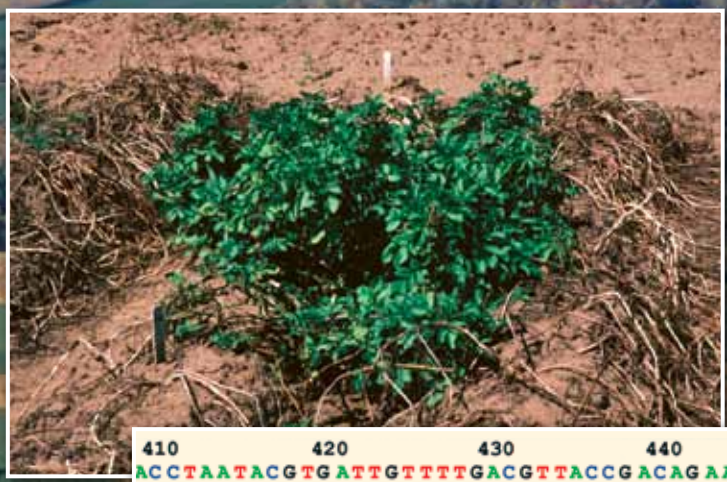
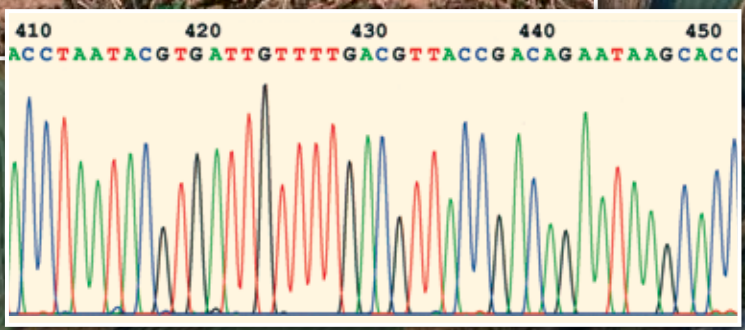
And One Hand on the Bench

The First Century of the Department of Plant Pathology at the University of Wisconsin–Madison





Edited by John H. Andrews

And One Hand on the Bench

The First Century of the Department of Plant Pathology at the University of Wisconsin–Madison

Edited by John H. Andrews

To all those who pass
through these gates —
members of the Department
past, present, and future —
this book is dedicated

"If you are lucky enough to have lived
in Paris as a young man, then wherever you
go for the rest of your life, it stays with
you, for Paris is a moveable feast" —

*Ernest Hemingway, to a friend, 1950**

*From: Ernest Hemingway, 1964. *A Moveable Feast*© Scribner, NY

COVER PHOTO CREDITS

Wisconsin agricultural landscape: Wolfgang Hoffmann

Plants: John Helgeson. Shown are healthy potato plants with resistance to potato late blight (conferred by the *RB* gene from *Solanum bulbocastanum*) surrounded by diseased susceptible plants.

Nucleotide electropherogram: Russell Spear

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Preface

This book marks the Centennial in 2010 of the creation of the Plant Pathology Department at the University of Wisconsin–Madison. For readers interested in our comprehensive history, this volume should be read in conjunction with the companion volume covering the first 75 years, *With One Foot in the Furrow* (eds. P. H. Williams and M. Marosy, Kendall Hunt, Dubuque, Iowa, 1986), hereafter abbreviated to 'Volume I' or 'Furrow.'[1] The title of that volume, as explained in its Preface (p. v), was based on advice given by J. C. Walker to Paul Williams about how Williams should pursue his future program. The title of this present volume, *And One Hand on the Bench*, is the logical counterpart to Walker's statement and it also reflects the mirror image of our discipline. Plant Pathology is in approximately equal measures an applied and basic science; nowhere else is this principle better illustrated than in the founding and evolution of our department.

These two historical volumes approach their shared topic from different but complementary perspectives. Volume I is a formal, exhaustive analysis that systematically documents the personalities, program areas, and evolution of the department from 1910 to 1985. Volume II is a relatively informal depiction of the first century captured through photographs and anecdotes (Section I), together with the personal reminiscences from faculty, staff, and alumni (Section II). Key demographic data on faculty and student trends for the most recent 25 years are updated in Section III. Both volumes are available as PDFs on the CD enclosed in a sleeve on the inner cover of this book.

