladd looked to the future; a successor to one of the nation's most distinguished geneticists and department heads. It is clear that the Dean thought of some one of like distinction from the "outside." No contemporary member of the faculty was considered. In the latter part of the 1930s Love was recovering from a serious illness and a major operation. Myers and Fraser both had health problems. They were to pass on "before their time." After an exhaustive search for candidates, however, some unusual changes in strategy, the untimely death of Ladd (23 July 1943), and the succession of William I. Myers as Dean, Professor Harry H. Love served as Acting Head (1942-1944) and was appointed Head of the Department of Plant Breeding (1944 -1949).

Love, as noted earlier, had had an extraordinarily broad career. He was born 19 March 1880, and grew up on a central Illinois farm. He received a BS degree from Illinois Wesleyan University and an AM from the University of Illinois in 1906, with a major interest in chemistry. He and E.M. East were colleagues at Illinois where they worked under the direction of Professor C.G. Hopkins on the long term selection experiments for high-low oil and high-low protein in maize. East received a doctorate and moved to the Connecticut Agricultural Experiment Station in 1905. Love continued graduate study at Illinois but moved to Cornell in 1907 to study with Professor Webber in the new Department of Experimental Plant Biology (by 1909 named Plant Breeding).

Love was a "man for all seasons." He believed strongly that professors should be involved in the community around them; not isolated in their scholarly activities. He participated in activities of his church, particularly the agricultural missionary ones of the Presbyterian Church; the service club, Rotary International; the international students organization, the Cosmopolitan Club; and Ithaca High School Athletics, especially baseball, where he was the coach in the early 1920s. Upon his retirement 30 June 1949, he accepted a short-time assignment to Formosa (Taiwan). Before he left, members of his championship Ithaca High School team of 1922 gave him a surprise party. Fourteen members were present including his oldest son, Harry Love, Jr.[23]

Love was somewhat unique with respect to administrative matters. He urged faculty to attend and participate in college and university faculty meetings and committees. He felt it inappropriate to volunteer for or seek administrative positions. One's peers and seniors should call on them, he believed. His advice to department heads was that their foremost priority was to the Department, its "mission" and faculty and staff. He noted that this would likely curtail some of the scholarly research activities of the incumbent but this was the loyalty that should be given the "institution." This brief review of his view of a professorship is given as a background for his activities in the years, 1938-1949.

There is extensive correspondence in both Dean Ladd's and Dean Myer's papers in the University Archives on the search for a Head, for replacements for Fraser and Myers, and, finally, for several new faculty members.[24] A few letters are reviewed here but to do a thorough search would require a major commitment of time and visits to some archival sources not immediately available to this reporter.

On 15 July 1938, C.B. Hutchison, Director of Agriculture in the University of California system at Berkeley, and former member of the faculty in the Department of Plant Breeding, replied to Dean Ladd regarding the Department of Plant Breeding. He suggested that a plant breeder be named as Head and a geneticist be appointed to a section in the Department. He noted that L.J. Cole, animal geneticist, had done this well at the University of Wisconsin. He suggested Beadle and Rhoades as candidates with a preference for Rhoades.[25]

On 7 January 1939, Emerson wrote to Dean Ladd with a copy to Professor Redfield, Director of the Division of Biology at Harvard University, suggesting a successor to E.M. East, who had died on 9 November 1938. He suggested A.H. Sturtevant and T. Dobzhansky, animal geneticists, and Beadle and Rhoades, plant geneticists, with a preference for Rhoades. If teaching is a primary responsibility he suggested Fraser with an admonition that he hoped he would not leave Cornell. Among East's students he gave unqualified support for Paul Mangelsdorf at Texas A & M University. He noted his excellent research, especially on the origin of maize, although he did not regard his final hypothesis as plausible. Emerson's recommendations led Dean Ladd to invite Mangelsdorf to succeed Emerson. Manglesdorf did not accept, but left open the possibility of doing so throughout 1942. Although Emerson wished to retire in 1941, he agreed to continue as Head for one more year. Emerson retired officially on 1 October 1942. One month later, Ladd appointed Love as acting Head (6 November 1942), until Mangelsdorf would arrive. Although Manglesdorf's rejection was not final, Ladd believed he would come.26 Dean Ladd recommended Love, as Acting Head, to President E.Z. Day, on 1 December 1942.

On 1 February 1941, Emerson wrote to Dean Ladd in some detail giving his idea on the type of man to succeed him:

> A Department Head:
> 1. should be "An outstanding geneticist or breeder." Plant breeding had been an important part of the Department's personnel and funds. The theoretical genetics part had probably used only 1/10th of the budget. The reputation of genetics at Cornell was great. He hoped it will continue but no man who is not sympathetic toward plant breeding should ever be made Head. If a plant breeder is made Head a first rate research geneticist should be added to the staff. It may be difficult to bring two outstanding men. It may be possible to bring an outstanding geneticist only if someone is promoted from within to Head.
> 2. should have an outstanding reputation.
> 3. must be able to cooperate with the other members of the staff and keep their good will and respect.
> 4. must be able to generate support. He feared an outsider may hesitate not because of salary but of inadequate support. He felt …"that I have failed more hopelessly in this than in any other function of a department head."

These considerations seem to have led to the major effort to bring Mangelsdorf as Head and Rhoades as Professor of Genetics. As one may note in the discussion that followed the salary and support seemed not to have been factors in the final decisions. Dean Ladd responded positively to Emerson's 1 February 1941 letter.

It is informative to review, in some detail, the activities of the Ladd administration in "retooling" the Department from 1938 to1943. The Dean invited Olaf Aamodt to the campus for an interview, consulted frequently with E.C. Auchter and his colleagues in the Bureau of Plant Industry, USDA and with Deans of other land grant colleges of agriculture. Many suggestions came forth during Ladd's tenure for the headship and others of more junior status who might be considered for faculty. At least forty names may be gleaned from the correspondence. Of these, the following subsequently joined the faculty, Henry M. Munger and Robert L. Cushing during Ladd's and Emerson-Loves time (1942-1943), and Sanford S. Atwood, Harold H. Smith, Royse P. Murphy, Neal F. Jensen, Alvin A. Johnson, Adrian M. Srb, and Walter T. Federer, were hired later, during Dean Myers and Love's time (1944-1948).

But, back to the major decision -- the leadership of the Department. L.F. Randolph, Professor of Botany (cytogenetics) worked closely with many members of the Department, including "geneticists" and "plant breeders." He developed autotetraploid corn and red clover, produced x-ray induced mutations and collaborated on cytological investigations. On 16 November 1940, he wrote to Ladd suggesting L.J. Stadler of the University of Missouri and the USDA; Paul Mangelsdorf, of Harvard; and M.M. Rhoades, then at Columbia University, as candidates for Head. He considered them the three best geneticists available. If a plant breeder is to be head he recommended R.D. Lewis [who earlier had left Cornell for Ohio State University]. One day later, he also suggested E.R. Sears, a member of Stadler's research group at Missouri and S.S. Atwood, US Pasture Research Laboratory, State College, PA.25 He continued to keep Stadler's name in his mix and on 12 April 1941, wrote to Ladd suggesting Love as temporary head and Rhoades for the Emerson position at his retirement.[25] Randolph looked forward to working

with Rhoades and added a personal point, Mrs. Rhoades (Virginia) would be an important addition. She had been the best technician he had ever had. It is interesting to note that Virginia Hatcher had come to Cornell as an assistant to Randolph in 1931. There she met and married Marcus Rhoades and enrolled in the graduate school for a masters and then a Ph.D. She was awarded the MS (1935) in Cytotology with Randolph and a minor in genetics with Emerson, but left Cornell before completing the PhD.

Other members of the Plant Breeding faculty made recommendations to Dean Ladd. On 26 March 1941, Livermore strongly recommended that Love be named Head. This was likely reinforced by their shared belief that the College needed an expanded research and teaching role in biometry.[25] Fraser, who was ill and at home, wrote a long hand-written letter (1 May 1941) to the Dean indicating that he would not be able to teach but hoped to return soon to research and to assist others. He suggested Stadler, Mangelsdorf, Rhoades and Randolph in no particular order. He concluded that Stadler and Mangelsdorf were probably not available because of their senior status but that the others should be. He was very supportive of Rhoades, even though he had been "controversial" with the "applied" faculty and students in the early 1930s. He felt this would no longer be true and noted that he had found Rhoades a most stimulating colleague in research. He noted that Randolph worked closely with the Department and that his research was very compatible and that he had an interest in practical research. C.H. Myers recommended (4 May 1941) Rhoades, a most brilliant scientist, for Emerson's replacement.[25] He suggested that Love be named Head for two or three years to be succeeded by Rhoades. He noted Rhoades' early brashness but felt this would no longer be a problem. His recommendation was really one with no reservation. It will be explained later why Rhoades was not comfortable returning to the "arena of conflict between theory and application," although those in the Department clearly recommended him as the most logical person to replace Emerson.

Love was most active in offering recommendations and on 2 February 1942, he suggested that Emerson continue as Head to the "end of the emergency."[25] If this was not to be, he suggested for a second time that Randolph be named Head and confirmed his belief that Rhoades had overcome his earlier "dislikes." He considered Rhoades an excellent teacher and researcher. On 28 March 1942, Love again recommended Randolph as Head, Rhoades for the position in genetics, and H.M. Munger for the plant breeding position.[25] From late 1942, there are several letters between Dean Ladd and Mangelsdorf and Rhoades. Both had visited the campus for interviews and discussions of research facilities. Mangelsdorf never declined but took the position that he would accept only if Rhoades came (letter, September 10, 1942). Rhoades for a second time declined (August 4, 1942), and again recommended Norman Giles, of Yale University, for the position. Giles came for an interview but no evidence of an offer was found. Ladd seems to have never fully accepted Rhoades' rejection, hoping that he would accept his offer and could attract the Mangelsdorf-Rhoades duo. Copies of correspondence between Mangelsdorf and Rhoades became available from the archives at Indiana University.[26] On 8 December 1942, Mangelsdorf wrote to Rhoades stating that he was following-up on letters he had received from Dean Ladd and Dr. Emerson. It seems clear that Mangelsdorf would have accepted the Cornell offer, if Rhoades did too. Mangelsdorf in a very analytical and insightful statement, outlined the important factors in making a final decision to accept or reject Ladd's generous offer. He prefaced these by stating that he had no intention of pressuring Rhoades to accept even though he, himself, had decided in favor of Cornell. However, he did offer his analysis of the situation:

> "First let me list some good reasons for both of us remaining where we are:
> 1. The atmosphere of intellectual freedom and scholarship at Harvard and Columbia is certainly superior to that at Cornell. We can ignore the politicians, both in and out of the University. This, I think, is the greatest advantage which an endowed institution has over a state-supported school. I am not sure that it will last, but it exists now.
> 2. We are completely free in our research; there is no necessity of achieving practical results, in fact, little inducement to do so.
> 3. Our associates are stimulating, and the opportunities for personal growth and intellectual development are unlimited.
> 4. Our physical facilities, laboratory, library etc. are much better than they would be immediately at Cornell, much better probably than they could be for some years to come.

5. Our graduate students will probably average somewhat higher in intelligence than those we get at Cornell, although the best at Cornell will probably equal the best at Harvard and Columbia.
6. There is a greater prestige in being a member of the faculty at Columbia or Harvard than at Cornell. This doesn't weigh very heavily with me, but I don't think it can be ignored.
7. Our social life can be, if we wish, completely independent of the social life of the university. This certainly can't be true at Cornell, which I am sure, must suffer to some extent from the same provincialism which you disliked at Ames, and I at College Station.

Now what does Cornell have to offer which can balance or outweigh these important considerations?

1. Of greatest importance, I think, is the opportunity--a very rare opportunity--of establishing a group with common interests. You and Randolph and I would all be working in the same general field, but upon entirely different problems. Three of us working together will accomplish more, I believe, than we ever will working alone. The situation provides for additional members as time goes on. We should have Giles, or his equivalent, almost immediately. Some one to replace Love within the next five years.
2. It is important for the land-grant colleges in general, and for maize-geneticists in particular, to keep the Department at Cornell alive and strong. We need in the United States,-- and the need is a desperate one,--at least one institution where an interest in plant breeding is combined with first class genetic research. The old Bussey Institution is gone and can never be revived. If the Department of Plant Breeding at Ithaca is allowed to die, it will mean a real loss to education in this country.
3. Cornell offers us an opportunity to build almost from the ground up, a small but very effective little Department which can have and, I hope, will have, a leavening effect upon the entire Plant Science structure at Ithaca. In other words, what we do at Cornell can have much greater effects upon the institution as a whole than anything that you or I can do at Columbia or Harvard.
4. I for one, and I suspect it will also prove to be true in your case, will find a large measure of personal satisfaction in contributing directly or indirectly to the improvement of maize and other important American crop plants. One of the most striking differences between Emerson and East, in my opinion, lay in the fact that Emerson was always certain that his work was contributing to human advancement, while, East since he left the Connecticut Experiment Station, had never had such a feeling.
5. There is, I think, an excellent possibility of obtaining a substantial grant from the Rockefeller Foundation for an integrated cytogenetic attack upon maize and its relatives at Cornell.
6. Living conditions at Ithaca are almost ideal, and infinitely better than those in New York or Boston. Furthermore, living conditions in the large Eastern cities will in my opinion, become even more intolerable.
7. Finally, we both have obligations to Dr. Emerson. He has been the father of one of the finest cooperative enterprises in scientific research. How great the obligation is, you can determine only for yourself. It certainly can't be ignored."

Rhoades replied on 11 January 1943, in a very personal letter that indicated he would not be "comfortable" in returning to Cornell. The schism between "basic and applied" that apparently 'erupted' openly in the 1930-1935 period still weighed heavily on him although faculty in the Department at Ithaca had forgiven the "youthful outbursts" of the young genetics students of those days and were unreservedly in favor of the Rhoades appointment. He even noted that Love had written him a "fine letter" urging him to come. Rhoades admitted that he and others had been openly and sometimes unjustly critical of some of the applied research.

Thus, the end of an effort. The negotiations with Mangelsdorf and Rhoades as a "pair" came to an end in January 1943. Mangelsdorf, apologetic for the delay, made a final decision to remain at Harvard. Rhoades had already declined and did not reconsider, although Love kept him in mind throughout the 1943 year. With the naming of W.I. Myers as Dean in August 1943, and Love as Head, the rebuilding and expansion of the Department began with strong administrative support.

One appointment had already been made during the last years of Emerson's tenure with strong support from Love: Henry M. Munger in 1942, was appointed to a new position as assistant professor in a joint appointment with the Department of Vegetable Crops. In 1943, when Love moved from acting Head to Head of Plant Breeding, and Myers assumed the Deanship following the unexpected death of Ladd, the plans for restaffing and expanding the

faculty turned to a new strategy. Love worked very closely with Dean Myers and the Director of Research, C.E.F. (Gus) Guterman. Some effort was still made to attract a senior scientist for forage crops breeding since there was little to build on in the Department. Myers and Guterman agreed with Love on his plan to attract "bright, young, energetic junior scientists" who exhibited great promise. They backed Love in his efforts to the fullest in several ways. Love, through his long time membership in scientific societies and his many invited lectures, especially on experimental methods and analysis of data for plant breeding and related research, had very good personal contacts with counterpart administrators at sister institutions. He was able to get comprehensive and fairly objective evaluations of candidates. He not only considered intellectual capacity, research activities and promise, but also what he called a cooperative spirit, an ability to work in a cooperative atmosphere in a department as "one happy family." The latter characteristics although of less weight in later years were accepted with enthusiasm by the new faculty and the post-war graduate student group. Of the new faculty, nearly half had served actively in the armed services during World War II and two had worked on strategic "war-time" research projects. Most of the graduate students during the post-war years were U.S. Veterans.

Love faced serious problems in recruitment. The salaries he could offer were modest and research support and facilities were minimal. He had only the promise of increased support from Myers and Guterman. A significant part of this was the offer of research grants for plant breeding from the G.L.F. (Cooperative Grange League Federation Exchange Inc.) under the leadership of General Manager H. Edward Babcock, who had urged Dean Ladd to increase research and had offered to consider funding research grants to expand current work and for promising new research projects. This source of funding would prove to be of some importance in faculty recruitment for the next two decades. The first grant was made in 1939 for small grains research. Other sources of funding were likewise important; federal funds from Director Guterman, state funds from the Dean, and individual faculty research grants from major federal agencies (National Institutes of Health, NIH; National Science Foundation, NSF; Atomic Energy Commission, AEC, etc.), and private foundations grants (Rockefeller Foundation, etc.). One way or another a fairly respectable budget for research existed during the years.

Adequate research facilities were a more difficult matter. More land for field plantings was obtained but required major improvement. Field laboratories and modern greenhouses, although urgently requested by Love immediately following the end of World War II, did not come for two decades. Nevertheless, history tells us that Love recruited an excellent group of academics for a lively and productive department of faculty, graduate students and staff. Many came because of their belief in the sincerity of Love, Guterman and Myers and the mystique of Cornell, somewhat as Paul Mangelsdorf noted in his letter of 8 December 1942, to M.M. Rhoades.26 The "academic freedom with responsibility" vision was not taken lightly by the new faculty.

The "Love appointments" recommended after close consultation with Myers, Guterman, and colleagues, followed in rapid order:

Robert L. Cushing	1943 (resigned 1947)	Alvin A. Johnson	1946
Sanford S. Atwood	1944	Adrian M. Srb	1947
Harold H. Smith	1945	Walter T. Federer	1948
Neal F. Jensen	1946	Robert L. Cushing	1949 (rehire)
Royse P. Murphy	1946		

What follows is a brief background on the young faculty, who would be the core of the Department for the next two decades. It was a period of rejuvenation following the lassitude of the 1930s Depression and the years of World War II.

Munger, a Cornell undergraduate in Vegetable Crops, began graduate study at Ohio State University at the age of 20 in 1936. He returned to Cornell in 1938 to complete a Doctorate in 1941 with Emerson and Professor Homer Thompson, Head of the Department of Vegetable Crops. He then held an Assistant Professorship at the University of Wisconsin for one year before again returning to Cornell to a joint appointment as an Assistant Professor in the Department of Plant Breeding and Vegetable Crops.

Cushing, came to Cornell with a BS and MS degree in Agronomy from the University of Nebraska and graduate study in plant genetics at the University of Minnesota with Professor H.K. Hayes. He was named, in 1943, Assistant Professor to succeed Fraser, and had the major responsibility for teaching the basic course in genetics.

Atwood was named an Assistant Professor in 1944. He had received all degrees from the University of Wisconsin. There he majored in Plant Cytology, minored in Genetics, with Professor R.A. Brink, and received his doctorate in 1937. He had summer-time experience in corn breeding with Professor N.P. Neal during graduate study. He then was an Associate Geneticist with the U.S. Regional Pasture Research Laboratory at State College, PA, 1937 – 1944.

Jensen was appointed Assistant Professor in January 1946, following three years of active duty with the United States Navy Reserve. He received a BS degree in Agronomy in 1939 from North Dakota State University where he worked as an undergraduate assistant with Dr. G.S. Smith, a USDA scientist in charge of durum wheat improvement. He then became a graduate research assistant in Plant Breeding at Cornell with Professor Love. He received the doctorate in 1943.

Harold H. Smith, named Associate Professor in 1946 with a major responsibility in genetics, began his career with the Tobacco and Plant Nutrition Division, Bureau of Plant Industry, Washington D.C. in 1936.27 He was an undergraduate at Rutgers University and then attended Harvard University, where he received an AM in 1934 and PhD in 1936. He had studied genetics with Professor E.M. East and cytology with Professor Karl Sax. Smith was on active duty with the United States Navy Reserve for two years, 1944-1946.

Murphy received the BS degree from Kansas State University in 1936 in Agronomy (Plant Breeding and Soils). He held appointments in the Division of Agronomy and Plant Genetics at the University of Minnesota as graduate research assistant (1936-1937) and Instructor (1937-1941). He was awarded an MS in agronomy in 1938 and PhD in plant genetics in 1941. He held several positions before being named Associate Professor in the Department at Cornell, in 1946. During the years 1942-1946, he was an Associate Professor of Agronomy at Montana State University but was on leave, first in 1943 with the Guayule Emergency Rubber Project, USDA and in 1944-1946, on active duty in the United States Navy Reserve.

Johnson was appointed an Associate Professor in 1946 with a major responsibility for the Pure Seed Program and leader of all extension activities in the Department. He received an undergraduate degree from North Dakota State University. During these years he had worked for the Soil Conservation Service. Graduate study followed at Michigan State University. He received an MS degree in Agronomy in 1938 at which time he was appointed an Assistant Professor with responsibilities in Foundation and Certified seed production and use.

A.M. Srb joined the faculty in 1947, as Associate Professor of Genetics with primary responsibility for teaching the basic course in genetics. His appointment had followed the resignation of Cushing who had accepted the position of Director of Research for the Hawaiian Pineapple Company in Oahu, Hawaii. Srb received an AB in 1937 in English Literature and an MS in Agronomy in 1941, from the University of Nebraska. He then entered Stanford University for graduate study in genetics under the tutelage of George W. Beadle (Cornell PhD 1930). He was awarded the doctorate in 1946 and was then appointed as Assistant Professor succeeding Beadle, who had moved to Head of The Biology Division, at California Institute of Technology. Srb was a member of the group that pioneered the biochemical genetic research with Neurospora. While at Stanford he was involved with a special war-time project on Penicillium.

Federer was named Professor in the Department in 1948 with primary responsibility for Biological Statistics (Biometry). He received a BS in Agronomy in 1939 from Colorado State University, an MS in Agronomy (corn breeding) from Kansas State University in 1941 and a doctorate in Statistics from Iowa State University in 1948. He studied with Professor George Snedecor and others in Statistics and George F. Sprague (Cornell PhD 1930) in corn breeding. Federer served for two years (1942- 1944) with the Guayule Emergency Rubber Project, Salinas, California. At Iowa State, he was employed by the Bureau of Agricultural Economics. All his appointments from 1939 to 1948 were joint with the USDA.

Cushing joined this group again in 1949. He returned to the Department to work on the corn breeding project, which was expanded with a major emphasis on grain production. Thus in 1949, the Department Faculty consisted of Love, Wiggans and Livermore from the "old guard" and the nine "Young Turks," a term some had suggested. From this reporter's view it was a remarkably compatible group. This was due in no small way to the enlightened leadership of Professor Love. In the decade following World War II all universities and public and private agricultural experimental stations were expanding in personnel and activities. Each member of the young group that Love had attracted to the Department had many opportunities for employment.

The Department recognized a major commitment to developing superior varieties of field and vegetable crops for producers and consumers. They were to live through the period of major increases in production and quality of economic plants in the last half of the 20th century. The use of improved varieties was a major component of these remarkable increases in yields, most notable in corn, wheat, oats, alfalfa, potatoes and several vegetable crops. The increases realized in the last half of the 20th century are greater than those achieved prior to this date, since agriculture was introduced into the new world.28 It was a fortuitous time to be a plant breeder.

Of this group of nine, five would become Emeritus Professors at Cornell (Munger, Jensen, Murphy, Srb, and Federer) and one (Johnson) would retire at age 55. Only three would become primarily involved in administration: Cushing, as Director of the Hawaiian Pineapple Research Institute, and later Director of the Hawaiian Sugar Planters Association, Atwood, as Dean of the Graduate School and Provost of Cornell, and in 1964, President of Emory University, and lastly, Smith, who became Director of Biology at the Brookhaven National Laboratory in 1957. Professor Love received many accolades from his contemporaries on the College Faculty and in particular, from Dean Myers, Director of Research C.E.F. Guterman, and the other directors, for his success in recruiting this group of young faculty.

As the War came to an end in the late summer of 1945, Professor Love began the rejuvenation of the research program. As already noted there were substantial deficiencies in facilities and land for field, greenhouse and laboratory research. The department relied on Farm Practice personnel for much of the land preparation for seeding and for some of the tillage operations. This was provided by William Barrett, Farm Manager, in the Farm Practice Department under the leadership of Professor Reuben Shapely in the central administration of the College of Agriculture. Barrett was very cooperative but had a small staff and still used some horse-drawn equipment. Some other departments were expanding field activities as well. The Department moved as rapidly as possible to take full direction of field and greenhouse facilities. This involved the use of several sizes of tractors and associated farm machinery, specialized small-plot motorized equipment and the use of department – designed plastic greenhouses, lath-shade areas and cold frames. The later facilities were the design of Murphy with the able assistance of Mr. Seba Sloughter, Mr. Robert Reddick and the experienced field crew. These moves were made to provide for the great expansion in the forage crop projects. They proved so useful that some other projects were using them since they too were expanding; notably small grains and vegetable crops.

To step back a bit, Dr. Love had clearly planned for the expansion and intensification of all activities, be they research, extension or teaching. In 1944, when he accepted the Headship on a permanent basis at the invitation of Dean W.I. Myers, he did so not as an honor but as a duty. He would do so only if he had the support of the administration to accomplish what he envisioned to be the top department in the country. This, the Dean stated, was his goal as well and thus began the remarkable career of Love as an administrator for the remaining five years (1944-1949) of his active service to Cornell.

Professor Love proceeded with the plan for the Department with full, even detailed, cooperation and participation by all faculty. He desired the full consideration by all members of the department for every decision. Two activities to which he gave intense consideration was the pure-seed project and the Biometrics Unit. Even when somewhat specific expansion was involved he desired the judgment of all.

In May 1947, Love presented his vision of the future for the Department in a 10 page document, "A Statement Relative to the Development of the Department of Plant Breeding." As a background he notes his experience in the

Department from its beginning in 1907 and his knowledge of "sister" institutions in the United States and several foreign countries. A brief synopsis follows:

Teaching: Continue present courses, four genetics, two plant breeding, three biometry, and four graduate teaching assistants requested.

Research: Seven research areas were listed with eight current faculty and a request for seven assistant professorships and additional graduate research assistants.

Extension: One current faculty and a request for one assistant professorship.

Space and building needs: These he noted had been presented earlier. A modern field house and new greenhouses were our greatest needs.

Financial support: Increases for equipment, field and laboratory needs, travel, and others. Since the funding for plant breeding projects was heavily dependant on the GLF grants he noted the need for more permanent sources of funds.

Land requirements: The need for a site on the better limestone soils, which is not available in the Ithaca area. He suggested this might be done in conjunction with other departments such as Agronomy.

Support staff: A great need for permanent personnel in all areas, there is too much dependence on temporary employees.

When Love retired, he distributed a copy of this comprehensive document, on 10 May 1949, to each faculty member, noting that it represented his view, but suggested that it may need updating.

Some of the most significant activities during Love's administration include a major increase in land for field research; the development of a pure seed program including the Foundation Seed Stocks Cooperative; and the establishment of the College Seed Committee in 1947. The beginning of a Biometrics Unit with the naming of a College Policy Committee on Biometry in 1948 and the on going aggressive effort to give increased support for research, particularly in basic genetics and forage and corn breeding. He was supported very ably by Seba Sloughter, Farm Manager, and Francis Feehan, Secretary, Business Manager and Statistical Clerk. Miss Feehan had worked with Love since 1913 and became very knowledgeable in statistics under Love's tutelage. Love had finally published his comprehensive book, *The Application of Statistical Methods to Agricultural Research*, in 1934 by the Commercial Press, Ltd. in Shanghai, China. This was the text that he had promised students and friends for at least 15 years. A version in the Chinese language was published also. It came as Love completed a three year span as a consultant to the National Agriculture Research Bureau in Peking. The Chinese version was translated by the wife of T.H. Shen (Cornell PhD 1928), Ti-ying Shen. In the preface, Love expresses his gratitude for Miss Feehan's excellent assistance in all phases of the work. This same could be said by all faculty and students in the Department. It was not uncommon to find her working extra minutes or hours to be certain to be up-to-date on all matters of finances, personnel records, and data analysis. She was to be a vital employee not only to Love but to his successors, Sanford S. Atwood and Royse P. Murphy until her untimely death on 16 November 1953.

Mr. Seba Sloughter continued his vital service through this period, 1940-1955, until his mandatory retirement at age 70 in 1955. During the growing season he often arrived early to prepare fields for planting before the crew arrived. He frequently would be found cultivating or preparing fields in the evenings and on weekends. Some of the younger staff urged him to lighten his hours but he always said this season is like farming and the hours are sunrise to sunset. He also said he enjoyed the work and was very interested in the increased research activities that the younger faculty and students had initiated. He remained interested after retirement but declined the Department's invitation for him to continue on a part time basis. He declined feeling he should not "stand" in the way of his successor but, instead moved to work part time in the Department of Agronomy.

During Professor Love's final years (1946-1949) he was present during the growing season at the field house before his crew began and sometimes at the end of the day. He consulted with Mr. Sloughter but always stood aside as he assigned the personnel to the various projects. During the middle of the growing season, planting through harvest, this could involve a crew number to upwards of thirty, most of who were seasonal employees. Most were from the student group at Cornell with a few high school students during mid-summer.

This style of administration resulted in a very congenial faculty and graduate student atmosphere. Professor Love worked tirelessly to implement his plans as stated in his vision for the Department. Research projects and teaching plans were developed in detail through frequent faculty meetings. In conferences with the Dean and/or Directors he invited the faculty members involved to accompany him. After such conferences he often wrote a letter defining his interpretation of the agreements made.

Love had been appointed through 30 June 1949, two years beyond the mandatory retirement age of 68. The Dean had asked Love on several occasions to suggest a successor. It seems to have been the Dean's plan to name someone from within the young faculty group. On more than one occasion Love stated he had no choice, he felt that anyone of the group would be excellent. He had recommended for appointment only people with such promise. However, he agreed with Dean Myers that Atwood would be a good choice and he was named Head on 1 July 1949. Some members of the faculty urged the Dean to continue with Love as Head. They were not totally comfortable with the selection of one person from among a group of equally qualified members. But, Professor Love was ready for a new career. From the beginning of his headship, friends and contemporaries in the broad area of "international agricultural activities" had been urging him, even beseeching him, to become involved. This came about from his activities in China in the 1920s and 1930s. As noted earlier, he was immediately involved internationally, upon being named Professor Emeritus in 1949, at age 70. He was sought for service in various international activities in South America and South Asia, including China, the Philippines and Thailand. After one year of retirement, one trip to China, and some consideration of several opportunities, he finally went to Thailand. There his career covered six years before he returned to his home in Ithaca and Cornell.

Upon his return in 1956, Murphy (by this time Head of the Department) and the Plant Breeding faculty heartily welcomed him back to active membership with an office and secretarial assistance. As mentioned earlier, he and John H. Reisner wrote *The Cornell Nanking Story*, published in 1963. Love also began an early history of the Department which was not completed because of ill health. His office door was always open upon his return in 1956 and he was a significant mentor for the graduate students as well as faculty on development of experimental methods, field plot technic, cereal crop improvement and, most of all, service in agricultural crop production in lesser developed countries.

There is a wealth of material in the Cornell University Archives, which covers his career (1907-1966) in detail, including his years of service in other countries. That which covers the Thai years (1950-1956) should be of special interest to historians of the national post World War II activities in assisting "friendly" nations and resisting others, notably the Communist Bloc. Love's service in Thailand was lauded by many United States visitors but, in particular, by the Thai scientists and government officials. Following his return to Cornell, the government of Thailand conferred on him the highest honor available for a foreigner, The Knight Commander of the Most Noble Order of the Crown of Thailand. He was not permitted, however, to accept this in the beginning, since Love had been financed during his six-year stint by U.S. funds, under more than one acronym. Such personnel were restricted from accepting awards, gifts etc. from the recipient nation because of possible "conflicts of interest." Several of his friends, including Dean Myers, recommended to New York's congressional representatives and government officials that the restrictions be waived in his case. Thus, the award was presented to him rather belatedly, in absentia, in New York City by the Thai ambassador to the United Nations via his son, Charles B. Love, in 1965. By this time Dr. Love was confined to the Ithaca hospital but was aware of the recognition. Dr. Love died on 20 April 1966 at the age of 86.

Chapter 6

MEMOIRS OF THE LAST 60 YEARS, 1949-2006:

The Atwood-Murphy Years (1949-1964)

At this time the chronicle of the Department is based on a plethora of sources. The papers of Dean W.I. Myers and the various annual reports of the College and Agricultural Experiment Station were reviewed. The other sources include un-collated records from 1949 onward. These include eight boxes of papers added to the University Archives (Collection no. 21-28-889) that were retrieved by Murphy as the files were being discarded in Emerson Hall. Brief minutes of department faculty meetings exist, especially for 1942-1979.

This section is written more as a memoir than as a documented history. R.P. Murphy (fondly called, "Murph") and S.S. Atwood (fondly called "Sandy," 1912-2002) worked closely in the Forage Improvement Project and in the management of the field, greenhouse and laboratory facilities.

Atwood was head for a short period (1949-1953) and was soon named Dean of the Graduate School at Cornell. In 1955, during the Malott presidency, he was made Provost. Murphy was head of the Department of Plant Breeding from 1953 through 1964, at which time he was elected Dean of the University Faculty (1964-1967) and later a faculty representative (1967-1970) on the Cornell University Board of Trustees.

Atwood had shown great interest in organization and administration. He welcomed Murphy as a colleague on all the perennial forage crop improvement projects. Murphy had taken over the perennial grass breeding programs, the variety testing for all forage species, and soon became heavily involved in alfalfa breeding and certified seed production, the later on a national basis. These activities were stimulated by A.A. Johnson's very active program in the use of certified seed of improved varieties and the belief that such varieties were certain to come from all the breeding projects, in particular small grains, forage crops, grain corn and vegetable crops.

The basic funding for these activities came from State and Federal (Hatch) funds. As noted earlier, an important addition came from the GLF agricultural cooperative. By 1949, additional Federal funds were appropriated for Regional Research Projects. These encouraged interaction with neighboring State and Federal agricultural experiment stations and the private seed industry. The latter was very important in the production and marketing of seed. Significant private breeding interests existed in the region for several vegetable crops and grain corn.

The Department has always been deeply involved in "basic" and "applied" research. Scholars and administrators tended to discuss the emphasis and support for research by dividing research into these rather artificial categories. In time, the "basic research" would justify its importance by predicting remarkable practical values. The Department strove to support all areas of research be it "basic or applied" in plant breeding, genetics or biometry. This was equally true in teaching and graduate student research.

Although few undergraduates had a concentration in plant breeding, most biology students in the university took the courses in genetics. A few took courses in biometry and plant breeding. At the graduate level, many students enrolled in the courses in plant breeding, genetics and biometry.

By the end of World War II in 1945, the nation provided support for education to veterans. This nearly overwhelmed the University due to the increased student load, at both the undergraduate and graduate levels. Many younger faculty and staff members were returning from active duty. The University established a quota for graduate students because housing was insufficient. There was some alleviation in the housing situation when two "Vetsburg" housing areas for married students became available, ca. 1950, on Tower Road (now the site of the Veterinary College) and East Ithaca (Maplewood Park). The "quota" system continued throughout the Atwood-Murphy Years.

The tradition of the Synapsis Club continued strong throughout these years. All major students and many minors were active members (see Photo Section). The faculty in the Department and a like number from allied Departments participated. Attendance averaged more or less 60 at the biweekly dinner meetings held in the Plant Science Building, Room 404 (today the Whetzel Seminar room) during the academic year. The ratio of major to minor students who were active members of Synapsis was approximately 1:2.

Records for major and minor students in the Department of Plant Breeding exist for the years 1951-1957 (6 years): The brief tables below represent some quantitative information (see also Photo Section).

Number of Graduate Students in Residence, in the Plant Breeding Department, 1951-1957.

Faculty	Major	Minor
S.S. Atwood	8	1
N.F. Jensen	26	9
H.H. Smith	27	64
H.M. Munger	27	46
R.P. Murphy	22	36
A.M. Srb	17	57
W.T. Federer	17	23
H.L. Everett	14	21
Other (10 faculty)	34	72
Total	192	329

Major Field of Minor Students (in percent) in the Plant Breeding Department, 1951-1957.

Department	%
Botany: Cytology (24%)	
Physiology (14%)	
Other (6%)	
Total for Botany	44
Plant Pathology	20
Vegetable Crops	11
Agronomy	11
Biochemistry	3
Other	11

The Synapsis Club continued meeting on a regular basis through this period (1949-1964) but with declining interest ca 1960 on the part of faculty and minor students. Brief minutes of meetings from 1907 to 1968 are in the Synapsis Record Books (Collection #21-28-889, boxes 49-50) recently deposited in the University Archives. A review of these minutes indicated that at least 800 meetings took place and over 26,000 signatures were recorded.

The Department made special note of anniversaries every quarter century and Synapsis was an important part of the activities. The 25th Anniversary (1932) was recognized when the Department hosted the Sixth International Congress of Genetics on the Cornell Campus, as described earlier.

The celebration of the Plant Breeding Department's 50th Anniversary was held on 25 April 1957. Four former graduates were invited to speak at a special seminar. They were: Milislav Demerec (Cornell PhD 1923), from the

Carnegie Institution's Department of Genetics at Cold Spring Harbor, who spoke on bacterial genetics. George F. Sprague (Cornell PhD 1930), of the USDA and Iowa State University, who summarized corn breeding and genetics. J. Winston Neely (Cornell PhD 1935) then at the Coker Seed Company, Hartsville, S.C., presented a summary of cotton genetics and breeding. And Paul Grun (Cornell PhD 1949) from Pennsylvania State University, who presented a talk on taxonomy and speciation in the genus *Allium*.

A special anniversary evening dinner was held in the Willard Straight Hall with ca. 150 attending. Those at the head table are shown in the Photo Section. Of note is the presence of Harry and Anna Love, who represented the beginning of Synapsis. The success of this 50th Symposium led the department to continue the tradition of celebrating an anniversary every 25 years. In 1982, the 75th Anniversary was celebrated and "The Golden Age of Corn Genetics," was one of the "highlights" of the two-day event.

Atwood was an organization person. While he was Department Head (1949-1953), he proposed fewer staff meetings, which the faculty voted down unanimously. They liked the openness of the Love era, which included weekly faculty meetings. Atwood received this rejection graciously and the life style in the Department changed little over the next decade. The Department followed Love's vision for the future. Atwood immediately "promoted" Murphy to the full leadership of the forage crops project. After Atwood became head of the department, he accepted no new students but continued to work with the students he had.

Another important contribution of the department, The New York Foundation Seed Stocks Cooperative, grew rapidly under the direction of A.A. Johnson and Russell Bradley (Cornell PhD 1951) as manager. The Foundation was initiated in 1947 by the Department and members of the New York Certified Seed Growers Cooperative. Its major purpose was to relieve the plant breeders of the production of stock seed of new varieties. This move was supported by the Dean and Director of Research in the College. It was to serve for four decades as a very effective step in the release and use of new varieties, from the several breeding projects.

Johnson took the lead for this program and for the College Seed Committee, and, in so doing, integrated the activities with allied Departments at Cornell (Ithaca), the Geneva Experiment Station (Seed Investigation and allied departments), and the New York State Department of Agriculture and Markets, in Albany. In addition, important extension activities included close relations with the New York State Seed Association, Atlantic Seedsmen Association, American Seed Trade Association, Western Seedsmen Association, and counterpart extension and pure seed associations in other states, especially in the Northeast Region. Johnson soon became a national, and later, an international leader in these activities.

In those days, there was a seed and fertilizer retail outlet in most hamlets and cities, often associated with a feed store. Large public events sponsored by the Department included regional seed and fertilizer dealer meetings (ten or so about the state) and an annual Seed School. The Department participated in Farm and Home Week on the Cornell campus. They also took part in the New York State Fair, in Syracuse, to present exhibits with allied departments, especially Agronomy, Vegetable Crops, Plant Pathology, Entomology, and Seed Investigations at Geneva.

A major concern for the Head of a Department is to retain its best faculty. Members of the department had many opportunities to move to other universities, federal agencies, and private industry and soon to international agencies, financed by Foundations and National funds. Johnson was on special leave in Greece for a short period and later spent a sabbatical leave there. Murphy, Jensen and Munger took one-semester sabbatical leaves, respectively, at the University of California, Davis in 1952-1953. Smith, Srb and Federer also took sabbatical leaves during this period. All were frequently recruited for positions elsewhere. Cushing returned to Hawaii in 1951, as Director of the Pineapple Research Station. All others remained during Atwood's term and only Smith left during Murphy's term. Atwood did not take a sabbatical leave but concentrated on administrative activities. Yet he encouraged all faculty members to take advantage of sabbatical leaves.

Many departmental faculty members were contacted for research and teaching positions, but, often, administrative responsibilities were part of the package for a senior appointment. Srb, Federer, and Murphy were not interested in full-time administration and rarely considered such opportunities.

There was some increase in faculty appointments during Atwood's term with the selection of T.L. York, (1951) in vegetable crops breeding, C.C. Lowe, (1952) in extension and forage crops improvement and R.G.D. Steel, (1952) in the Biometrics Unit. The position of Biometrician, held by D.S. Robson in that unit was upgraded to tenure track status. The final appointment was of H.L. Everett, (1951) to the Cushing position; with primary responsibilities for teaching the first course in genetics, and research in breeding corn for grain.

