Celebrating

The Department of Agronomy & Plant Genetics

100 Years of Improving Plants & the Lives of People

http://www.agronomy.cfans.umn.edu/
OUTLINE of our HISTORY

1851  University of Minnesota authorized by the territorial legislature
1861  State legislature reorganizes University, provides for a College of Agriculture and Mechanic Arts as specified in the natural land grant act, instructs board of regents to secure suitable land near the university for an experimental farm. Farm land purchased in Prospect Park area of Minneapolis
1881  E.D. Porter hired as Professor of Agriculture
1881-83 Legislature authorized sale of Prospect Park farm, purchased 155 acres in St. Anthony Park
1888  Willet Hays hired as first Agronomist by E.D. Porter
1891  Andrew Boss hired as Farm Foreman by W. Hays. Boss begins a 41-year career at the university
1915  H.K. Hayes recruited by Boss to be University’s first qualified geneticist/plant breeder
1929  E.R. Ausemus is first USDA scientist assigned to Agronomy and Plant Genetics on a permanent basis. He will remain as hard red spring wheat breeder until his retirement
1937-39 MCIA supports drive for legislative appropriation for construction of Agronomy and Plant Pathology buildings. Appropriation is approved in 1939
1940  Construction of the two identical buildings begins. General contract is for $249,700; mechanical contract is for $37,000
1941  Buildings completed, staff moves in
1994  Agronomy building renamed Hayes Hall
H.K. Hayes 1928-1952

A. Boss 1909-1928

W. Myers 1952-1963
1998-2004
B. GEGENBACH

2005-present
N.J. EHLKE

AGRONOMY HEADS
AGRICULTURE (AGRONOMY) FACULTY ca. 1928

LEFT TO RIGHT: (sitting) A.C. Arny, R. Crim, L.B. Bassett, S. Raleigh, H.K. Wilson, H.K. Hayes, unknown, I. Johnson
LEFT TO RIGHT: (standing) L. Alexander, H.L. Thomas, F.R. Immer, H. Brewbaker
The faculty has grown from one (Willet Hays) to 24 in 2009 (including 6 USDA-ARS adjuncts). A total of 127 regular faculty and 30 USDA-ARS adjuncts have served in the department. The department has had only 8 heads between 1909 and 2009.
The Original Home Building (also known as the Old Home Building) served as the center of activities for the newly formed School of Agriculture. When it was torn down in 1952, it was the oldest building still in use on the St. Paul campus despite having been condemned for 30 years. Perhaps because of this, the Original Home Building offered the cheapest rent on campus - $30 per academic quarter. The building had dormitory rooms, a small library, small classrooms and some administrative offices. Some of its rooms were just 7'x15'. It was home to 49 students when it was finally torn down. The Original Home Building cost $17,000 to build in 1887. Today, only the stone arch remains.
These two buildings were built as twins. The Agronomy and Plant Pathology buildings were completed during late 1940 to early 1941. Prior to occupying this building, Agronomy was housed in the remodeled Farm House and Plant Pathology had a space in Main Hall (now Coffey Hall), Old Horticulture and Drill Hall (later known as Ag-Botany).

Faculty members at the ground breaking in 1940 (right).
The Ag-Botany building was erected in 1893 at a cost of $30,000. Before the building was demolished in 1971, it housed the State Seed Laboratory and Certification Program, the USDA-ARS Cereal Rust Laboratory, and research laboratories and offices of Plant Physiology faculty and graduate students of the Department of Plant Pathology and Physiology.

Pendergast Hall was built in 1889 primarily as a boys' dormitory. This building had rooms for 65 students, two classrooms, an assembly room and a recreation area.

Pendergast was the second building erected on the St. Paul campus.
In the fall of 1941, 23 students on a National Youth Administration project attended the school of agriculture three days a week and worked three days on a project dismantling the Farm House piece by piece and salvaging all the lumber. Some of the lumber was used by Don Harvey (an Agronomy plot worker) to build a house at 1965 North Cleveland Avenue in Roseville. This property is still occupied today.
Professor E.D. Porter was hired by the Board of Regents in January 1981. He was the native of Vermont and a graduate of the University of Pennsylvania. He had held the Chair of Agriculture at Delaware College in Newark.