All current faculty (including those holding joint appointments with Plant Pathology), all active faculty emeriti, selected office and technical staff, and students representative of various eras were asked to submit recollections for Volume II. Although not all have chosen to do so, the resulting compilation is nevertheless representative of the contemporary department. Authors were given broad latitude as to the composition of their essays but were invited to reflect on such aspects as what brought them to this campus, their career aspirations or the personal stories underlying noteworthy accomplishments, and interesting persons with whom they interacted inside or outside the department.

As noted above, the historical chronology of our department is thoroughly discussed in Volume I. One cannot read the 100-year history of this remarkable

1 By convention, in both volumes we have taken 1910 as the inception of the department. This is because our first chair, L. R. Jones, arrived to take up his position in February 1910. However, in the interest of historical accuracy, it is noteworthy that administrative action approving formation of the new Department of Plant Pathology actually was passed by the UW Board of Regents in 1909. Minutes of the Regents' meeting of June 18, 1909 cross-reference the 1909–10 budget documents where Plant Pathology appears on p. 74 as a "new department." The relevant portion of minutes from the Board of Regents Executive Committee meeting dated July 27 reads as follows: *"That L. R. Jones, University of Vermont, be appointed professor of plant pathology* [sic]*, at a salary of $3,000 per annum, appointment to take effect July 1, 1909, or as soon thereafter as he can report for duty; same to be charged to appropriation of $2,500 provided in the budget for this position, and the remaining $500 to contingent instruction*" (UW–Madison Archives).

department without wondering how it came to be so. Clearly, much of the explanation lies in the extraordinary talent and personality of L. R. Jones and those pioneers that he recruited. Not only were they intellectually astute, but coupled to their high intelligence was an unusual combination of skills including ambition, a hard work ethic, personal generosity, and a common vision for where the department and profession should be headed. The latter is particularly important, because although these early leaders could and frequently did disagree on virtually any issue, and various fiefdoms developed over time, they had enough sense to close ranks for the good of the department in public matters.

But there were other reasons why the early department was, and arguably still is, preeminent. One is that the greater university soon came to be world-renowned and in its early evolutionary stages prospered by visionary leadership, for the most part, and it won the admiration and support of the state (for details see Curti and Carstensen, 1949). Regrettably, the historic pride in and support of the university by the state, as reflected by the UW–Madison budget, has deteriorated in recent decades and is a cause for future concern. Another likely reason for the strength of the department and the university is that the traditional Madison academic policies emphasizing faculty governance and freedom of inquiry, linked to expectations of high achievement both of faculty and students, have served us well. May these principles continue through the coming century and beyond.

The persons named below and many unnamed have assisted with the preparation of this book. I thank them all. My longstanding technician and friend, Russell Spear, gave unstintingly of his time to all the photographic aspects. We would not have the raw material to work with had it not been for the meticulous collection and preservation in the university archives of photos and documents over many decades by Deane Arny. The department owes him an immeasurable debt. The archivist, Bernie Schermetzler, (Steenbock Library) provided unrestricted access to our holdings, facilitated searches, and answered innumerable questions. Sara Rodock, Steve Cloyd, Paul Jelle, and Donna Bucholtz helped find records or checked facts. I thank many individuals for generously providing photos, in particular, Albert Paulus, Russell Spear, John Helgeson, Rennie Stavely, Ron Cameron, Wolfgang Hoffmann, and Milton Schroth. The Centennial Committee (Spear, Sequeira, Williams, Worf, Helgeson, Clayton, McManus, Lippert, Yashiro, Arny, Bent, Andrews) provided useful advice while allowing me the latitude to construct the book as I thought best. In particular, I am indebted to Paul Williams and Luis Sequeira for their editorial comments, enthusiasm, and voluminous knowledge of the department. Additionally, Luis and Russ kindly proofread the entire text. Aleksandr Dobkin, a computer science undergraduate, redesigned and substantially upgraded the Centennial website, developed an electronic database of our alumni, and coordinated electronic communications throughout. Finally, I thank the authors for their contributions, which generally were very well prepared, and presented in good spirit with minimal

hounding from the editor. The staff of University Communications, especially Doug DeRosa and Barry Carlsen, provided excellent suggestions on design and assembly of the book and managed it through to production.