When Murphy was named Head (1953), an assistant professorship was added to the perennial forage improvement project. C.C. Lowe accepted that position, and R.E. Anderson was recruited as his replacement. This was the only increase in faculty in the subjects of plant breeding and genetics, since the Atwood years. In biometry S.R. Searle was hired as a new faculty member and temporary appointments were made to succeed Steel who resigned in 1960 to move to North Carolina State University.

The plant breeding and genetics group saw many changes during this period (1949-1964). The "basic" genetics group consisted of three positions, increased by one with the appointment, by Murphy, of Margaret Emmerling in 1958, when Wiggans retired. Her research was on mutable genes in corn and she taught the basic course in genetics, when Everett, on leave, assumed responsibilities for an international program at the College of Agriculture in the Philippines. She and Keith Thompson, a student in Biometry (Cornell MS 1957), met at Cornell and were married in 1961. Emmerling resigned in 1962, when Thompson accepted a statistics position in the Department of Biology at the Brookhaven National Laboratory (BNL), Upton Long Island, New York. H.H. Smith was named chairman of the Biology Department at BNL in 1957. He had been acting chair for one year while on leave from the Department of Plant Breeding. Murphy made every effort to encourage Smith to return but the salary and research support could not be matched in any meaningful way. It was an amicable parting and two graduate students did research with him after 1957. Furthermore, several of the department's graduate students did postdoctoral research in the BNL Biology Department.

Bruce Wallace, from the Long Island Biological Laboratory, at Cold Spring Harbor, Long Island, NY, was recruited by Murphy in 1958 to replace Smith. H.T. Stinson Jr., of the Connecticut Agricultural Research Station, was appointed in 1962, as a Professor to replace the position previously held by Dr. Emmerling-Thompson. Stinson assumed responsibility for teaching the basic genetics course. A.A. Johnson was named Director of Extension in the Colleges of Agriculture and Home Economics in 1962. In 1963, L.V. Crowder (Cornell PhD 1952) was named to Johnson's former position in the department. Later, during the Plaisted years, Crowder was named to the new departmental position in International Agriculture (1966). W.D. Pardee, (Cornell PhD 1960), then at the University of Illinois, was recruited to succeed Crowder.

The support staff is a vital part of any department and key appointments were made during Murphy's term: Robert Reddick as Farm Manager, 1955; Jean Hover as Department Secretary and Finance Officer, 1953; and Andrew Zergenyi as Greenhouse Manager, 1954. Murphy, Department Head, always met individually with every new hire, whether they were a permanent or summer time temporary appointment. He explained, albeit briefly, the goals of the research and stressed the fact that all hired staff members were considered representatives of the Department. In fact, Murphy clarified, that we had a public trust as a teaching, research and extension university. He further noted the work was financed by state and federal governments, tuition and endowment funds, and each of us was responsible to do a good job. Furthermore, we expected to have attractive fields, nurseries and greenhouses, where important experiments were carried out. Murphy believed his explanation was a "morale booster," and many who he interviewed were pleased to learn this information and found it less boring to do the mundane tasks of hoeing, picking stones, transplanting and repetitive tasks that exist in all projects from laboratory to greenhouse to field.

Atwood continued in the Department as an active faculty member until being named Provost in 1955. As noted earlier, he moved on from Cornell to the Presidency of Emory University in 1963 and Murphy kept "in touch." His presidency was a distinguished one. He became President Emeritus on 31 August 1977. He and his wife, Elizabeth ("Betty"), were awarded honorary degrees.

He visited Ithaca on occasion, most notably for the 75th anniversary celebration of the Department. Former students and colleagues from Cornell and members of the American Society of Agronomy and the American Seed

Trade Association, who he had known from Cornell days, were occasional guests in their gracious home on the Emory Campus, when conventions were in Atlanta. He was a Cornell "Plant Breeder" to the end and many fondly remembered his days as colleague, graduate student mentor, plant breeder and spirited public citizen. He died 2 December 2002, in the retirement community, Lake Toxaway, Brevard, N.C., not far from his beloved campus, Emory University.

The tradition of frequent, usually bi-weekly, faculty meetings continued during the Murphy Years. They were frequently "lively affairs;" often, we met over lunch in a private dining room in the original Statler Hotel. After dispensing with necessary matters, we turned to planning for the future. Brief minutes of these meetings are in the Plant Breeding Department archives. He acted as the Graduate Field Representative and aggressively recruited potential graduate students and urged his colleagues to join in this activity.

In 1952, Cornell's College of Agriculture contracted to assist in the development and renovation of the College of Agriculture at The University of the Philippines in Los Baños, PI. The first contract (1952-1960) was financed by U.S. funds (Mutual Security Agency and Foreign Operations Administration) and the Philippine Government. During the first contract, five scientists (three in temporary visiting status and two from the resident staff at Cornell) worked on the project:

1952-1954, H.K Hayes, Emeritus Professor, Plant Genetics, University of Minnesota
1954-1956, A. M. Brunson (Cornell PhD 1950), Professor Purdue University and the USDA
1955-1957, S.C. Salmon, Senior Agronomist, Bureau Plant Industry, USDA
1955-1957, T.L. York, Assistant Professor, Department of Plant Breeding, Cornell
1956-1957, H.L. Everett, Associate Professor, Department of Plant Breeding, Cornell

The second contract (1963-1972) was supported primarily by the Ford Foundation and the Philippine Government. During the second contract three faculty members from the Department of Plant Breeding were on leave to Los Baños:

1964-1967, H.L. Everett, Professor, who served as Director of the Cornell Project
1967-1969, D.H. Wallace, Associate Professor
1969-1970, H.M. Munger, Professor

The second contract included some emphasis on graduate study (Munger, Crowder and Plaisted went for short periods). Some graduate students from Cornell did their research at the college at Los Baños.

The Los Baños project was considered an excellent example of rehabilitation of a war-ravaged ally in World War II. It became an important center for graduate study in South Asia. The International Rice Research Institute (IRRI) was established in 1962, on a site contiguous to the college at Los Baños. Major funding for IRRI came from the Ford and Rockefeller Foundations (see Kenneth L. Turk, *The Cornell-Los Baños Story*, 1974, New York State College of Agriculture and Life Sciences. A Statutory College of the State University, at Cornell University, Ithaca, NY).

Change was in the air in science, both "applied" and "basic," in education, in extension, and in the nature of agriculture. Murphy attempted to keep abreast of all these areas. He served as President of the Crop Science Society of America (1961-1962). Murphy was the Agronomy Society Representative to the AIBS (American Institute of Biological Sciences) Council. He was a member and attended the Genetic Society of America meetings. Other activities included participation in regional research projects, in seed trade association meetings and in foundation and certified seed association's activities. In spite of these demands, Murphy was able to continue a comprehensive breeding program with alfalfa and other research in forage crops in collaboration with C.C. Lowe and R.E. Anderson.

Murphy was chairman of the Committee on Plant Breeding and Genetics of the Agricultural Board of the National Research Council, National Academy of Sciences (ca 1958-1963). The committee members were R.A. Brink, W.M. Myers, F.L. Patterson, H.F. Robinson, W.R. Singleton, G.F. Sprague and R.P. Murphy.

The Agricultural Board membership included individuals from the Land Grant Colleges and Universities, research councils, division of biology and agriculture of the National Research Council and some scientists from

private industry. They expected great contributions ("break throughs") from radiation-induced mutations and from the power of statistical genetics.

Two Symposia were organized by the Committee on Plant Breeding and Genetics, and resulted in two publications:

Luckett, J.D. (editor). 1961. Symposium on Mutation and Plant Breeding, Cornell University, 28 November -2 December 1960. Publication 891, NAS-NRC, Washington D.C.

Hanson, WD & H.F. Robinson (editors). 1963. Statistical Genetics and Plant Breeding Symposium, North Carolina State University 1961. Publication 982, NAS-NRC Washington D.C.

The Atwood-Murphy and the Plaisted Years were noted for their contributions to New York Agriculture (see appendices G & H on faculty recognition and varieties released).

Murphy felt a responsibility to encourage, even assist graduate students in choosing a career. He was most involved ca. 1947-1966. A brief summary for doctoral student's careers is presented below (87 national and 39 non-national).

Career	Number
U.S. Land Grant University	43
U.S. other University or College	17
Federal or State Government	11
Private Industry	6
U.S. International	8
Home Country	29
Unknown	12
Total	126
[Only 10 were post-doctorate before choosing a career]	

Other major activities in Murphy's term involved the development of the biological sciences at Cornell, the growth of the Biometry Unit, the growth of the Northeastern States Seed Development Corporation, the plans for Bradfield Emerson Hall, the Guterman Greenhouse and Growth Chamber Complex and, finally, the Love Field House.

The evolution of the Division of Biological Sciences was several years in the making and Murphy strongly supported it. A history of the Department's involvement remains to be written.

In 1964, Murphy felt it was time to step down as Head. Bob Plaisted proved to be a very effective Head (now Chairman). Murphy planned to continue full time in research and teaching, but as noted earlier, unexpected events would interfere for another six years. He accepted retirement at the mandatory age of 65 and was awarded emeritus status in 1979. He continues to work in the department.

The Plaisted Years, 1964-1979

by
Robert L. Plaisted
Chair, Department of Plant Breeding

In 1964, I became the first chairman of the Plant Breeding department. Up until then the leaders of departments in the College of Agriculture were titled heads of the departments with indefinite tenure. President James Perkins chose to make the change to chairs with short tenure when he became president. Looking back at the fifty years I have been part of the faculty I could not have selected a more favorable fifteen years to serve as chairman.

The year after I came back to Cornell, Dr. Murphy made it possible for me to work part time in the office of the Director of Research with Dr. C.E.F. Guterman. At that time, the Hatch funds were a large part of the support for research in the college. He and his secretary, Rosalie Gombash, gave me my first lessons in administration and a glimpse into regional and national experiment station operations. Sadly, Dr. Guterman died the year after I went to work for him. In the short period of time that followed, I had my first experience in how important long term staff members like Rosalie Gombash are to the continuous operation of the institution. Charles Palm was selected to become the new Director of Research and Director of the Cornell University Agricultural Experiment Station. In about a year, at the end of my three year appointment, I had to choose between working full time in that office or going back to Plant Breeding. I wasn't ready for the first and not willing to give up the latter. However, that brief period with Charlie was extremely influential for me. By his example he showed me the best there can be in leadership, particularly in personal interactions. He defined what a mentor should be and I cannot give him all the credit he deserves.

In 1964, when Dr. Murphy became the dean of the university faculty, and I became chairman of the department, Plant Breeding was a great place to be. It had three distinctive facets; plant breeding, genetics, and statistics; but all the faculty worked as one unit. The department taught the introductory courses for the college in all three areas. The breeding programs, including those at the Geneva Experiment Station, covered most of the field crops and vegetable crops important in the state. The NY Seed Improvement Cooperative was an effective outlet for variety releases and the NY seed trade was strong. It included some very good friends of the department, like Jim MacEachron and Willard Hovde of GLF, Russell Billings, Elmer Townsend, the Robson brothers, and Joe Harris.

One of my earliest challenges was the need to find a replacement for Russ Bradley as Manger of the NY Seed Improvement Cooperative. I recollect that this was resolved smoothly by Murphy and Al Johnson and directors of the Coop by hiring Wint Baines to become the manager. A bigger challenge arose when the university created the Division of Biological Sciences and Drs. Srb, Stinson, and Bruce Wallace were moved from our department to the Division (1965). The reassignment of support positions and resources was uncomfortable for the department, but help from Dean Palm and the three faculty members eased this problem. This coincided with our move to Bradfield Hall (1968) and the separation of the geneticists from the breeders by one floor added to the sense of change. By this time the number of statisticians had increased and they relocated to Warren Hall rather than moving to Emerson Hall and it became appropriate to change the department name to include Biometry. For routine matters, each met separately with Walt Federer as the leader of the Biometrics unit. We still met together on some issues and at social functions, but the unity of the department was not as strong as before. In 1967, when the college decided to coordinate computing functions, it created a structure named the Computer Activities Group, which provided computing services for the state colleges, with Shayle Searle as its leader. It was placed within our department and Errol Jones was hired as Director in 1968. In size and complexity, the department stayed about the same, but for most operations, the three units functioned separately, except at the administrative level.

The plant breeding section of the department was not without changes, also. The department had been discussing the need for someone skilled in cytogenetics for some time and soon after 1962, Adrian Srb identified a person he thought we should try to recruit. I went to the college administration with this proposal. Unfortunately, the college did not have that option, but they did give us one of the five new state positions for International Agriculture. Srb's judgment of the man we might have hired has since been well substantiated. On the other hand, the important role international agriculture has had on our department proves that opportunities do not always turn out as one plans.

Another event that reshaped the department was the move from Plant Science to Bradfield-Emerson in 1968. Particularly significant was the addition of the laboratory space and the adjustment to the physical rearrangements. An early addition of Aurora Calo as a research associate to oversee our utilization of these resources ultimately led to the creation of a faculty position in biochemistry. Most breeding projects had added objectives that needed this type of interaction not available between the departments. The college was agreeable and, with strong support from Dr. Ephraim Racker in Biochemistry, Peter Gregory joined the department in 1974. Peter and his successor,

John Steffens, strengthened our plant breeding research objectives and added a dimension to our graduate training, but were in an awkward position for their own professional advancement and training of graduate students.

One of my early goals was to improve the field house facilities at Caldwell field. The old building had much history and memories, but it seriously limited the work of the department. Dean Palm and the directors approved of seeking state money for this project. Fortunately, A.H. Peterson had moved from our college's business office to the controller's office in Day Hall. Art was an exceptionally capable individual and in a position to secure the aid from the state. With his knowledge of our department and its facilities, he accepted our arguments and initiated the process to secure the present building at Caldwell field, the H.H. Love Fieldhouse, dedicated in 1970.

This department had not been distracted by the flurry of interest in radiation breeding that occurred in the early fifties. Likewise, the national interest in quantitative genetics did not produce extensive staffing changes in our department. In this case, the strengths of Henderson in Animal Science and Robson and Federer in our Biometrics unit provided the expertise that was needed for teaching and graduate training. When the field of plant tissue culture began to open up, this department did elect to divert a breeding position in this direction. The first appointment was temporary, but this was followed by the opportunity in 1975 to hire Elizabeth (Lisa) Earle from the Floriculture Department. Through all these changes, the ability of this department to train students in the profession of plant breeding and to produce improved varieties remained strong.

One person I need to make special note of for her help during my years as chairman is Jean Hover. She was department secretary for Dr. Murphy and promoted to the new position of Administrative Aide, soon after I became chairman. She is the one who kept the machinery of the department working. She is the one I could talk with about department affairs, knowing she understood the situation and I was confident that she would not reveal our discussion. She helped with the annual budget preparation and she kept the account of department and project grant funds.

In the fifteen years as chairman, I learned lessons about plant breeding from the faculty that helped me in the following twenty. From Henry Munger, I learned how careful choice of objectives and acute observations can alleviate short budgets and tight space. From Murph and Al Johnson I learned how one should integrate a breeding program with commercial seed multiplication and distribution programs. In Murph, I also grew to admire a memory of exceptional quality. Neal Jensen taught me how to work with foundation and certified seed programs, how to understate the qualities of new variety releases so growers will have good experience to come back with, and how a well run program knows what the next release will likely be at the time of the current release. From Carl Lowe, I learned how good will and a contagious laugh can defuse a serious moment and create a constructive environment. Walt Federer and Doug Robson demonstrated the productivity that comes from pairing one who is bountiful in ideas with one who is a critical evaluator. I also observed how important the graduate students are to the life of the department. The friendships they make often persist throughout their careers.

Finally, I want to end with a personal note, a special thanks to Henry Munger. He is the reason I chose plant breeding for a career. In 1946, when I graduated from high school, competition in college enrollment was very keen from the WWII veterans taking advantage of the GI Bill. My experience was with dairy cows, so when I applied to Cornell I expected to indicate Animal Husbandry as my area of interest. My vocational agriculture teacher thought that would be quite competitive. He had known Henry as an undergraduate at Cornell and knew how few undergraduates there were in plant breeding. Therefore, he suggested I list that as my preference. Henry became my first adviser and he also employed me for part time work. Even though Robert Cushing and Adrian Srb became my advisors, Henry continued to influence my undergraduate years. Then in 1950, he and Homer Thompson helped me secure an assistantship with Dr. Charles Rick at Davis, California. I had to take a leave of absence in 1951 to go into the army. When I was discharged from active duty in 1953, the Davis assistantship was not available, but while I was enroute home from Korea, Henry secured one for me at Iowa State.

The Pardee Years, 1979-1989

by
W. D. Pardee
Chair, Plant Breeding & Biometry

The Department was in fine condition when I became chair in 1979. I had the good luck to succeed Bob Plaisted, who was an excellent organizer. Funding was mostly adequate, and each of the major breeding programs was providing a steady stream of superior varieties for farmers and gardeners in New York State.

Lead scientists when I started as chair included Ron Anderson, Lisa Earle, Herb Everett, Vernon Gracen, Peter Gregory, Carl Lowe, Henry Munger, Bob Plaisted, Mark Sorrells, Don Viands and Don Wallace. Murph, as always, was continuing his activities. This all-star faculty provided us (and me) with a wealth of experience, knowledge and leadership. None were shy about providing helpful advice to a new department chair.

During my years as chairman several major changes occurred:

Continuous erosion of state and federal support ate away at funds for our operations, our personnel, graduate student support and our projects. To fund our programs we developed and expanded new and old programs with grower and industry groups. Most of these programs were successful, and are still on going. I will expand on these below.

Seed industry interest shifted from desiring open public release of varieties to interest in exclusive releases. This caused us to revamp our release policies in most crops.

Meanwhile, the seed industry was changing, as large national companies bought out smaller local companies, including several of our Northeast cooperators. Then, in turn, chemical and drug companies came to believe that the seed industry was a place for potentially large returns on their research investments. Companies like Monsanto, Dupont and Novartis purchased multiple seed companies and became major players. All of this affected potential funding for our programs as well as use for our developments.

Computers arrived during this period, and soon changed forever the way we did business. We started with a Diablo on Judy's desk then an Apple Lisa in Ronnie's office and another for Lorraine. These were followed by an ever-growing flood of Macintoshes and PC's. By the time my term was done there were computers on nearly every desk and in every laboratory, and they were changing the way we recorded information, analyzed data, even how we communicated with each other.

Plant breeding itself was changing as a science during this time. Plant breeders had traditionally focused on field and greenhouse research. Only a few had laboratory activities to support their field breeding programs. Our emphasis was focused on breeding improved varieties and enhanced germplasm. We were good at it, and the model worked well.

But this changed during the 1980's, as our breeders reached deeper to study the make-up of genes and their effects on inheritance of factors ranging from insect and disease resistance to food and feed characteristics. Tissue culture, biochemistry and molecular genetics became important components, and we began to learn about QTL's, southern blots and genomics. Laboratory research became increasingly important in all projects.

The biotechnology challenge also arose during the 1980's. Several other institutions were initiating programs, and gaining funding. Transgenic activities at Monsanto and other companies were attracting world attention. Discussions at professional meetings showed exploding interest in biotechnology and related information. Our graduate students were requesting instruction in biotechnology techniques that might be important for their careers. Many of our faculty felt that biotechnology knowledge and techniques could enhance our knowledge of genes and gene transfer and gain information that could speed our efforts to improve crop plants.

To examine this, in 1983 we convened a group of interested faculty and several graduate students in the department. We decided, as plant breeders, that we needed to become familiar with the science of biotechnology and its potential use in our projects. As a major step we decided that we needed to add a new faculty member with biotechnology strength, who had sufficient plant breeding understanding that he/she could speak both "languages" and provide us with a bridge between disciplines.

Other CALS departments were discussing these same issues, as biotechnology impacted on their fields. We initiated talks with the chairs of the Sections of Plant Biology, Biochemistry and the Section of Genetics and Development, all in the Division of Biological Sciences. We found we had common interests and concerns. We agreed that CALS should develop a major program that could quickly launch Cornell into national leadership in biotechnology in the plant sciences. We agreed that we should work together on this, and urge that CALS rapidly develop broad expertise in this area.

To jump start this, we felt that CALS should simultaneously establish and support three new faculty positions in biotechnology areas. We should fill these with top young scientists who had shown strong expertise and accomplishments in this field, who could "hit the ground running". By creating three positions we could emphasize our excitement and support for this program, and enable them to interact and build mutual strengths.

Our goal was to add this expertise to our departments to help integrate the new knowledge and techniques into existing and new programs. These faculty would develop their own research programs, as related to the missions of our various departments. They would also serve as an interface to help us knit biotechnology into our other research programs.

For this we decided on a unique strategy. We would search for three outstanding young scientists. In recruiting, we would allow them to choose the department that best fit their interests. They would, of course, need to be accepted by the faculty in the departments of their choice.

Together we presented this concept to Dean David Call. Dean Call saw the merit of our proposal. He generously agreed to provide funds to fill the new positions, and to provide funds for the laboratories and equipment for these three new scientists.

We were highly successful in our recruitment. Steve Tanksley joined the Department of Plant Breeding. Maureen Hanson entered the Section of Genetics and Development. And June Nasrallah joined the Section of Plant Biology. All have made significant contributions to their science and to our departments. All have gone on to receive major recognitions and are national, even international leaders in their fields.

Boosting project funding

As noted above, funding became increasingly difficult during the 1980's, as state funds eroded during tight budget years in Albany. Cuts in state funding became annual events, putting stress on department operations, facilities and programs. We felt the pain, but made adjustments and kept the department going.

Dwindling state support, however, took a toll on breeding projects. These became increasingly difficult to fund. Support was available for biotechnology and other basic research. But the field breeding programs suffered.

So we increased our efforts to attract support funds from the seed industries that we served. In alfalfa, we shored up support for the programs of R.P Murphy, Carl Lowe and (later) Don Viands. Our major support developed from the NESSD (Northeastern States Seed Development Corporation). This was set up by NY alfalfa seed companies to fund Cornell alfalfa research. The NESSD had been initiated in the 1950s, but needed new encouragement. Chief supporters and friends in the industry were Russ and Jim Billings of Stanford Seed; Swede and Elmer Townsend of Craver Dickinson; Jim MacEachron, Willard Hovde and (later) Kathy Gillespie, of Agway; and Carl Fribolin and (later) Don Wertman of Seedway.

For small grains we initiated funding for Mark Sorrells' program through a "check-off" charge for certified seed tags distributed by NYSIC (New York Seed Improvement Cooperative). Then we received serious help from CALS Director of Research Norm Scott through a program developed to encourage grower support for research. Through this program his office provided research funds to match input from seed growers, using the match to build an endowment for future funding of the project. Scott continued this input for some 6 years, building an endowment that continues to provide important funding for Mark's small grain project.

The vegetable breeding programs were severely impacted as state funds dwindled. Vegetable seed companies were providing almost no support for these programs, even though they were making major use of varieties from our vegetable breeders at Ithaca and Geneva. At that time, we had six vegetable breeders, Munger, Mutschler and Wallace at Ithaca, and Robinson, Dickson and Marx at Geneva. None had adequate funding, and the future of several projects was at risk.

In discussions, we decided to try to develop an industry support group of companies that would contribute funding to our vegetable breeding programs. We contacted several industry leaders including Joe Harris of Harris Seeds, Carl Fribolin of Seedway, and Bob Strosnider of Asgrow. Encouraged by them, Henry Munger and I presented our proposal to the ASTA (American Seed Trade Association) research committee at their meeting in Atlanta in 1980. Response was again encouraging, and through further meetings and contacts we obtained participation of some 15 companies. The contribution of each company was to be based on their perceived sales of Cornell developed varieties. This started as the Cornell Vegetable Breeding Group, then became the Cornell Vegetable Breeding Institute. Major incentives for industry have been our annual vegetable breeders field day at Ithaca and Geneva in August and our annual publication of upcoming releases. These provide breeders of participating companies with early views of coming releases. They also help us gain feedback on the interest and needs of company breeders. This program continues in strength, with Don Shardlow as coordinator.

For dry bean research, the Dry Bean Shippers Group were collecting an annual check-off for dry bean research and promotion. Most of the funds were going elsewhere, with little support for our breeding program. Through the efforts of Winton Baines and Don Shardlow most of this funding was redirected to the dry bean breeding program of Don Wallace.

The corn research program, just taken over by Vern Gracen, was strangling financially. Developing Cornell varieties had been the mainstay of our corn program for some 60 years. By 1980 industry interest was shifting, as competition forced companies to shift to proprietary varieties. Companies now wanted inbreds that they could fit into varieties that they could promote and sell as their own. This dramatically changed the directions of our corn breeding program, from the development of hybrids for open release to the development of inbreds for exclusive releases.

To fund this added breeding we interested six New York seed companies in participating in the program dubbed CRAC (Corn Research at Cornell). Each contributed an equal amount of dollars. The CRAC funding was helpful for several years. However excellent inbreds were now becoming available from Holden's in Iowa, and other Midwest companies specializing in inbred development. These programs were amply funded, far beyond our potential. They were aggressively marketing excellent inbreds to NY companies. This was tough competition for our program. After about five years our CRAC support eroded, as companies shifted to proprietary inbreds, mostly from Holden's.

Faculty Changes

Meanwhile faculty faces in the department were changing, in response to retirements, recruitments, new hires and new programs. Chief features included:

In International Agriculture: Loy Crowder created and held this position for some 14 years. In 1979 Crowder decided to take an international assignment in Indonesia. As his replacement, we were able to persuade Ronnie Coffman to leave his highly successful career as rice breeder at IRRI, to join us as our Professor of International

Agriculture. Ronnie hit the ground running (or flying) and greatly expanded our international activities in the Department and the College. He has gone on to become chair of this department (twice), Associate Dean and Director of Research, and most recently, Director of CALS International Programs.

Martha Mutschler came in August 1979. She had earlier agreed to assist Loy Crowder in teaching PB 225, our undergraduate course in Plant Breeding. The plan was that she would take over the teaching of this course at some time in the future. Crowder announced his departure in August, just before the semester began. I had to call Martha to request that she come prepared to begin teaching in two weeks. Martha agreed, and her Cornell career was off and running. Martha has provided us with teaching strength over several courses. She has contributed to our breeding accomplishments in tomatoes and (later) onions, and become one of the lead breeders in our Vegetable Breeding Institute.

Steve Tanksley joined us in 1985, from the University of New Mexico. Steve was a leader among the three biotechnology scientists attracted to CALS that year. Steve's research and leadership have brought him national and international acclaim and awards. He has provided the department, the college and the University with strong leadership in molecular genetics and its applications in Plant Breeding.

Margaret Smith joined us in 1987, to head our corn breeding research. She replaced Vern Gracen, who took a position leading Cargill's corn breeding program. Margaret joined us from her successful breeding program at CIMMYT. She has contributed great strength in our teaching and research programs. She currently leads our departmental extension activities in addition to her corn breeding programs. She also supervises NYSIP (New York Seed Improvement Project), which conducts our Foundation and Certified seed programs.

John Steffens also came in 1987. John replaced Peter Gregory in our biochemistry position, when Peter was attracted to a position at the International Potato Center in Peru. John provided strong leadership and interaction with our breeding programs and to our graduate training. John got off to a strong start but was frustrated by lack of acceptance by the field of Biochemistry. This limited his opportunities for training graduate students and professional advancement as a biochemist. This eventually caused him to leave us for a promising job in industry.

Molly Jahn arrived in the department in the early 1980s, as a graduate student. She showed her strong potential early, and several of us hoped we could attract her to become a member of the department. Through a series of events this became possible. Molly rapidly became a highly productive scientist, developing and releasing numerous vegetable varieties, inbreds and breeding lines. She also added great strength to our teaching programs and our graduate student training. She developed strong support among seed company breeders and leaders, and attracted substantial royalties to support her program through the CVBI (Cornell Vegetable Breeding Institute). Molly's abilities attracted national attention. This recently led to an invitation to become Dean of the College of Agriculture at the University of Wisconsin. She is currently on leave from this department while she tries out this Deanship. We would hate to lose her but wish her well whichever way her career turns.

Biometry

By the early 1980s, the separation of Biometrics and Plant Breeding was nearly complete. The only remaining connections were through the department chair and the Administrative Manager.

Walt Federer continued as a central figure in the Unit throughout my term. I think he retired in there somewhere but you would never have guessed it. Meanwhile as chair of the overall department, I carried administrative responsibilities for the Unit.

Outstanding faculty additions during this period included:

George Casella, who joined us about 1980, and soon established himself as a national "star" in Biometrics. He greatly strengthened our teaching, research and graduate student training. He served as Associate Chairman of the Unit from 1985-86.

Charles McCulloch came back to us from Florida A&M about 1983. Chuck was a strong addition, and added major strength to our teaching, graduate training, research capabilities and national stature. He later served as Associate Chairman of the Unit.

Naomi Altman joined us about 1986. She was also a fine statistician, and added teaching and research strength. She also served as Associate Chairman after McCulloch.

Shortly after my term, the Biometrics Unit split off and became part of a University wide Department of Statistical Science. One of my biggest disappointments was that all three of these fine statisticians eventually decided to leave Cornell for other opportunities.

Graduate students

We benefited from a series of great graduate students during those years in both Plant Breeding and Biometry. Many went on to outstanding careers in this country and abroad. Working with these fine young professionals was, to me, one of the most satisfying elements of the chairmanship. I would note names, but I don't have space to do them all justice [See Appendices K & L]. And I'd surely leave someone out. All were noteworthy!

Support Staff

Throughout my tenure we were lucky to work with highly capable and dedicated professionals in our office and field house staff. Several stand out in my memory:

Allene Hays joined us in 1983, as our Administrative Manager. Allene revised the bookkeeping organization, and soon had our records in good order. She continued providing strong financial and administrative leadership until her retirement in 2001. We wish Allene well in her future activities.

Lorraine Hollenbeck was the Department Chair Secretary throughout my term. Lorraine provided able assistance in many ways, not least by keeping me abreast of my calendar and helping me to get to meetings on time.

Marggy Vangeli joined us in 1984, replacing Annie Rogers as our office manager. Marggy's financial expertise helped to pay our bills and, most important, kept our salary checks coming on time. Then as the computer age developed, Marggy became our "go to" person for computer questions. She helped many of us learn how to use those things, and patiently coached us, as we struggled up our software and hardware learning curves.

Al Parente, manager of our Field House and our Field Crew, provided us with the strong support in the field, a key area in our Plant Breeding programs. Al managed with good humor, but with firmness. His maxim of "Do it right or do it over!" was respected by all who worked for and with him.

Cynda Farnham joined us in 1981, as a secretary in Bradfield Hall. She continued to grow in experience, and now serves as our Department Head Administrative Assistant. She combines good humor and ready service that make her a pleasure to work with.

Judy Singer came as a temporary worker in 1976, and soon became my full-time secretary. She served in that role, often helping us in our field research as we planted, thinned and harvested corn plots over the state. When Fred Spry retired, Judy transferred to the Field House and became the Extension Support Specialist on my project. Her capable assistance allowed me to take time from my project to be Department Chair.

We gained particularly strong project support from Research Associates Julie Hansen (forages), and Cliff Manchester (corn), and from our Research Support Specialists Ken Devine, then Dave Vaughn (forages), Al Neiss (cereals), Dan Winch, then Ken Paddock (potatoes); Bruce Rich (beans), and Bob Riker, then George Moriarity, also Ed Cobb (Vegetables). I was particularly lucky in my own program to work with Fred Spry, then Judy Singer.

Nancy Eannetta came to work for Peter Gregory in 1980, and proved herself a talented laboratory professional. Nancy was versatile, and after Peter Gregory left she provided biochemistry laboratory support for Pierre Bouyette

and Dirk Ave' and then John Steffens. Now, she works with Steve Tanksley.

Lou Ann Batts worked with Lisa Earle in her tissue culture laboratory, providing skilled support in this exacting science.

Seed Improvement Project

Leadership also changed in our Seed Improvement Project. When Winton Baines retired from his successful career as Project Manager we were able to persuade Don Shardlow to take over this responsibility. Don brought long experience as a farmer and county agent. He provided strong leadership with certified seed growers and seed companies. Don rapidly became a leader in national seed certification affairs, and was elected by his peers to be President of the International Association of Seed Certifying Agencies.

Lena Gray joined the Project as office manager during this period. Lena has been great at keeping Don Shardlow and myself out of trouble, and managing all the details and records involved with certifying thousands of acres.

Phil Atkins also joined us as manager of our Foundation Seed Plant and Production Manager for Foundation Seeds. Phil provided us with strong farm experience, and rapidly became a master seed cleaner. Phil provided us with the skill and precision that we needed in this key position in our seed release program.

Field Assistants

Key to our field and greenhouse operations are the dedicated people that carried them out. Stand-outs in my memory include Harry Wellin, our outstanding greenhouse manager, Laraine Erickson and Sherrie Norman who joined us on our corn project, Keith Payne who worked with Judy and me, and Ed Thomas assisting Julie Hanson on forages.

Key field house workers included mechanic George Thomas, who kept our machinery working and fabricated much of it, Larry (Butch) Bush, our plow master, Nelson Pratt (our combine artist), and Don Coonradt and Jimmie Hatch, jacks-of-all-trades.

Looking back

Looking back, it was a busy and challenging time, and I enjoyed nearly all of it. I had the opportunity to get to know and work with fine people in all areas of the department. I believe we advanced the science of Plant Breeding. And I know that we contributed a series of improved varieties, inbreds and breeding lines that made important contributions to seed companies, seed growers, farmers, gardeners and consumers.

The Coffman Years, 1987-1993

by
W. Ronnie Coffman
Chair, Plant Breeding & Biometry

I first joined the department in 1967, as a graduate student under Neal Jensen. In 1968 I was part of the move from Plant Science to Bradfield Hall. I remember switching the routing sticker on Neal Jensen's (very nice old) desk, which was destined for disposal, and causing it to arrive in my graduate student office in Bradfield, where it served me well through the remainder of my graduate career. When this came to the attention of the department chair, R.L. Plaisted, I believe he decided that I might have administrative potential.

In 1987, a few years after returning from an enjoyable decade (1971-1981) in the Philippines as a rice breeder at the International Rice Research Institute (IRRI), I found myself appointed as department chair, succeeding W.D. Pardee, who had hired me as the department's International Professor, replacing Loy Crowder. Allene Hays was the administrative manager; Al Parente was the farm manager; Lorraine Hollenbeck was the departmental secretary; and Marggy Vangeli looked after everything else (and then some).

The First Fax Machine

This was a period of rapidly changing technology, or so it seemed at the time. First came the fax. With Marggy Vangeli's help, we bought the first fax machine in the college, and only the second one in the university. We got a call from Day Hall to tell us that it was not appropriate for a department to have a fax machine. University policy dictated that the institution should have only one telex number and one fax number. Having tenure, I decided to hang on to it. By charging a dollar per page, we paid for it in a few weeks, as the alternative for the entire upper campus was to walk to Day Hall and pay $2 per page to send or receive a fax. Within a year, fax machines began to proliferate.

We Got Mail

Marggy's next achievement was to obtain for me a Bitnet account in the Computing Center and I became the first department chair to have an e-mail account. This was thought to be a time waster as no other plant breeder in the world could receive e-mail. Now that everybody receives and sends e-mail, I suppose it is still a time waster. Soon thereafter, Mark Sorrells and I set up the first computer network in the department (perhaps the first in the college) by stringing our own wire (we could not afford CIT's rates). We set up a server and started using Quickmail, our first e-mail program. Eventually, we set up a proper network and started using the web. I still recall the first image that I saw on the web – a photo of a beautiful apple residing on a server at the Geneva station.

Space

My first faculty meeting in August of 1987 dealt with space, which we needed badly as we were squeezed onto the 4th floor and half of the 5th floor in Bradfield Hall. My first achievement as Chair was a successful proposal to Associate Dean Kenneth Wing to occupy the 3rd floor of Bradfield Hall, which the Section of Genetics & Development was vacating in favor of the new Biotechnology Building. Later in the term, to satisfy the growing needs of the Tanksley Lab, I persuaded Dominick Paolillo, of the Section of Plant Biology, that he should allow us to occupy the northeast corner of the second floor of Emerson, an area that originally may have been designed for use as an aviary/museum but which was Dom's research laboratory for many years. Dean Call referred to this as the "great space robbery" but he approved it, nevertheless, and Steve Tanksley has made very productive use of the space.

Field Space

In 1987, Associate Dean Wing requested that we consider moving out of the Plant Breeding Gardens to make way for Plantations to develop "visitor friendly activities." He and others were particularly concerned about pesticide use in the area. In exchange for irrigation facilities at another location to support our vegetable work, we eventually agreed to move out after almost 80 years of research in the area.

New York State Seed Improvement Project (NYSIP)

In 1988, the New York State Seed Improvement Co-op (NYSIC) began to evolve to the New York State Seed Improvement Project (NYSIP), thanks to the efforts of Bill Pardee and the concurrence of Dean David Call. This eventually placed the Director's salary on a college line and ensured financial stability for this important activity. Don Shardlow was hired to fill the newly created position.

Undergraduate Course in Plant Breeding

PB 301, Introduction to Plant Breeding, Fall 2 credits (Coffman & others), was developed and first offered in the fall of 1989. It included elementary genetics, an overview of breeding methods and emerging technologies, and some discussion of social issues related to plant breeding. When I moved to Roberts Hall (in 1993) as Associate Dean for Research and Director of the Cornell University Agricultural Experiment Station, Susan McCouch took over the course and developed it to its full potentical, attracting many undergraduates to Plant Breeding and associated fields.

A.D. White Professors-at-Large

In 1989, Dr. M.S. Swaminathan, the first recipient of the World Food Prize, was selected as an A.D. White Professor-at-Large with sponsorship by the department. Dr. Swaminathan visited the Department regularly over the next several years and gave numerous lectures throughout the university, raising the visibility of plant breeding. He was a prolific writer and lecturer and would fully utilize all of our administrative assistants for the two weeks of his visits to transcribe his dictation. Dr. Norman Borlaug, the only agricultural scientist to be awarded a Nobel Peace Prize, and my mentor and committee member during my graduate years, also served as an A.D. White Professor during W.D. Pardee's term as Chair and continued to visit during my term.

Plant Breeding Library

In 1989, the Plant Breeding Library, which had been shared with Agronomy since 1968 and which had not been subscribing to journals since sometime in the 1970s, was finally closed. The important contents were shifted to Mann Library and copies of all theses were moved to the Plant Breeding Conference Room.

Past Accomplishments

In 1989 the department compiled a list of past accomplishments, which I felt (and still feel) were quite remarkable:

1. Developed the germplasm base for major field and vegetable crops, particularly in the Northeastern United States.
2. Discovered and incorporated into commercial varieties of numerous vegetable and field crops, multiple disease and insect resistance.
3. Pioneered the investigation and utilization of various mechanisms of pest resistance in plants.
4. Developed the multiline concept of disease resistance.
5. Developed for numerous vegetable and field crops the methodology and germplasm for the production of F_1 hybrid varieties.
6. Identified and incorporated into commercial varieties of numerous field and vegetable crops genes conditioning improved characteristics for storage and eating quality.
7. Originated for major food crops classical and molecular genetic maps.
8. Expanded knowledge of how and why farmers adopt new crop varieties.
9. Provided leadership for the earliest and more recent programs for technical assistance in agriculture in less developed countries.
10. Trained numerous plant breeding scientists who have made global contributions to the production and availability of food.

McCouch and Watanabe Welcomed to the Faculty

The Faculty welcomed Susan McCouch to her first meeting in January of 1992. Susan joined as an Adjunct Assistant Professor in the Department employed by the International Rice Research Institute (IRRI). At a later date, she was shifted to regular faculty status with support from the college.

In October of the same year, Coffman welcomed Kazuo Watanabe to his first faculty meeting as an Adjunct Assistant Professor. He had agreed to teach a lab course in cytogenetics, beginning in the spring semester of 1993 and still continues to contribute to this course.

Hollenbeck Retirement

In January of 1993, Lorraine Hollenbeck notified the department that she would retire in July. Lorraine served as the departmental secretary for many years and contributed in many ways to the success of our department.

Coffman's Last Faculty Meeting

(From the minutes of the department)

> In January of 1993, Coffman closed his last meeting as Chair by expressing his sincere appreciation for the support of the faculty and staff during his term. He expressed confidence that the faculty would provide the new Chair with the same strong support that has made the job so rewarding for him.

The Earle Years, 1993-2001

by
Elizabeth (Lisa) D. Earle
Chair, Department of Plant Breeding and Biometry

My term as Department Chair began unexpectedly in January 1993 when Ronnie Coffman moved to Roberts Hall as Director of the Cornell Experiment Station and Associate Dean for Research. Initially I served as Acting Chair, but later was confirmed as Chair for a five-year term, followed by another three-year term. My applied agricultural experience was very limited, so it was initially quite a stretch to lead a unit that had not only labs but also tractors, a farm crew, and 300 acres of land; however, I believe that I gradually grew into the job.