With no students enrolled in agriculture, Porter was free to attend meetings of the state legislature and agricultural organizations to learn what they wanted in the way of agricultural programs. He conducted meetings for farmers through the Farmer’s Lecture courses which later became the Farmer Institutes and still later the Agricultural Extension Division.

In June, 1882, the Board of Regents purchased the Bass Farm of 155 acres in St. Anthony Park. The next few years were spent cleaning up the farmland and constructing the Farm House, Home Building, Barn, and an Experiment Station building.

The second president of the U of MN, Cyrus Northrup, observed...

*In Minnesota there was a professor of agriculture, a Farm House, a large barn, and a farm devoted to agriculture and chemistry about 4 miles from the main campus. This professor was a good man, earnest, energetic, and enthusiastic, but he had little help. It was difficult to find qualified people because in no colleges could there be found men of sufficient knowledge in the various branches of agriculture to train students, and if such competent men could be found, they were already engaged and not interested in serving at an agricultural college.*

The Hatch Act passed in March, 1887, making $15,000/year available to the experiment station. Porter soon used this money to bring together five men of such talents and ability that he soon was criticized for being less able than the new scientists he had just hired. Willet M. Hays was hired to conduct agricultural research and teach in the school.

Porter soon responded to questions about education in agriculture by getting Board of Regents approval of a School of Agriculture which was neither a high school nor a college but a school whose primary focus was to bring as large a number of intelligent and ambitious farmer boys of agriculture, horticulture and allied industries. Students needed to be at least 15 years old and have a good common school education. Such was the start of the school which operated from 1888 to 1960. Classes dealing with grain crops, forage crops, genetics, crop breeding, crop judging and farm management were taught by Agronomy faculty (Willet Hays, Andrew Boss, H.L. Thomas, E. Pinnell, L. Elling, C. Borgeson, H.K. Wilson, L. Bassett, A.C. Arny and J. Senz.)

Porter resigned in March, 1889 to become Dean and Director of the College of Agriculture and Experiment Station at the University of Missouri.
Willet Hays began research and teaching at the University of Minnesota in 1888 as an Assistant Professor. He was the first appointee made by E.D. Porter to the fledgling Department of Agriculture. He became Professor in 1893. He resigned in 1905 to become the Assistant Secretary of Agriculture.

While with the department, Hays laid out the general framework for the study of farm management and conceived of the idea that there are “Shakespeares” in plants, or plants with a genius strain, before the concept of heredity was widely known.
ANDREW BOSS

Andrew Boss was born in Wabasha County, Minnesota in 1867. At age 24 he graduated in the second class (1891) of the School of Agriculture (a 2 year program at that time). Boss was chosen as the commencement speaker and a quote from his speech gives some insight into his views on the need for education, work experience, attention to details and a positive attitude towards life.

*If we wish to be successful as farmers we must first obtain an education appropriate to the vocation, have some practical experience in field work, develop a habit of close observation and watchfulness, and last, but not least, a determined will to succeed.*

He was immediately hired as the experimental farm foreman by Willet Hays.

Boss was actively involved in most aspects of the plant breeding program and very early saw the importance of the developing science of genetics to the improvement of crop plants and animals.

He initiated pioneering studies of meats, including preparation, grading and proper application of these grades to live animal evaluation. He was responsible for construction and operation of the first abattoir at an educational institution in the United States.

Boss and W. Hays developed and taught courses in farm implements use, production and handling of hay and grain crops and farm management.
H.K. Hayes came to U as an Assistant Professor of plant breeding in 1915. He became Professor in 1919 and by 1928 he was Chief of the Division of Agronomy & Plant Genetics. In 1952, he retired from the university. One of his former students, W.M. Myers, succeeded Dr. Hayes as Division Chief.

He was often called “the dean of corn breeders” and in 1994 the Agronomy Building built in 1941 was renamed as Hayes Hall.
H.K. Hayes was hired by Andrew Boss to lead Plant Breeding & Genetics research and teach at the University of Minnesota in 1915. He was the first of a line of scholarly men who were trained by the early geneticists at Harvard, Connecticut Agricultural Station, and the Bussey Institution. In fact, Hayes and his major professor E.M. East were the first to describe two of the maize genes in 1911.