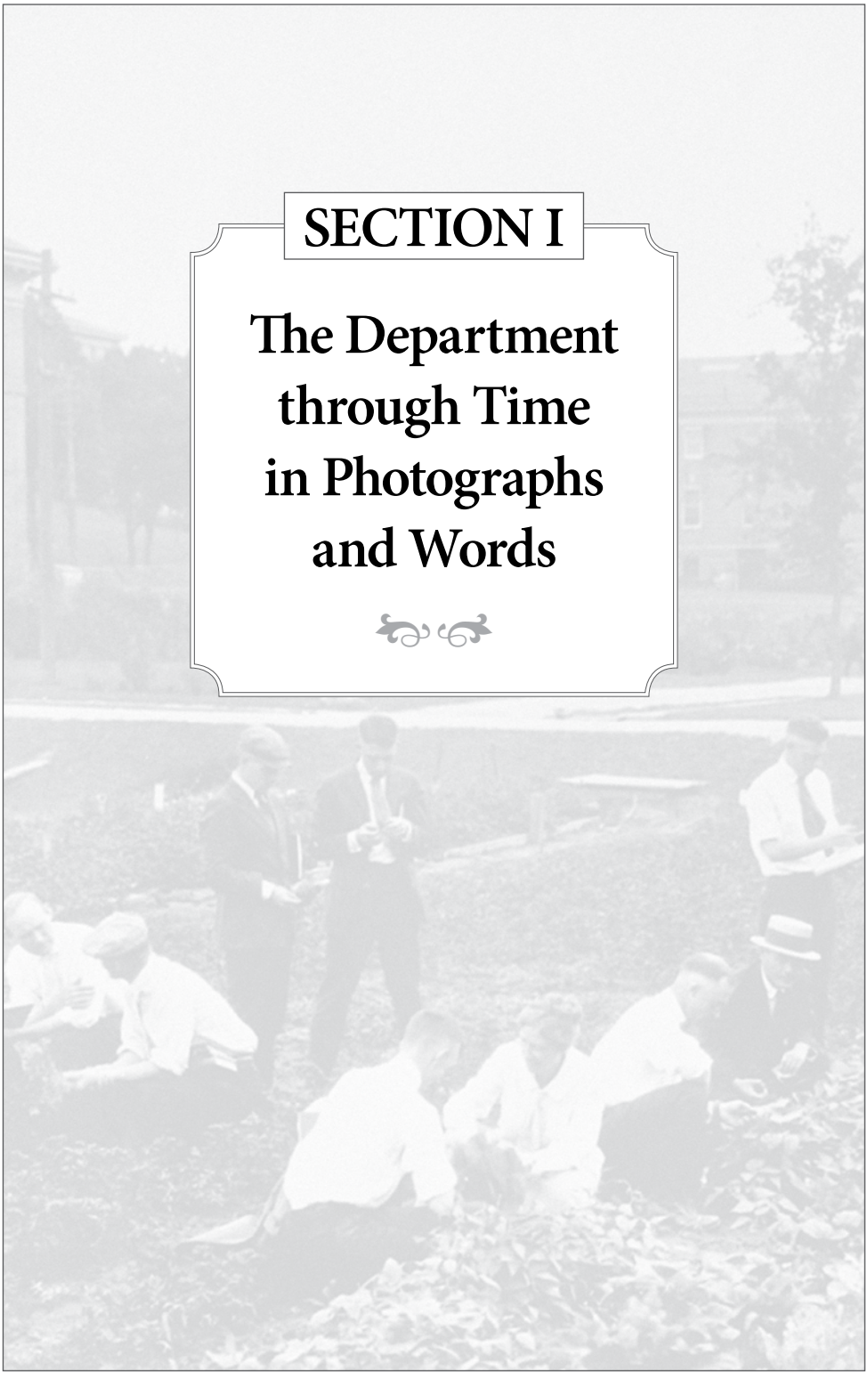
Finally, what of the future? Contributors to this historical treatise have interpreted the context literally and nobody speaks substantively of a vision or planning for what lies ahead. One might well wonder about the next 100 years and whether or in what form the department may exist. Since the early 1980s the UW–Madison has been in a somewhat demoralizing era of incessant fiscal cutbacks. While this bodes ominously as we embark on the coming century, it should be put in perspective and some encouraging signs noted. There appears to be no current intent by the college administration to further merge or terminate departments. Our department continues to hire faculty, although the inflow rate for many decades has not matched the outflow. Perhaps of some consolation is that every generation has felt more-or-less under siege in its time. As an example, W. C. Snyder (one of our distinguished alumni), in his prefatory chapter some 40 years ago in *Annu. Rev. Phytopathol.* (1971, 9:1–7), speaks of the sciences, the universities, and plant pathology as being "in trouble." In hindsight and by comparison with the current state of affairs, the 1970s appear to have been a veritable heyday, as now in 2010 the struggle is to emerge from decades of retrenchment capped by the most severe economic recession since the Great Depression! To some extent, general principles and past experience can be a guide to positioning ourselves for the future. Both as a discipline some 200 years ago and as a Wisconsin department 100 years ago, the inception of plant pathology was agrarian. Our fate will remain closely linked to the fate of agriculture, though not exclusively so. Plant pathology draws widely from and contributes much to the basic sciences. We need to seek out such new opportunities and partnerships but in so doing must hold united both the applied and the basic components of our department and discipline. Without the link to growers, there is relatively little justification for plant pathology and likely we will disappear. Without the link to basic science, there is no mechanistic understanding and no wellspring of ideas to advance technology and disease control. These are not radical or even new ideas — if you read the remarkable history of our department you will see that men like Jones and Walker not only were saying such things but practicing them 100 years ago!