The period between 1993 and 2001 was an active and productive part of our Department's distinctive history, and it included many significant events. Some of them are listed below.

Interactions with three deans

During my term, CALS was led by three different Deans (David Call, Daryl Lund, Susan Henry), each with a very different personal style. This meant that annual budget meetings and other interactions with them required quite different strategies and presentations in order to advance the interests of Plant Breeding.

Faculty changes

Two long-term faculty members and former Department Chairs retired and were awarded emeritus status: Bill Pardee and Bob Plaisted. Lively parties celebrated their careers. Bill continued as Department Extension leader until Margaret Smith assumed that role. Bob kept the potato program going until Walter De Jong arrived.

Several new faculty were appointed: Susan McCouch, who shifted from her position as IRRI Shuttle Geneticist and Adjunct faculty member to a tenure-track position in 1995; Steve Kresovich, who came from USDA in 1998; Walter De Jong, who came from the Scottish Crop Research Institute in 2000 after the refill of the potato position was finally approved. Other Adjunct or Joint Faculty were also added to the department roster, among them Tom Brutnell from the Boyce Thompson Institute and Jeff Doyle from the Department of Plant Biology. The faculty meeting minutes from 1993-2001 describe extensive discussions of many other possible new faculty positions that would enhance our programs. Unfortunately budget stresses in CALS resulted in actual decreases of college faculty numbers, and very few faculty searches were approved.

Three Assistant Professors were awarded tenure during this period: Margaret Smith (1993), Molly Jahn (1997), and Susan McCouch (1999). Biochemist John Steffens departed in 1999 to an industry position with Syngenta. Emeritus Professor Carl Lowe died in 1999.

Increasing emphasis on genomics

This period saw increasing attention to the emerging areas of genomics and bioinformatics. This was based on a more wide-reaching vision than the earlier trend toward linkage of plant molecular biology with applied crop improvement. Steve Tanksley led the Cornell faculty-driven "Genomics Initiative," which resulted in many new university faculty hires and the eventual establishment of this area (now called "The New Life Sciences") as a priority for the university. Other Plant Breeding faculty were also active in the faculty initiative. The New Life Sciences Building, currently under construction and soon to be designated Weill Hall, is a very visible manifestation of this major Cornell program.

With state support, most of Emerson Hall was converted into a Plant Genomics Facility, housing faculty from several plant departments.

Soon after his arrival, Steve Kresovich established The Institute for Genomic Diversity, which focuses on development on new genomic technology and bioinformatics tools to be applied to agriculture and conservation. The Institute is housed in the Biotechnology Building.

A joint Computer Science-Plant Breeding course (*Problems and Perspectives in Computational Molecular Biology*, cross-listed as CS726/PB726) was initiated in 2000, in part through the efforts of Susan McCouch.

Links with USDA genome database programs were established and some of the USDA personnel held appointments in Plant Breeding; however, most of the direct links were later discontinued, for complex reasons.

Curriculum

Our undergraduate and graduate course offerings were frequently discussed at faculty meetings, with special emphasis on the ever-problematic Plant Breeding 225 course (*Plant Genetics*). Many ideas for diverse new 1-month graduate modules were presented. Most were not implemented because of limited faculty teaching resources (a significant number of faculty were heavily involved in administrative activities, as they still are).

Several new courses were initiated and continue to be taught, including *Crop Evolution, Domestication and Diversity* (Steve Kresovich) and Intellectual Property Management (Anatole Krattiger). Martha Mutschler offered a course in Advanced Plant Breeding Methods for several years. Edie Paul (one of our graduates) and others taught popular modules on *Electronic Data Resources and Comparative Genomics*. Continued staffing of those modules was difficult, and other departments now cover these topics. Adjunct Professor Kazuo Watanabe returned several times from his current position in Japan to continue teaching his *Plant Cytogenetics Lab* course.

Graduate students

Almost 100 students earned MS and/or PhD degrees in the graduate field of plant breeding. The field was administered by the Department of Plant Breeding but included plant breeders from the Department of Horticultural Sciences at Geneva as well as faculty in several other units. The graduate students, over half of whom were international, contributed substantially to department research productivity and social life.

Support of graduate students became steadily more challenging after the Plant Cell & Molecular Biology Fellowships and the 2-year Cornell Graduate Fellowships were no longer available. Student numbers gradually decreased from highs of over 50 each year to the current level in the 30s; however, we maintained the high quality of our grad students through the Frank Rhodes Fellowship endowed by Marie Lavallard, a fellowship provided by Pioneer, USDA National Needs Fellowships, and judicious use of department funds to supplement faculty resources.

We implemented the teaching requirement for grad students and added a requirement for annual Special Committee meetings with written reports. The annual Munger/Murphy award for outstanding graduate students was initiated in 2001, in honor of these distinguished Emeritus Professors. Graduate students (and others) displayed posters about their work at the annual poster session that became part of the Plant Breeding Seminar Series.

Cooperative State Research Education & Extension Service (CSREES) review

This review in February 1997 was our first since 1983. It required extensive planning and preparation of a detailed document describing all of our activities. The reviewers were Charles Arntzen, Frederick Bliss, Donald Duvick, Ronald L. Phillips and John Sorensen. They were generally positive about our programs, but made some 30 recommendations for improvements. Perhaps the most helpful comment was their contempt for our seed storage facility (see below).

Restructuring of the farm support staff and facilities

Following the retirement of Al Parente in 1995, Dan Van Vleet was hired as Farm Manager. He efficiently took on the task of restructuring the farm crew, most of whom were close to retirement after many years of service, and gradually replacing our aging farm equipment.

We used some of the Harris bequest to develop initial plans for an improved seed storage facility. Having those plans, together with the strong comments from the CSREES review team, eventually got the facility onto the New York State construction list at a cost of close to $500,000.

The CALS consolidation of greenhouse management resulted in charges to faculty for use of greenhouse space, an unwelcome development. The Department cushioned the blow somewhat with temporary support to faculty whose programs were most affected.

Finances

Budget stresses in CALS resulted in periodic requirements for significant departmental budget cuts. We generally managed to absorb these cuts without major pain, in part because of the strong grant and industry support obtained by the faculty. Administrative Manager Allene Hays kept track of all the accounts with great care and sent out monthly financial reports to faculty. She and I ran a frugal department budget and maintained a fairly healthy reserve fund. We invested a substantial portion of the reserves in what was called "John Finamore's Mutual Fund". This fund, run by the CALS chief financial officer, allowed us to obtain interest on our money.

Increased levels of technology and paperwork

Both the faculty and the department administration experienced steady upgrading of computers, printers, fax machines, copiers, etc. as improved versions became available. On the other hand, faculty were subjected to increasing reporting requirements (or at least so they perceived).

Intellectual property issues and use of Material Transfer Agreements (MTAs) for dispatch and receipt of seeds and other biological materials became increasingly important.

Space shifting

The period was marked by constant alterations of space assignments in Bradfield/Emerson, including construction of the Plant Genomics Facility and a lab for Walter De Jong; the move of Steve Tanksley and Susan McCouch to the 2nd floor of Emerson; and relocation of NYSIP, ISAAA, and emeritus faculty offices. Marggy Vangeli played

an important role in making all this happen as smoothly as possible.

The Department offices were transferred from 252 Emerson to their current location in 240 Emerson in 2000. That was originally viewed as temporary but now appears to be permanent.

From "Plant Breeding & Biometry" to "Plant Breeding"

The complex history of involvement of our department with the Biometry Unit was concluded when the two were separated in 1998. Biometry became the Department of Computational Biology & Biological Statistics.

Plant Breeding: to be or not to be

Following the dissolution of the Division of Biological Sciences in 1999 and the merger of the Bailey Hortorium with the Section of Plant Biology to form the new Department of Plant Biology, the future of the Department of Plant Breeding was an active topic of discussion. Would it be a good idea to merge with Plant Biology? The pros and cons of this concept were considered at a faculty retreat held in early 2000. The consensus was in favor of remaining as a separate department.

Other things to remember

In 1998 Steve Tanksley received the Alexander von Humboldt award for the most significant contributions to U.S. agriculture in the past 5 years. A very well attended ceremony/reception honoring Steve was held in the Biotechnology Building.

For some of this period, a department newsletter (*New Plant News*) was distributed to enhance communication about faculty and staff activities and accomplishments.

Holiday parties for the whole department were held in the field house in mid-December of most years. The farm crew did a great job converting the space to a clean and festive venue. Attendance eventually became so high that the event is now held in the Statler ballroom.

Throughout my term Cynda Farnham provided valuable and good-humored support, putting up with my ill-advised efforts as a micromanager.

The last word

The experience of being Chair brought with it many unexpected experiences and opportunities to learn about and assist my colleagues. I was honored to serve; however, on June 30, 2001, I was happy to hand the master keys and responsibilities back to Ronnie Coffman.

The Coffman Reprise, 2001-2006

by
W. Ronnie Coffman
Chair, Plant Breeding & Genetics

At some point around the turn of the century, Lisa Earle approached me to say that she had a vision of me as "… the once and future chair," and thus I was granted a reprise. After 9 years as Associate Dean for Research of the College of Agriculture and Life Sciences and Director of the Cornell University Agricultural Experiment Station, it was good to return to the Department. Having experienced both jobs, I knew that a department chair's job is,

in many ways, more complicated than an Associate Dean's job. Most of the challenging issues in a university involve the department chair, and ours is no exception. On the other hand, the culture of our department should be a source of pride. As I learned in dealing with the 25 other units in our college, our department is exceptionally supportive and enlightened. It is a good place to work and a good place to be chair. I found myself in the capable hands of Allene Hays as the departmental business administrator, Dan Van Vleet as the farm manager, Cynda Farnham as the departmental administrative assistant and Marggy Vangeli looking after everything else. These capable, reliable people allowed me to be on the road a lot. This was important because I had a joint appointment as Director of International Programs and I was concerned about meeting the Department's needs while also holding down another demanding job.

Departmental Business Administrator

Due to incentives in the State retirement system and the opportunity to pursue her profession in one of the endowed units, Allene Hays elected to retire as our business manager after serving the Department well and faithfully under three chairs (Pardee, Coffman, and Earle). Knowing that this was in the offing, I began to search for a new administrator even before I took up my position officially. In August of 2001, I was fortunate to hire Tammy Thomas, who has exceeded our every expectation in the position, while also serving as the administrator of International Programs.

Seed Storage Unit

Thanks to the efforts of Lisa Earle, who oversaw the initial planning, we were finally able to construct a suitable seed storage unit for the department. Money for the design was made available during the first month of my term but, due to various frustrations and delays, we had still not officially occupied the building after five years of determined effort. I remain optimistic that it will become operational sometime during 2007.

9/11/2001 (The day the World Trade Center and other U.S. buildings were attacked)

On 11 September 2001, I was in an airplane over the Pacific, bound for Detroit from Bangkok via Tokyo. Without any explanation, we landed in Vancouver, WA along with 6,000 people from other jetliners over the Pacific at the time. I managed to reach Ithaca four days later by taking one of the first planes to fly from Vancouver to Montreal where I rented a car and drove to Ithaca. At the time we had five Muslim students including one who was very concerned about the safety of his wife because she maintained traditional Muslim dress. Fortunately, the students were able to continue their studies without any problems. It was also fortunate that none of our foreign students were out of the country at the time because those who were could not return to the U.S. for many months.

Faculty Appointments

Vernon Gracen, formerly a full professor in the department, agreed to return to teach PB403, the breeding methods course, and to help develop continuing education programs. Rebecca Nelson (Plant Pathology) and Tim Setter (Crop & Soil Science) were granted joint appointments. With a lot of influence from Steve Kresovich, Ed Buckler was attracted to a USDA/ARS position at Cornell and was granted an adjunct appointment in the Department. Li Li was hired by the USDA/ARS Plant Soil and Nutrition Lab and was granted a joint appointment. Anatole Krattiger of International Programs was granted an adjunct appointment with the understanding that he would teach a course on intellectual property management. Dani Zamir of Israel, a long time collaborator with the Department, especially the Tanksley lab, was appointed as an Adjunct Professor. Frank Shotkoski, newly hired Director of the Agricultural Biotechnology Support Project (International Programs) was granted an adjunct appointment along with Matthew Blair, Legume Breeder from CIAT. In early 2004, Wojtek Pawlowski was offered a position as Assistant Professor in the Department. He accepted and joined the faculty in August of the same year. I felt very pleased with the quality and number of the people attracted to the Department during my term. My only wish was for more tenure-track faculty positions.

Technology

Marggy Vangeli, Cynda Farnham and I began to use MeetingMaker as a calendar program that operated within our network. Eventually, the University set up Corporate Time that could be used to book appointments with anyone in the University willing to use it. Mobile phones proliferated. Wireless internet became common and was installed in the departmental office and the conference room

Lampkin Barn Restoration

The roof of the Lampkin Barn collapsed from snow load during the winter of 2000 – 2001. With a lot of cajoling and support from neighbors and others, we were able to convince the College administration to provide matching funds to restore it. At a cost of around $40,000 to the department, we were able to complete the work by the end of 2001, restoring the barn with a pitched roof, rather than the original beveled modification that would have been more costly.

Nine-Month Appointments

In order to improve faculty salaries without investing money, the Dean offered to consider switching faculty to nine-month appointments. The faculty viewed this offer with considerable suspicion. However, most people eventually agreed to the change and, as far as I know, it has been a beneficial move, particularly for those able to provide their summary salary from one or more grants.

Dogs Banned on Tailby and Pulleyn Farms

After many unhappy episodes affecting the quality of our plots, the faculty decided to ban dogs on the Tailby and Pulleyn farms. Dan Van Vleet and I agreed to deal with unhappy owners who had been treating the farm as their own recreational area where they could allow their pets off leash to inflict damage wherever their nose might lead them. By installing a gate that prevented parking, we were able to enforce the policy. Most of us being pet owners ourselves, we did not feel good about it but saw no other choice as owners refused to obey the leash laws.

African Center for Crop Improvement

In November of 2002, I reported to the faculty on the efforts of the Rockefeller Foundation to train 50 African plant breeders over the next five years with course work at the University of Natal and thesis research in their home countries. It was a very challenging situation to provide an adequate curriculum and I urged that we consider how we might help. Several faculty members eventually contributed and, with the help of Vernon Gracen and Margaret Smith in particular, and with leadership on the technology side from Stefan Einarson, we were eventually awarded a grant from the Rockefeller Foundation in partnership with International Programs to support what became the African Center for Crop Improvement (ACCI). The first cohort of students graduated from the University of Natal in 2006.

Murph's 90th Birthday

In May of 2004, we hosted a 90th birthday party for Royse Murphy. Many of his colleagues and former students, who were able, returned to Ithaca for the event. A good time was had by all and we enjoyed honoring Murph for more than half a century of contributions to the Department, the College and the University. The organizing committee for this event included Lee Kass, Jamie Neally, and Judy Singer, and ably chaired by Julie Hanson. Judy Singer was responsible for compiling and editing a beautiful memorial book.

Departmental Name Change

In September 2003, Lisa Earle and I raised the possibility of a departmental name change from "Plant Breeding" to "Plant Breeding & Genetics" to reflect more fully the activities in our department. Eventually, the faculty approved the idea and a request was made to Dean Susan Henry. She agreed that it was a good idea but would need to be approved through the Faculty Senate, and be recommended by her to the Provost for approval. Eventually, we worked through the entire process and the new name was approved in 2004. With some satisfaction we noted that we have come full circle, as Genetics was originally a part of our department. It was noted that the name on the building (on the Tower Road side of Bradfield) is now correct and we resolved to take a departmental photo under it (which we have not yet done).

College Centennial

From May 2004 to May 2005 the College celebrated its Centennial with a number of events, including a parade. Our entry, organized by Ken Paddock of the potato project, received one of the major awards. We participated in several events with an eye toward our own Centennial to be observed in 2007.

Departmental Performance

In 2004, I analyzed some data on departmental performance provided by the College administration. We ranked at the top of all departments in terms of research performance and we were above the median on teaching. Our performance is exemplary, even though we are one of the smallest Departments.

Coffman's Last Faculty Meeting

(From the minutes of the department)

> Ronnie reported on the Chair transition. Mark has the keys and the office is being cleaned and readied … Ronnie appreciated the applause at the end of the meeting. We all left the meeting with the sense that we are a strong department supporting a vital profession. We have both the history and the prospect of continuing renewal that will serve us well in the years to come.

Endnotes

1a. *Autobiography of Andrew D. White*, selected chapters from a 2 volume treatise. 1939. Cornell University Press.

1b. Dorf, Philip. 1952. *The Builder, a Biography of Ezra Cornell*. The Macmillan Co., NY.

1c. Hewett, Waterman Thomas. 1894. The history of Cornell University in the twenty-five years of its existence 1868-1893. Reprinted from: Landmarks of Tompkins Co., NY. John H. Selkreg (editor), D. Mason & Co., Syracuse, NY.

2a. Colman, Gould P. 1963. *Education & Agriculture, A History of the New York State College of Agriculture at Cornell University*. Cornell University (Developed from Colman, Gould Patchin. February 1962. *A History of Agricultural Education at Cornell University*, a doctoral thesis in two volumes). *http://ecommons.library.cornell.edu/handle/1813/10733*

2b. Rodgers III, Andrew Denny. 1949. *Liberty Hyde Bailey, A Story of American Plant Sciences*. Princeton University Press.

3. Robert Cook, 1937. A Chronology of Genetics. In the *Yearbook of Agriculture 1937*, USDA, Government Printing Office, Washington, DC.

4. Rare and Manuscript Collections, Cornell University Library ***[RMCUL henceforth]***; 21/2/84, Box 41, Liberty Hyde Bailey, New York State College of Agriculture and Agricultural Experiment Station records, 1903-1914 (Bailey Papers).

5. This area has been recently incorporated into the Plantations.

6. RMCUL, 21-2-84, Dean Bailey Papers; 21-28-889, Dept. of Plant Breeding records, 1906-1970 (Plant Breeding Records); 21-28-890, Love, Harry H. papers, 1907-1964 (Love papers); 21-2-2709, Beverly T. Galloway, New York State College of Agriculture Records, 1914-1916 (Galloway Papers); and Plant Breeding Records (1907-1913) and Synapsis notes, which have recently been added to Collection Number: 21-28-889.

7. Dean Bailey to President Schurman, name Webber as Director of the College effective October 1, 1909 and also continue as Head of Plant Breeding, RMCUL, 21-2-84, Box 58, Bailey Papers.

8. RMCUL, 21-2-84, Box 73, Bailey Papers.

9. Gould P. Colman. 1963. *Education & Agriculture. Cornell University.* *http://ecommons.library.cornell.edu/handle/1813/10733*

10. This was done on 7 January 1916 in a long letter of 22 pages.

11. These tapes have been shared with Dr. Lee Kass who is preparing a biography of Barbara McClintock and she has shared them with me.

12. See the several biographical memoirs, i.e., Rosalind Morris. 1969. Rollins Adams Emerson (1873-1947), horticulturalist, pioneer in plant genetics, administrator, inspiring adviser. *Proc. Nebr. Acad. Sci.* 79th annual meeting, p. 37 (abst.). (An unabridged copy is in the Plant Breeding Records, RMCUL Archives).

13. Private correspondence with N.F. Jensen (Cornell PhD 1943).

14. RMCUL 21/28/890, Box 7, Love papers.

15. A comment from Henry Munger, MS Ohio State 1936-1938: Professor Lewis' course in corn breeding was one of the best of several that he took, in what he considered a good graduate program.

16. Biographical Memoir of Rollins Adams Emerson 1873-1947. *National Academy of Sciences* Vol. 25, 1949.

17. RMCUL, 41/2/877, Box 368, Deceased Alumni files, 1868-1990.

18. See RMCUL, 21/2/466, Box 2, Folder 57, Myers, William I. papers, 1892-1977 (Myers papers).

19. *USDA Yearbook of Agriculture 1936*; A.F. Troyer. 1999. Background of US hybrid corn. Crop Sci. 39:601-626.

20. R.A. Emerson, G.W. Beadle, A.C. Fraser. 1935. *A summary of linkage studies in Maize*. Cornell Memoir 180, Cornell University Experiment Station, Ithaca, NY.

21. Personal communication, W.F. Tracy. Dept. of Agronomy, University of Wisconsin (CU PhD, 1982).

22. Jane Perry-Camp correspondence, to be placed in RMCUL, Plant Breeding Records, 21/28/889.

23. *Ithaca Journal*, September 7, 1949.

24. RMCUL, 21/2/87, Ladd, Carl E. papers, 1932-1943 (Ladd papers), 21/2/466, Myers Papers.

25. RMCUL, 21/2/466, Box 2, Folder 4, Myers Papers.

26. M.M. Rhoades mss, courtesy Lilly Library, Indiana University, Bloomington, Indiana.

27. *USDA Yearbook of Agriculture*, 1936

28. Paarlberg, Don and Philip Paarlberg, 2000. *Agricultural Revolution of the 20th Century*. Iowa State University Press.

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Coe, EH and LB Kass. 2005b. Maize Genetics Cooperation News Letter files: Expanded chronological list of materials and related cooperation. *Maize Genetics Cooperation Newsletter* 79: 72-76, available online, April 2005: http://www.agron.missouri.edu/mnl/79/06CoeKass.html.

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Editor's note: A collection of materials pertaining to the life and legacy of Royse Peak Murphy will be placed online at: http://ecommons.library.cornell.edu/handle/1813/14143

APPENDICES CONTENTS

Editor's Note: In the online version, the above entries are hyperlinked to the Appendices.

1 Italicized names had appointments in the Department and this convention is used throughout these Appendices.

2 Includes biometry and genetics majors admitted in the Department through 1965. W.T. Federer has written a history of biometry. 1989. BU-1000-M, Biometrics Unit. H.T. Stinson has written a brief history of Biological Sciences, unpublished.

3 Professorial titles only.

Appendix A
Administrative Officers of Cornell University 1865 - 2006

President

Andrew D. White	1865-1885
Charles K. Adams	1885-1892
Jacob G. Schurman	1892-1920
Livingston Farrand	1921-1937
Edmund E. Day	1937-1949
Deane W. Malott	1951-1963
James A. Perkins	1963-1969
Dale R. Corson	1969-1977
Frank H.T. Rhodes	1977-1995
Hunter Rawlings III	1995-2003
Jeffrey Lehman	2003-2005
David Skorton	2006-

Acting President

Thomas F. Crane	1899-1900
	1912-1913
Cornelius W. de Kiewit	1949-1950
Theodore P. Wright	1950-1951
Hunter Rawlings III	2005-2006

Provost

Albert R. Mann	1931-1937
H. W. Peters	1938-1942
Arthur S. Adams	1946-1948
Cornelius W. de Kiewit	1948-1951
Forest F. Hill	1952-1955
Sanford S. Atwood	1955-1963
Dale R. Corson	1963-1969
Robert A. Plane	1969-1973
David Knapp	1974-1978
W. Keith Kennedy	1978-1984
Robert Barker	1984-1991
Malden C. Nesheim	1989-1995
Don M. Randel	1995- 2000
Carolyn A. Martin	2000-

Associate Provost

Stephen Kresovich	2005-

Dean of the University Faculty

George Caldwell	1872-1886
Charles Scheffer	1896-1887
Henry S. Williams	1887-1888
Horatio S. White	1888-1902
Thomas F. Crane	1902-1909
William A. Hammond[1]	1920-1930
Cornelius Betten[2]	1932-1945
Carleton C. Murdock	1945-1952
William H. Farnham	1952-1957
C. Arnold Hanson	1957-1961
Thomas W. Mackesey	1961-1964
Royse P. Murphy	1964-1967
Robert D. Miller	1967-1971
Norman Penny	1971-1974
Byron W. Saunders	1974-1978
Kenneth I. Greisen	1978-1983
Joseph P. Bugliari	1983-1988
Walter R. Lynn	1988-1993
Peter C. Stein	1993-1998
J. Robert Cooke	1998-2003
Charles Walcott	2003-

Dean of the Graduate School

Ernest G. Merritt	1909-1914
James E. Creighton	1914-1923
Ralph H. Keniston	1923-1925
Rollins A. Emerson	1925-1931
Floyd K. Richtmyer	1931-1939
George H. Sabine	1940-1944
G. Watts Cunningham	1944-1948
Charles W. Jones	1948-1953
Sanford S. Atwood	1953-1956
John W. McConnell	1957-1959
Damon Boynton	1959-1964
W. Donald Cooke	1964-1973
William M. Lambert	1974-1979
Alison P. Casarett	1979-1993
Walter I. Cohen	1993-2002
Alison G. Power	2002-

1 Records indicate that there was no Dean of Faculty from 1909-1920. However, records indicate that William A. Hammond served as Secretary of Faculty during that time until he was appointed Dean in 1920 by the President.

2 William A. Hammond retired in June 1930, leaving a vacancy in the Deanship until 1932, when the President recommended with the Faculty's approval, Cornelius Betten to fill the position.

Faculty Representatives to Cornell University Board of Trustees (Faculty-elected)

Rollins A. Emerson	1925-1928
Royse P. Murphy	1968-1970
Adrian M. Srb	1975-1980
(incomplete list before 1977)	
Don Holcomb	1977-1981
Karen Brazell	1979-1983
Dan Sisler	1980-1984
Walter Lynn	1981-1985
Howard Evans	1982-1986
Olan Forker	1984-1988
Mary Beth Norton	1984-1988
J. Robert Cooke	1986-1990
Jennie Farley	1988-1992
Isaac Kramnick	1990-1994
Joseph Calvo	1992-1996
Richard Schuler	1994-1998
Kay Obendorf	1996-2000
William Fry	1998-2002
Peter Stein	2000-2004
Elizabeth Earle	2002-2006
Kathleen Rasmussen	2004-2008
Ronald Ehrenberg	2006-2010
Rosemary Avery	2008-2012
Nelson Hairston	2010-2014

Appendix B
Administrative Officers of the College of Agriculture and Life Sciences 1868 - 2006

Dean

George C. Caldwell	1868-1874	Department of Agriculture
Isaac P. Roberts	1874-1887	Dean of Faculty of Agriculture
	1888-1903	Dean of College of Agriculture
Liberty H. Bailey	1903-1913	
Beverly T. Galloway	1914-1916	
Albert R. Mann	1917-1931	
Carl E. Ladd	1931-1943	
William I. Myers	1943-1959	
Charles E. Palm	1959-1972	
W. Keith Kennedy	1972-1978	
David L. Call	1978-1995	
Daryl B. Lund	1995-2000	
Susan A. Henry	2000-	

Acting Dean

Herbert J. Webber	1909-1910	
William A. Stocking Jr.	1913-1914	
Albert R. Mann	1916-1917	
Cornelius Betten	1924-1926, 1931	

Associate Dean

W. Keith Kennedy	1965-1967	
James W. Spencer	1973-1978	
Joan R. Egner	1978-1982	
Kenneth E. Wing	1983-1991	
Brian F. Chabot	1993-2000	
William E. Fry	2001-2006	Senior Assoc. Dean
Barbara Knuth	2007-	Co-Senoir Assoc. Dean
Jan Nyrop	2007	Co-Senior Assoc. Dean

Director of Research and the Cornell University Agricultural Experiment Station

George C. Caldwell	1879-1886	
Isaac P. Roberts	1888-1903	
Liberty H. Bailey	1903-1913	
Herbert J. Webber	1909-1910	Acting
Beverly T. Galloway	1914-1916	
Albert R. Mann	1916-1923, 1928-1931	
Roscoe W. Thatcher	1923-1927	
Frank B. Morrison	1927-1928	
Carl E. Ladd	1931-1942	
Carl E. F. Guterman	1942-1957	
Charles E. Palm	1957-1959	
W. Keith Kennedy	1959-1965	

Nyle C. Brady	1965-1973	
Nolan L. Vandemark	1974-1981	
Theodore L. Hullar	1981-1984	
Norman R. Scott	1984-1989	
Brian F. Chabot	1989-1993	
W. Ronnie Coffman	1993-2001	and Associate Dean
Daniel J. Decker	2002-2005	
Michael Hoffman	2006-	

Director of Instruction and Academic Programs

Cornelius Betten	1915-1920	Secretary-Registrar
"	1920-1924	Vice-Director Instruction
"	1924-1940	
Anson W. Gibson	1940-1960	
Thomas C. Watkins	1960-1965	
Herbert L. Everett	1966-1977	
J. Robert Cooke	1977-1981	
George J. Conneman	1981-1994	
H. Dean Sutphin	1994-2002	and Associate Dean
Donald R. Viands	2003-	

Director of Extension - Colleges of Agriculture and Life Sciences and Human Ecology - Cornell Cooperative Extension

Albert R. Mann	1916-1923	
Maurice C. Burritt	1923-1924	
Carl E. Ladd	1924-1931	
Lloyd R. Simons	1931-1954	
Morris C. Bond	1954-1962	
Alvin A. Johnson	1962-1967	
Edward H. Smith	1968-1973	
David L. Call	1973-1978	
Lucinda A. Noble	1978-1994	
William B. Lacy	1994-1998	
Merrill Ewert	1998-2002	and Associate Dean
Helene Dillard	2002-	

Director of the Division of Biological Sciences - 1965-1998

Robert S. Morison	1965-1970	
Richard D. O'Brien	1970-1978	
Harry T. Stinson, Jr.	1978-1979	Interim
Robert Barker	1979-1982	
Geoffrey W. G. Sharp	1983-1987	
Peter J. Bruns	1988-1998	

Director of International Programs

Kenneth L. Turk	1963-1974	
Edwin B. Oyer	1974-1977, 1982-1987	
Joseph F. Metz, Jr.	1977-1982	
E. Walter Coward	1987-1989	
Norman T. Uphoff	1989-2001	
W. Ronnie Coffman	2001-	

Director of Finance

Ralph H. Wheeler	1945-1951	
Arthur H. Peterson	1951-1961	
Robert L. Walsh	1961-1967	
Stewart M. Comber	1968-1983	
Nathan Fawcett	1984-1988	
John M. Finamore	1980-2006	Assoc. Dean 2000
Margaret H. Ferguson	2006-	

Appendix C
Heads of Departments 1907 - 2006

Department of Plant Breeding

Herbert J. Webber	1907-1912	Head
Harry H. Love	1913-1914	Acting
Rollins A. Emerson	1914-1942	
Harry H. Love	1942-1944	Acting
	1944-1949	
Sanford S. Atwood	1949-1953	
Royse P. Murphy	1953-1964	
Robert L. Plaisted	1964-1979	Chair
William D. Pardee	1979-1987	
W. Ronnie Coffman	1987-1993	
Elizabeth D. Earle	1993-2001	
W. Ronnie Coffman	2001-2006	
Mark E. Sorrells	2006-	

Associate Chairman of Biometrics Unit

Walter T. Federer	1948-1977
Daniel L. Solomon	1977-1981
Douglas S. Robson	1983-1985
George Casella	1985-1986
Charles E. McCulloch	1986-1995
Carlos Castillo-Chavez	1995-1998
Naomi S. Altman	1998-2000

Chair of Section of Genetics, Development and Physiology

Harry T. Stinson, Jr.	1965-1977

Chairs of Section of Botany, Genetics and Development

Harry T. Stinson, Jr.	1977-1978
Antonie W. Blackler (Acting Chair)	1978-1979
Dominic J. Paolillo Jr. (Acting Assoc. Chair)	1978-1979 (Term I)
Antonie W. Blackler (Acting Chair)	1979-1980 (Term I)
Harry T. Stinson, Jr. (Acting Chair)	1979-1980 (Term II)
Dominic J. Paolillo Jr. (Acting Assoc. Chair)	1979-1980

Section of Botany, Genetics and Development split into two Sections: Section of Genetics and Development (1980-1999) and Section of Plant Biology (1980-1999).

Chairs of Section of Genetics and Development

Peter J. Bruns	1980-1985
Ross J. MacIntyre	1985-1990
Stanley A. Zahler	1990-1994
Antonie W. Blackler	1994-1999

Appendix D
Faculty 1906 - 2006

E - emeritus
R - resigned

Tenure-track Faculty

Herbert J. Webber	1906-1912R	Professor	Acting Director 1909-1910 Acting Dean 1909-1910
Jesse B. Norton	1907-1908R	Asst. Professor	
Arthur W. Gilbert	1909-1916R	Professor	
Harry H. Love	1909-1949E	Professor	China 1925, 1929, 1931-1934
Clyde H. Myers	1911-1944E	Professor	China 1926, 1931
J. Randall Livermore[1]*	1913-1915R	Instructor	
	1921-1955E	Assoc. Professor	
Elmer E. Barker	1914-1919R	Asst. Professor	
Rollins A. Emerson	1914-1942E	Professor	
Allan C. Fraser*	1914-1941	Professor	Died 1941
Frank P. Bussell*	1915-1946E	Professor	
Roy G. Wiggans*	1915-1958E	Professor	1916-17 Ohio State, China 1930
Claude B. Hutchison	1916-1922R	Professor	
Robert D. Lewis	1925-1930R	Asst. Professor	
Henry M. Munger	1942-1983E	Professor	Joint with Dept. of Veg. Crops, Head 1951-1966; Los Banos, P.I. 1969-1970
Robert L. Cushing	1943-1947R	Assoc. Professor	
	1949-1951R	Professor	
Sanford S. Atwood	1944-1963R	Professor	Dean, Graduate School 1953-1955 Provost 1955-1963
Neal F. Jensen	1946-1978E	Professor	
Alvin A. Johnson	1946-1967R	Professor	Director of Extension 1962-1967, retired 1967
Royse P. Murphy	1946-1979E	Professor	Dean, Univ. Faculty 1964-1967
Harold H. Smith	1946-1957R	Professor	
Adrian M. Srb	1947-1983E	Professor	Genetics, 1965
Walter T. Federer	1948-1986E	Professor	Biometrics
Douglas S. Robson*	1949-1987E	Professor	Biometrics
Herbert L. Everett	1952-1983E	Professor	Los Banos, P.I. 1956-1957 Los Banos, P.I. 1964-1966, Project Leader Director of Instruction 1966-1977
Thomas L. York	1950-1957	Assoc. Professor	Joint with Dept. of Veg. Crops Los Banos, P.I. 1955-1957, died 1957
Carl C. Lowe	1952-1983E	Professor	
Robert G. D. Steel	1952-1960R	Assoc. Professor	Biometrics
Ronald E. Anderson	1954-1988E	Assoc. Professor	

1 * Began as Instructor or Research Associate.

Donald H. Wallace	1958-1992E	Professor	Joint with Dept. of Veg. Crops, Los Banos, P.I. 1967-1969
Robert R. Seaney	1955-1967	Assoc. Professor	U.S.D.A., Joint with Agronomy
	1967-1989E	Professor	Joint with Agronomy
Robert L. Plaisted	1956-1995E	Professor	Assistant Director of Research 1956-1959
Margaret H. Emmerling-Thompson[1]	1958-1962R	Asst. Professor	
Bruce Wallace	1958-1981E	Professor	Genetics, 1965
Keewhan Choi	1962-1966R	Asst. Professor	Biometrics
Shayle R. Searle	1962-1995E	Professor	Biometrics
Harry T. Stinson, Jr.	1962-1998E	Professor	Genetics, 1965, Acting Head Botany 1964-1965
Loy V. Crowder	1963-1979E	Professor	
	1966-1979		International Agriculture
Robert W. Miller	1963R	Asst. Professor	
B. Leo Raktoe	1964-1965R	Asst. Professor	Biometrics
J. Neil Rutger	1964-1970R	Assoc. Professor	
N. Scott Urquhart	1965-1971R	Assoc. Professor	Biometrics
Clarence O. Grogan	1966-1976R	Professor	
William D. Pardee	1966-2000E	Professor	Joint with Dept. of Agronomy
Daniel L. Solomon	1968-1981R	Professor	Biometrics
Abdossamad Heydayat	1969-1972R	Asst. Professor	Biometrics
Foster B. Cady	1971-1979R	Professor	Biometrics
Roger R. Davidson	1971-1973R	Asst. Professor	Biometrics
Vernon E. Gracen	1971-1986R	Professor	
Constance L. Wood	1973-1977R	Asst. Professor	Biometrics
Elizabeth D. Earle[2]*	1975-	Professor	
Peter Gregory*	1974-1985R	Assoc. Professor	
	1980-1982		Assist. Director of Research
	1985-		Adjunct Professor CIP, World Bank, Dept. of Plant Breeding
Roy Chaleff	1976-1980R	Asst. Professor	
Mark E. Sorrells	1978-	Professor	
Martha A. Mutschler	1979-	Professor	
Donald R. Viands	1979-	Professor	
	1995-		Assoc. Dir. Academic Programs
W. Ronnie Coffman	1981-	Professor	
	1981-1993		International Agriculture
	1993-2001		Assoc. Dean & Dir. Res.
	2001-		Director of International Programs
Pierre Yves Bouyette*	1981-1983R	Asst. Professor	
Steven D. Tanksley	1985-	Professor	
Margaret E. Smith Einarson	1987-	Professor	
	1998-2002		Assoc. Dir. Extension
John C. Steffens	1987-1999R	Assoc. Professor	

1 First woman faculty member.

2 * Began as Instructor or Research Associate.

Margaret M. Jahn	1991-	Professor
Susan R. McCouch	1992-1995	Adjunct Asst. Professor IRRI
	1995-	Professor, International Agriculture
Stephen Kresovich	1998-	Professor
	2005-	Associate Vice-Provost for Life Sciences
Walter De Jong	2000-	Asst. Professor
J. Jeffrey Doyle	2000-	Professor (joint with Plant Biology)
Timothy L. Setter	2002-	Professor (joint with Crop and Soil Science)
Rebecca J. Nelson	2002-	Assoc. Professor (joint with Plant Pathology)
Wojtek Pawlowski	2005-	Asst. Professor

Current Faculty at Geneva Experiment Station in the Graduate Field of Plant Breeding

Susan K. Brown	Professor
Michael H. Dickson-E	Professor Emeritus
Bruce I. Reisch	Professor
Richard W. Robinson-E	Professor
Norman F. Weeden	Professor R
Courtney A. Weber	Assoc. Professor
Phillip D. Griffiths	Assoc. Professor
Christopher L. Owens	Adjunct Asst. Professor

Other Academic Appointments

Invited temporary appointments and lectureships[1]

John H. Parker	1931-1932	Visiting Professor
Herbert K. Hayes	1932-1933	Visiting Professor
	1952-1954	Professor - Los Banos, P.I.
J. B. Harrington	1938	Resident Doctor
Edward Novitski	1950	Professor - Summer session
Bruce Wallace	1951	Professor - Summer session
Jens Clausen	ca1952	Lecturer
James L. Brewbaker	1953-1955	Assistant Professor - Los Banos, P.I.
Arthur M. Brunson	1954-1956	Professor - Los Banos, P.I.
Donald F. Jones	1954	Lecturer
Ralph E. Comstock	1954	Lecturer
Samuel C. Salmon	1955-1957	Professor - Los Banos, P.I.
Th. Dobzhansky	ca1955	Lecturer
Mogens C. Westergaard	1955	Lecturer
Arnold H. Sparrow	1956	Visiting Professor
Ray D. Owen	1956	Lecturer
Marcus M. Rhoades	1956	Lecturer
Stanley G. Stephens	1956	Lecturer
Ching-chun Li	1957	Lecturer

1 Various titles used in appointments, usually a lecturer gave lectures and consulted with students and staff and a professor gave formal instruction.