In 1937, H.K. Hayes met with then-President G.S. Ford and described his frustrations over the years attempting to conduct cytogenetic research on maize. President Ford asked what was needed to change that. Hays replied, “Sufficient salary and support funding to make a position attractive.” Ford told him to put the request in writing and he would approve it.

One of these Ph.D. student advisees was R. Phillips, who had recently completed his B.S. and M.S. degrees at Purdue University. Dr. Phillips’ thesis title was “Cytogenetic Studies of Recombination in Reciprocal Crosses and Location of Genes in Zea mays L.” and was completed in 1966. After post doctoral research at Cornell University, Dr. Phillips returned to the department as a Research Associate and in 1968 was hired as Assistant Professor who would take charge of the cytogenetics program when Burnham retired. He was the third scientist in the line of scholarly descent from the eastern maize scholars.

In late May 2010, 34 former students and post docs returned to the campus for a symposium celebrating Dr. Phillips’ career and retirement. Nineteen of them presented summaries of the research that they are now involved in and how their experiences at Minnesota prepared them for their future careers. These students and post docs represented the next generation in the line of maize research scholars that started on the east coast. They are currently working at 15 universities and 2 companies in the USA, Canada, England and Italy.

W. Hays responded and soon Dr. C.R. Burnham, who was studying at Cornell University, was hired to teach graduate courses in genetics and cytogenetics, conduct research and direct thesis problems. He was the second product of the eastern cytogenetics group to migrate to Minnesota. During his 34-year (1937-1972) career, Dr. Burnham and his students discovered much of what is now known about inversions, translocations and other aberrations related to maize chromosomes. Four of his students were elected to the National Academy of Science, and graduate students came from all over the world to study with him.
During Ron Phillips’ 40+ years of service, he oversaw the research efforts of 66 graduate students, 23 post doctoral associates and 29 visiting scientists. This work contributed to a better understanding of the roles of the nucleolus, nuclear organizer region and ribosomal genes. He also studied DNA endoreduplication, male sterility and tissue culture induced variations. More recently his work dealt with techniques for improving the amino acid and oil composition of corn grain. His work used the basic techniques of plant genetics and molecular biology to enhance the understanding of the basic biology of cereal crops and to improve them.

Phillips’ outstanding publication record included 150 refereed journal articles, 355 abstracts, 75 book chapters and editor of 6 books. He was an elected fellow in the American Society of Agronomy (ASA), the Crop Science Society of America (CSSA), and the American Association for the Advancement of Science (AAAS). He has received the DeKalb Genetics/Crop Science Distinguished Career Award, and an honorary Doctorate degree from Purdue University (the highest honor the University can bestow on an alumnus).

Dr. Phillips’ students recently reflected on their time of study with him. They learned to: conduct research with integrity and scientific rigor, treasure the encountered exceptions, facilitate the growth of students in the scientific community, give students your best ideas, collegiate relationships are important in advancing scientific excellence, and lastly that a successful scientist can have a successful and fulfilling family life as well as a fulfilling career.
The Siehl Prize was established to honor the personal and professional achievements of agriculture's foremost leaders who have turned their love of the land into a lifetime of exemplary work. By honoring such excellence, the Siehl Prize expands public awareness and knowledge of agriculture. Laureates are selected from three categories: production agriculture, agri-business and academics. Each laureate receives a granite and glass sculpture, a lapel pin and a cash award presented by the Dean of the College of Food, Agricultural & Natural Resources at a special ceremony.

These retirees from the Department of Agronomy & Plant Genetics were honored for their work in academics and research.

Siehl Prize pin (left), Siehl Prize sculpture (right).
FIELD DAYS

OUTREACH
CROSSING

THEN

NOW

FIELD PREPARATION

THEN

NOW

BARLEY HARVEST

THEN

NOW

NOW
Work horses had a place on the farm campus until 1959, when the last one was sold. These photos are from the late 1920’s and early 1930’s.
U of MN and USDA-ARS researchers have been working cooperatively on alfalfa improvement for 114 years (1895-2009). Work has focused on disease resistant germplasm, nematode resistance, winter survival in a multiple (3-4 per year) cut system, high N fixing ability, special types for use as biofuel, and deep-rooted types for use in fertilizer and pesticide spill clean-ups.