Some of the older members of the department will remember that actor and comedian Bob Hope introduced in a 1938 film the song that was to become his trademark, "Thanks for the Memory." As we look back on our associations with this department, whether of long or short duration, I think that, for most of us, similar words come to mind with some pride and emotion. For all of us, it should be added, "Thanks for the Opportunity!"

John H. Andrews
Madison, Wisconsin
January 2010

SECTION I

The Department through Time in Photographs and Words



The Pioneers: Our Founder and the "Big Four"

Department founder L. R. Jones from a portrait presented to him by his admiring colleagues and former students at a reception held in his honor as part of the International Congress of Plant Sciences held at Cornell University, August 19, 1926.

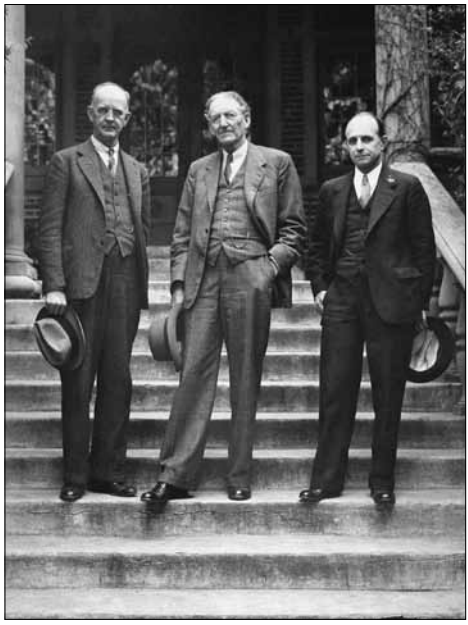
L. R. Jones

L. R. Jones with two graduate students, Isme Hoggan (left) and Grace Gilchrist (right), on the steps of Horticulture, 1925. At that time this building housed the departments of Agronomy, Horticulture, and Plant Pathology.