George F. Sprague	ca1957	Lecturer
George W. Beadle	ca1958	Lecturer
John J. Beardmore	1958	Visiting Professor
Boris Ephrussi	ca1958	Lecturer
Guido Pontecorvo	ca1960	Lecturer
LeRoy Powers	1960	Lecturer
John Laughnan	1961	Visiting Professor
Ernest W. Sprague	1963	Visiting Professor
Rafael R. Frankel	1964-1965	Visiting Professor
Karl Sax	1964	Visiting Professor
Sterling Emerson	1965	Visiting Professor
James C. Sentz	1966-1968	Professor, Los Banos, P.I.
Norman F. Borlaug	1972-1977	Adjunct Professor CIMMYT
Glenn W. Burton	1984-1987	Visiting Professor
James A. Hawk	1985	Visiting Professor

Annual appointments including visiting, adjunct, associates, etc.[1]

Charles F. Clark	1907-1911	Assistant Professor
Rhett Y. Winters	1912-1913	Instructor
Ernest G. Anderson	1918	Instructor
Ernest Dorsey	1919-1948	Instructor
Merl C. Gillis	1921-1924	Extension Assistant Professor
Lewis J. Stadler	1926	Fellow NCR
George W. Beadle	1928-1930	Experimentalist
Carl G. Scott	1928-1933	Experimentalist
Charles R. Burnham	1929, 1931	Fellow NCR
John B. Cotner	1930	Extension Assistant Professor
William D. Swope	1930-1953	Extension, Seed Technologist
Marcus M. Rhoades	1932-1935	Experimentalist
Barbara McClintock	1934-1936	Research Associate
Karl H. Jarvis	1936-1941	Research Assistant
Henry M. Munger	1940-1941	Experimentalist
Merritt J. Murray	1941-1943	Instructor
Donald H. Wallace	1954-1956	Acting Assistant Professor
Edwin J. Kinbacker	1956-1963	Associate Professor, USDA, Joint with Agronomy
Harley J. Otto	1957-1958	Assistant Professor
Oivind Nissen	1958	Assistant Professor
William D. Pardee	1960-1961	Research Associate
Ross J. MacIntyre	1964-	Research Associate, Genetics, 1965
Colin J. Driscoll	1964	Research Associate
Marvin L. Risius	1965	Assistant Professor
Mikhail Nasrallah	1965-1967	Assistant Professor
Ronald L. Phillips	1966	Research Associate, Genetics
Thomas E. Devine	1967-1969	Assistant Professor, USDA, joint Dept. Agronomy
Ricardo M. Lantican	1967-1968	Visiting Associate Professor
Bir B. Singh	1967-1968	Research Associate

1 Various titles used. Also, see Walter T. Federer 1989. The Biometrics Unit. BU-1000-M. Cornell University.

Ruben M. Heerman	1967-1968	Professor, USDA
	1970-1976	Associate Director Research
Oscar H. Pearson	1967-1972	Senior Research Associate
Herbert M. Schaaf	1969-1979	Professor, USDA, Joint Dept. Agronomy
Aurora Calo	1969-1972	Research Associate
Mary M. Bechtold	1972-1974	Research Associate
Dermot P. Coyne	1972	Visiting Fellow
John R. Stander	1973	Extension Associate
John S. Niederhauser	1973	Visiting Fellow
Carlos J. Torres	1974	Visiting Fellow
James L. Brewbaker	1974	Visiting Fellow
U. Jerry Grant	1975-1977	Visiting Fellow
Sheng-Tian Yen	1976-1979	Research Associate
Ahmed Kheyr-Pour	1978-1980	Visiting Fellow
Richard W. Zobel	1978-1997	Professor, USDA, Joint with Agronomy
Ruben L. Villareal	1979	Visiting Professor
David E. Matthews	1980-	Adjunct Associate Professor, USDA
Jean D. Kreizinger	1980-1981	Visiting Fellow
Robert W. Hoopes	1983-1987	Senior Research Associate
Durvasala V. Seshu	1983-1984	Visiting Fellow
	1986-1988	Adjunct Professor
Daniel Zamir	1986-	Adjunct Professor
Julie L. Hansen	1989-	Senior Research Associate II
Reynaldo L. Villareal	1990-	Adjunct Professor, CIMMYT
Miloudi Nachit	1991-2006	Adjunct Professor, ICARDA
Kazuo Watanabe	1992-	Adjunct Assistant Professor, CIP, Kobe University
Sanjaya Rajaram	1992-1995	Adjunct Professor, CIMMYT
Kandukuri V. Raman	1993-	Adjunct Professor, ISAAA, CEEM
David Altman	1992-1995	Adjunct Professor, ISAAA
Narendra N. Roy	1992-1996	Visiting Fellow
Anatole F. Krattiger	1992-	Executive Director, ISAAA, Director, Swift
David McElroy	1996-	Adjunct Assistant Professor, Dekalb Genetics
Samuel Cartinhour	1999-2003	Adjunct Associate Professor, USDA
David F. Garvin	1998-2003	Adjunct Assistant Professor, USDA
Thomas Brutnell	2000-	Adjunct Professor, BTI
Vernon E. Gracen	2002-	Visiting Professor
Edward S. Buckler	2003-	Adjunct Associate Professor, USDA
Li Li	2003-	Adjunct Assistant Professor, USDA
Matthew Blair	2005	Adjunct Assistant Professor, CIMMYT
Frank A. Shotkoski	2005-	Adjunct Professor
Sushma Naithani	2006-	Lecturer

Annual appointments for research associates, postdoctoral associates, postdoctoral fellows, visiting fellows.

Research Associates

Dirk Avé	1982-1987	Senior Research Associate
Martin Ganal	1987-1993	Research Associate
Kathiravetpillai Arumuganathan	1988-1992	Research Associate
Thomas Barker	1988-1992	Senior Research Associate
Donald Walters	1988-1992	Research Associate
Nevin Young	1988-1989	Research Associate
Barbara Liedl	1989-1995	Research Associate
Sally Newman	1989-1996	Research Associate
John Murphy	1991-1994	Research Associate
Gurdev Ghangas	1992-1998	Research Associate
Jeffrey Mullen	1992-1994	Research Associate
Jill Miller-Garvin	1993-2001	Research Associate
George Craig Yencho	1994-2001	Research Associate
Swapan Chaudhuri	1994-1996	Research Associate
Susan Ely	1994-1996	Research Associate
Marina Sigareva	1994-1998	Research Associate
Amy Frary	1995-2000	Research Associate
Li Li	1995-1998	Research Associate
Svetlana Temnykh	1995-2004	Research Associate
Jun Cao	1996-2006	Research Associate
Anne Frary	1998-2001	Research Associate
Laurie Landry	1998-2001	Research Associate
Barbara Sneath	1999	Research Associate
Thomas Tai	1997-1999	Research Associate
Ramesh Kantety	2000	Research Associate
Rutger Van der Hoeven	1995-2002	Research Associate
Danielle Clark Lupold	1999-2002	Research Associate
Bin Cong	2000-	Research Associate
Jungjan Ni	2001-	Research Associate
Jiping Liu	2002-	Research Associate
Helen Griffiths	2002-2005	Research Associate
Byoung-Cherol Kang	1995-2005	Research Associate
Pankaj Jaiswal	2001-	Research Associate
Lukas Mueller	2003-	Senior Research Associate
Jonathan Comstock	2004-2006	Senior Research Associate
Hilary Mayton	2006-	Research Associate

Postdoctoral Associates

Kumar Paka	1985-1986
Nora Lapitan	1986-1989
Andrew Paterson	1987-1989
Margaret Peterson	1987-1991
Joseph Goffreda	1988-1989
Gregory Martin	1989-1992
Ann Kennedy	1989-1991
Madge Rothenberg	1989-1990
Merideth Bonierbale	1990-1992
James Giovannoni	1990-1992
John Ingersoll	1990-1991
Marion Röeder	1990-1992
Pamela Ronald	1990-1992
Zhenyuan Wang	1990-1991
Carmen de Vicente	1991-1992
Louise O'Donoughue	1991-1992
James Prince	1991-1993
Jianping Kuai	1992-1996
Tiyun Wu	1992-1996
Seiji Yanagihara	1992-1995
Pierre Broun	1993-1994
Rebecca Doerge	1993-1995
Douglas Heather	1993-1994
Padamawabanj Nagarajan	1993-1995
Olivier Panaud	1993-1995
Stanley P. Kowalski	1994
Klaus Pillen	1993-1996
Allen Van Deynze	1993-1995
Sang Nag Ahn	1994-2000
Kenneth L. McNally	1994-1996
Johnson Olufowote	1994-1995
Jie Xu	1994-1996
J. Clare Nelson	1995-1997
Elaine Radwanski	1995-1997
Tao Wei	1995-1997
William Wilson	1995-1998
Jinhua Xiao	1995-1997
Yunbi Xu	1995-2006
Silvana Grandillo	1996-2000
Darlene Lawson	1996-1997
Zhengqiang Ma	1996-2004
Piyada Thipyapong	1996-1999
Matthew Blair	1997-1999
Esther van der Knaap	1998-2001
Hsin-Mei Ku	1998-2000
Sami Doganlar	1999-2001
Catharine Catranis	1999
Jian-Ping Ren	1999
Aigars Brants	2000-2001
Rebecca Grube	2000
Maria Moncada	2000
Alejandra Mora-Aviles	2000
Huver Posada-Suarez	2000
Kede Liu	2001-2003
Timothy Gabriel Porch	2001-2002
Ali Ramazan Alan	2002-2006
Han Suk Kim	2002
Hailu Tefera	2002-2006
Michael J. Thomson	2001-2003
Ju-Kyung Yu	2001-2006
Ying Wang	2002-2005
Immanuel Yap	2002-
Min-Jea Kim	2003
Hong Lu	2003
Ndang Mulyani Septiningsih	2003
Luz Barrero	2004-2006
Wansang Lim	2004-
Shana Moore Fellman	2004-
Mande Semon	2004-
Boris Igic	2005-2006
Naama Menda	2005-
Dean Ravenscroft	2005-
Arnaud Ronceret	2005-
Charles E. Stewart	2005-2006
Isaak Tecle	2005-
Moira Sheehan	2006-
Megan T. Sweeney	2006-
Chih-Wei Tung	2006-
Mahmoud Zeid	2006-
Stella Zitter	2006-

Postdoctoral Fellows

Michael Champoux	1993-1994
Pinio Soares	1993-1994
Zhengqiang Ma	1994-1995
Sugiono Moeljopawiro	1993-1995
Silvana Grandillo	1996-2000
Yong Gu Cho	1999-

Marappa Maheswaran	1994-1999
Gilbert Monforte	1997-1999
Marie-Noelle Ndjjiondjop	2000
Christelle Etienne	2002
Chun Suk Jung	2005-

Visiting Fellows

Jelena Levic	1985-1986
Odal Kwon	1986
Ramon Messenguer	1987-1989
John Dodds	1988-1989
Gerard Second	1989-1990
Hamdy El-Deweny	1989
Gail Rubin	1989-1995
Augustin Ungurean	1989
Kuo-Kao Wu	1989-1990
Osami Furumoto	1990
Takashi Hagio	1990-1991
Manford Heun	1990-1992
John A. Juvik	1990-1991
Harumi Kikuchi	1990-1991
Cesar Martinez-Racines	1990-1991
Le Thi Xuan	1990
Daniel Joel	1991-1992
Tomoko Murai	1991-2007
Wang Su	1991-1992
Tantono Subagyo	1991
Stephane Bentolila	1992-1995
Angel Capurro	1992-1993
Teodoro Cardi	1992-1996
Dominique Fourdrinier	1992
Eitan Harel	1992-1993
Syed Hossain	1992-1993
Kharaiti Mehra	1992
Eija Pehu	1992-2007
Qingzhong Xue	1992-1993
Wei Kan Yan	1993-1996
Shawky Abo El Sadd	1993
Daniella Braga	1993-1995
Hamdy El-Sherbieny	1993
Habib Ketata	1993
Galal Mahgoub	1994
Davendra Sharma	1993
Akihiro Arihara	1994-1995
Mirja Auranen	1994-1995
Cristina Carpio	1994
Baojian Huang	1994-1995
Jochen Huhn	1994
Suman Lakhanpaul	1994
Katarzyna Niemirowicz-Szczytt	1994
Anurudh Singh	1994
Kazuycshi Hosaka	1995
Hee Jong Koh	1995-2004
Hector Sanchez	1995
Ahmad Al Saleh	1996
James Blauth	1996
Charles Brown	1996-1997
Takashige Ishii	1996-1997
Hyeon So Ji	1996-2004
Janos Kovacs	1996-1997
Timothy Metz	1996
Xinqi Li	1997-2000
Ripusudan Paliwal	1997-2000
Dominique This	1998-2003
Todd Vision	1998
Jeong Shin	1999
Thierry Cadalen	1999
Maria Ercolono	1999
Ahmad Maqbool	1999
Michael Baum	2000
Reynaldo Ebora	2000-2002
Ismahane Elouafi	2000
Nurit Katzir	2000
Richard David Kryder	2000-2007
Dwinita Utami	2000
Parichart Burns	2001
Kuan Chang	2001-2003
Kuanyuan Chang	2001-2003
Le Thi Thu Hien	2001
Tatjana Gavrilenko	2001
Julio Kalazich	2001-2002
Peng Lam	2001
Mahmoud Lotfi	2001
Eun Young You	2001
Arnon Ben Chaim	2002-2005
Young Il Cho	2002-2005
Sunita Jain	2002-2004
Hui Jiang	2001-2004
Clair H. Hershey	2002
Hyun Jung Kim	2002
Ki-Teak Kim	2002-2004
Jonaliza Lanceras	2002
Gang Seop Lee	2002-2006

Robert Potter	2002
Boris Sagredo Diaz	2002
Abreha Aderajew	2003
Hyeonso Ji	2003
Seung Joon Lee	2003
Hanxi Li	2003
Yongfei Zhang	2003
Soloman Kassa	2003-2004
Pasquele Tripoli	2005-
Ormubol Chomdej	2006-
Kadriye Kantoglu	2006-
Juliang Zhao	2006-

Appendix E
Support Staff[1] 1907 - 2006

Central Office Management

Anna Atwater	1907-1918	Secretary
Francis Feehan	1913-1940	Statistical Clerk
	1941-1953	Secretary
Anne Beckley	1925-1940	Secretary
Jean Hover-Durso	1952-1971	Secretary
	1971-1978	Administrative Assistant
Lorraine Hollenbeck	1971-1993	Administrative Assistant
Cynda Farnham	1980-1993	Secretary
	1993-	Administrative Assistant
Flora Karasin	2002-	Administrative Assistant

Central Office Finance

Robert B. Reddick	1966-1976	Purchasing
Annie B. Rogers	1973-1985	Secretary
Daniel M. Winch	1976-1987	Purchasing
Sharon Kenyon	1978-1983	Administrator
Allene C. Hays	1983-2001	Administrator
Marggy F. Vangeli	1984-	Financial Specialist
Tammy J. Thomas	2001-	Administrator

Secretary

Mabel V. Perry	1949-1964
Verna Turk	1955-1965
Janine Hart	1958-1970
Florence Brown	1965-1977
Steffie Z. David	1969-1995
Carole L. Morehouse	1971-2001
Laurie J. Hanley	1981-2002

Biometrics Unit Secretary

Annabelle Pedersen	1949-1952
O. Helen Resnick	1953-1956
Donna VanOrder	1956-1985
Helen Seamon	1957-1985
Betty Holeman	1963-1969
Norma E. Phalen	1972-1991

1 General classification of responsibilities.

Farm Manager

H. W. Teeter	1908-1940	
Seba Sloughter	1940-1955	
Robert B. Reddick	1955-1966	
Albert N. Parente	1966-1995	
Daniel L. VanVleet	1995-	

Greenhouse Manager

Orrie Cornelius	1923-1954	
Andrew Zergenyi	1954-1966	
Harry D. Wellin	1966-1995	
John Jantz	2000-	

Small Grains

William T. Craig	1913-1945	Research Associate
George H. Willis	1934-1971	Experimentalist
Alan M. Neiss	1965-1996	Research Support Specialist
Susan Price	1970-1975	Technician
Todd Sherwood	1994-1996	Technician
David Benscher	1996-	Research Support Specialist
Gretchen L. Salm	1998-	Technician
Robert Green	1998-2004	Technician
James Tanaka	2001-	Technician
Roxanne VanWormer	2007-	Technician

Corn Breeding

John W. Swarthout	1946-1965	Experimentalist
Raymond Davenport	1965-1976	Experimentalist
Clifford E. Manchester	1966-1988	Research Associate
John R. Kelly	1974-1995	Technician
Laraine Ericson	1980-	Research Support Specialist
Sherrie A. Norman	1981-	Research Support Specialist
Daniel E. Lathwell	1990-1997	Technician
Ronald Nelsen	2000-	Technician
Adam LaLonde	2002-	Technician

Forage Crops Breeding

Francis A. Munch	1947-1978	Experimentalist
Norma Brace	1957-1980	USDA

J. Kenneth Devine, Jr.	1963-1996	Experimentalist
Gloria Shen	1970s	Technician
Iva Cohen	1970s	Technician
Pamela Horn	1970s	Technician
Robert Heisey	1972-1975	Technician
Melissa Craven-Fowler	1975-1981	Research Support Specialist
David L. Vaughn	1979-1988	Research Support Specialist
Edward M. Thomas	1982-	Research Support Specialist
Steven Haner	1996-2001	Technician
Jerry A. Yaeger	1997-	Technician
Robert Deubler	2000-	Technician
Jamie L. Neally	2001-	Technician

Potato Breeding

John J. McAllister	1934-1963	Experimentalist
Daniel M. Winch	1963-1976	Experimentalist
Roland J. Kelly	1976-1981	Experimentalist
James Finnerty	1980s	Field Assistant
Kenneth M. Paddock	1981-	Experimentalist
Lynn H. Rider	1983-	Field Assistant
Gloria Tubbs	1985-1999	Technician
Mark D. Stilwell	1989-	Technician
Deborah Kenyon-Koch	1999-	Technician
Shuping Cheng	2002-	Technician

Vegetable Breeding

W.I. Fisher	1912-1945	Experimentalist
Carl L. English	1948-1973	Experimentalist
Bruce H. Rich	1965-1997	Research Support Specialist
Susan Fast	1970s	Technician
Robert W. Riker	1974-1990	Research Support Specialist
Edward Cobb	1980-2004	Research Support Specialist
Sue Fenton	1990s	Technician
George Moriarty	1991-	Research Support Specialist
Brynda Beeman	1998-	Technician
Mark Henning	1999-2004	Technician
Mary E. Kreitinger	2000-	Research Support Specialist
Matthew Falise	2000-	Technician
Maryann Fink	2003-	Technician
Michael A. Glos	2004-	Technician
Peter T. Hyde	2004-	Technician
Stephen E. Southwick	2006-	Technician

Genetics

Marcus M. Rhoades	1932-1935	Experimentalist
Gabriel A. Lebedeff	1935-1940	Experimentalist
Margery Shaw	1947-1951	Lab Technician
Mary Basl	1963-1993	Teaching Support Specialist, Genetics, 1965
Nancy Eannetta	1980-	Research Support Specialist
Lou Ann Batts	1982-1995	Lab Technician
Theresa Fulton	1987-2000	Extension Associate
Nickolas VanEck	1989-	Research Support Specialist
Sandra E. Harrington	1992-	Research Support Specialist
Fumio Onishi	1997-	Technician
Yimin Xu	1998-	Research Support Specialist
Lois A. Swales	1999-	Administrative Assistant
Xiao Min Jia	2001-	Technician
Ingrid S. Phillips	2003-	Technician
Lingxia Huang	2005-	Technician
Jennifer Kimball	2006-	Technician

Extension

David Wilson	1965-1969	Experimentalist
Fred J. Spry, Jr.	1969-1983	Experimentalist
Judy L. Singer	1976-	Extension Support Specialist
Keith Payne	1977-	Technician

Field Assistants

Cary L. Drake	1928-1960	
Dennis J. Willsey	1942-1971	
Albert Berich	1943-1959	
S. Louise Armitage	1948-1971	
Roland G. Van Sickle	1948-1963	
Joseph T. Peterson	1949-1958	
William C. Washburn	1956-1972	
Roland J. Kelly	1961-1976	
Nelson L. Pratt	1965-1996	
Larry A. Bush	1966-1997	
Donald C. Coonradt	1966-2000	
James N. Hatch	1968-1996	
Irving Hand	1970s	
George R. Thomas, Jr.	1980-1996	Mechanic
John Conklin	1996-	Mechanic
Stephen J. Lis, Jr.	1997-	
Timothy Dodge	2001-	

Appendix F
University Professors and Scholars

Andrew Dickson White Professor-at-Large

Barbara McClintock	1965-1971, 1971-1974	Genetics
Norman E. Borlaug	1982-1988	Plant Breeding
Margery W. Shaw	1982-1988	Science and Society
M.S. Swaminathan	1989-1995	Plant Breeding

Messenger Lecturer

Thomas H. Morgan	1930-1931	Genetics
Clarence C. Little	1945-1946	Genetics
Herman J. Muller	1945-1946	Genetics
Laurence H. Snyder	1945-1946	Genetics
Jens C. Clausen	1950-1951	Genetics and Ecology
Guido Pontecorvo	1957-1958	Genetics
Alexander Hollaender	1962	Genetics

Appendix G
Notable Recognitions and Scholarly Books

Chaired Professorship

Adrian M. Srb	1976	Jacob Gould Schurman
Neal F. Jensen	1977	Liberty Hyde Bailey
Walter T. Federer	1978	Liberty Hyde Bailey
Steven D. Tanksley	1994	Liberty Hyde Bailey

Member of the National Academy of Sciences

Rollins A. Emerson	1927
Adrian M. Srb	1968
Bruce Wallace	1970
Steven D. Tanksley	1995

Fellow of the American Academy of Arts and Sciences

Adrian M. Srb	1961
Bruce Wallace	1971

Honorary Degree

Rollins A. Emerson	1917	University of Nebraska
Alvin A. Johnson	1965	North Dakota State University
Adrian M. Srb	1969	University of Nebraska
Henry M. Munger	1994	University of Nebraska

President of Scientific Societies

Rollins A. Emerson	1923	American Society of Naturalists
	1933	Genetics Society of America
J. Randall Livermore	1932, 1933	Potato Association of America
Walter T. Federer	1960	Biometrics Society (ENAR)
Royse P. Murphy	1962	Crop Science Society of America
Henry M. Munger	1966	American Society of Horticultural Science
Douglas S. Robson	1970	Biometrics Society (ENAR)
Bruce Wallace	1970	American Society of Naturalists
	1974	Genetics Society of America
	1974	Society for the Study of Evolution
	1990	American Genetics Association
Robert L. Plaisted	1972	Potato Association of America

Some Special Awards

Harry H. Love. 1965. Knight Commander of the Most Noble Order of the Crown of Thailand.

Neal F. Jensen. 1977. DeKalb Crop Science Distinguished Career, Crop Science Society of America.

Donald H. Wallace. 1970. Campbell Soup, American Society of Horticultural Science.

_____. 1981. Asgrow Merit, American Society of Horticultural Science.

Henry M. Munger. 1969. Asgrow Merit, American Society of Horticultural Science.

_____. 1994. World Seed Prize, Federation Internationale du Commerce des Semances.

_____. 1995. Hall of Fame, American Society of Horticultural Science.

_____. 1996. Luther Burbank Medal, American Society of Horticultural Science.

Steven D. Tanksley. 1998. Alexander von Humboldt Foundation Award

_____. 2004. Wolf Foundation Prize in Agriculture

_____. 2005. Kumho Award in Plant Molecular Biology and Biotechnology

Science Books

Love, Harry H. 1937. *Applications of Statistical Methods to Agricultural Research*. The Commercial Press, Limited, Shanghai, China.

_____. 1943. *Experimental Methods in Agricultural Research*. The Agricultural Experiment Station of the University of Puerto Rico, Rio Piedras, PR.

Jensen, Neal F. 1988. *Plant Breeding Methodology*. Wiley Interscience, John Wiley & Sons, New York, NY.

Wallace, Donald H. and Weiki Yan. 1998. *Plant Breeding and Whole-System Crop Physiology - Improving Crop Maturity, Adaptation and Yield*. CAB International, Wallingford, UK.

Srb, Adrian M. and Ray D. Owen. 1952. *General Genetics*. W. H. Freeman and Company, San Francisco, CA.

_____, Ray D. Owen and Robert S. Edgar. 1965. *General Genetics (rev.)*. W. H. Freeman and Company, San Francisco, CA.

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_____, _____ and _____. 1975. *Editors, Genes, Enzymes and Populations*. Vol. 2, Basic Life Sciences. Plenum Press, NY.

Wallace, Bruce. 1966. *Chromosomes, Giant Molecules, and Evolution*. W. W. Norton and Company, NY.

_____. 1968. *Topics in Population Genetics*. W. W. Norton and Company, NY.

_____. 1970. *Genetic Load*. Prentice-Hall, NJ.

_____. 1972. *Essays in Social Biology* (3 Volumes). Prentice-Hall, NJ. (Biology and Society at Cornell University.)

_____. 1981. *Basic Population Genetics.* Columbia University Press.

_____. 1991. *Fifty Years of Genetic Load: An Odyssey.* Cornell University Press.

_____. 1992. *The Search for the Gene.* Cornell University Press.

_____ and Th. Dobzhansky. 1959. *Radiation, Genes and Man.* Henry Holt and Company, NY.

_____ and Adrian Srb. 1961. *Adaptation.* Prentice-Hall, NJ.

_____ and _____. 1964. *Adaptation.* Second Edition.

Lewontin, R. C., J. A. Moore, W. B. Provine, and B. Wallace (Eds.). 1981. Dobzhansky's *"Genetics of Natural Populations I-XLIII."* Columbia University Press.

Dobzhansky, Theodosius and Ernest Boesiger (edited and completed by Bruce Wallace). 1983. *Human Culture: A moment in evolution.* Columbia University Press.

Wallace, Bruce and George M. Simmons, Jr. 1987. *Biology for Living.* Johns Hopkins University Press, Baltimore. (BSCS Text for Non-biologists.)

_____ and Joseph O. Falkinham. 1997. *The Study of Gene Action.* Cornell University Press.

Federer, Walter T. 1955. *Experimental Design - Theory and Application.* Macmilliam Co., NY.

_____. 1973. *Statistics and Society.* Marcel Dekker Inc. NY. Second edition 1998.

_____. 1993. *Statistical Design and Analyses for Intercropping Experiments.* Vol. I: Two Crops. Springer-Verlag, NY etc. Vol. II in press 1998.

_____ and Leslie N. Balaam. 1973. *Bibliography on Experiment and Treatment Design Pre-1968.* Oliver and Boyd, Edinburgh.

Searle, Shayle R. 1966. *Matrix Algebra for the Biological Sciences.* John Wiley & Sons, NY.

_____. 1971. *Linear Models.* John Wiley & Sons, NY.

_____. 1982. *Matrix Algebra Useful for Statistics.* John Wiley & Sons, NY.

_____. 1987. *Linear Models for Unbalanced Data.* John Wiley & Sons, NY.

_____ and W. H. Hausman. 1970. *Matrix Algebra for Business and Economics.* John Wiley & Sons, NY.

_____, George Cassella and Charles E. McCulloch. 1972. *Variance Components.* John Wiley & Sons, NY.

Graduate Student Awards (Munger/Murphy)

Alexandra Casa, Julie Ho, Timothy Porch	2001
Ayman Ali Diab	2002
Jeremy Edwards	2003
Jesse Munkvold, Randy Wisser	2004
Liza Conrad	2005
Cintia Orsi, Seth Murray	2006

Appendix H
Varieties Released

Forage Crops

Name	Year	Breeder	Distribution
Timothy:			
Cornell 1777	1922	Webber-Myers	limited
Cornell 4059	1922	"	limited
Essex	1958	Murphy	limited
Champlain	1974	Lowe	very limited
Chazy	1989	"	private company
Tupper	1989	"	private company
Bromegrass:			
Saratoga	1958	Murphy	wide
York	1989	"	private company
Peak	1994	"	private company
Alfalfa:			
Cayuga	1960	Murphy	wide
Saranac	1963	"	very wide
Mark II	1965	"	some
Iroquois	1966	"	very wide
Multileaf	1975	"	very limited
Saranac AR	1975	"	very wide
Honeoye	1975	"	some
Oneida	1980	"	wide
Oneida VR	1983	Viands-Lowe	very wide
Mohawk	1985	Murphy	some
Reselect Saranac	1985	"	private company
Pinnacle	1986	Viands	wide
Sabre	1988	"	wide
Majestic	1988	"	wide
Medallion	1988	"	private company
Eclipse	1988	"	"
Victory	1989	"	"
Guardsman	1990	"	"
Preferred	1994	"	"
Oneida Ultra	1995	"	"
unnamed	1996	"	"
unnamed	1996	"	"

Birdsfoot Trefoil:

Empire[1]	1947	MacDonald	very wide
Viking[1]	1949	"	very wide
Norcen[2]	1981	Viands et al.	some
Pardee	2000	Viands	some

Small Grains

Name	Year	Breeder	Distribution
Winter Wheat:			
Shepherd	1912	Leighty/Love	unknown
Honor	1918	Webber/Love	unknown
Forward	1920	Love	unknown
Valprize	1930	"	unknown
Yorkwin	1936	"	wide
Nured	1938	"	limited
Cornell 595	1942	"	very wide
Genesee	1950	Jensen-Love	very wide
Avon	1959	Jensen	wide
Yorkstar	1968	"	wide
Arrow	1971	"	limited
Ticonderoga	1974	"	wide
Houser	1977	"	wide
Purcell	1979	"	limited
Geneva	1985	Sorrells	very wide
Susquehanna[3]	1989	"	some
NY Batavia	1994	"	wide
Cayuga	1995	"	new
Caledonia	1997	"	new
Spring Oats:			
Cornell Welcome	1909	Norton-Webber	limited
Empire	1918	Love	"
Upright	1918	"	"
Cornellian	1920	"	"
Comewell (Welcome)	1921	"	"
Standwell	1921	"	"
Ithacan	1922	"	"
Lenroc	1936	"	"

1 Dept. of Agronomy.
2 Produced from cooperative research among several states.
3 Joint release Maryland with New York.

Goldwin	1944	Love-Jensen	wide
Mohawk	1947	Jensen	very wide
Advance	1949	"	limited
Craig	1951	"	limited
Oneida	1960	"	limited
Tioga	1962	"	limited
Niagara	1963	"	limited
Orbit	1966	"	very wide
Cayuse[1]	1966	"	some
Astro	1972	"	very wide
Ogle[2]	1980	"	very wide
Newdak[3]	1990	Sorrells	wide
Rodeo2	1997	"	new
Moffat	1997	"	private company

Spring Barley:

Featherton #7	1917	Love	unknown
Alpha	1921	"	wide
Erie	1951	Jensen	wide

Winter Barley:

Wong	1941	Love	very wide
Hudson	1951	Jensen	wide
Dutchess	1961	"	limited
Catskill	1963	"	limited
Schuyler[4]	1968	"	very wide
Wintermalt[5]	1978	"	limited
Willis	1983	"	limited

Corn

Name	Year	Breeder	Distribution
Weber's Early Dent O.P.	1922	Webber et al.	limited
Cornell 12 O.P.	1922	"	limited
Cornell 11 O.P.	1922	"	wide
Cornell 29-3	1932	Wiggans	very wide
Cornell 29-5	1932	"	limited
Cornell 34-53	1938	"	limited
Cornell 35-5	1945	"	limited
Cornell E-10	1951	"	limited

1 Joint releases with Washington State University and University of Idaho.
2 Joint release with University of Illinois.
3 Joint release with North Dakota State University.
4 Used in several states. Certified seed produced in Colorado, Idaho, Arizona and New Mexico.
5 Joint release with Oklahoma State University.

Cornell M-1	1951	"	limited
Cornell M-4	1954	"	very wide
NE 310	1957	Everett	some
Cornell M-8		1959	" limited
Cornell M-10	1959	"	limited
Cornell M-3	1959	"	very wide
Cornell M-9	1964	"	limited
Cornell 101	1970	Grogan	some
Cornell 110	1972	"	some
Cornell 407	1973	"	some
Cornell 565	1973	"	some
Cornell 281	1977	"	wide
Cornell 175	1980	Everett	wide
Cornell 279	1982	"	some

1982-date:

26 inbred lines	Resistant to leaf blight	Gracen/Smith
9 " "	Resistant to European corn borers	Gracen/Smith
3 " "	Resistant to anthracnose stalk rot	Smith/Gracen
28 " "	Yield and adaptation combining ability	Smith/Gracen

Soybeans

Name	Year	Breeder	Distribution
Cayuga	1934	Wiggans	limited
Seneca	1940	Wiggans	limited

Potatoes

Name	Year	Source	Distribution
Empire	1945	Reddick-Peterson[1]	unknown
Ashworth	1946	"	"
Cayuga	1946	Blodgett[1]	"
Chenango	1946	Reddick-Peterson[1]	"
Glenmeer	1946	"	"
Ontario	1946	Blodgett[1]	wide
Placid	1946	Reddick-Peterson[1]	unknown
Seneca	1946	Blodgett[1]	"
Virgil	1946	Reddick-Peterson[1]	"

1 Department of Plant Pathology

Cortland	1947	"	"
Essex	1947	"	"
Fillmore	1947	"	"
Harford	1947	"	"
Madison	1947	"	"
Saranac	1949	Livermore-Stevenson (USDA)	limited
Canoga	1950	Livermore	"
Snowdrift	1950	Reddick-Peterson	"
Peconic	1966	Peterson-Plaisted	"
Bake-King	1967	Plaisted	limited
Hudson	1972	Plaisted-Peterson	"
Rosa	1981	Plaisted	"
Elba	1985	Plaisted-Thurston	limited
Hampton	1985	Plaisted	some
Kanona	1988	"	wide
Allegany	1989	"	limited
Steuben	1989	"	limited
Genesee	1993	"	limited
Andover	1995	"	wide
Pike	1995	"	very wide
Reba	1997	"	very wide
Salem	1997	"	wide
Eva	1999	"	wide
Keuka Gold	1999	"	limited

Dry Beans

Name	Year	Source	Distribution
Geneva	1918		unknown
Honeoye	1918		unknown
Perry Marrow	1918	Emerson et al.	Wide
Monroe	1950	Munger	unknown
Steuben Yellow Eye	1960	D. Wallace	wide
Redkote	1965	"	wide
Redcloud	1973	"	wide
Midnight Black Turtle Soup	1980	Sandsted, Vegetable Crops	wide
Aurora Small White	1986	"	some
Ruddy Light Red Kidney	1990	"	some
NY4109	1990	D. Wallace	some
Redkanner	1997	"	new

Vegetables

Name	Year	Source	Distribution
Cabbage:			
Several selections	1925-1934	Myers	unknown
Empire Danish	1955	Munger	some
Celery:			
Cornell #19	1941	Emerson	wide
Emerson Pascal	1950	Munger	"
Beacon	1969	"	"
Pickling Cucumber:			
21 releases	1950-to date	Munger	wide
Slicing Cucumber:			
30 releases (lines of Niagara, Tablegreen, Marketmore, Poinsett, and F1 hybrids)	1951-to date	Munger	wide
Marketmore 76	1976	Munger	very wide
Marketmore 86	1986	Munger	limited
Marketmore 97	1997	Munger-Henning	"
Poinsett 97	1997	Jahn-Munger-Henning	wide
Marketmore 2000	2000	Munger-Jahn-Henning	limited
Green Finger	2006	Jahn-Moriarty	"
Melon:			
Hannah's Choice	2003	Jahn-Henning	limited
PMR Delicious 51	2003	Jahn-Munger-Henning	"
Muskmelon:			
Iroquois	1944	Emerson-Munger	wide
4 releases	1948-to date	Munger	"
Onion:			
3 F1 hybrids	1959-to date	Munger	wide
Algonquin	2004	Mutschler	limited
Cayuga	2004	"	"
Elba Gold	2004	"	"
Iroquois	2004	"	"

Pepper:

Peacework	2007	Jahn-Moriarty-Glos	new

Summer Squash:

Success PM yellow squash	2002	Jahn-Moriarty	some
Romulus PM zucchini	2005	"	limited

Winter Squash:

2 releases	1977-to date	Munger	wide
Bugle	2000	Jahn-Moriarty	"
Harlequin	2000	"	limited
Cornell's Bush Delicata	2002	"	"
Sweet REBA	2003	"	"

Tomato:

Valnorth	1954	Munger	wide
Gardener	1962	"	"
3 releases	1965-to date	Munger-Mutschler	"
Numerous germplasm exchanges and releases			

Appendix I
Pure Seed Program 1915 - 2006

Department Project Leader

Frank P. Bussell	1915-1947
Alvin A. Johnson	1947-1963
Loy V. Crowder	1963-1966
William D. Pardee	1966-2003
Margaret E. Smith	2004-

Seed Cooperatives

New York Certified Seed Growers' Cooperative	1923
New York Foundation Seed Stocks Cooperative	1947
Merged as New York Seed Improvement Cooperative	1970
Became NY Seed Improvement Project in Department	1991

Managers of Seed Cooperatives

Alvin A. Johanson	1947-1950
Russell H. Bradley	1950-1964 on leave 1963
Royse P. Murphy	1963
Winton M. Baines	1965-1984
Don K. Shardlow	1984-1990
"	1991-2002 Executive VP of Cooperative
A. Alan Westra	2001-

Directors of International Crop Improvement Association (ICIA) (ICIA became AOSCA in 1969)

Bruce Jones (seed grower)	1945-1951
Alvin A. Johnson	1952-1962 Honorary Member 1964
Royse P. Murphy	1963
Loy V. Crowder	1964-1965
William D. Pardee	1966-1968

Directors of the Association of Official Seed Certifying Agencies (AOSCA)

William D. Pardee	1969-1981
Winton M. Baines	1982-1984
Don K. Shardlow	1985- 2002 President, 1996
A. Alan Westra	2001-

Production and Certification Personnel

Fred J. Spry Jr.	1950-1969
Clyde Hart	1956-1964
Stephen M. Nagy	1965-1986
Kenneth S. Shaw	1972-1979
Philip M. Atkins	1990-2004

Office Staff

Lorraine Hollenbeck	1954-1959
Delores McLaren	1955-1968
Janet Willis	1968-1973
Ida Cratsley	1972-1988
Helen Kulp	1973-1983
Pamela S. Solomon	1986-
Eileen M. Gray	1988-

Appendix J
Masters of Science in Agriculture 1908-1951

Student	*Advisor*	*Year*
Dwivades Datta	Webber	1908
Eugene P. Humbert	Webber	1908
Maxwell J. Dorsey	Webber	1909
Early C. Ewing	Webber	1909
Horace B. Cowgill	Gilbert	1910
Charles E. Myers	Webber	1911
Johannes H. Neethling	Gilbert	1911
Charles F. Noll	Webber	1911
Alfred Atkinson	Love	1912
Oliver W. Dynes	Gilbert	1912
Harry N. Vinall	Webber	1912
William O. Whitcomb	Love	1912
Roy D. Anthony	Webber	1913
Thomas B. Hutcheson	Love	1913
Claude B. Hutchison	Webber	1913
Alexander McTaggart	Webber	1913
Alfred C. Hottes	Gilbert	1914
William Southworth	Myers	1914
Sarkis Boshnakian	Love	1915
Ben C. Helmick	Love	1915
Harry W. Dye	Gilbert	1916
Clarence W. Moore	Barker	1916
Curtis H. Pollack	Myers	1916
Albert S. Kenerson	Barker	1917
Chih L. Chien	Barker/Love	1918
Gordon P. McRostie	Emerson	1918
C.K. Hsu	Love	1920
Rui Feng	Fraser	1922
Iang Chandrastitya	Wiggans	1923
Juan P. Torres	Myers	1924
M.A.A. El-Koshairy	Love	1925
Bower Forward	Myers	1928
Cheng Y. Tang	Love	1930
Chang M. Heh	Bussell	1933
Siang-long Hsiang	Love	1935
Hsioh N. Shen	Myers	1935
Cheng-yao Lin	Love	1937
Cheng Y. Tsao	Fraser	1937

Alfredo Talleri	Fraser	1940
Angel Acosta-Matienzo	Love/Fraser	1941
Arturo Riollano	Love	1941
M.A. Navarrette-Rico	Livermore	1945
George B. Barstow	Cushing/MacDaniels	1947
Joseph C. Craddock	Jensen	1950
Sylvan Alcabes	Cushing	1950
Arth Nakornthap	Wiggans	1951

Appendix K
Masters of Science 1916-2006

Student	*Advisor*	*Year*
John H. Parker	Love	1916
George J. Wilds	Love	1917
Lewis A. Eyster	Emerson	1920
Robert Summerby	Love	1921
Chao C. Feng	Emerson	1923
Helen Ziegler Trajkovich	Emerson	1923
Clement G. Bowers	Fraser	1925
John R. A. McMillan	Love	1925
Lourens J. Henning	Love	1926
Francis-Xavier Jean	Fraser	1926
Elizabeth M. Bodger	Fraser	1927
George E. Ritchey	Emerson	1927
Ray Bender	Fraser	1928
Baburao S. Kadam	Emerson	1928
Jasbhai S. Patel	Love	1928
H. Fairfield Smith	Love	1928
Mihron A. Aristakes	Love	1930
Arturo Roque	Myers	1930
Gilbert W. Scott	Myers	1930
Chia Chi Kwan	Myers	1931
Gabriel A. Lebedeff	Emerson	1931
Manuel Moncloa	Myers	1931
Jacabo Zender	Myers	1931
Che-Fang Feng	Livermore/Myers	1932
Ian D. Gray	Myers	1932
Salomon Horowitz	Emerson	1932
Trimbak R. Khadilker	Emerson	1932
Shan-Pao King	Wiggans	1932
Carlos A. Krug	Emerson	1932
Shou Keng Ru	Wiggans	1932
Arthur N.L. Butler	Myers	1933
Teh-ren Chang	Myers	1933
Ruth E. Lenderking	Myers	1933
Carl G. Scott	Wiggans	1933
Sheo T. Shen	Myers	1933
Sheo Wang	Myers	1933
Sylvia Allen-Wernham	Emerson/Rhoades	1935
Yien-Shan Chen	Love	1936
Wei-Liang Chia	Love	1936