A notable contribution of this project was the release (1895) of the Grimm variety, an outstanding winter hardy variety developed from seed brought to Minnesota by a German immigrant in 1857. It quickly became the premier forage for dairy producers in the northern areas of the United States.
The University of Minnesota has been improving barley for 108 years (1901-2009).

Nineteen varieties have been released, the earliest ones were all feed barleys.

When D. Rasmusson became the full-time breeder in 1961 the focus was switched to developing high yielding, disease resistant malting varieties, which resulted in these Minnesota six-row barley varieties becoming the industry standard.

An economic analysis in 1992 determined that two-thirds of all the beer brewed in the United States used Minnesota developed varieties.

Supplemental funds to support this work have been provided by the Minnesota Barley Research and Promotion Council, Minnesota Scab Initiative, and the American Malting Barley Association.
This project was one of the first applied research projects at the MAES.

118 years of breeding research (1889-2009) began when Willet Hays began work on oats. He produced the first oat variety, Improved Ligoua, which was released in 1895. 32 varieties have been produced.

Variety development work focused on increased protein content, seed size, disease resistance and shorter height plants to prevent lodging in higher yield environments.
As a result of the University of Minnesota’s cooperative work with USDA-ARS geneticists, 32 varieties of Hard Red Spring Wheat were released since 1907.

Yield, disease and insect resistance, and management research made the crop attractive to producers in the West Central and Northwest sections of the state as interest in corn pushed wheat out of southern Minnesota.

Breeders have produced shorter high yielding varieties with resistance to lodging, leaf and stem rust and scab.
Open pollinated corn, which required farmers to select the best ears for planting next year’s crop, predominated on Minnesota farms between 1893 and 1920’s.

Minn 13 developed by Willet Hays was widely planted. There were 200,000 acres in 1896, 2 million acres in 1911 and 5 million acres in 1932.

When H.K. Hayes arrived he set up an aggressive program to develop inbreds to use as parents for hybrids. Early season vigor, insect and disease resistance, height, number and length of ears, root and stem strength to resist lodging, maturity and yield were the selection criteria. Project work was split between Waseca (full season types) and St. Paul (earlier maturity types). At one time there were more than 10,000 individual plots (on 40 acres of land) of corn planted at Waseca.

First Minnhybrid Minn 402 was released to seedsmen in 1929-1930.

The project has produced 78 Minnhybrids, 102 inbred lines, and 14 special use germplasms.
The flax work in Minnesota began in 1890 when the governor, responding to the flax disease (Wilt) crisis ordered Experiment Station scientists to solve this problem. Thousands of plants were screened for resistance during the next four years and only one resistant plant was identified. Progeny of this single plant was released as the variety Primost in 1900. This was the first pure line flax variety to be developed in the United States.

The early work on disease resistant varieties, along with the weed management research by agronomists resulted in flax becoming the number one oilseed crop in Minnesota until shortly after World War II when demand for linseed oil and fiber for linen declined.
Jean Lambert began as a part-time soybean breeder in 1948. He assumed full-time leadership of the project in 1961. So far, only two full-time breeders have worked on the soybean breeding project: Jean Lambert and Jim Orf who came in 1981.

Breeding strategies focused on yield, maturity by climatic zone, disease and insect resistance, iron chlorosis tolerance, seed size, hilum color, and protein and oil content. The first variety release was Renville in 1953 followed by 95 regular and special use varieties appropriate for the various climatic zones in the states. Special funds appropriated by the Minnesota state legislature (Soybean Special) and supplemental funds from the Minnesota Soybean Research and Promotion Council (Soybean Checkoff) allowed the Project to expand its work. Their influence and financial support helped to increase soybean acreage from about 2 million in the 60's to 5 million in the 70's. Today there are about 7 million acres of soybeans produced in the state.