A scholar and humanitarian of the first rank, Jones was born in Wisconsin, spent his early academic career primarily in Michigan and Vermont, and in 1909 was recalled to this state by Agriculture Dean H. L. Russell to chair the recently created Department of Plant Pathology. He took up his position on February 1, 1910 (Keitt and Rand 1946; Walker 1979). A gifted, visionary administrator, Jones was also a stellar teacher, inspiring mentor, and prolific researcher. He was a pioneer in establishing the genetic basis of plant disease resistance and the use of resistant cultivars to control disease — a theme that remains a core organizing principle of the department to this day. More broadly, this research was an example of his philosophy of applying basic knowledge to solve growers' problems. He was strongly influenced by his mastery of botany and practical knowledge of farming. His papers encompass studies on topics as diverse as potatoes and numerous vegetables, fruits, cereals, forest trees, and ornamentals. Indeed, the first state forest in Vermont, a 642-acre tract still in existence at Plainfield, was named the L. R. Jones State Forest in recognition of his contributions to forestry. Beyond his distinguished research, Jones seemingly left his mark as a leader wherever he went: in numerous civic organizations, the founding of the Graduate Division of Biological Sciences on this campus, the Vermont Botanical Club, Vermont Forestry Association, the American Journal of Botany, the Boyce Thompson Institute for Plant Research, and the Tropical Plant Research Foundation. He was one of the founders and a charter member of the American Phytopathological Society, its first president, and the first editor-in-chief of *Phytopathology*. His accolades are legion and notably include among them election in 1920 to the National Academy of Sciences (where, in 1922,

he chaired the National Research Council). He was appointed by Franklin Roosevelt to the President's Science Advisory Board in 1934.

Something of the nature of the man can be gleaned in the following anecdotes. There are repeated accounts of his empathy towards others and, in particular, to the personal interest he showed in his students. On one occasion when one of them (Edith Seymour) had an emergency appendectomy, Jones and his wife stayed with her in the hospital until the operation was over (see Chapter 28 in *Furrow*). His 20 years at the University of Vermont established him as an international leader in botany and plant pathology as well as a stellar academician. *"He became one of the most effective and beloved teachers in the history of the University of Vermont. He was held in the highest affection by his students and so great was his esteem by the student body that many who were concentrating in unrelated fields took work with*



LEFT: Jones at Gainesville, Florida, 1933.

ABOVE: L. R. Jones (center) with professors E. M. Gilbert (Botany) (left) and B. M. Duggar (Botany) (right), both of whom were closely affiliated with Plant Pathology, 1935.

Some of the individuals who were influential in the founding of the department. From left to right: Charles R. Van Hise, Thomas C. Chamberlin, Harry L. Russell, William A. Henry, and Stephen M. Babcock. Van Hise and Chamberlin both served terms as President of the University, Van Hise at the time Jones was recruited. Henry and then Russell (for whom our building is named) both served terms as Dean of Agriculture, Russell at the time Jones was recruited. Russell provided the budget for the new Department of Plant Pathology and insisted to Van Hise that it be placed in his college over the strenuous objections of E. A. Birge, Dean of the College of Letters and Science. For details, see Chapter 1 in *Furrow* by J. C. Walker. The photograph was taken in 1918.

him to experience the influence of his tutelage and personality. Some of these were so attracted that they continued in this field for their life work" (Keitt and Rand 1946, p. 3). To mark the occasion of his 80th birthday, some 250 former students and other friends from all over the world sent letters of congratulation and appreciation (Keitt and Rand 1946).

The portrait of Jones that previously hung in the conference room was presented to him and the University of Wisconsin by his former students at a reception held in his honor at Ithaca, New York, in conjunction with the International Congress of Plant Sciences, August 19, 1926.

The crop and disease on which a department was founded! Cabbage varietal trials for resistance to the yellows disease (caused by *Fusarium oxysporum* f. sp. *conglutinans*) under inspection in the Hansche plot near Racine, 1914. As early as 1910, L. R. Jones found hundreds of acres affected by the then relatively obscure disease, which he identified as yellows. Occasional plants survived and formed the basis for a successful breeding program instigated by Jones and pursued by several of his students, most notably Walker. For details, see Volume I (*With One Foot in the Furrow*) and Walker's textbooks, alluded to later under the heading "The Big Four."

The "Big Four"

The following photographs are of portraits presented to the University of Wisconsin during a celebration of the 50th anniversary of the department held on August 29, 1960, in conjunction with the annual meeting of APS at Green Lake, Wisconsin. Glenn Pound was Master of Ceremonies and C. A. Elvehjem accepted the gifts on behalf of the university. They formerly hung in our conference room, 594 Russell Laboratories.