Harold E. Fischer	Fraser	1936
Si-Chiu Peh	Love	1936
Maurice L. Shapiro	Emerson	1936
Siang Y. Tang	Love	1936
Ti-Hua Cheng	Love	1937
Ti-Chiu Chiang	Love	1937
Amanda E. McKee	Fraser	1937
Ching Y. Tsao	Love	1937
Leendert A. Vanmelle	Love	1937
Lester Halbreich	Fraser	1938
Willy E. Hartmann	Myers	1940
Krui Punyasingh	Wiggans	1940
Mary E. Sanders	Fraser	1940
Mom Chao Chakrabandhu	Love	1941
Sturla Fridriksson	Atwood	1945
Chu P. Ting	Love	1945
Ervin T. Bullard	Munger	1946
Ruth H. Guttman	Atwood	1947
Ruben Ortega-Aguilera	Livermore	1947
M.S. Pawar	Love	1947
George Sawada	Murphy/Snyder	1948
Pothery Uttaman	H. Smith	1948
Alvin R. Hamson	Munger	1949
Wayne F. Keim	Srb	1949
Yuen-lieng Ku	Murphy	1950
Carl C. Lowe	Murphy	1950
H. Oropeza-Perera	Atwood	1950
Thomas Sheehan	Srb/Post (Plan B)	1950
Douglas S. Robson	Federer	1951
Carlos Schlottfield	Srb	1951
Catherine Thomas-Smith	H. Smith (Plan B)	1951
Daniel T. Pope	Munger	1952
John F. Underwood	Murphy/Johnson	1952
Samuel W. Bowne, Jr.	Srb	1953
Sayed Galal Sayed	Everett	1953
William M. Martin	York (Plan B)	1953
Prasert NaNagara	Federer	1953
Te-Tzu Chang	Everett	1954
Donald R. Egolf	H. Smith	1954
Pedro B. Escuro	Murphy	1954
W. Stanley Young	Lowe	1954
William P. Anderson	H. Smith	1955
M. Aslam Zafar	Livermore	1955

Peter J. Loesch, Jr.	Everett	1955
Charles L. Ricketson	Munger	1955
Wolfgang H. Wessling	Munger	1955
Zlata Demerec-Hartman	Srb	1956
A. Dunsubutra-Ratanadaros	Jensen	1956
Jean D. Kreizinger	H. Smith	1956
William D. Potter	Federer	1956
William A. Rose, Jr.	Johnson	1956
C.N. Scapariotis	Jensen	1956
Gustaaf Blaak	Everett	1957
Sanga Duangratna	Lowe	1957
S. Vittal Rao	Everett/Anderson	1957
Keith H. Thompson	Munger	1957
Roger D. Uhlinger	Munger	1957
Wallace R. Blischke	Federer	1958
Luis H. Camacho-M	Munger	1958
Richard W. Lighty	Plaisted	1958
David B. Walden	Everett	1958
S.B. White, Jr.	Lowe	1958
Ann R. Ebner	Federer	1959
Joan Leopold Muneta	Srb	1959
Chitra Vithayasai	Federer	1959
Banjerd Boonsue	Anderson	1960
Clyde L. Hart	Jensen	1960
Alan W. Douglas	Robson	1961
Sheila Marston	Munger	1961
E. Roger Sayers	Murphy	1961
Sumin Smutkupf	Jensen	1961
Janet C. Cassady	Federer	1962
Shu-Shih Chu	Emmerling	1962
William A. Colette	Jensen	1962
Ronald Echandi Z.	D. Wallace	1962
Barbara A. Jones	Plaisted	1962
B. Leo Raktoe	Federer	1962
B. M. Rao	Federer	1962
Marvin L. Risius	Lowe	1962
Luis A. Alvarez	Munger	1963
Thomas M. Beetle	Robson	1963
Guido Pincheira V.	Srb	1963
Jane Wakely-Johnson	Srb	1963
Juan E. Acevedo	Jensen	1964
Belle C. Ang	Federer	1964

Ruth M. Blakeley	Srb	1964
C.D. Dalianis	Plaisted	1964
Bruce E. Mackey	Lowe	1964
Fernando C. Ortiz	Seaney	1964
Clyde D. Christensen	Lowe	1965
Ernest V. Falke	B. Wallace	1965
John L. Fendik	Crowder	1965
Rusli Hakim	Everett/Anderson	1965
Gerbrand Kingma	Crowder	1965
James D. Maxwell	Jensen	1965
Hugo Pacheco	Murphy	1965
Edwin G. Vann	B. Wallace (Genetics)	1965
Peter R. Dawson	Munger	1966
James C. Fu	Federer	1966
Hugh G. Gauch, Jr.	Stinson (Genetics)	1966
Abdossamad Hedayat	Federer	1966
Robert L. Jacobsen	Robson	1966
Olasupo O. Ladipo	Federer	1966
Uhn B. Paik	Federer	1966
Elissa Purnell-Seva	B. Wallace (Genetics)	1966
Alice J. Schwartz	B. Wallace (Genetics)	1966
Elaine Beebe	Srb (Genetics)	1967
Alonso M. Bravo	D. Wallace	1967
Julian L. Epstein	Robson	1967
Charles A. Francis	Grogan	1967
Sonia Kosow-Guterman	Srb (Genetics)	1967
Jean Y. Rein	D. Wallace	1967
D. Ali Momeni	Plaisted	1968
James M. Wilson	Munger	1968
Bruce W. Balgooyen	Anderson	1969
Daniel K. Dorney	Lowe (Plan B)	1969
Joaquin A. Gonzalez	Crowder	1969
Linda Koch	Stinson (Genetics)	1969
Carlos B. Banchero	Murphy	1970
Lewis S. Beckham	Rutger	1970
Richard D. Morse	Pardee	1970
Elton O. Santos	Crowder	1970
Enrique Alarcon-Millan	Crowder	1971
John E. Ferguson	Murphy	1971
John W. Miles	Munger	1971

Ruben Zambrano-Ruiz	Crowder	1971
Michael J. Forster	Grogan	1972
Ho Chai Yee	Lowe	1972
Maximo E. Contin	Anderson/Marx	1973
Richard F. Plage	D. Wallace	1973
John C. Webster	D. Wallace	1973
James A. Deutsch	Munger	1974
Francisco J. Munoz	Plaisted	1974
David W. York	D. Wallace	1975
M. Melissa Craven-Fowler	Murphy	1976
Robert W. Hoopes	Anderson	1977
Daniel H. Hudson	Pardee	1977
Octavio H. Vargas	Gracen	1977
James E. Sumberg	Murphy/Lowe	1977
Alan D. Barkema	Jensen	1978
Rigoberto Hidalgo	D. Wallace	1978
Eric A. Pillemer	D. Wallace	1978
Andrea Sonnabend	Pardee	1978
Kevitt D. Brown	Jensen	1979
Ellen Chirco	Employee/Pardee (Seed Science)	1979
Robert F. Heisey	Murphy	1979
Edwin W. Stockmeyer	Everett	1979
Thomas M. Gradziel	Munger	1980
W. Larry Hymes	Pardee	1980
Biantanga Kungula	Pardee	1980
N'Kashama Mukendi	Gracen	1980
Francis C. Orakwu	Crowder	1980
Roland C. Massaquoi	Gracen	1981
Akrofi Djietror	Pardee (Seed Science)	1982
Paul A. Gniffke	D. Wallace	1982
Jonathan Greenham	D. Wallace	1982
David P. Lane	Munger	1982
Jeffrey B. McElroy	Munger	1982
Steven E. Smith	Viands	1982
David C. Cooper	Sorrells	1983
M. Bess Dicklow	Gracen	1983
Sara Estrada-Brown	Mutschler	1983
Sue E. Fritz	Sorrells	1983
Carol A. Lemke	Mutschler	1983
Louise L. Casey	Zobel	1984
Javier Gonzalez-Ramos	Munger	1984

Z.O. Mduruma	Gracen	1984
Samuel Sarpong	Gracen	1984
A.Z. Wolokolie	D. Wallace	1984
Fernando Aldana	D. Wallace	1985
Mary E. Lyons-Kreitinger	Dickson/D. Wallace	1985
G.J. Soto-Guevara	Everett	1985
Zhi-Xiang Chen	Mutschler	1986
Zaida Lentini-Gil	Earle	1986
Andrew H. Paterson	Sorrells	1986
Merideth W. Bonierbale	Employee/Plaisted	1987
Carlos E. L. Fonseca	Viands	1987
Edward J. Souza	Sorrells	1987
Martha G. Voland	Zobel	1987
J.B. Zangue-Cheuka	Pardee	1987
Humberto Gomez-Paniagua	Coffman	1988
Julie L. Hansen	Viands	1988
Karen K. Varley	Earle	1988
David L. Vaughn	Employee/Viands	1988
Guangning Ye	Earle (Plant Biology)	1988
Fernando Loaiza-Figueroa	Weeden	1989
Cesar Franjul	Mutschler	1989
Stacy M. Kinzer	Mutschler	1989
Musa Mbenga	Zobel	1989
Jill Miller-Garvin	Viands	1990
Ram C. Mishra	Sorrells	1990
Marina Goffreda	Earle	1991
Jeanette C. Stephenson	Earle	1991
Samuel Beer	Sorrells	1992
Maria G. Heriz	Viands	1992
Raphael Gilbert	Jahn	1992
Laura Matthews	Zobel	1992
Ana E. Rodriguez	Mutschler	1992
Xiaojian Ye	Brown/Sanford	1992
Alfora-Stella Gonzalez C.	Steffens	1993
Alfredo Bolanos Herrera	Jahn	1994
Winthrop B. Phippen	Kresovich	1994
Omaira Pineda	Plaisted	1994
James L.S. Johnson	Viands	1995
Wilawan Siripoonwiwat	Sorrells	1995
Ali Ramazan Alan	Sorrells	1996
Sami Doganlar	Tanksley	1996

Theresa M. Fulton	Employee/Tanksley	1996
Cleveland R. Paul	Viands	1996
Ji Weijuan	Pardee	1996
Maria Gabriela Chacon Acostar	Plaisted	1997
Marci Ann Blintaub	Employee/Doyle/ McCouch	1999
Muhammet Tonguc	Weeden	1999
Elena DiMuzio	Garvin	2000
Sandra Elizabeth Harrington	McCouch	2000
Carlos Maurico LaRota	McCouch	2000
Brian Just	Brown	2001
Sarah Scholss	Kresovich	2001
Elizabeth Graznak	Sorrells	2003
Wing Yee Liu	Jahn	2006
Jason Cavatorta	Jahn	2006

Appendix L
Doctors of Philosophy 1909-2007

Student	*Advisor*	*Year*
Charles F. Clark	Webber	1909
Arthur W. Gilbert	Webber	1909
Harry H. Love	Webber	1909
Fred J. Pritchard	Webber	1909
Eugene P. Humbert	Webber	1910
Robert J. Evans	Webber	1912
Clyde E. Leighty	Webber/Love	1912
Clyde H. Myers	Webber	1912
Rhett Y. Winters	Webber	1912
Maxwell J. Dorsey	Webber	1913
Alfred W. Drinkard, Jr.	Webber	1913
Tanomo Odaria	Webber	1913
Elmer E. Barker	Webber	1914
Allan C. Fraser	Love	1918
Ernest W. Lindstrom	Emerson	1918
Nemesio B. Mendiola	Love	1918
Frank P. Bussell	Love	1919
Ernest G. Anderson	Emerson	1920
Roy D. Anthony	Love	1920
William H. Eyster	Emerson	1920
Gordon P. McRostie	Emerson	1920
Sarkis Boshnakian	Love	1921
Thomas K. Wolfe	Love	1921
Herbert P. Cooper	Love	1922
Charles E. Myers	Myers	1922
Arthur M. Brunson	Emerson	1923
Milislav Demerec	Emerson	1923
Charles F. Noll	Love	1923
Archie F. Barney	Love	1924
Ernest Dorsey	Love	1924
Merl C. Gillis	Bussell	1924
Pavao Kvakan	Emerson	1924
Andrew D. Suttle	Fraser	1924
Robert D. Lewis	Love	1926
Theodore E. Odland	Love	1926
Fayette E. Stephens	Love	1926
Juan P. Torres	Myers	1926
Franklin D. Keim	Love	1927

J. Randall Livermore	Myers	1927
Lloyd R. Watson	Emerson	1927
Thomas Bregger	Emerson	1928
George G. Moe	Love	1928
Ivan F. Phipps	Emerson	1928
T.H. Shen	Love/Myers	1928
Lawrence R. Waldron	Love	1928
John B. Wentz	Emerson	1928
John B. Cotner	Wiggans	1929
Edwin R. Parker	Love	1929
George W. Beadle	Emerson	1930
Troy M. Currence	Emerson	1930
Hsien W. Li	Emerson	1930
Gordon K. Middleton	Love	1930
George F. Sprague	Emerson	1930
Joel W. Elliott	Love	1931
Johannes D. J. Hofmeyr	Emerson	1931
Roy Magruder	Myers	1931
Cheng Yao Chou	Love	1932
Max M. Hoover	Emerson	1932
Harold S. Perry	Emerson	1932
Marcus M. Rhoades	Emerson	1932
Che-fang Feng	Myers/Livermore	1933
Chia Chi Kwan	Myers	1933
Pao C. Ma	Love	1933
Shou-Keng Ru	Wiggans	1933
Jacob O. Ware	Livermore	1933
L. Gordon Miles	Love	1934
Swarn Singh	Emerson	1934
J. Winston Neely	Livermore	1935
Song E. Tai	Love	1937
Tseh-liang Kwan	Love	1938
Gabriel A. Lebedeff	Emerson	1938
Merritt J. Murray	Emerson	1938
George D. Oberle	Emerson/R. Wellington	1938
Siang Y. Tang	Love	1938
Sih C. Yu	Love	1938
George Arceneaux	Myers	1939
Wei-Liang Chia	Love	1939
Harold E. Fischer	Fraser	1939
Derald G. Langham	Emerson	1939
Eldon E. Down	Love	1940
Francis E. Johnstone, Jr.	Livermore	1940

Ching-chun Li	Love	1940
William B. Storey	Emerson	1940
Allen R. Trotter	Emerson	1940
George R. Walker	Love	1940
Joseph E. Chevrette	Love	1941
Henry M. Munger	Emerson	1941
Oved Shifriss	Myers	1941
William D. Wray	Love/J.H. Curtiss (Mathematics)	1941
James E. Welch	Emerson	1942
N.M. Patel	Love	1942
Sala Dasananda	Love	1943
Neal F. Jensen	Love	1943
Calvin C. Murray	Love	1945
Desmond D. Dolan	Munger	1946
Leona O. Schnell-Emrich	Livermore	1946
Fung T. Fung	Love	1947
M. Rosalind Morris	Love	1947
Abraham Abraham	Love/H. Smith	1948
Francis J. Bell	Love	1948
Gursham Singh	Love	1948
Florence Thomas-Martin	Munger	1948
Mahmoud Soliman Attia	Munger	1949
Warren S. Barham	Munger	1949
Henry R. Fortman	Atwood	1949
Paul Grun	Atwood	1949
Dioscoro L. Umali	H. Smith	1949
J. Clark Ballard	Munger	1950
Earl S. Horner	Wiggans	1950
Robert I. Jackson	Wiggans	1950
August E. Kehr	H. Smith	1950
Satya P. Kohli	Murphy	1950
Robert E. Lee	H. Smith	1950
Thurston J. Mann	H. Smith	1950
James E. Wright, Jr.	H. Smith	1950
Thomas L. York	Munger	1950
Russell H. Bradley	Johnson	1951
Edward D. Donnelly	Atwood	1951
Frank L. Haynes, Jr.	Livermore	1951
Carl N. Hittle	Murphy	1951
James L. Brewbaker	Atwood	1952
Julian R. Craigmiles	Jensen	1952
Loy V. Crowder	Atwood	1952

Ronald D. Ensign	Murphy	1952
U. Jerry Grant	Wiggans	1952
Alvin R. Hamson	Munger	1952
Wayne F. Keim	Murphy	1952
Calvin F. Konzak	Jensen	1952
Carl C. Lowe	Murphy	1952
Luis E. Marcano-Coello	Munger	1952
Daniel T. Pope	Munger	1952
Anson E. Thompson	Munger	1952
Jess W. Jones	Jensen	1953
LeRoy W. Nittler	Murphy/Johnson	1953
Carlos Schlottfield	Srb	1953
Donald L. Smith	Atwood	1953
Norman L. Taylor	Atwood	1953
Val W. Woodward	Srb	1953
Edward W. Owens	Munger	1954
Lester W. Schiable	Munger	1954
Darrel R. Bienz	Livermore	1955
William H. Isom	Jensen	1955
E. Beatrice Murray	Atwood	1955
Seaward S. Sand	H. Smith	1955
Sayed Galal Sayed	Everett	1955
Robert R. Seaney	Everett	1955
J. Robert Wall	York/Munger	1955
Wade G. Dewey	Jensen	1956
Donald R. Egolf	H. Smith	1956
Wiley C. Johnson	Lowe	1956
Harley J. Otto	Everett	1956
Douglas S. Robson	Federer (Statistics)	1956
Ernest W. Sprague	Murphy	1956
Samuel W. Bowne, Jr.	Srb	1957
Prasert NaNagara	Federer (Statistics)	1957
Keith F. Schertz	Murphy	1957
Forrest C. Bent	Murphy	1958
Dermot P. Coyne	Munger	1958
Kevin R. Daly	H. Smith	1958
Hugh A. Daubeny	Munger	1958
Jean D. Kreizinger	H. Smith/Murphy	1958
Richard L. Latterell	H. Smith/Srb	1958
John A. Mortensen	Munger	1958
Emil Sebesta	Jensen	1958
Donald H. Wallace	Munger	1958
David W. Alling	Robson	1959

Mark W. Martin	Munger	1959
Jay C. Murray	Srb	1959
Jimmie Bob Smith	Srb	1959
Ukio Urata	Everett/H. Smith	1959
David B. Walden	Everett/Anderson	1959
W. Stanley Young	Jensen	1959
Lillie Chang	Jensen	1960
Richard W. Lighty	Plaisted	1960
JonasW. Miller	Murphy	1960
B.R. Murty	Murphy/H. Smith	1960
William D. Pardee	Lowe/Johnson	1960
Bhag S. Sidhu	Everett	1960
Björn Sigurbjörnsson	Murphy	1960
David J. Thompson	Munger	1960
Ross W. Downes	Murphy/Lowe	1961
R. Keith Downey	Murphy	1961
David Gershon	Seaney	1961
Narendra N. Roy	Everett	1961
Donald A. Wheeler	Anderson/Everett	1961
Wallace R. Blischke	Robson	1962
Donald W. Denna	Munger	1962
Colin J. Driscoll	Jensen	1962
Elmer Gray	Anderson	1962
Keith R. Jones	Jensen	1962
Kenneth E. Sanderson	Srb	1962
Roger D. Uhlinger	Munger	1962
Glenn F. Atkinson	Robson	1963
Sister Ann Infanger Martin	Srb	1963
William R. Meredith, Jr.	Lowe	1963
Oval Myers, Jr.	Plaisted	1963
Eduardo Alvarez-Luna	Munger	1964
E. Theodore Bingham	Murphy	1964
Alan W. Douglas	Robson	1964
Richard R. Hill	Lowe	1964
Houng-Zung Liu	Everett	1964
Kenneth E. Papa	Srb	1964
B. Leo Raktoe	Robson	1964
Marvin L. Risius	Lowe	1964
E. Roger Sayers	Murphy	1964
Jack Thompson	Everett	1964
Climaco Cassalett-Davila	Everett/Crowder	1965
Devon L. Doney	Plaisted	1965
Barbara A. Jones	Plaisted	1965

William L. Marchant	Munger	1965
Mikhail Nasrallah	D. Wallace	1965
Chen Shifriss	Munger	1965
Ram D. Banzal	Seaney	1966
C.D. Dalianis	Plaisted	1966
Yoel Efron	Everett	1966
George C. Emery	Munger	1966
Helmi A. Ibrahim	Jensen	1966
Shamay Izhar	D. Wallace (Genetics)	1966
Bruce E. Mackey	Lowe	1966
John E. Puhalla	Srb (Genetics)	1966
Edwin G. Vann	B. Wallace (Genetics)	1966
Gerbrand Kingma	Crowder	1967
Sati Mazumdar	Robson	1967
Guido Pincheira V.	Srb (Genetics)	1967
Ghassem Tehrani-Moayed	Munger	1967
Naim T. al-Mohammed	Jensen	1968
Robert L. Jacobsen	Robson	1968
Jane Oakes Magill	Srb (Genetics)	1968
Darshan S. Padda	Munger	1968
Uhn B. Paik	Federer	1968
Daulat N. Sajnani	Jensen	1968
Edwin C. Townsend	Searle	1968
Peter R. Dawson	Munger	1969
Hamdy M. Eisa	Munger	1969
Abdossamad Hedayat	Federer	1969
Emil Quinto Javier	Crowder	1969
Clint Magill	Srb (Genetics)	1969
Charles A. Francis	Grogan	1970
A. Abdel-Moneim Hassan	D. Wallace	1970
Roland K. Littlewood	Srb (Genetics)	1970
Claude A. St.-Pierre	Jensen	1970
Kuan-hon Chow	Crowder	1971
W. Ronnie Coffman	Jensen	1971
Benjamin F. George	Munger	1971
Onogbakere Leleji	Crowder	1971
Dennis R. Novak	Srb (Genetics)	1971
Antonio S. Pompeu	Crowder	1971
Kenneth D. Sayre	Grogan	1971
Bruce W. Balgooyen	Munger	1972
Melvin D. Epp	Stinson	1972
Maria Mayer-Scurrah	Plaisted	1972
V.V.S. Murty	Jensen	1972

Robert J. Redden	Jensen	1972
Melvin V. Splitter	Grogan	1972
Lewis S. Beckham	Pardee	1973
Clyde F. Smith	Stinson (Genetics)	1973
Marco A. Soto Pflucker	D. Wallace	1973
David W. Sperling	Grogan	1973
John R. Stander	Anderson	1973
Holmgeir Bjornsson	Lowe	1974
Alberto Guillermo Cubillos	Plaisted	1974
John E. Ferguson	Crowder	1974
Michael J. Forster	Grogan	1974
Nadarajah Vignarajah	Jensen	1974
N'Guetta Bosso	Grogan	1975
Alonso M. Bravo	D. Wallace	1975
Gustavo A. Enriquez	D. Wallace	1975
Abdrabboh Ahmed Ismail	Grogan	1975
Abad Morales	Munger	1975
Richard F. Plage	Munger	1975
Sue Lynn Sullivan	Gracen	1975
Enrique Alarcon-Millan	Crowder	1976
Theodore H. Superak	D. Wallace	1976
Ivor G. Caunter	Gracen	1977
James A. Deutsch	Munger	1977
David A. Knauft	Jensen	1977
J. David Mackenzie	Gracen	1977
Gaafar H. Mohamed Ali	Munger	1977
Samuel C. Muchena	Grogan	1977
Justin O. Sanwo	Crowder	1977
Peter J. Bradbury	Grogan	1978
Maximo E. Contin	Munger	1978
James A. Hawk	Crowder	1978
Clair H. Hershey	Gracen	1978
Robert W. Hoopes	Plaisted	1978
Eric A. Kueneman	D. Wallace	1978
Porfirio Nicholas Masaya	D. Wallace	1978
Elton O. Santos	Crowder	1978
James E. Sumberg	Murphy	1978
Sadig Khidir Omara	Munger	1979
Eufemio T. Rasco, Jr.	Plaisted	1979
David H. Byrne	Gracen	1980
Judith M. Lyman-Snow	Munger	1980
Francisco J. Munoz	Plaisted	1980
Hiep Ngoc Pham	Gregory/Gracen	1980

David W. York	Gracen	1980
Amnart Chinchest	Crowder	1981
Marsham M.Dahlan	Everett	1981
James A. Gilchrist	Sorrells	1981
Robert F. Heisey	Murphy	1981
Chi-Hsiung Hsiao	Munger	1981
Roger A. Kirkby	Gracen	1981
Stephen V. Evola	Earle	1982
Pedro L. Gomez-Cuervo	Plaisted	1982
Donald E. Halseth	Pardee	1982
Mark H. McCaslin	Murphy	1982
Shawn A. Mehlenbacher	Plaisted	1982
Paul H. Sisco	Gracen	1982
Margaret E. Smith	Gracen	1982
William F. Tracy	Everett	1982
Steven A. Wright	Zobel	1982
Kevitt D. Brown	Sorrells	1983
Marcelo Atilio Huarte	Plaisted	1983
W. Mangoendidjojo	Everett	1983
Mohammad A.A. Miah	Earle	1983
C. Rojanaridpiched	Gracen	1983
Richard L. Washek	Munger	1983
James G. Coors	Lowe	1984
Akrofi Djietror	Pardee (Crop Science)	1984
Ali El Amin El Jack	Munger	1984
David P. Lane	Munger	1984
Kiran Pathak Misra	Gracen	1984
Steven E. Smith	Murphy/Viands	1984
Sue E. Fritz	Sorrells	1985
Paul A. Gniffke	D. Wallace	1985
Alice E. Johnson	Gracen	1985
Julia Louise Kornegay	Gracen	1985
Jeffrey B. McElroy	Munger	1985
RoseMary Salter	Viands	1985
Baffour Badu-Apraku	Gracen	1986
Dirk L. Benson	Gracen	1986
Michele Louise Gardiner	Everett	1986
Charles T. Hash	Coffman	1986
Randy A. Hautea	Coffman	1986
Carol A. Lemke	Gracen	1986
Leon O. Namuco	Coffman	1986
Dominique Robertson	Earle (Plant Biology)	1986
Shafi B. Siddique	Pardee	1986

Hernan I.A. Ceballos	Gracen	1987
Javier Gonzalez-Ramos	Gracen	1987
Thomas M. Gradziel	Robinson	1987
Geoffrey J. Keyes	Sorrells	1987
Raul Dario Leon	Plaisted	1987
Gary R. Taurick	Marx	1987
Francisco Luis Vilaro	Plaisted	1987
A. Hassan Abdalla	Coffman	1988
Joseph C. Goffreda	Mutschler	1988
Pablo S. Jourdan	Earle (Plant Biology)	1988
Adelheid Renate Kuehnle	Earle	1988
Margaret Miller Jahn	Dickson/Munger	1988
Nur-E-Elahi	Pardee (Crop Science)	1988
Andrew H. Paterson	Sorrells	1988
Raymond A. Porter	Gracen	1988
Edward J. Souza	Sorrells	1988
Susan Jane Wolf	Earle	1988
Kenneth S. Yourstone	D. Wallace	1988
M. Brett Callaway	Coffman	1989
Mary Christey	Earle (Plant Biology)	1989
Julie L. Hansen	Viands	1989
Julio Cesar Kalazich	Plaisted	1989
Stanley P. Kowalski	Steffens	1989
Zaida Lentini-Gil Ceballos	Earle	1989
Joyce Christa Miller	Tanksley	1989
Euclydes Minella	Sorrells	1989
Gerald A. Rau	Mutschler	1989
Brian T. Scully	D. Wallace	1989
Martin Bicamumpaka	Plaisted	1990
Merideth W. Bonierbale	Plaisted	1990
Ossami Furumoto	Plaisted	1990
Susan R. McCouch	Coffman/Tanksley	1990
Jean Marie Poulos	Coffman	1990
Zhenyuan Wang	Tanksley	1990
William L. Burnquist	Sorrells	1991
Humberto Gomez-Paniagua	D. Wallace	1991
Bulent Samanci	M. Smith	1991
Gregario J. Soto-Guevara	M. Smith	1991
Catherine R. Thome	M. Smith	1991
Thomas W. Walters	Earle	1991
Zhihong Yu	Tanksley	1991
James A. Anderson	Sorrells	1992
Zenaida N. Ganga	Plaisted	1992

David F. Garvin	Weeden	1992
N'G. Wa-Se Kiala Kilusi	Coffman	1992
Seja G. Mmopi	D. Wallace	1992
Haifeng Yu	Steffens	1992
Sang Nag Ahn	Tanksley	1993
Jorge Enrique Autrique	Sorrells	1993
M. Carmen de Vincente	Tanksley	1993
Jorge A. Gonzalvez da Silva	Sorrells	1993
Pablo A. Grau	Coffman	1993
Douglas W. Heather	Earle	1993
Satriyas Ilyas	Pardee/Kahn (Seed Science)	1993
Jill Miller-Garvin	Viands	1993
James P. Prince	Tanksley (Plant Biology)	1993
Joseph A. Shapiro	Mutschler	1993
Muhamed F. Shirdon	Coffman/M. Smith	1993
Joyce M. Van Eck	Earle	1993
Kunsheng Wu	Tanksley	1993
James R. Blauth	Jahn	1994
Pierre E. Broun	Tanksley	1994
Lise N. Hansen	Earle	1994
Johnson Olufowote	Coffman	1994
Stephen R. King	Dickson	1994
Muhammad Lodhi	Reisch	1994
Sin-Chieh Liu	Mutschler	1994
Fernando Loaiza-Figueroa	Weeden	1994
Zhengqiang Ma	Sorrells	1994
Timothy D. Metz	Earle (Plant Biology)	1994
J. Clare Nelson	Sorrells	1994
Leocadio S. Sebastian	McCouch/Coffman	1994
Julka Vrebalov	M. Smith	1994
Jose F. Barbosa-Neto	Sorrells	1995
Julapark Chunwongse	Tanksley	1995
Joseph D. DeVries	Coffman/M. Smith	1995
Marcia L. Fisher	Jahn	1995
Anne Frary	Earle	1995
Weikuan Gu	Weeden	1995
Michelle D. Hunt	Steffens	1995
Laura Matthews	Zobel	1995
Niamh O'Leary	M. Smith	1995
Elizabeth M. Sibale	M. Smith	1995
Janny van Beem	M. Smith	1995
Jinhua Xiao	Tanksley	1995
Kevin B. Alpert	Tanksley	1996

Sergio H. Brommonschenkel	Tanksley	1996
Patrick J. Conner	Brown	1996
Amy Frary	Tanksley	1996
Silvana Grandillo	Tanksley	1996
Darlene M. Lawson	Mutschler	1996
Paul S. Salon	Pardee	1996
Dario Bernacchi	Tanksley	1997
Susan Lee Eggleston	Mutschler	1997
Edyth Marie Paul	McCouch	1997
Omaira Pineda	Plaisted	1997
Piyada Thepyapong	Steffens	1997
Yiping Zhang	Jahn	1997
Mathew W. Blair	McCouch	1998
Anton S. Callaway	Steffens	1998
Carlos E. L. Fonseca	Viands	1998
Aftab A. Kahn	Sorrells	1998
Hsin-Mai Ku	Tanksley	1998
Xiang Li	Steffens	1998
Dipamwita Maiti	Steffens (Plant Biology)	1998
Jianping Ren	Dickson	1998
Anne Lousi Westman	Coffman	1998
Aigars Brant	Earle	1999
Xiulu Chen	McCouch	1999
Stephen Majara Chite	Weeden	1999
Rebecca Cynthia Grube	Jahn	1999
Kevin Donald Livingston	Jahn	1999
Stephen Ngure Mugo	M. Smith	1999
Wilairam Siripoonwiwat	Sorrells	1999
Rutger Simon Van der Hoeven	Steffens	1999
Jiaqian Zhu	Sorrells	1999
Maria Del Pilar Moncoda	McCouch	2000
Alejandra Mora-Aviles	Earle	2000
Troy Alan Thorup	Jahn	2000
Laura Benson	Lamboy	2001
Julie Ho	M. Smith	2001
Timothy Porch	Jahn	2001
Ali Ramazan Alan	Earle	2001
Alexandra Casa	Kresovich	2002
Jennifer Long	M. Smith	2002
Thomas Clint Nesbit	Tanksley	2002
Endang M. Septiningsih	McCouch	2002
Michael Thomson	McCouch	2002
Immanuel Yap	McCouch	2002

Ayman Ali Diab	Sorrells	2003
James Frantz	Jahn	2003
James Gethi	M. Smith	2003
Min-Jea Kim	Mutschler	2003
Jiming Li	McCouch	2003
Mande Semon	McCouch	2003
Muhammet Tongue	Griffiths	2003
Amanda J. Garris	Kresovich	2004
Carlos Enrique Harjes	M. Smith	2004
Carlos Mauricio LaRota	Sorrells	2004
Luz Stella Barrero Meneses	Tanksley	2004
Ahmed Maher Wally	Mutschler	2004
Muhamed Yunus	Sorrells	2004
Flavio Breseghello	Sorrells	2005
Molly Cadle-Davidson	Jahn	2005
Kai-Yi Chen	Tanksley	2005
Jeremy Edwards	McCouch	2005
Chung Suk Jung	DeJong	2005
Frank Joseph Kutka	M. Smith	2005
Katy Rainey	Griffiths	2005
Isaak Tecle	Viands	2006
Anjali Susan Iyer-Pascuzzi	McCouch	2006
Inhwa Yeam	Jahn	2006
Randall Wisser	Nelson	2006
Megan Sweeney	McCouch	2006
J. Arahon Hernandez-Guzman	M. Smith	2007
Jesse Munkvold	Sorrells	2007

Appendix M
Number of Degrees Catalogued by Major Advisor

	Degree			
Major Faculty Advisor	*M.S. Agric.*	*M.S.*	*Ph.D.*	*Total*
Herbert J. Webber	10		13	23
Arthur W. Gilbert	5			5
Harry H. Love	12	19	42	73
Charles H. Myers	5	12	8	25
Eugene E. Barker	3			3
Rollins A. Emerson	1	11	28	40
Allan C. Fraser	3	8	2	13
Frank Russell	1		1	2
Roy G. Wiggans	2	4	5	11
J. Randal Livermore	1	3	6	10
Henry Munger		18	42	60
Robert L. Cushing	2			2
Sanford S. Atwood		3	8	11
Neal F. Jensen	1	9	19	29
Harold H. Smith		5	10	15
Royse P. Murphy		12	20	32
Alvin A. Johnson		1	1	2
Adrian M. Srb[2]		11	14	24
Walter T. Federer[1]		14	4	18
Douglas S. Robson[1]		4	7	11
Herbert L. Everett		9	15	24
Thomas L. York		1	1	2
Carl C. Lowe		8	8	16
Ronald Anderson		4	3	7
Robert L. Plaisted		8	21	29
Robert R. Seaney		1	2	3
Donald H. Wallace		12	14	26
Margaret H. Emmerling		1		1
Bruce Wallace2		4	1	5
Shayle R. Searle1			1	1
Harry T. Stinson Jr.[2]		2	2	4
Loy V. Crowder		7	11	18
J. Neil Rutger		1		1
Clarence O. Grogan		2	9	11

Willian D. Pardee		9	7	16
Vernon E. Gracen		6	19	25
Peter Gregory			1	1
Elizabeth D. Earle		5	16	21
Mark E. Sorrells		9	21	30
Martha A. Mutchler		6	8	14
Donald R. Viands		8	5	13
W. Ronnie Coffman		1	13	14
Steven D. Tanksley		2	20	22
Margaret E. Smith			15	15
John C. Steffens		1	8	9
Margaret M. Jahn		4	10	14
Susan R. McCouch		3	13	16
Richard W. Zobel		4	3	7
Susan Brown		2	1	3
Michael Dickson		1	3	4
Stephen Kresovich		2	2	4
Gerald Marx			1	1
Bruce I. Reisch			1	1
Richard W. Robinson			1	1
John C. Sanford		1		1
Norman F. Weeden		2	4	6
David R. Garvin		1		
Warren F. Lamboy			1	1
Phillip D. Griffiths			2	2
Rebecca J. Nelson			1	1
Total	**46**	**261**	**494**	**801**

1. Biometrics Unit to about 1970
2. Genetics, Development and Physiology, 1965

Appendix N
Number of Degrees Awarded by Time Periods

	Degrees			
Period	M.S. Agric.	M.S.	Ph.D.	Total
1907-1931	33	23	56	112
1932-1956	13	68	97	178
1957-1981	0	101	149	250
1982-2006	0	69	192	261
1907-2006	46	261	494	801[3]

Appendix O
Percentage Non-National Degrees by Time Periods

	Degree		
Period	M.S. Agric.	M.S.	Ph.D.
1907-1931	36	61	23
1932-1956	85	54	29
1957-1981	0	42	45
1982-2006	0	48	52
1907-2006	50	50	43

Appendix P
Percentage Women Degrees by Time Periods

	Degree		
Period	M.S. Agric.	M.S.[2]	Ph.D.[3]
1907-1931	0	9	0
1932-1956	0	13	5
1957-1981	0	19	6
1982-2006	0	42	32
1907-2006	0	19	15

1. Number of students – 723 (78 Ph.D. Also earned M.S.A. or M.S.)
2. First M.S. Degree – Helen Zeigler Trajkovich – Emerson – 1923
3. First Ph.D. – Leona E. Schnell-Emrich – Livermore – 1946

Appendix Q

Summary of Degrees by Major Interest
1908-2006

Number degrees awarded	801
Individuals	723 (78 PhD also earned M.S.A. or M.S.)

A rather subjective classification for major interest:

Plant Breeding	70%
Genetics[1]	25%
Biometry[2]	5%

1. Numbers reduced after Biological Sciences Division was established in 1965; however, numbers increased in recent years due to increased interest in molecular biology, genetic engineering, genomics, etc.
2. Numbers no longer listed after ca 1970 when biometry became semi-autonomous and moved into statistics - see The Biometrics Unit - The First 40 Years by Walter T. Federer, BU-1000-M, Feb. 1989. Cornell U.

The distribution among the three major interests is similar for U.S. and Foreign students.

Appendix R
Number of Foreign Students 1908-2006 70 Nations

	Degrees				
Area	**MSA**	**MS**	**PhD**	**# Degrees Awarded**	**Individuals**
Asia	14	56	102	172	161
Africa	2	13	30	45	44
Europe	0	13	17	30	27
North America	6	19	23	48	43
South America	2	30	38	70	59
Total	24	131	210	365	334

Appendix S
Department of Plant Breeding Courses 1907-ca 1980

1907-1925

1	Genetics (Plant Breeding) 1908-1924; 2-4 hours	Gilbert 1907-1916; Barker 1914-1918; Hutchison 1917-1922; Fraser 1915-cont.; Dorsey (laboratory) 1919-cont. Other assistants Friedman 1915; Bregger 1916-1917; W.H. Eyster 1918; Brunson 1922; Lewis 1923
2	Plant Breeding Laboratory 1908-1916; 1-3 hours	Gilbert 1907-1912; Barker 1913-1915; Fraser 1916-cont.
3	Methods of Plant Breeding 1913-1914; 3 hours	Gilbert 1913
4	Biometry 1908-1914; 1 hour	Love 1908-cont.
5	Advanced Plant Breeding 1913-1914; 2 hours	Gilbert 1913
6	Eugenics 1913-1915; 1 hour	Gilbert 1914-1915
8	Methods of Plant Breeding 1914-1924; 1-3 hours	Gilbert 1914-1916; Fraser 1915; Myers 1916; Hutchison 1917; Barker 1917; Myers 1918; Fraser 1920-1921; Bussell 1922-cont.
11	Biometry 1914-1925; 2 hours	Love 1914-1925
13	Advanced Genetics (Plant Breeding) 1914-1925; 3 hours	Barker 1914-1916; Emerson 1916; Love 1916; Hutchison 1916-1921; Fraser 1920-cont. Assistants Friedman 1915; Lindstrom 1915; Fraser 1916; Bregger 1917; Anderson 1918-1919
14	Organic Evolution 1917-1918; 2 hours	Barker 1917-1918

1925-1940

101	Genetics 1925-1940; 4 hours	Fraser 1925-cont.; Dorsey (laboratory) 1925-cont. Assistant Lewis 1925
201	Advanced Genetics 1925-1940; 3 hours	Fraser 1925-cont.
103	Plant Breeding 1925-1940; 2-3 hours	Bussell 1925-1926; Myers 1927-cont.
211	Biometry 1930-1940; 2-3 hours after 1930	Love 1925-1931; Livermore 1932-cont.

1940-1950

1	Heredity and Eugenics 1948-1950; 2 hours	Srb 1948-cont.
101	Genetics 1940-1950; 4 hours	Fraser 1940-1941; Murray 1942-1943; Cushing 1944-1947; Srb 1948-1949

201	Advanced Genetics 1940-1950; 2-3 hours	Fraser 1940-1941; Murray 1942-1943; Cushing 1943-1947; Srb 1948-cont.
102	Plant Breeding 1940-1950; 3 hours	Myers 1940-1942; Munger 1943-1946; Munger-Murphy 1947-cont.
203	Methods of Plant Breeding 1947-1950; 3-4 hours	Munger-Murphy 1947-cont.
204	Experimental Evolution 1947-1950; 2 hours	Smith 1947-cont.
211	Statistical Methods 1940-1950; 2 hours	Livermore 1940-cont.
212	Statistics 1942-1950; 2 hours after 1948	Love 1942-1947; Atwood 1948-cont.
213	Advanced Statistics 4 hours	Federer 1948-cont.

1950-~1965

1	Heredity and Eugenics 1950-1965; 2 hours	Srb 1950-cont.
101	Genetics 1950-1965; 4 hours	Srb 1951; Everett 1952-1960; Anderson 1956; Emmerling 1960-1962; Everett 1963-cont.; Stinson 1965-cont.
201	Biochemical Genetics 1950-1965; 2 hours	Srb 1951-cont.
204	Experimental Evolution 1950-1965; 2 hours	Smith 1950-1956; Uhl 1957; B. Wallace 1959-cont. (Population Genetics)
102	Plant Breeding 1950-1965; 3 hours	Munger-Murphy 1950-1959; Plaisted 1960-cont.
203	Methods of Plant Breeding 1950-1965; 3 hours	Munger-Murphy 1950-cont.
210	Statistical Methods 1950-1965; 3 hours	Steel 1953-1960; Robson-Choi 1961-1964
211	Statistical Methods 1950-1965; 3 hours	Livermore cont.-1953; Steel 1953-1960; Robson-Choi 1961-1962
212	Experimental Methods 1950-1965; 2 hours	Atwood 1950-1955; Lowe 1955-cont.
213	Design of Experiments 1950-1965; 3 hours	Federer 1950-cont.
214	Advanced Statistics 1950-1965; 3 hours	Federer 1950-cont.
219	Statistical Genetics 1950-1965; 3 hours	Robson 1962-cont.

1964-1980

Genetics (to 1968):

300	Human Genetics 2 hours	Srb	Biological Sciences 1965-1967	(1968 - 280)
301	Genetics 4 hours	Everett-Stinson	Biological Sciences 1965-1967	(1968 - 281)
500	Population Genetics 2 hours	B. Wallace	Biological Sciences 1965-1967	(1968 - 480)
501	Physiological Genetics 2 hours	Srb	Biological Sciences 1965-1967	(1968 - 482)

Plant Breeding (to ca 1980)[1]:

200	Plant Breeding 1964-1965; 3 hours	Plaisted	1964 dropped
225	Animal and Plant Genetics 1975-cont.; 4-5 hours	Crowder-Brotman 1975-76; Crowder 1977-cont.	
503	Methods of Plant Breeding 1964-cont.; 3 hours	Munger-Murphy 1964-1977; Munger-Everett 1978-cont.	
512	Experimental Methods 1964-cont.; 2 hours	Lowe 1964-cont.	
515	Quantitative Genetics 1965-1970; 2 hours	Lowe-Plaisted 1965-1966; Plaisted, Jensen, Rutger 1971	
516	Advanced Topics 1970-1980; 1-3 hours	Jensen-Plaisted-Gracen 1970-cont.	
429	Special-Extension Methods 1964-cont.; 1 hour	Johnson 1964-1968 & Minges (Vegetable Crops) 1964-cont. Minges & Pardee 1976-cont.	

Statistics and Biometry (to 1964): (See ***The Biometrics Unit—The First 40 Years*** by Walter T. Federer, Biometrics Unit, Cornell University, 1989)

410-411	Statistical Methods et al. 1-4 hours	Choi, Federer, Robson	1964-
510-511	Statistical Methods 1-4 hours	Choi	1964-
513-514	Design 3-4 hours	Robson-Searle	1964
519	Statistical Genetics	Robson	1964-

1 After 1980, frequent changes in course offerings.

Appendix T

Faculty by Rank and Chronology
1906-2007

D - deceased
E - emeritus
R – resigned

Name	Assistant Professor	Associate Professor[0]	Full Professor
Webber			1906-1912 R
Norton[3]	1907-1908 R		
Love[1]	1909-1911		1911-1949 E
Gilbert[1]	1909-1911		1911-1916 R
Myers[1]	1912-1914		1914-1944 E
Barker[1]	1914-1919 R		
Emerson			1914-1942 E
Hutchison[2,3]			1916-1922 R
Fraser[1]	1919-1934		1934-1941 D
Wiggans[2]	1919-1934		1934-1958 E
Bussell[2]	1920-1924		1924-1946 E
Lewis[1]	1926-1930 R		
Livermore[2]	1931-1939	1939-1955 E	1955 E
Munger[2]	1942-1944	1944-1948	1948-1983 E
Cushing[3]	1943-1945	1945-1947 R	1949-1951 R
Atwood	1944-1945	1945-1948	1948-1963 R
Jensen[1]	1946-1948	1948-1951	1951-1978 E
H. Smith		1946-1948	1948-1957 R
Murphy		1946-1948	1948-1979 E
Johnson[3]		1946-1948	1948-1967 retire
Srb		1947-1951	1951-1983 E
Federer			1948-1986 E
Everett	1951-1953	1953-1964	1964-1983 E
York[1]	1951-1953	1953-1957 D	
Steel		1952-1960 R	
Lowe[1]	1952-1955	1955-1964	1964-1983 E
Anderson	1954-1960	1960-1988 E	1988 E
Robson[2]	1955-1959	1959-1964	1964-1987 E
Plaisted	1956-1960	1960-1964	1964-1995 E
D. Wallace[1]	1958-1964	1964-1971	1971-1992 E
Emmerling	1958-1962 R		
B. Wallace		1958-1961	1961-1981 E
Searle[2]	1962-1965	1965-1970	1970-1995 E
Stinson			1962-1998 E

Crowder[2]		1963-1970	1970-1979 E
Miller	1963-1964 R		
Rutger	1964-1970	1970 R	
Grogan			1966-1976 R
Pardee[2]		1966-1969	1969-2000 E
Gracen	1971-1976	1976-1981	1981-1986 R
Gregory	1975-1981	1981-1985 R	
Chaleff	1976-1980 R		
Sorrells	1978-1984	1984-1990	1991-
Earle		1979-1986	1986-
Viands	1979-1985	1985-1992	1992-
Mutschler	1979-1985	1985-1994	1994-
Coffman[2]			1981-
Tanksley		1985-1991	1991-
M. Smith[2]	1987-1993	1993-2006	2006-
Steffens	1987-1993	1993-1999R	
Kyle Jahn[1]	1991-1997	1997-2003	2003-
McCouch[2]	1992-1999	1999-2003	2003-
DeJong	2000-		
Pawlowski	2004-		

0. The Associate Professor rank was adopted in 1939.
1. Cornell graduate degrees, no prior experience, 11/54
2. Cornell graduate degrees, prior experience, 12/54
3. Without doctorate (2 received honorary doctorates, 4/54
   Non-Cornell graduate degrees, 28/54

Photo Section

Figure 1. 1907, Fall, First Seminar.
Left to Right: EC Ewing, AW Gilbert, EP Humbert, HP Mitra, D Datta, JB Norton, CF Clark, FJ Pritchard, HB Brown, LD Batchelor (missing HJ Webber, & HH Love).
(Courtesy Rare and Manuscript Collections, Cornell University Library)

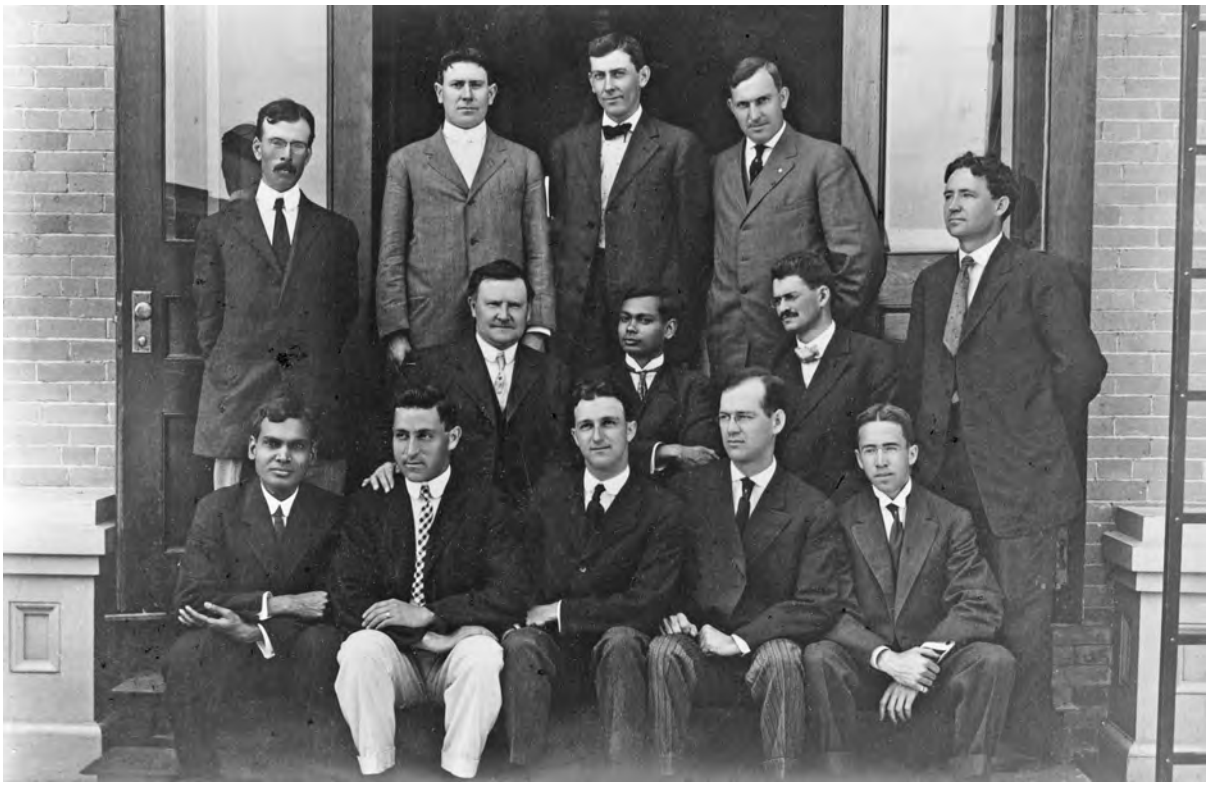


Figure 2. 1908, Spring, Synapsis Club.
Left to Right, Back Row: CF Clark, FJ Pritchard, HB Brown, AW Gilbert. Middle row: HJ Webber, D Datta, EP Humbert, JB Norton. Front row: HP Mitra, SJ Craig, HH Love, EL Worthen, LD Batchelor.
Courtesy Rare and Manuscript Collections, Cornell University Library)

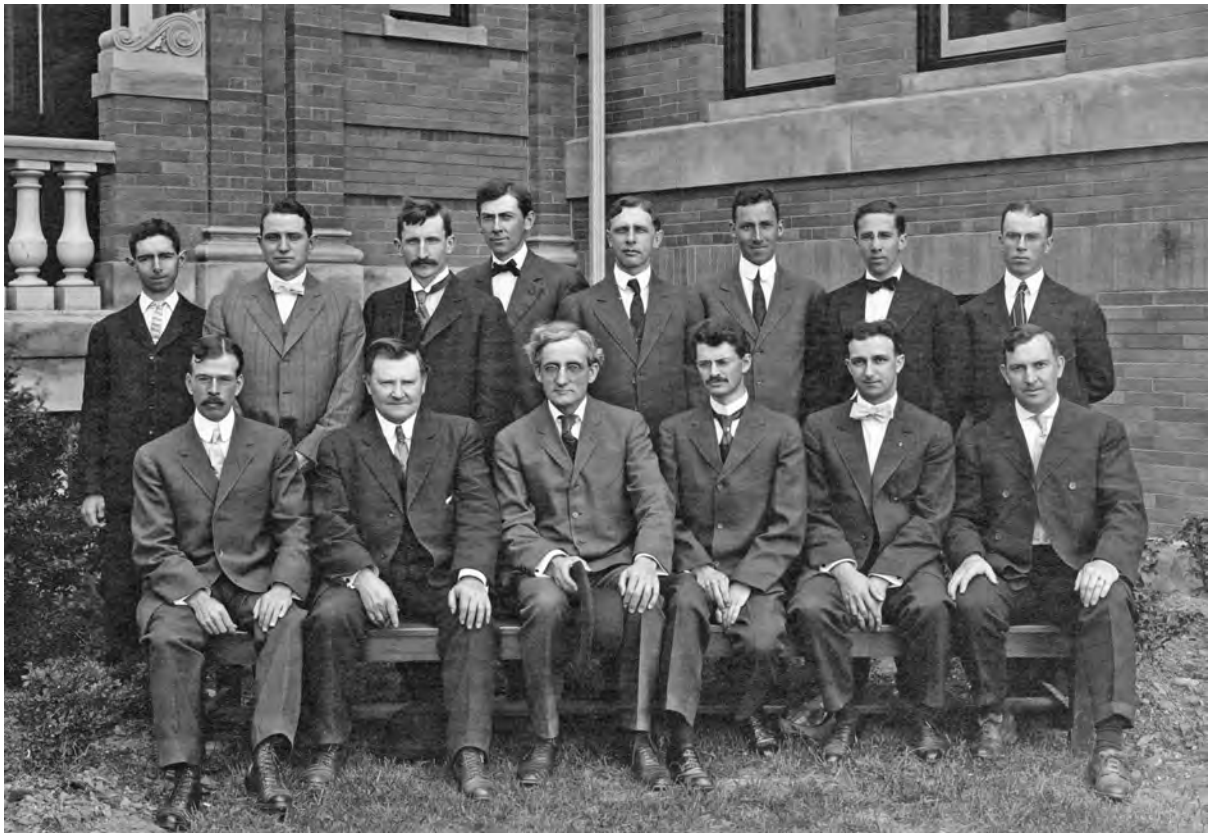


Figure 3. 1909, Spring, Synapsis Club.
Left to Right: Back Row: HB Frost, CE Leighty, LH Waldron, HB Brown, H Beckenstrater, SF Willard Jr., LD Batchelor, MJ Dorsey. Front Row: CF Clark, HJ Webber, LH Bailey, EP Humbert, HH Love, AW Gilbert.
(Courtesy Department of Plant Breeding)

Figure 4. 1910, Spring, Department members in the Laboratory [Stone Hall].
Left to Right, Back Row: HB Brown, GJ Bouyoucos, AB Buckholz, Hsieh, DR Coker, T Odaira. Front Row: EP Humbert, RJ Evans, AW Gilbert, HH Love, HB Cowgill, CE Leighty, CC Vincent, _?_, MJ Dorsey.
(Courtesy Rare and Manuscript Collections, Cornell University Library)

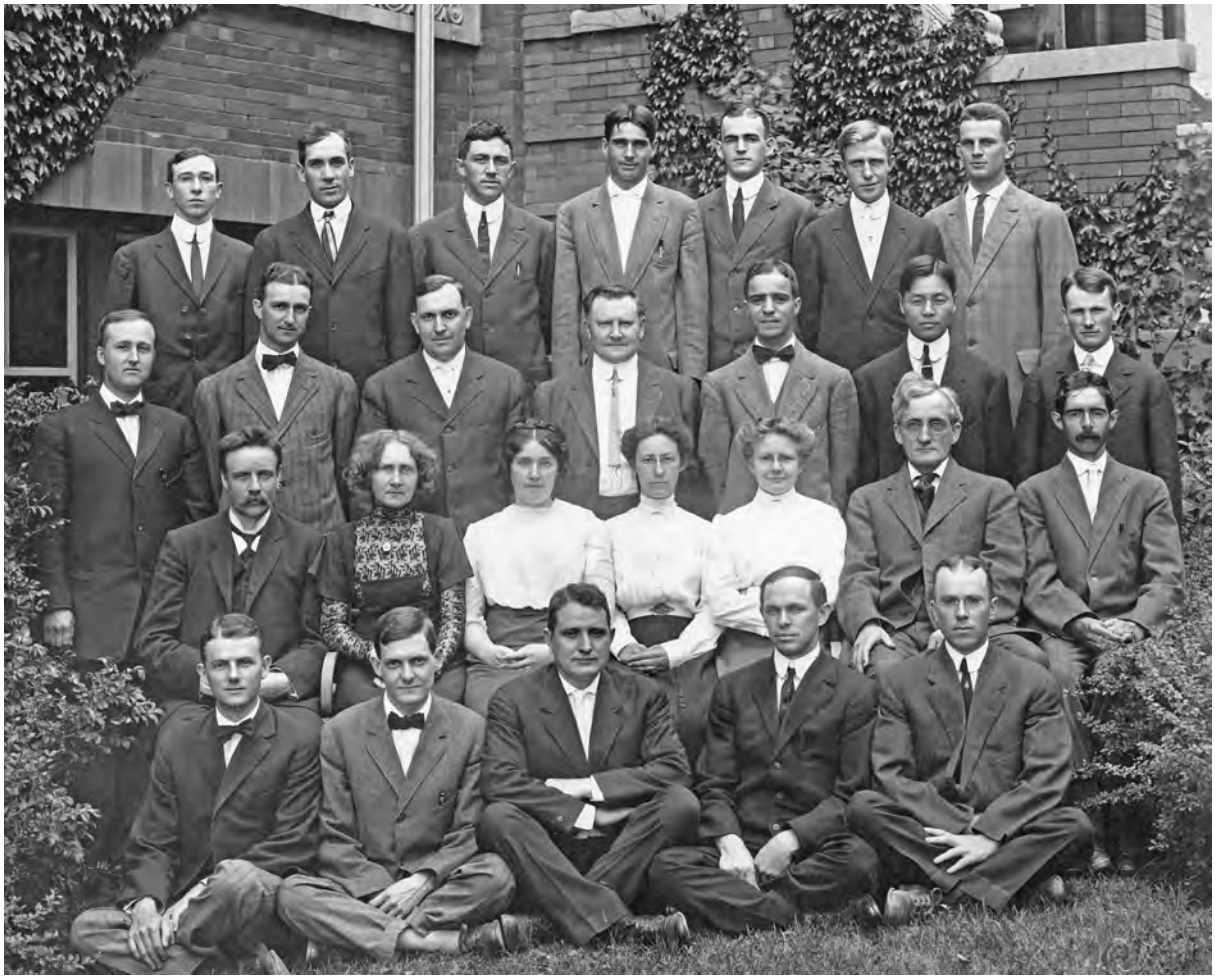


Figure 5. 1911, Spring, Synapsis Club [Stone Hall].
Left to Right, Back Row: SH Neethling, CF Noll, OW Dynes, RJ Evans, GM Darrow, HB Cowgill, KC Livermore. Third Row: CH Myers, HH Love, AW Gilbert, HJ Webber, GJ Bouyoucos, T Odaira, AW Drinkard, Second Row: Professor and Mrs. Horngstadt, Mrs. Smith, Miss Genung, Miss Atwater, LH Bailey, HB Frost. Front Row: RY Winters, DR Coker, CE Leighty, CE Myers, MJ Dorsey.
(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 6. 1911, Plant Breeding Garden.
Field with woman recording data under tent and men planting
(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 7. 1911, Plant Breeding Garden.
Field with men planting

(Courtesy Rare and Manuscript Collections, Cornell University Library)

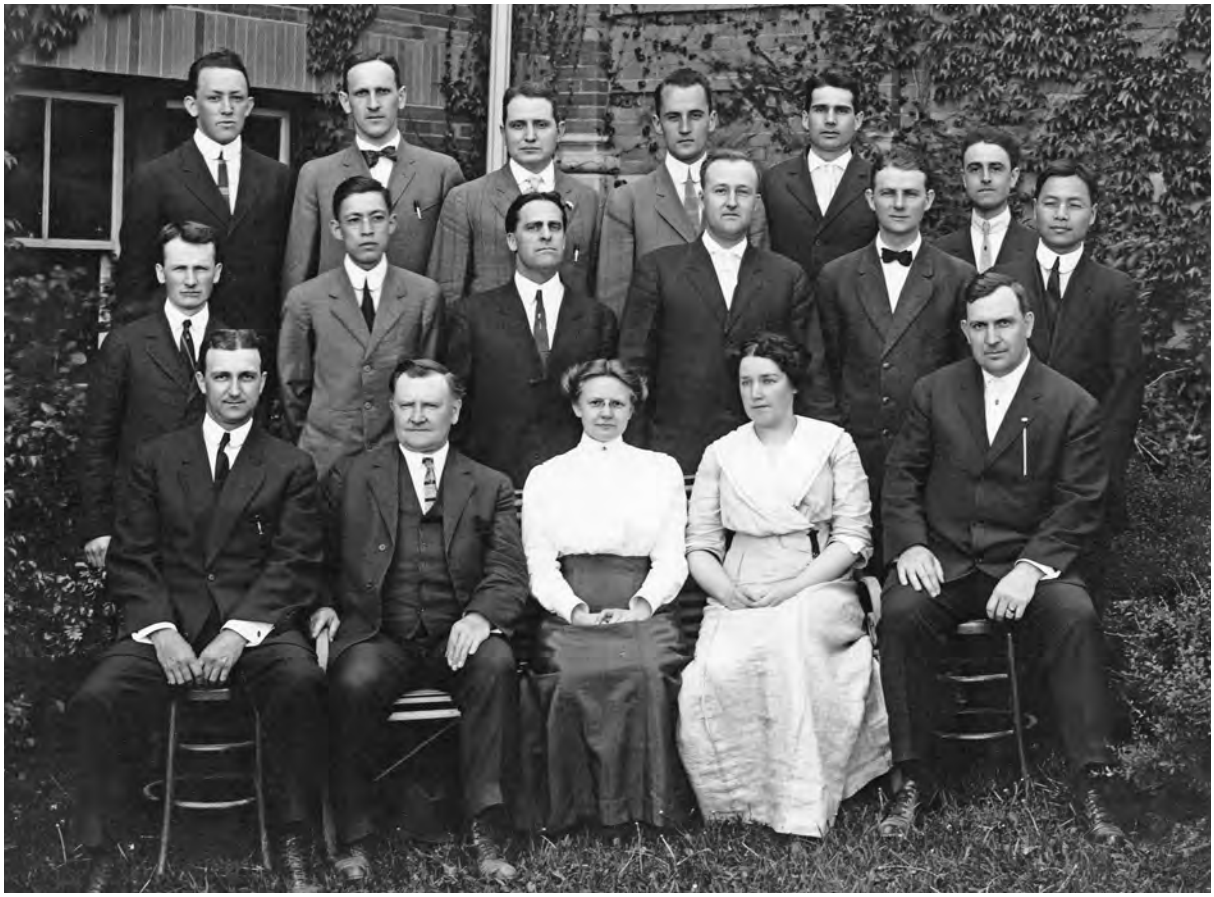


Figure 8. 1912, Spring, Department of Plant Breeding.
Left to Right, Back Row: SA Miller, A Atkinson, CE Leighty, EL Markell, RJ Evans. Middle Row: AW Drinkard, I Nagai, HN Vinall, CH Meyers, RY Winters, EE Barker, T Odaira. Front Row: HH Love, HJ Webber, Miss Atwater, Mrs Smith, AW Gilbert.

(Courtesy Rare and Manuscript Collections, Cornell University Library)

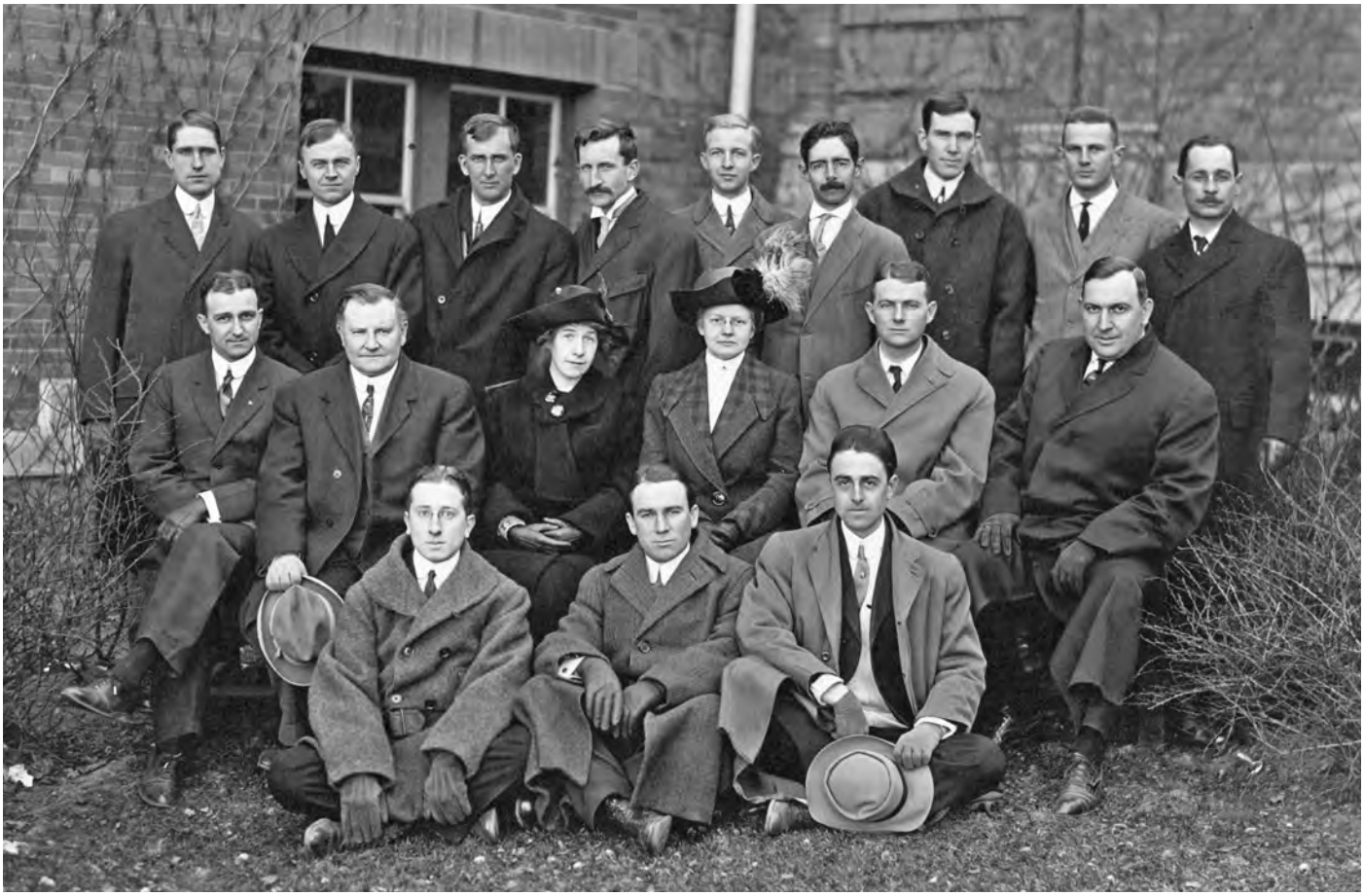


Figure 9. 1912, Fall, Department of Plant Breeding.
Left to Right, Back Row: WO Whitcomb, CO Dalrymple, TB Hutchison, LR Waldron, EW Benjamin, HB Frost, CB Hutchison, KC Livermore, CD Sherbakoff. Middle Row: HH Love, HJ Webber, Miss F Feehan, Miss A Atwater, RY Winters, AW Gilbert. Front Row: N Menderson, A MacTaggart, EE Barker.

(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 10. Alan Cameron Fraser (1890-1941)
Instructor and Professor in charge of instruction in Plant Breeding (1914-1941)

(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 11. 1914, Spring, Department of Plant Breeding [Fernow Hall].
Left to Right, Back Row: JB Reisner, W Southworth, Kuo, DB Carrick, CL Thayer, EW Benjamin, WH Burkholder, CJ Davis, Jundel. Middle Row: Warsaw, AC Hottes, DE Thomas, Potts, CG Crittendon, Jagger, KC Livermore, EE Barker, CD Sherbakoff, Shaper. Front Row: AW Gilbert, Miss Dean, _?_, Miss A Atwater, Miss F Feehan, CH Myers.

(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 12. 1915, Spring, Synapsis Club.
Left to Right, Back Row: WT Craig, BC Helmich, S Robinson, AC Hottes. Third Row: EV Hardenburg, VH Ries, CL Thayer, DB Carrick, OW Dynes, du Bursson, RG Wiggans. Second Row: P Work, CH Pollack, S Boshnakian, _?_, AC Fraser, HE Knowlton, JJ Pollack, EW Lindstrom, _?_. Front Row: AW Gilbert, Miss Dean, Miss A Atwater, Miss LA Minns, Miss F Feehan, HH Love, RA Emerson, CH Meyers.

(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 13. 1916, Spring, Synapsis Club.
Left to Right, Back Row: EV Hardenburg, AS Kenerson, T Bregger, JB Wentz, HW Dye, GJ Wilds, JH Parker, S Boshnakian, J Grossman, VF Tapke. Middle Row: FP Bussell, CL Thayer, EG Anderson, BC Helmick, EW Lindstrom, JJ Pollock, HE Knowlton, L Robbins, CW Moore. Front Row: Miss F Feehan, Miss A Atwater, CH Meyers, RA Emerson, Miss Ronto, Miss LA Minns, Miss Dean.
(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 14. 1917 Sigma Xi Exhibit.
(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 15. 1920-1921, Synapsis Club.
Left to Right, Back Row: WI Fisher, FH Dennis, WT Craig, AD Suttle, WH Burkholder, LF Randolph, P Kvakan, M Demerec, AM Brunson. Middle Row: E Dorsey, HP Cooper, HH Love, Miss LA Minns, RA Emerson, CB Hutchison, FB Bussell, AC Fraser. Front Row: AM Wolfson, KK Skovgaard, LA Eyster, TK Wolfe, R Summerby, MC Gillis, CH Myers, AF Barney.
(Courtesy Rare and Manuscript Collections, Cornell University Library)

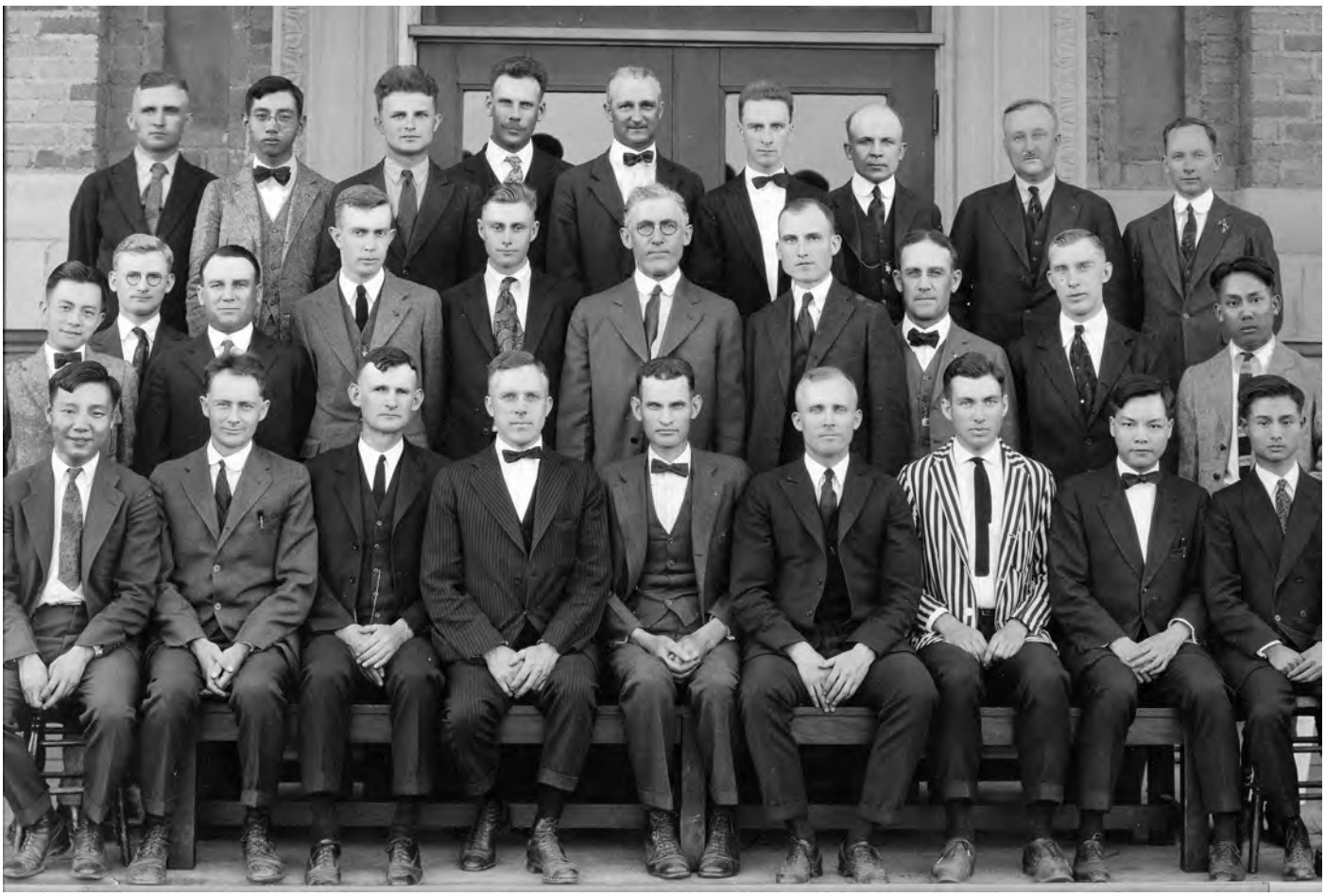


Figure 16. 1921-1922, Synapsis Club.
Left to Right, Back Row: P Kvakan, W Wang, M Demerec, HV Harlan, HH Love, LW Sharp, AC Fraser, CH Myers, EV Hardenburg. Middle Row: TC Tang, A Copeland, A McTaggart, WA Burkholder, T Bregger, RA Emerson, AM Brunson, FP Bussell, HD Brown, J Chandrastitya. Front Row: TC Chen, AF Barney, HP Cooper, E Dorsey, AD Suttle, JP Jones, SH Emerson, R Feng, CC Feng.
(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 17. 1922, January 1, group photo of W Bateson, RA Emerson with students and colleagues, Fernow Hall, Cornell University, following the AAAS meeting in Toronto.
Left to Right, Back Row: M Demerec, SH Emerson, EG Anderson, C Metz. Front Row: MJ Dorsey, S Wright, RA Emerson, W Bateson, CB Hutchison, C Bridges, FP Bussell, LA Eyster.
(See Kass 2005, photo courtesy RP Murphy, Department of Plant Breeding files)

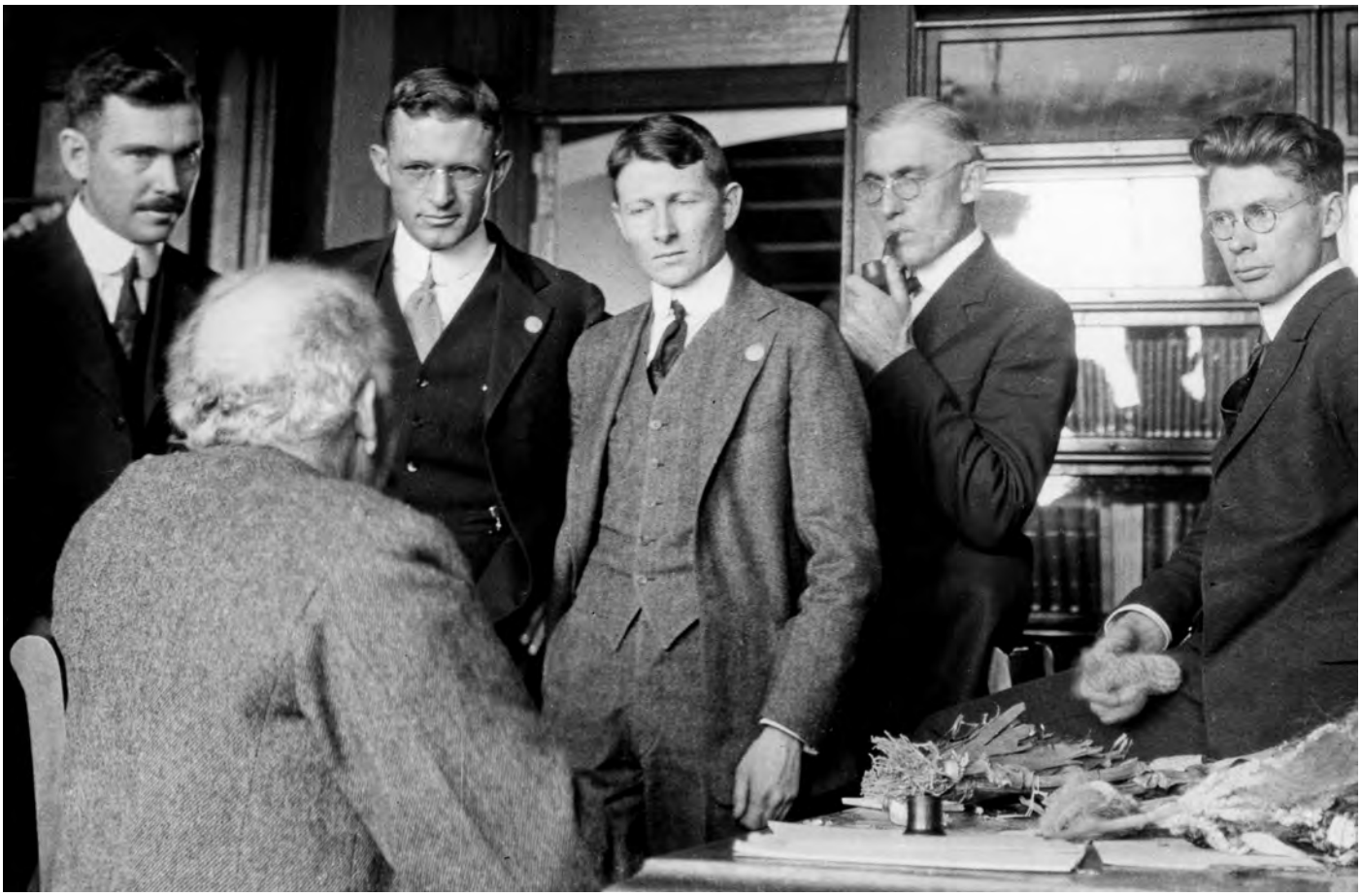


Figure 18. 1922, January 1, Bateson and colleagues at Cornell University.
Left to Right, Back Row: CB Hutchison, C Metz, S Wright, RA Emerson, CB Bridges. Front Row: W Bateson.
(Courtesy Department of Plant Breeding files)

Figure 19. 1922-1923, Synapsis Club.
Left to Right, Back Row: T Sasaki, AF Barney, HD Brown, LA Van Rooyen, P Kvakan, AD Suttle, WA Burkholder, Miss LA Minns, EL Proebsting, CV Kightlinger, MC Gillis, I Chandrastitya. Middle Row: FB Bussell, AC Fraser, HH Love, RA Emerson, CH Myers, RG Wiggans, LW Sharp, LF Randolph. Front Row: WT Craig, JR Livermore, E Dorsey, FD Keim, RD Lewis, LJ Henning, JP Jones, Mrs AZ Trajkovich, GV Wazalwar.

(See Kass 2005, Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 20. 1924, Synapsis Club.
Left to Right, Back Row: WT Craig, LR Watson, CB Hutchison, _?_, _?_, E Dorsey, _?_, _?_, _?_.
Middle Row: _?_, FP Bussell, AC Fraser, CE Myers, _?_, _?_, _?_, F Feehan, RG Wiggans, HH Love.
Front Row: _?_, RD Lewis, JR Livermore, _?_, _?_, GV Wazalwar, _?_.

(Courtesy HM Munger, Department of Plant Breeding files; scan by WP Provine)

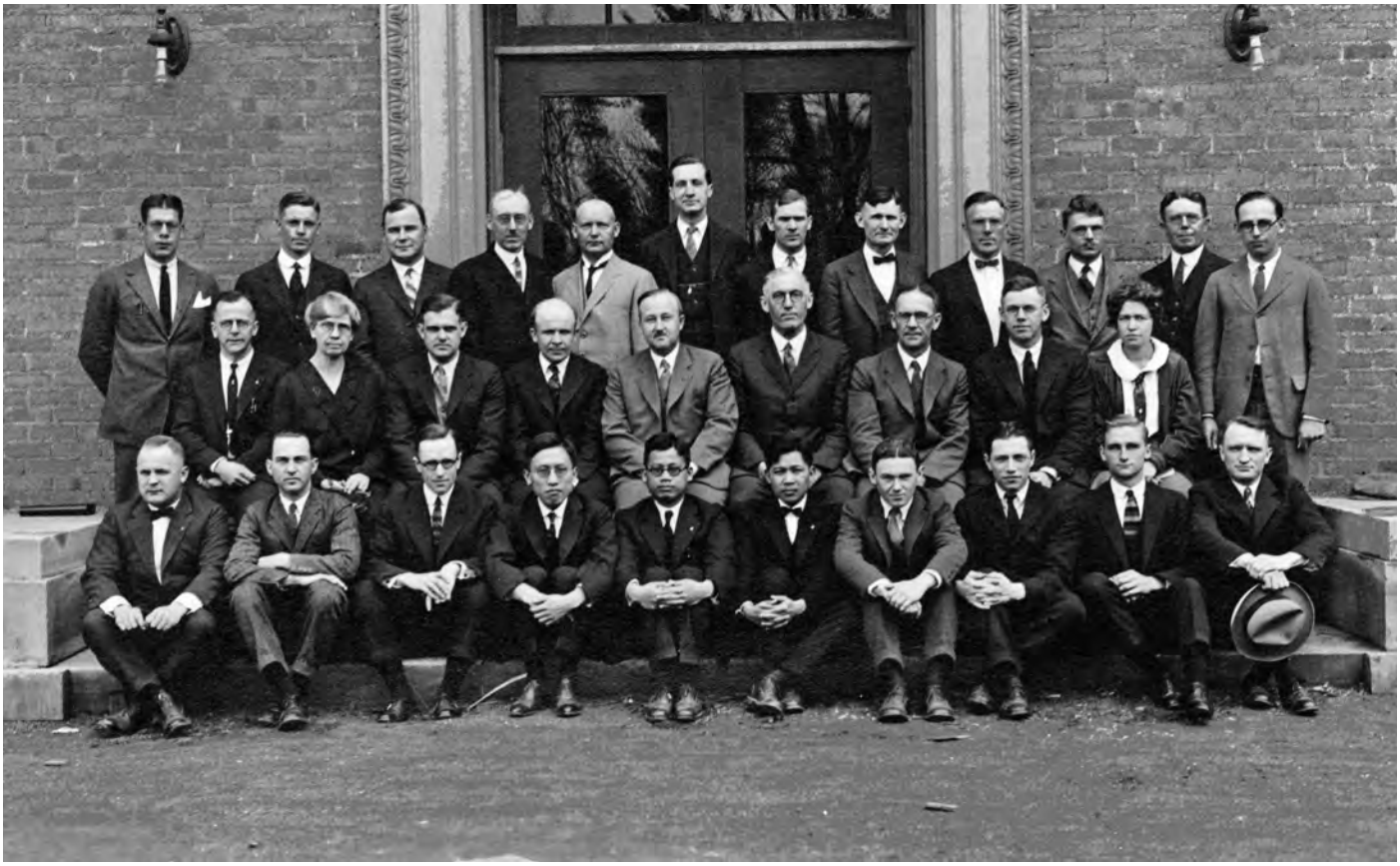


Figure 21. 1925, Synapsis Club.
Left to Right, Back Row: _?_, _?_, _?_, LR Watson, _?_, _?_, _?_, HP Cooper, E Dorsey, _?_, WT Craig, _?_. Middle Row: JR Livermore, LA Minns, RD Lewis, AC Fraser, CH Meyers, RA Emerson, FP Bussell, RG Wiggans, E Bodger. Front Row: _?_, _?_, _?_, _?_, _?_, _?_, _?_, _?_, _?_, _?_, _?_, _?_.

(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 22. 1926, Synapsis Club.
Left to Right, Back Row: _?_, _?_, _?_, _?_, LJ Stadler, LF Randolph, RA Emerson, _?_, _?_, _?_, HP Cooper. Middle Row: _?_, _?_, JR Livermore, HH Love, Miss A Beckley, _?_, Miss LA Minns, _?_, WT Craig, _?_. Front Row: AC Fraser _?_, _?_, _?_, _?_, _?_, _?_, _?_, _?_, _?_.

(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 23. 1927, Synapsis Club.
Left to Right, Back Row: GF Sprague, GW Beadle, _?_, _?_, _?_, _?_, _?_, _?_, _?_, WT Craig, HH Love, _?_, _?_, _?_. Middle Row: _?_, _?_, _?_, _?_, FD Keim, Miss _?_, Miss A Beckley, _?_, JR Livermore, _?_, AC Fraser. Front Row: HW Li, _?_, _?_, _?_, _?_, RA Emerson and Dog, FP Bussell, RD Lewis, _?_ CH Myers, _?_.

(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 24. 1927, Emerson Corn Group posing in front of the Plant Breeding shed.
Left to Right, Back Row: T Bregger, GF Sprague, RA Emerson, SCAR Crow, Emerson's dog, RG Wiggans, Wiggan's technician. Front Row: HW Li, IF Phipps, AC Fraser, Beadle's Dog Toto, GW Beadle, HB Riley.

(See Kass 2005, Courtesy WB Provine)

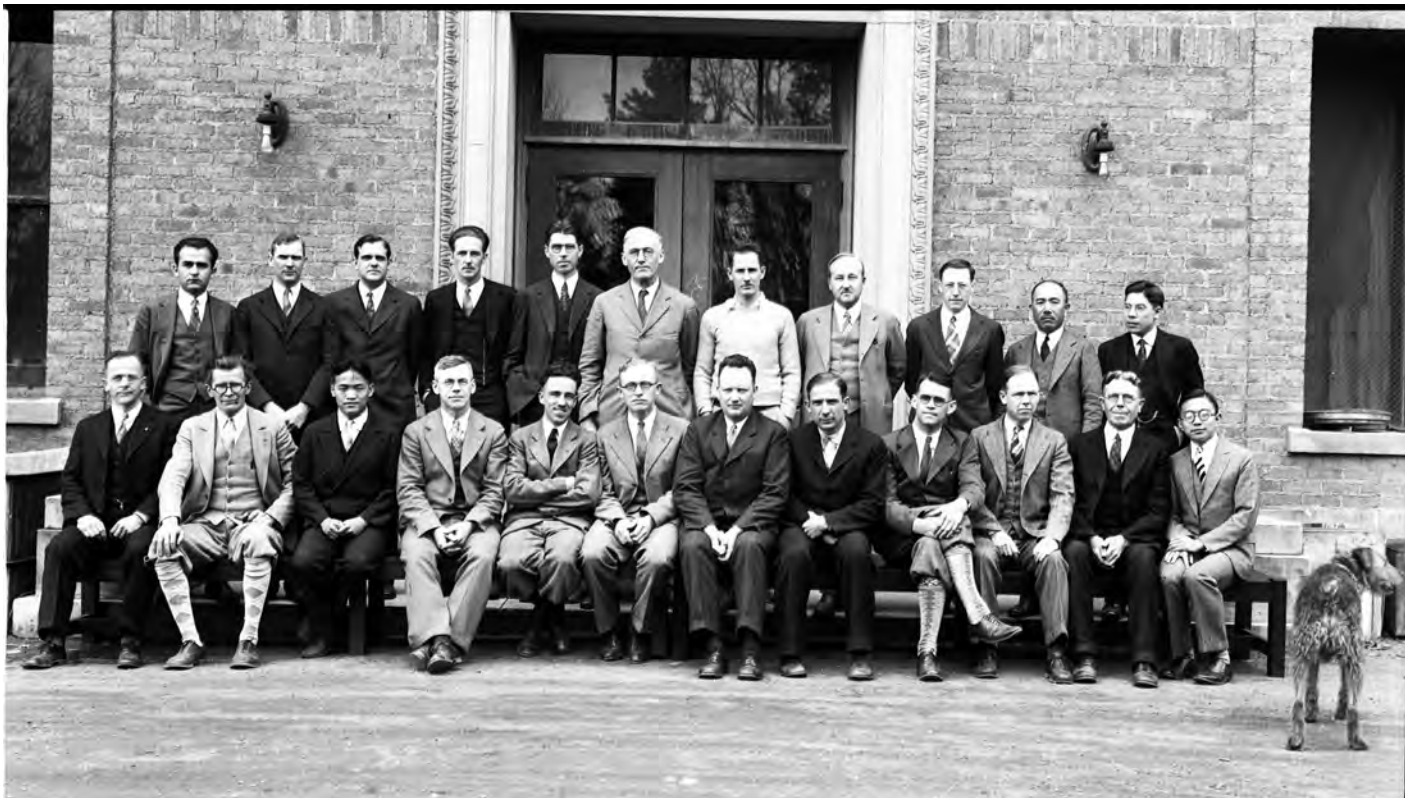


Figure 25. 1929, Synapsis Club.
Left to Right, Back Row: _?_ _?_, RD Lewis, HS Perry, LF Randolph, RA Emerson, GW Beadle, CH Myers, _?_, _?_, _?_. Front Row: JR Livermore, _?_, HW Li, RG Wiggans, _?_, _?_, _?_, MM Rhoades, _?_, _?_, WT Craig, _?_.
(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 26. 1929, Plant Breeding Garden.
Left to Right, Back Row: RA Emerson, _?_, MM Rhoades, HS Perry, LF Randolph, CR Burnham.
Front Row: Emerson's Dog, HW Li, GW Beadle, E Dorsey, Dog.
(Courtesy HM Munger, Department of Plant Breeding files)

Figure 27. 1929, Plant Breeding Garden, "Fab 5."
Left to Right, Back Row: CR Burnham, MM Rhoades, RA Emerson, B McClintock. Front Row: GW Beadle, Beadle's Dog.

(Courtesy W.B. Provine)

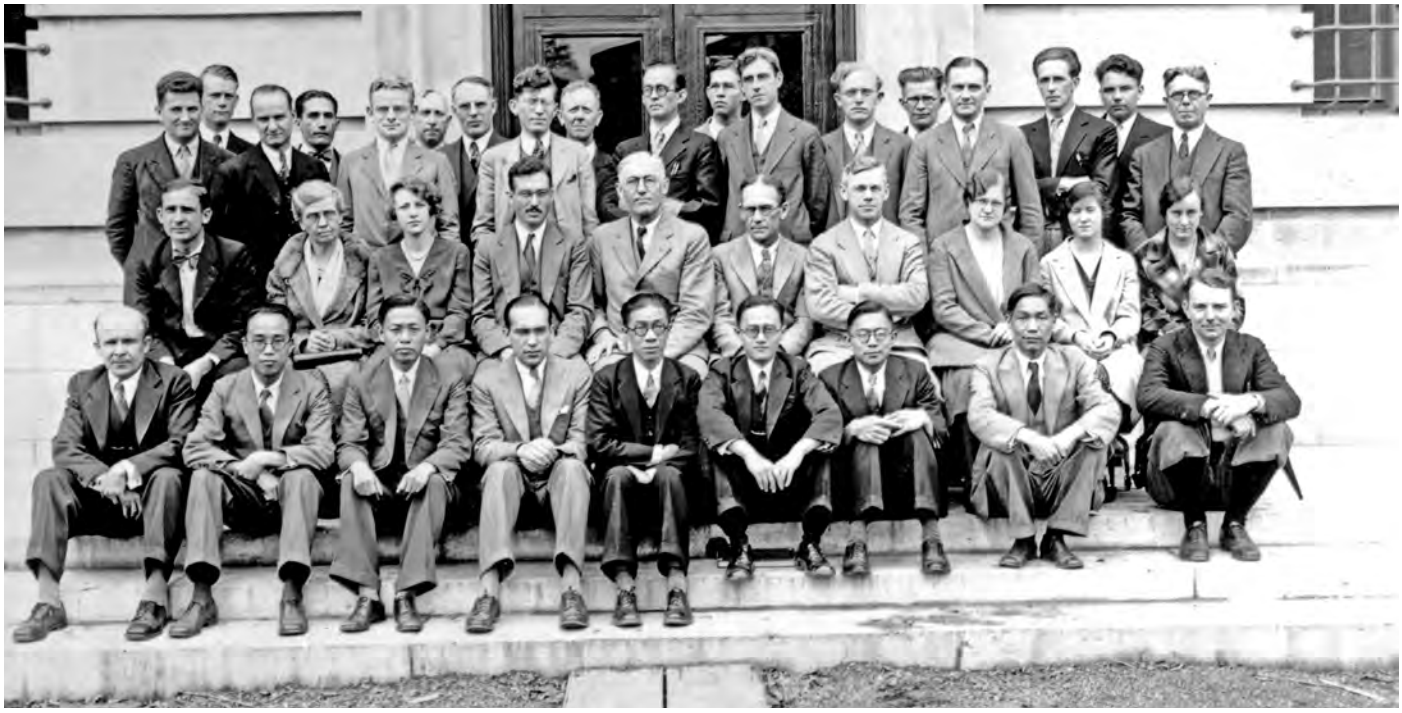


Figure 28. 1931, Synapsis Club.
Left to Right, Back Row: JV Shankweiler, JW Neely, AM Showalter, JMB Nolla, AG Richards, EW Geyer, LC Curtis, JC Tatsek, O Einset, JW Elliott, GK Parris, RM Haff, AJ Pratt, GW Scott, GA Lebedeff, HS Perry, P Brierley, WT Craig. Middle Row: MM Rhoades, Miss LA Minns, Miss HB Creighton, SH Emerson, RA Emerson, FP Bussell, RG Wiggans, Miss AM Skaer, Miss Dolan, Miss Townsend. Front Row, AC Fraser, R Feng, SK Ru, C. Tantalean, CC Kwan, PC Ma, CY Chou, SP King, RC Tasker.

(Courtesy Rare and Manuscript Collections, Cornell University Library, IDs completed by RP Murphy)

Figure 29. 1932, Synapsis Club, 25th Anniversary.
Left to Right, Back Row: _?_, _?_, _?_, _?_, _?_, RA Emerson, _?_, _?_, _?_, _?_. Middle Row: _?_, _?_, _?_, _?_, _?_, _?_, JH Parker, _?_, _?_, CH Meyers. Front Row: _?_, _?_, _?_, JW Neely, _?_, RG Wiggans, _?_, _?_, _?_.
(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 30. 1936, Synapsis Club.
Left to Right, Back Row: SC Yu, WD Swope, SC Peh, JH Moore, WL Chia, CC Wernham, KC Westover, TL Kwah, WT Craig, DD Hill, GB Patel, JS Brooks, AR Trotter, JS Cobb, DG Langham, EP Hume, HM Briggs, KH Jarvis, SY Tang, MM Burns, GA Lebedeff, EK Cowan, LF Randolph, FB Maughan, and H Terami. Front Row: RG Wiggans, HH Love, MJ Murray, AC Fraser, M Dawson, B McClintock, SM Allen, CY Tsao, JR Livermore, RA Emerson, HE Fischer, SE Tai.
(Courtesy Rare and Manuscript Collections, Cornell University Library; IDs courtesy of M Bhavnani)

Figure 31. 1945, April 23, Synapsis Club.
Left to Right, Back Row: LG Cox, OF Curtis, GE Willlis, SH Aldrich, VG Guzman, MA Baeza, G Blanco, ET Bullard, WE Chappell, C Ting, W Eto. Middle Row: FP Bussell, KD Butler (speaker), RA Emerson, JS Niederhauser, WH Burknolder, RL Cushing, HM Munger, S Fridrickson, P Grun, DD Dolan, C Branton, WT Craig, EH Casseres. Front Row: E Koudal, G Seelye, HH Love, F Thomas, WF Mai, FT Fung, R Morris, L Schnell, L Rubin.

(Courtesy Rare and Manuscript Collections, Cornell University Library).

Figure 32. 1946. Emerson pollinating celery in greenhouse
(Courtesy HM Munger, Department of Plant Breeding files)

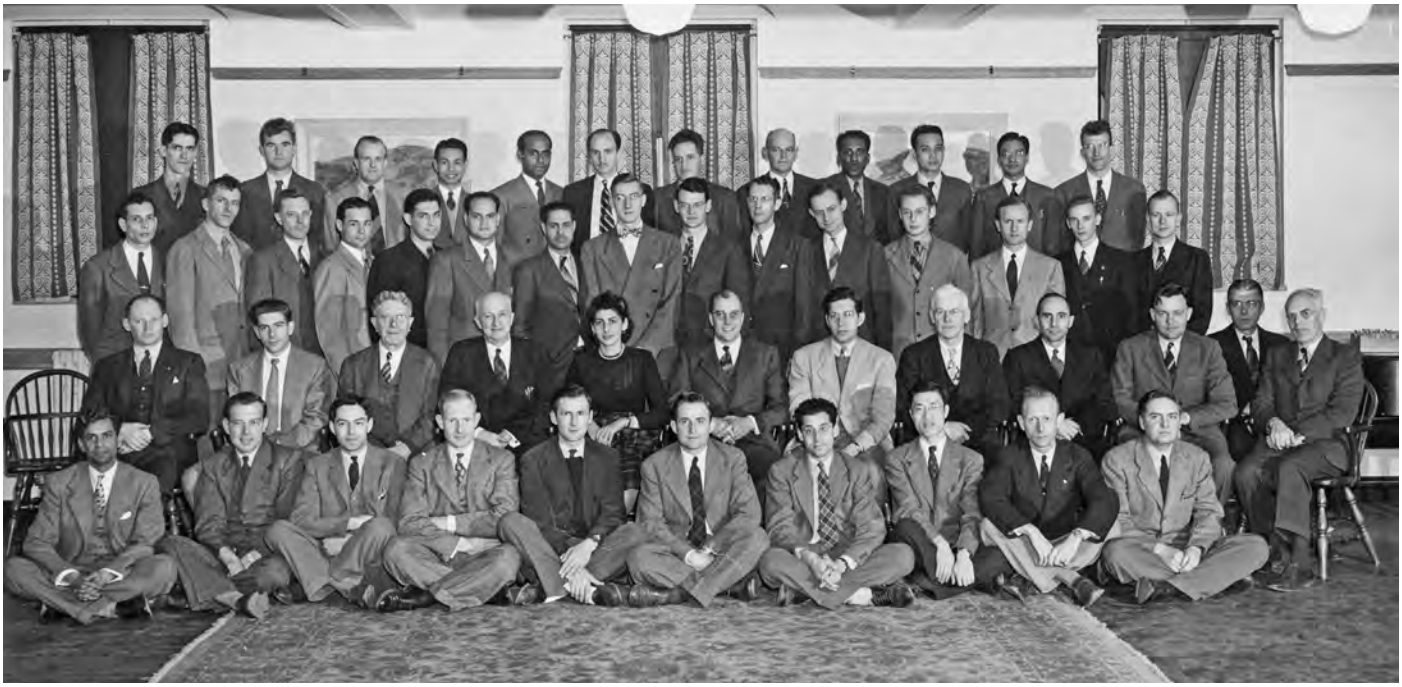


Figure 33. 1947, Synapsis Club.
Left to Right, Back Row: SG Smith, FJ Bell, JL Blanchard, GB Rotor Jr., A Abraham, C Gonzenbach, A Bing, JW Swarthout, P Uttaman, DL Umali, GS Randhawa, HR Fortmann. Third Row: TJ Mann, L Saltonstall Jr., RL Cushing, JD Aughtry, AL Isbit, MS Attia, G Singh, RP Korf, AM French, RE Lee, WT Scudder, P Grun, WE Chappell, CA Hornby, CA Taylor Jr. Second Row: HA MacDonald, JE Wright Jr. WT Craig, HH Love, Miss EE Gaertner, FE Eldridge, RF Dubler, RG Wiggans, HH Smith, RP Murphy, LF Randolph, OF Curtis. Front Row: MS Pawar, ES Horner, SS Atwood, RI Jackson, AT Hotchkiss, WS Barham, CA Breitenbach, CH Li, RE Wilkinson, B Lear.

(Courtesy Department of Plant Breeding files)

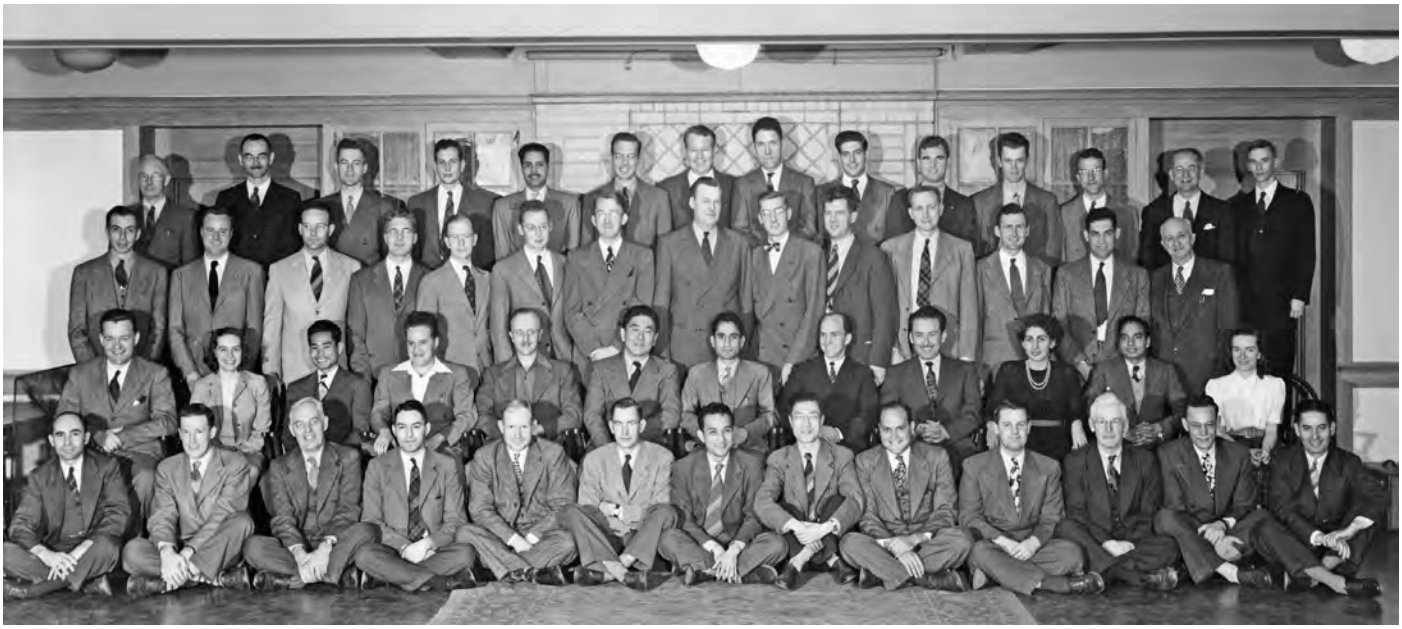


Figure 34. 1948, April 12, Synapsis Club.
Left to Right, Back Row: WD Swope, JD Hartman, NF Jensen, TJ Mann, G Singh, ES Horner, FL Haynes, BC Smith, JE Wright, Jr., J Bell, SL Dallyn, HR Fortmann, LA Alvarez-Garcia, CA Hornby. Third Row: WE Snyder, GA Johannessen, WD Pew, AE Kehr, CA Taylor, P Grun, A Srb, AA Johnson, R Korf, O Nissen, MW Meadows, AT Hotchkiss, A Isbit, HH Love. Second Row: RP Murphy, M Shaw, H Kamemoto, A Bing, FJ Nesbit, G Sawada, SP Kohli, C Gonzenbach, A Mercado, E Gaertner, GS Randhawa, M Paquett. Front Row: HH Smith, CB Hall, OF Curtis, SS Atwood, RI Jackson, CN Hittle, DS Umali, CH Li, MS Attia, WF Keim, RG Wiggans CF Konzak, O Smith (speaker).

(Courtesy Rare and Manuscript Collections, Cornell University Library)

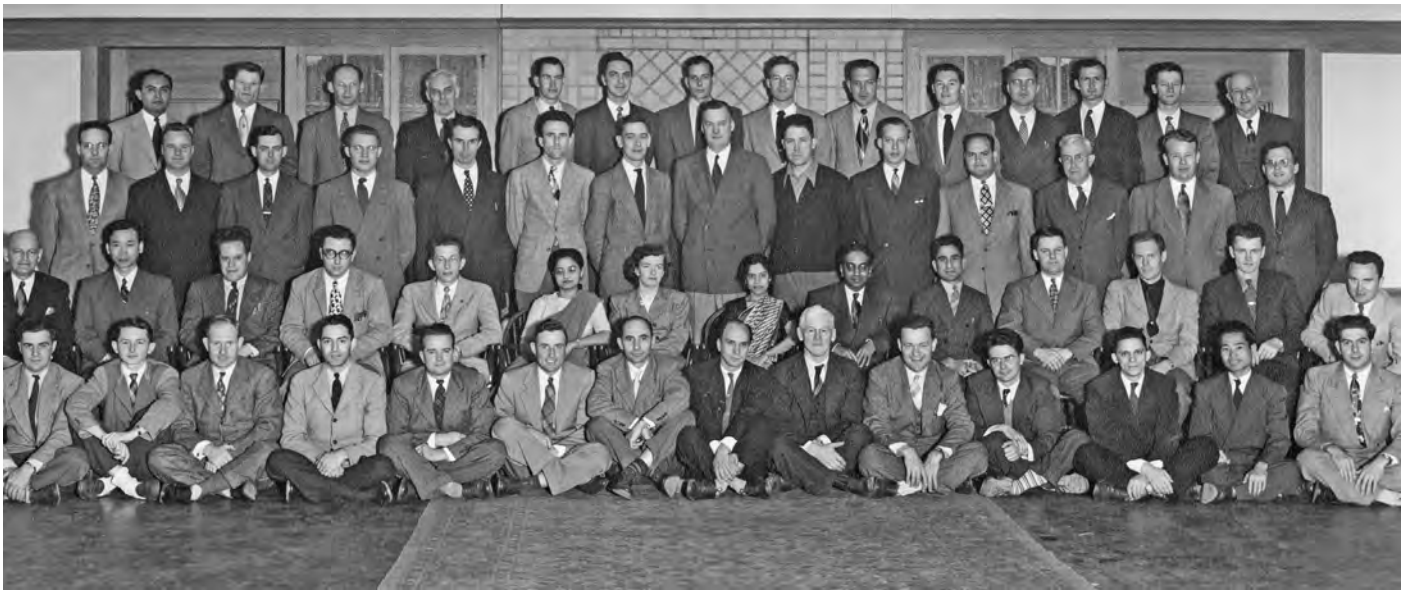


Figure 35. 1949, April 25, Synapsis Club.
Left to Right, Back Row: JP Ojeda, UJ Grant, HA MacDonald, OF Curtis, CN Hittle, JJ Mikell, TJ Mann, NF Jensen, ES Horner, AE Thompson, AE Kehr, AT Hotchkiss, TL York, HH Love. Third Row: WD Pew, GA Johannessen, HM Munger, AR Manson, CR Henderson, ED Donnelly, WC Paddock, AA Johnson, BC Smith, JC Craddock, MS Attia, WH Burkholder, FL Haynes, CC Lowe. Second Row: JW Swartout, YL Ku, A Bing, HA Fribourg, DG Huttleson, S Batra, M Pacquette, SS Pawar, MP Mahadevan (speaker), SP Kohli, WF Keim, RH White, SL Dallyn, C Burch. Front Row: RH Bradley, JL Brewbaker, RI Jackson, SS Atwood, JC Ballard, WS Barham, HH Smith, C Gonzenbach, RG Wiggans, RP Murphy, WJ Collins, G Schlottfeldt, H Kamemoto, JE Wright Jr.
(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 36. 1949, L.H. Bailey and Plant Breeding faculty in field.
Left to Right, Back Row: NF Jensen, AA Johnson, RG Wiggans, LH Bailey, RP Murphy, HH Love.
Front Row: SS Atwood, HM Munger, JR Livermore.
(Courtesy Department of Plant Breeding files)

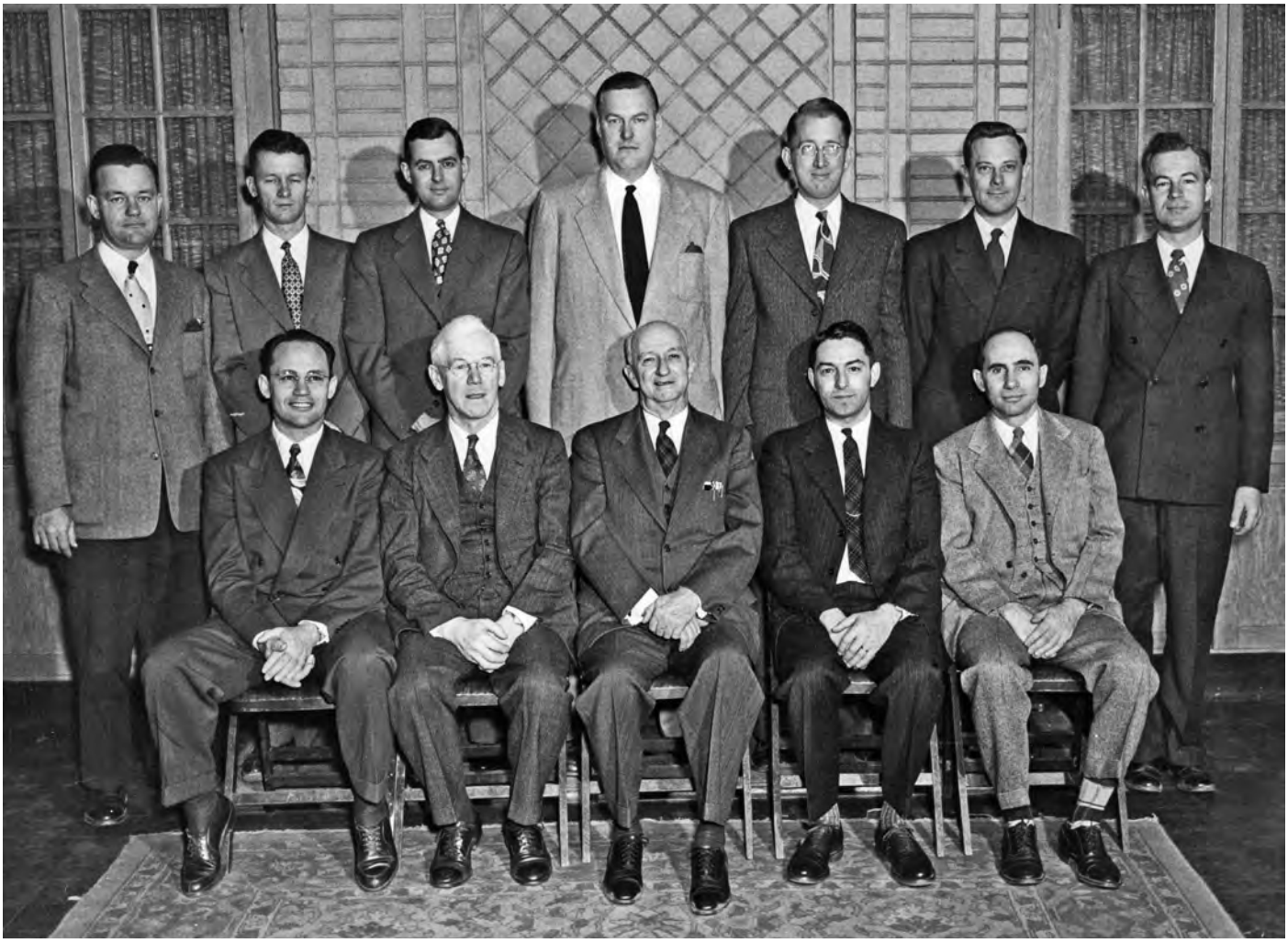


Figure 37. 1950, 28 Feb, Plant Breeding faculty.
Left to Right, Back Row: RP Murphy, TL York, HM Munger, AA Johnson, AM Srb, RL Cushing, NF Jensen.
Front Row: WT Federer, RG Wiggans, HH Love, SS Atwood, HH Smith.

(Courtesy Department of Plant Breeding files)

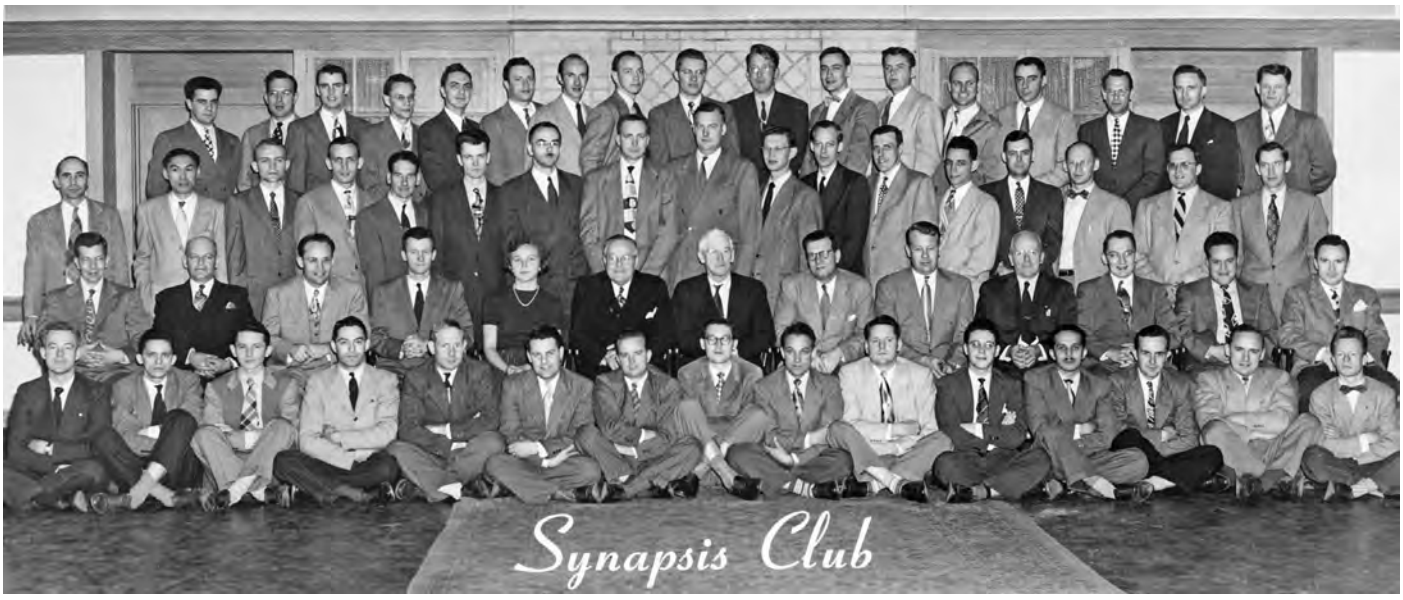


Figure 38. 1950, April 10, Synapsis Club.
Left to Right, Back Row: RH Bradley, ES Horner, R Plaisted, CF Konzak, JJ Mikell, RH Foote, FA Munch, JP Craigmiles, AR Hamson, AM Srb, WC Paddock, B Lear, CJ Daigle, W Marchant, DT Pope, AD Day, UJ Grant. Third Row: HH Smith, A Nakornthap, WP Anderson, M Hohn, CL English, SL Dallyn, JD Hartman, MW Meadows, AA Johnson, CA Lewis, J Craddock, E Beekhorn, R Segall, HM Munger, HA MacDonald, CC Lowe, CN Hittle. Second Row: WE McGraw, J Swarthout, WT Federer, TL York, B Hunt, RC Smith (speaker), RG Wiggans, CW Jones, FL Haynes, JR Livermore, J Antognini, A Bing, C Burch. Front Row: NF Jensen, C Schlottfeldt, JL Brewbaker, SS Atwood, RI Jackson, WF Keim, JC Ballard, A Thompson, LV Crowder, RD Ensign, S Alcabes, L Marcano, TJ Sheehan, L Carrier, E Ryder.

(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 39. 1951, May 14, Synapsis Club.
Left to Right, Back Row: CF Konzak, M Hohn, D Corbet, R Segall, NF Jensen, W Nuttall, HA MacDonald, WT Federer, J Underwood, J Antognini, EJ Kennedy, DS Robson, EA Borchers. Third Row: JW Swarthout, RP Murphy, JD Hartman, R Sawyer, B Lear, HM Munger, Mrs HM Munger, AA Johnson, WL Marchant, NL Taylor, KM Mikaelsen, JW Jones, WP Anderson, DL Smith, Y Ting. Second Row: HH Smith, J Smith, RJ Livermore, RG Wiggans, B Childs (Speaker), Mrs TL York, TL York, LV Crowder, A Bing, JR Orsenigo, RF Foley. Front Row: DT Pope, JL Brewbaker, SS Atwood, DB Ward, H Massey, RH Moll, LW Nittler, DR Bienz, T Sheehan, VW Woodward, WF Keim, RD Ensign.

(Courtesy Rare and Manuscript Collections, Cornell University Library)

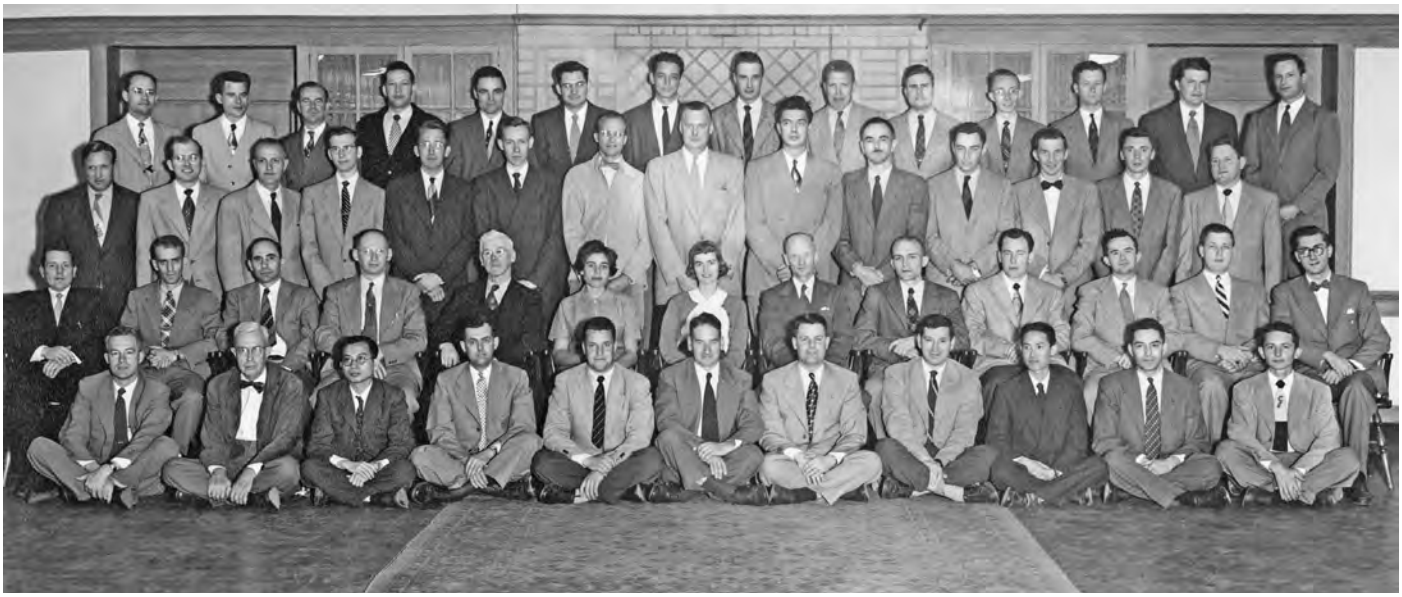


Figure 40. 1952, April 28, Synapsis Club.
Left to Right, Back Row: WT Federer, V Woodward, LW Nittler, RJ Stadtherr, R Way, EJ Kennedy, RH Segall, MD Corbett, RF Foley, J Underwood, CB Beck, TL York, HL Everett, RH Foote. Third Row: RS Dunbar, J Browning, LJ Tyler, JR Wall, AM Srb, DR Egolf, RR Seaney, AA Johnson, EW Owens, JD Hartman, WL Marchant, RL Sawyer, JE Cruise, RD Ensign. Second Row: JR Orsenigo, CI Hannon, HH Smith, HA MacDonald, RG Wiggans, U Hirsch, V Rogers, HCS Thom, WP Anderson, NL Taylor, JW Jones, DL Smith, RP Korf. Front Row: NF Jensen, WH Burkholder, P Na Nagara, HM Munger, CM Johnson, CL English, WF Keim, R Rabson, JH Wu, SS Atwood, JL Brewbaker.

(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 41. 1953, April 27, Synapsis Club.
Left to Right, Back Row: SS Atwood, WF Brannon, AA Wellwood, JR Wall, GM Johnson, RP Murphy, OM Rogers, JD Hartman, TL York, RH Segall, JW Jones, DL Smith, RA Capellini, CL English, HJ Otto, MK Corbett. Third Row: JE Dowd, AR Hamson, LJ Tyler, RL Blackwell, HL Everett, NL Taylor, RR Seaney, AA Johnson, EW Owens, WL Williams, RP Korf, RGD Steel, SW Bowne, S Galal Sayed, B Forrest, VW Woodward. Second Row: WT Federer, HA MacDonald, CG Hickman, RG Wiggans, Mrs. N. Slack, TP Wright (Cornell Vice Pres. For Res.), Miss TA Lotfy, WS Bessey (Vis Prof. Pl. Path.), JR Smith, HQ Stevenson, R Rabson. Front Row: KH MacDonald, WH Isom, EJ Kennedy, CC Lowe, TT Chang, EW Sprague, RH Bradley, DR Bienz, W Drake, WP Anderson, SA Sand, NF Jensen, J Weibe.

(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 42. 1954, April 12, Synapsis Club
Left to Right, Back Row: HL Everett, D Bienz, D Robson, W Isom, E Sebesta, M Zelle, JM Bruckner, NF Jensen, RP Murphy, HA MacDonald, R Rabson, R Shoemaker, RGD Steel, E Sprague. Fourth Row: J Wiebe, Bob Seif, RE Anderson, W Johnson, R Seaney, E Owens, A Hamson, RE Lee, H Otto, L Judd, LJ Tyler, AA Ahmadi, M Martin. Third Row: W Dewey, SG Sayed, S Young, C English, MA Zafar, M El Ghawas, J Underwood, HH Smith, W Drake, SA Sand, J Mitra, R Shaffer, TL York. Second Row: F Hobson, J Smith, B Murray, RG Wiggans, DF Jones (Guest Speaker), T Lotfy, J Dolloff, N Slack, S King, R Foote. Front Row: J Smith, SS Atwood TT Chang, HQ Stevenson, JR Wall, D Wallace, J Ogg, W Anderson, U Urata, CC Lowe.

(Courtesy Rare and Manuscript Collections, Cornell University Library).

Figure 43. 1955, April 25, Synapsis Club.
Left to Right, Back Row: HL Everett, D Wallace, G. Sayed, DB Walden, W Johnson, RGD Steel, R Downey, DA Roberts, C Boothroyd, JM Barnes, AM Srb, D Watson, R Rabson. Third Row: D. Fiester, F Bent, D Coyne, D Ward, WD Potter, JB Smith, W Dewey, H Stevenson, K Thompson, J Mortensen, R Ruf, E J Kinbacher, J Kainski, HJ Otto, K Fezer, E Forsund, J Smith,
HA MacDonald, LJ Tyler. Second Row: J Ogg, RE Anderson, R Uhlinger, K Mears, J Smith, R Straus (Guest Speaker), D Niimoto, RG Wiggans, FC Steward, WD Bonner, RP Murphy, A Lasher. Front Row: E Sprague, W Rose, U Urata, SS Atwood, E Houseman, L Aalders, J Mitra, HH Smith, E Sebsta, R Shaffer, K Macdonald, G Scaporiotes.
(Courtesy Rare and Manuscript Collections, Cornell University Library).

Figure 44. 1956, April 23, Synapsis Club.
Left to Right, Back Row: WS Young, KF Schertz, AA Johnson, CL Hart, RD Uhlinger, AH Sparrow, KH Thompson, MW Martin, RP Murphy, HA MacDonald, LJ Tyler, HJ Otto. Third Row: DR Egolf, JT Crynes, DB Walden, EJ Kinbacher, CL English, DA West, JW Miller, HA Daubeny, RK Downey, Ms. DG Van de Mar, HM Munger, R Rabson, WJ Dress, WC Dewey. Second Row: JE Cruise, RL Plaisted, RE Anderson, Ms DH Niimoto, Ms KA Mears, LE Weaver, Ms RM Savelkoul, Ms A Lasher, Ms JB Smith, CC Lowe. Front Row: KH MacDonald, WA Rose, JM Barnes, DH Wallace, WC Johnson, DB Ward, HQ Stevenson, LE Aalders, EE Sebesta.
(Courtesy Department of Plant Breeding files)

Figure 45. 1957, 25 April, 50th Anniversary Dinner of Plant Breeding Department and Synapsis, Head Table.
Left to Right, Back Row: RP Murphy, SS Atwood, J Wright Jr., HH Love, RGD Steel, R Korf. Front Row: Mrs Korf, Mrs A Love, Mrs E Atwood, Mrs C Wright, Mrs M Murphy, Mrs V Steel.

(Courtesy Department of Plant Breeding files)

Figure 46. 1957, May 13, Synapsis Club.
Left to Right, Back Row: W Blischke, R Elston, K Jones, S Young, SB White, WJ Dress, M Martin, W Johnson, DJ Thompson, RP Murphy, GT Atkinson, SV Rao, JF Sutcliffe, TL York, W Pardee. Third Row: DS Robson, A Lubell, DH Wallace, DB Walden, I Poostchi, RL Plaisted, RD Uhlinger, J Miller, D West, HA Daubeny, EJ Kinbacher, RW Lighty, R Steel, R Ford, JW Barnes, DA Wheeler, AM Srb, RE Anderson, LJ Tyler, CW Boothroyd, HM Munger, AA Johnson. Second Row: K Mears, E Meyers, J Smith, K Borojevic, HH Love, CF Green, RM Abbot, U Bhagat, GM Donnelly, CP Fussell, DH Niimoto. Front Row: JL Muneta, P Muneta, J Diaz, DP Coyne, RL Latterell, LH Camacho, C Hart, U Urata, L Aalders, K MacDonald, KH Thompson.

(Courtesy Department of Plant Breeding files)

Figure 47. 1957-1958, Synapsis Club.
Left to Right, Back Row: WSYoung, JA Beardmore, DJ Thompson, DS Robson, DA Wheeler, JC Thompson, WR Blischke, RW Lightly, BN Okigbo, GF Atkinson, B. Murty, PL Curran. Third Row: JC Weaver, HA Daubeny, WD Pardee, DP Coyne, WJ Dress, DB Walden, DA West, AA Johnson, JW Miller, RGD Steel, CW Boothroyd, CG Sibley, CH Ward, AM Srb, HL Everett.
Second Row: E Meyer, AR Lubell, JS Hover, JW McConnell, RG Wiggans, G Wade, RL Lyndon, WD Bonner, HM Munger, B Sigurbjornsson. Front Row: MW Martin, JM Barnes, KR Jones, RE Anderson, DH Wallace, RP Murphy.
(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 48. 1958 (Fall), Synapsis Club.
Left to Right, Back Row: KH Thompson, B Boonsue, DB Walden, RW Downes, RW Lighty, WR Meredith, Jr, DW Denna, A List, Jr Third Row: S Platt, HM Munger, LO Chang, E Gray, WJ Dress, RZ Echandi, L Sherk, DB Foster, BS Sidhu, AA Johnson, D Gershon, BR Murty, DA Roberts, R Bradfield, HL Everett, E Alvarez, ML Risius, HZ Liu. Second Row: CG Sibley, R Lyndon, RE Ford, WD Pardee, DA West, C Berg, ER Sayers, B Wallace. Front Row: NN Roy, DH Wallace, EJ Kinbacher, JH Bruckner.
(Courtesy Department of Plant Breeding files)

Figure 49. 1958-1959, (Synapsis Club) Picnic, Plant Breeding.
(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 50. 1959, Field Assistants Retirement.
Left to Right, Back Row: Cary Drake, Joe Peterson, Bob Reddick, Dennis Willsey, Roland Van Sickle, Bill Washburn, Seba Sloughter, Joe Stilwell. Front Row: John Swarthout, Al Berich, Orrie Cornelius, Louise Armithage.
(Courtesy Department of Plant Breeding files)

Figure 51. 1960 (Fall), Faculty Department of Plant Breeding.
Left to Right, Back Row: AA Johnson, AM Srb, B Wallace, HL Everett, RR Seaney, RG Steel. Middle Row: EJ Kinbacher, RP Murphy, ME Thompson, HH Love, RE Anderson, DS Robson, NF Jensen. Front Row: HM Munger, CC Lowe, WT Federer, DH Wallace, RL Plaisted, RH Bradley.

(Courtesy Department of Plant Breeding files)

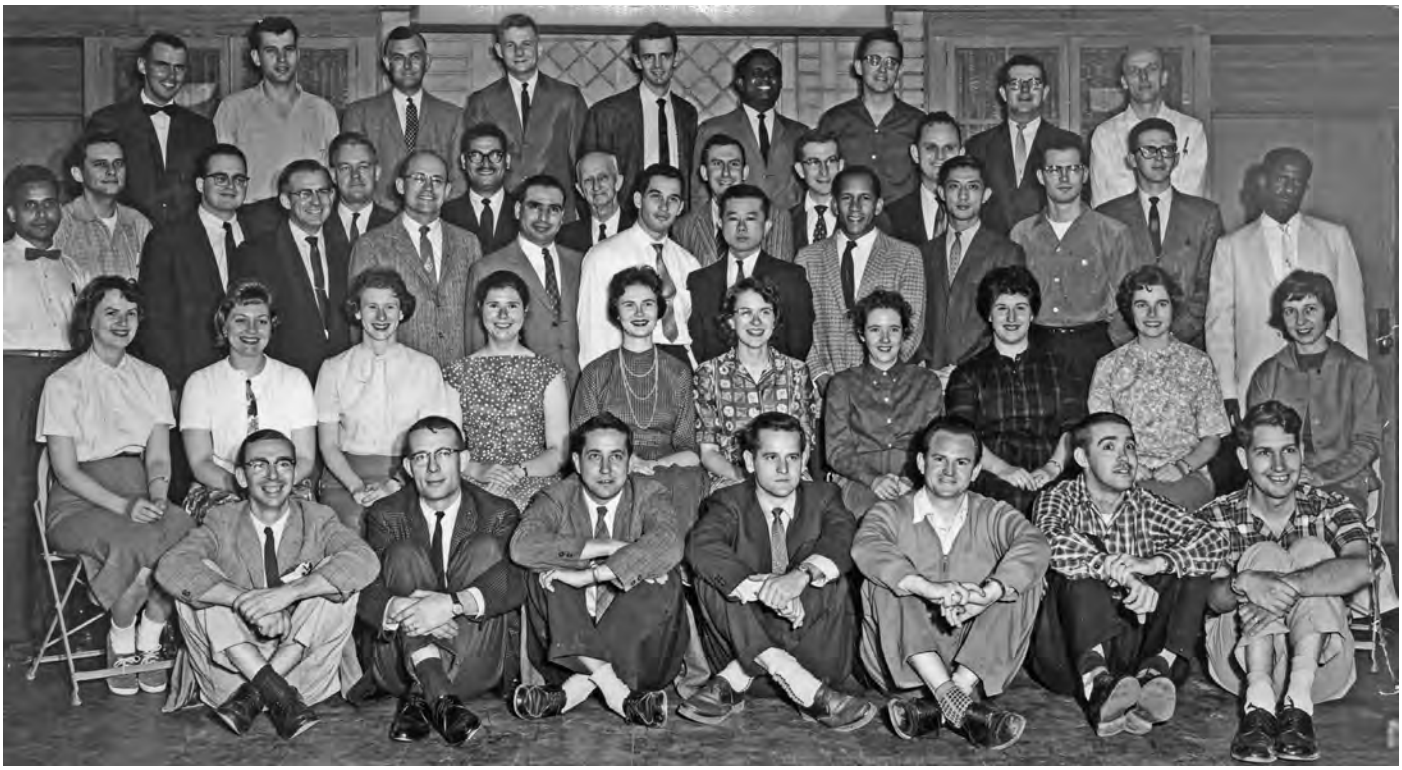


Figure 52. 1960-1961 (Spring), Synapsis Club.
Left to Right, Back Row: R Plaisted, D Johnson, HM Munger, E Vanoucek, J Baumann, D Pillay, D Denna, R Sayers, K Papa. Third Row: R Rao, L Blakely, S Blumenthal, D Wallace, RP Murphy, W Federer, A Abdel-Al, L Lujan, HH Love, G Poirier, O Myers, S Smutkupt, D Wheeler, E Edmunds, WD Pardee, H Liu, J Thompson, T Bingham, B Bakhit. Second Row: J Johnson, C Sayers, R Blakely, S Newman, C Vanoucek, B Pardee, S Marston, L Blumenthal, A McVittie, M [Emmerling-] Thomson. Front Row: K Sanderson, K Thompson, B Wallace, E Gray, C Driscoll, W Meredith, D Newman.

(Courtesy Department of Plant Breeding files)

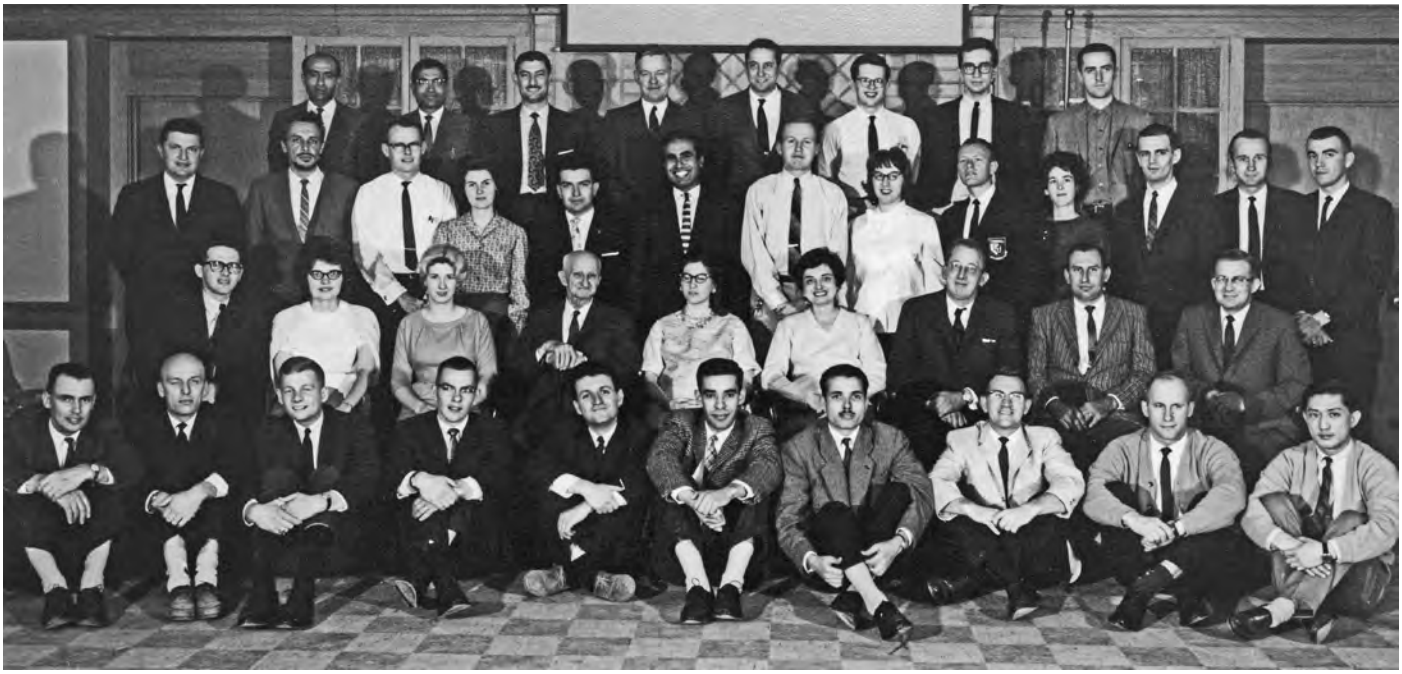


Figure 53. 1962-1963, Synapsis Club.
Left to Right, Back Row: _?_, _?_, _?_, RP Murphy, B Wallace, _?_, _?_, _?_. Third Row: HL Everett, _?_, RR Hill, _?_, _?_, R Bamsal, DA West, _?_, _?_, _?_, _?_, HT Stinson, _?_. Second Row: ET Bingham, _?_, _?_, HH Love, _?_, _?_, AM Srb, O Myers Jr., DH Wallace. Front Row: RL Plaisted, KE Papa, EG Vann, _?_, _?_, M Nasrallah, _?_, GC Emery, ML Risius, HZ Liu.
(Courtesy Department of Plant Breeding files)

Figure 54. 1965, April 12, Synapsis Club.
Left to Right, Back Row: HH Munger, JN Rutger, DS Padda, RP Murphy, SH Emerson, G Kingma, P Dawson. Fourth Row: RL Plaisted, RC Sward, NF Jensen, A Hedayat, HM Eisa, NT Al Mohammed, HG Gauch, JH Bruckner. Third Row: CC Lowe, RL Frankel, JL Fendick, CA Breitenbach, M Nasrallah, PW Gates (guest), HE Schaffer, DN Sajnani, G Pincheira, HA Pacheco, H Ibrahim, LV Crowder. Second Row: ML Risius, Mrs Jensen, Mrs Emery, Miss C Gecking, Miss B Jones, Mrs Eisa, DE Wallace,
J Valle-Riestra. Front Row: S Izhar, G Emery, J Puhalla, EQ Javier, R Bansal, R Hakim.
(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 55. 1966, Plant Breeding Department Faculty and Staff, [and Spouses] Celebration, Everett named director of Resident Instruction.
Left to Right, Back Row: D Wallace, M Risius, N Jensen, RP Murphy, HM Munger, AM Srb, H Stinson, Jr., AA Johnson. Third Row: C Lowe, H Everett, R Wiggans, JN Rutger, R Anderson, B Wallace, Mildred Murphy, Jean Anderson, R Plaisted, S Searle, Norma Munger, W Baines. Second Row: Naomi Wallace, Jean Baines, Ellen Plaisted, Olive Johnson, Jozetta Srb, Helen Searle, Jean Stinson, Jean Hover, R Reddick, Frances Reddick, Miriam Wallace, L Crowder. Front Row: Mary Jensen, Margaret Rutger, Frances Risius, Edna Wiggans, Cleo Lowe, Anne Robson, Dorothy Everett, Eloise Crowder.
(Courtesy Department of Plant Breeding files, IDs by RP Murphy)

Figure 56. 1967 (August), Johnson Retirement Party.
Left to Right, Back Row: LV Crowder, DS Robson, DW Wallace, M Nasrallah, CC Lowe, RG Wiggans, RB Reddick, WT Federer, NF Jensen. Fourth Row: AM Srb, HT Stinson, Mrs Munger, RR Seaney, W Baines, CO Grogan, AA Johnson. Third Row: Mrs Lowe, Mrs Rutger, Mrs Robson, Mrs Srb, Mrs Federer, Mrs Townsend, Mrs Seaney, Mrs Anderson, Mrs Baines, Mrs Grogan, Mrs Pardee, Mrs Stinson, Mrs Plaisted, Mrs Reddick, Mrs Murphy, B Wallace. Second Row: EL Townsend, Mrs DH Wallace, Mrs Crowder, Mrs Jensen, Mrs MacEachron, Mrs Smith, Mrs Everett, Mrs Wiggans, Mrs Johnson, Mrs B Wallace, HM Munger, J MacEachron. Front Row: RP Murphy, ER Townsend, WD Pardee, JN Rutger, RL Plaisted, J Hover, HL Everett.
(Courtesy Department of Plant Breeding files)

Figure 57. 1968, June Picnic

(Courtesy Department of Plant Breeding files)

Figure 58. 1970, Plant Breeding Department
Left to Right, Back Row: DW Sperling, WR Coffman, JC Webster, O Leleji, RF Plage, HM Schaaf, BW Balgooyen. Third Row: M Garriott, E Alarcon, JR Stander, KD Sayre, LS Beckham, JE Ferguson, AS Pompeii, NF Jensen. Second Row: WD Pardee, BF George, MJ Forster, JN Rutger, RJ Redden, MA Soto, RL Plaisted, DH Wallace. First Row: RD Morse, K Chow, EO Santos, A Calo, LV Crowder, M Scurrah, AA Hassan VVS Murty, CA St-Pierre.

(Courtesy Steve Beckham, IDs RP Muprhy)

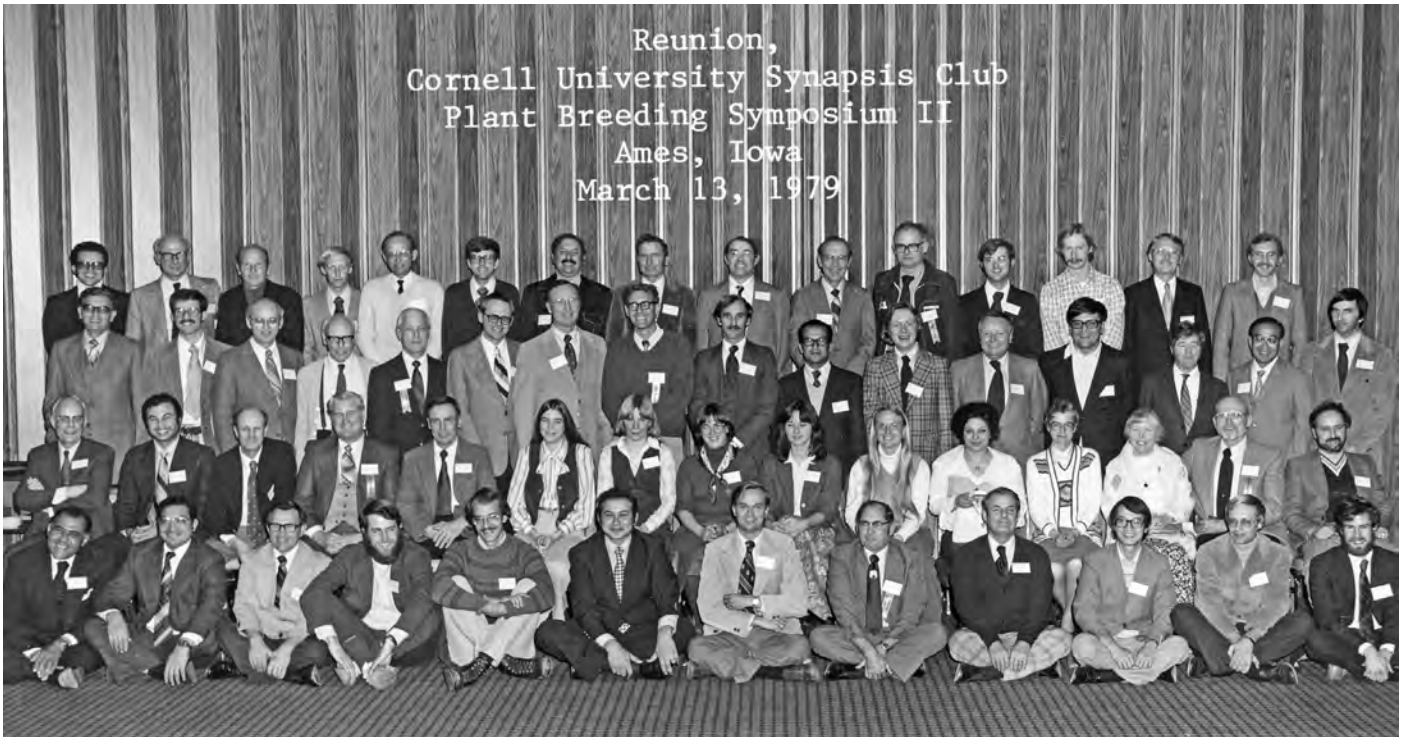


Figure 59. 1979, March 13, Synapsis Club Reunion, Iowa State University.
Left to Right, Back Row: _?_, S Chase, C Shiffriss, M Sorrels, G Kingma, _?_, O Myers, W Dewey, W Meredith, E Horner, R Hill, D York, T Gradziel, A Thompson, P Gniffke. Third Row: _?_, _?_, _?_, C Burnham, D Smith, T Bingham, J Miller, C Francis, WR Coffman, A Ismail, J Ryan, W Wessling, F Munoz, P Loesch, TT Chang, J Hawk. Second Row: K Sneep, _?_, D Coyne, R Phillips, R Plaisted, D Plaisted, M Smith, B Lamb, C McGinn, M Lamberts, _?_, E Plaisted, Mrs Browning, A Browning, A Kheyr-Pour. Front Row: S Galal, _?_, G Emery, S Wright, K Brown, _?_, P Sisco, E Ewing, Jr., W Keim, L Everett,
S Mehlenbacher.

(Courtesy Department of Plant Breeding)

Figure 60. 1979, Summer, Plant Breeding Department.
Left to Right, Back Row: DR Viands, PH Sisco, WF Tracy, J Ryan, C Baker, SE Smith, KD Brown, JG Coors, TM Gradziel, SA Mehlenbacker. Third, Row: HL Everett, ED Earle, VE Gracen, P Gregory, ME Sorrells, ME Smith, SA Wright, AE Jack, MB Dicklow (hidden) FJ Munoz, PA Gniffke, HM Munger, PL Gomez-Cuervo, C Rojanaridpiched. Second Row: O Pearson, WD Pardee, N Mukendi, DP Lane, A Djietror, RC Massaquoi, RF Heisey, DH Wallace. Front Row: S Estrada-Brown, MA Huarte, MAA Mia, MM Dahlan, B Kungula, CH Hsiao, _?_.

(Courtesy Rare and Manuscript Collections, Cornell University Library, IDs RP Murphy)

Figure 61. 1979, Fall, Plant Breeding Department
Left to Right, Back Row: DR Viands, HL Everett, J Ryan, KD Brown, RL Plaisted, RW Robinson, HM Munger. Third Row: MA Huarte, ME Sorrells, ED Earle, P Gregory, JG Coors, MB Dicklow, J Greenham, WD Pardee. Second Row: PL Gomez, RE Anderson, B Kungula, SA Wright, JB McElroy, C. Rojanaridpiched, MA Mutschler. First Row: S Estrada-Brown, W Mangoendidjojo, SE Smith, PA Sisco, PA Gniffke, N Mukendi, DP Lane, RC Massaquoi, CH Hsiao.

(Courtesy Rare and Manuscript Collections, Cornell University Library)

Figure 62. 1982, 75th Synapsis reunion and Anniversary of Plant Breeding Department.
See below for numbered individuals.

(Courtesy Department of Plant Breeding, IDs by RP Murphy & LB Kass)

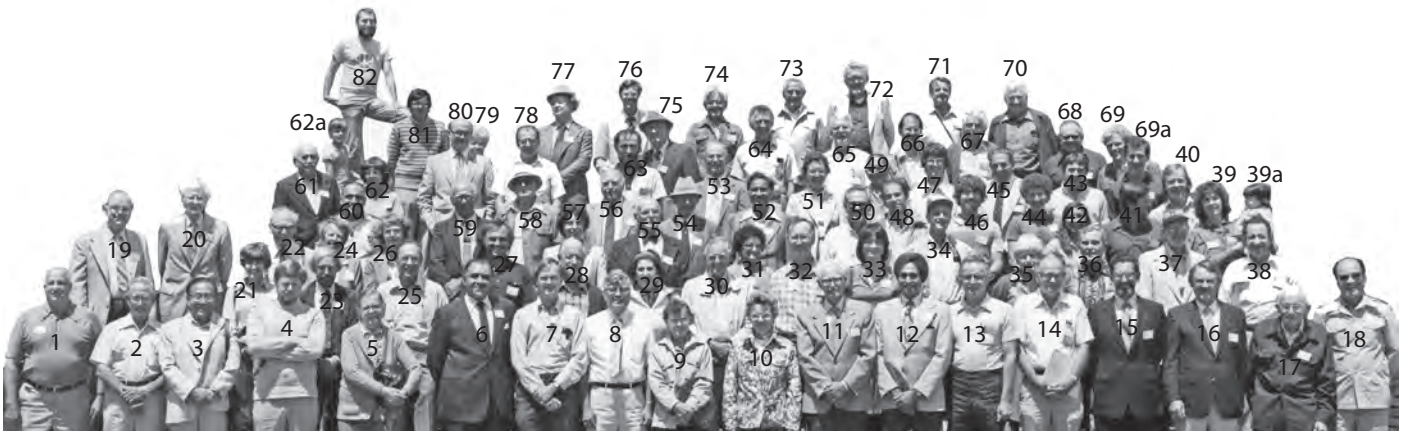


Figure 62 (continued) 1. RE Anderson, 2. E Sebesta, 3. TT Chang, 4. P Gregory, 5. H Pearson, 6. SG Sayed, 7. P Sisco, 8. J Underwood, 9. B McClintock, 10. R Morris, 11. GF Sprague, 12. D Padda, 13. FC Bent, 14. RR Hill, 15. TE Devine, 16. AE Thompson, 17. A Pratt, 18. _?_, 19. WD Pardee, 20. H Perry, 21. _?_, 22. C Burnham, 23. M Sorrells, 24. H Creighton, 25. V Rhoades, 26. J Magill, 27. V Gracen, 28. D Smith, 29 _?_, 30. HM Munger, 31. _?_, 32. J Miller, 33. M Mutschler, 34. D Coyne, 35. _?_, 36. _?_, 37. _?_, 38. _?_, 39. _?_, 40. _?_, 41. Steven Smith, 42. _?_, 43. J McElroy, 44. _?_, 45. JE Wright, Jr., 46. _?_, 47._?_, 48. _?_, 49 R. Uhlinger, 50. _?_, 51. J. Kreizinger, 52. _?_, 53. _?_, 54. _?_, 55. _?_, 56. _?_, 57. _?_, 58. _?_, 59. S Chase, 60 C. Magill, 61. _?_, 62. N Slack, 63. _?_, 64. _?_, 65. A Kehr, 66. Kevitt Brown, 67. O Pearson, 68. _?_, 69. J. Coors, 70. R Rabson, 71. W. Keim, 72. DB Walden, 73. _?_, 74. RP Murphy, 75. MM Rhoades, 76. WB Provine, 77. _?_, 78. DH Wallace, 79. _?_, 80. _?_, 81. _?_. 82. Gary Taurick.

Figure 63. 1992, October 25, Plant Breeding Department.
For IDs see below

(Courtesy Rare and Manuscript Collections, Cornell University Library)

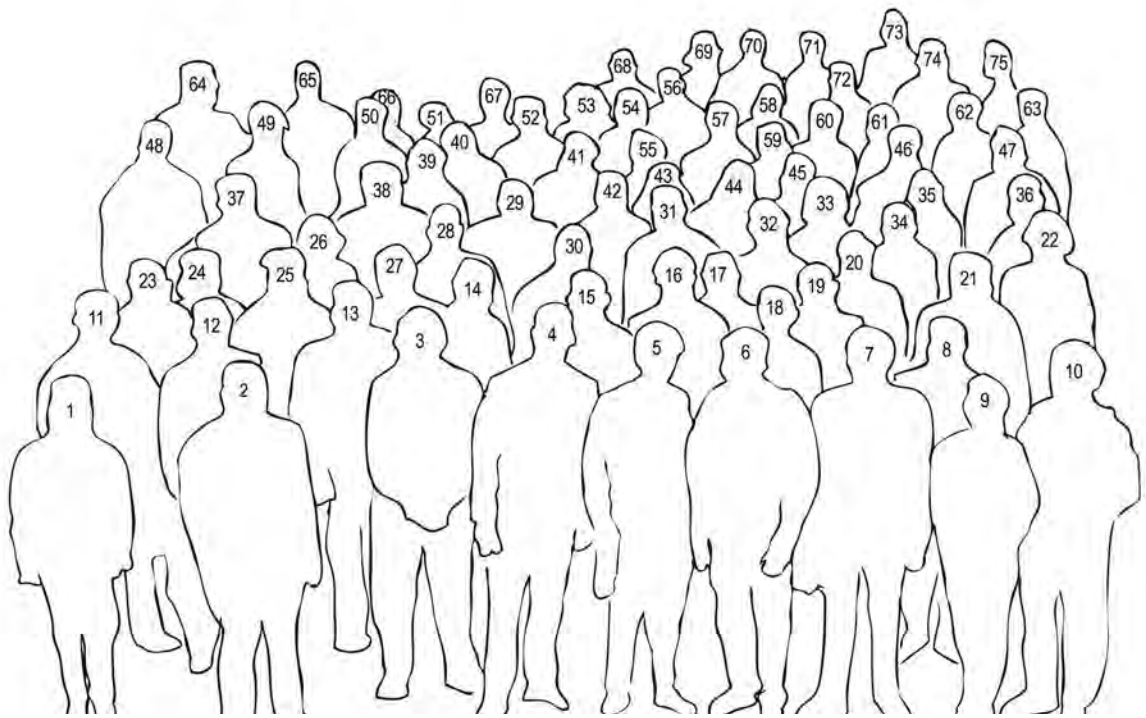


Figure 63 (continued) 1. S Wang 2. D Wallace 3. E Autrique 4. WR Coffman 5. J Blauth 6. S King 7. A Thompson 8 Z Ma 9. L Hansen 10. S Ahn 11 Q Xue 12. W Klein 13. C Hittle 14. D Matthews 15. C. Shifress 16. J DeVries 17. R Smail 18. H Pham 19. N Roy 20. J Underwood 21. H Everett 22. C Hershey 23 H Schaaf 24 C Thome 25. R Murphy 26. E Earle 27. H Elsa 28. H Gauch 29. H Munger 30. S Hossain 31. G Kingma 32. M Ganal 33. J Vrebalov 34. M Smith 35. M Mutschler 36. D Viands 37. S Chase 38. A Krattiger 39. C Hunsinger 40. T Metz 41. G Ghangas 42. D Coyne 43. J Hansen 44. H Pearson 45. O Pearson 46. L Everett 47 WD Pardee 48. P Broun 49. D Bernacchi 50. W Pippen 51. E Galinato 52. P Conner 53. S Eggleston 54. S McCouch 55. Y Zhang 56. S Veach 57. Cho 58. M Kyle 59. J Johnson 60. J Chunwongse 61. K Watanabe 62. M Sorrells 63 S Fenton 64. O Panaud 65. P Grau 66. T Wu 67. W Gu 68. R Anderson 69. O Pineda 70. N Weeden 71. E Cobb 72. J Sanford 73. R Zobel 74. J Steffens 75. J Zhu

Figure 64. 1982, Synapsis, 75th reunion, Speakers for the "Golden Age of Corn Genetics Symposium"
Left to Right: Marcus M Rhoades, Charles R Burnham, Barbara McClintock, Harriet B Creighton, George F Sprague, Harold S Perry.

(Courtesy Department of Plant Breeding)

Figure 65. 2006, August, Chairs Department of Plant Breeding.
Left to Right: RL Plaisted, ED Earle, ME Sorrells, WR Coffman, WD Pardee, RP Murphy.

(Courtesy, Department of Plant Breeding & Genetics, Photo by Cynda Farnham)

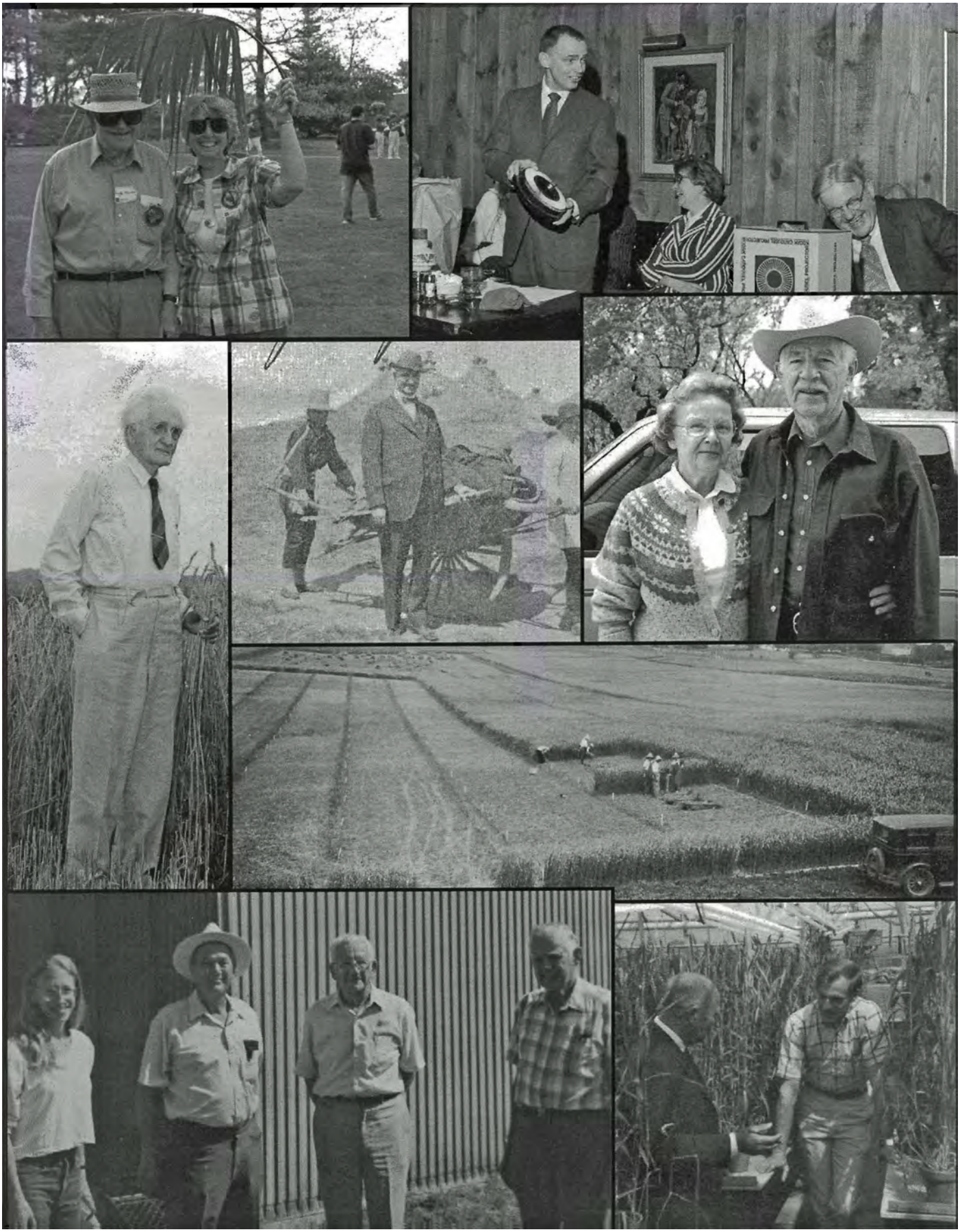
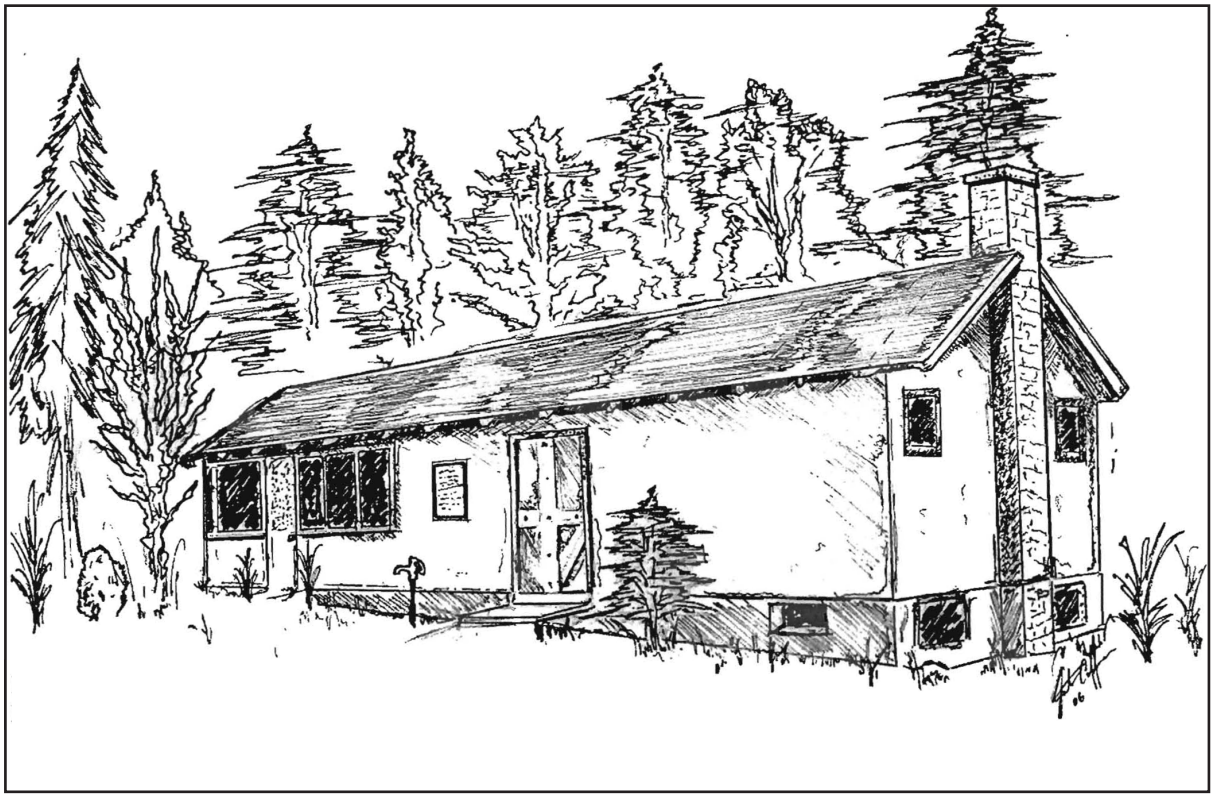


Figure 66. 1946, HH Love and RA Emerson in their office on the first Floor of the Plant Science Building. The Department was located in this Building from 1931 -1968.
(Courtesy Department of Plant Breeding files)



Justin Coffman

Emerson Garden Field Laboratory
Fondly known as the "McClintock Shed"

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