In Vol I (p. 369) Carl Beckman (PhD '53) has wryly commented that *"the 'Big Four' were an amazing collection of characters who were all highly respected for their accomplishments and who by one thoroughly nonpedagogic method or another cajoled, intimidated, inspired and bored us into a vigorous pursuit of plant pathology. I would not have missed it for the world!"*

G. W. Keitt

George Wannamaker Keitt

Born on a farm in South Carolina, George Wannamaker Keitt originated in the South and appears to have been the quintessential "Southern gentleman." Unlike the other three members of the so-called "Big Four," who were given to candor if not abruptness, Keitt used his skills of charm, humor, and diplomacy to resolve problems by mediation and persuasion (Leben 1981). Following undergraduate work at Clemson College, he was drawn to Madison in 1910 to work with Jones. Keitt received his MS the following year (and his PhD in 1914), and in so doing had the distinction of obtaining the first graduate degree awarded from this new department. He joined the faculty in 1914. His program focused on fruit tree diseases and over a career of some 45 years he published 200 papers on aerial dissemination of pathogens, viruses, chemical control, the nature of parasitism, and antibiotics. He is probably most famous as a pioneer in the use of eradicant fungicides, and for his genetic approach to studies of pathogenicity of *Venturia*, which rivaled the early work by fungal geneticists on *Neurospora*. He followed Jones as chair of the department for 25 years (1930–55), a period of rapid growth for both the department and the campus. He appeared to excel as an administrator and was an influential figure within the university community, chairing the university committee and being the first chair of the faculty Division of the Biological Sciences. He was APS President in 1937 and received numerous other tributes.

J. G. Dickson

James Gere Dickson

James Gere Dickson was born to a farming family in 1891 near Yakima, Washington, and it seems that his career was greatly influenced by the many challenges of early rural life (Bruehl 1980). Following undergraduate studies at Washington State College, he came to Wisconsin to work with L. R. Jones and received his PhD in 1921. A premonition of his stellar potential was that Dickson was actually hired as an assistant professor two years before that, and he had progressed already to associate professor by 1922! Dickson was renowned both in Wisconsin and internationally for his voluminous knowledge of field crop (forage and cereal) diseases. Like Walker, he is perhaps best known for his famous book, *Diseases of Field Crops*, which went through two editions (1947, 1956) and was translated into Spanish and Russian. It has been said that "*During his mature years James Geere Dickson possessed the greatest knowledge of more field crops than any other person*" (Bruehl 1980, p. 11). He was president of APS in 1953, was an influential member of the Mycological Society of America, and was on the governing board and later president of AIBS. Beyond his energetic devotion to academia, he was an accomplished artist, builder, naturalist, and photographer. He believed in serving one's community; not only did he serve on the usual civic boards, but was president of the local volunteer firemen's association. Dickson's astute advice in pathology was widely sought and it was during a consulting trip to the Philippines, one year following retirement, that he was killed in a plane crash in 1962. Ironically he died not far from the beaches where one of his sons had been killed in action during the Battle of Leyte in World War II (Hanson and Arny 1962).

J. C. Walker

John Charles Walker

Born in 1893 to a Wisconsin farming family, John Charles Walker had originally intended to study medicine. However, he was so impressed by the diseases that were destroying the cabbage industry centered near where he had grown up in Racine that he entered plant pathology instead. A portent of his brilliance was a Science Club Medal awarded for his bachelor's thesis on onion smut. Only one such prize was offered annually at UW–Madison for the most outstanding undergraduate study in science. As retold in a biography by Pound (1987), one of Walker's students, "*Chance favored J. C. Walker with a golden opportunity and he moved in on it with force and vigor*" (p. 52). In many ways Walker rivaled the genius of Jones and followed in his mentor's footsteps by mastery of both basic and applied pathology as exemplified best by his research on the genetics of plant disease resistance. Though he was a prolific writer who published more than 400 technical papers and mentored some 70 doctoral students, Walker is probably still most widely known for his two seminal books read by generations of aspiring students, *Diseases of Vegetable Crops* (1952), followed by *Plant Pathology* (1957). By nature candid and seemingly gruff, he worked prodigiously, set very high expectations for himself and others, and was a stern taskmaster. Beneath this exterior, Walker was noted for his occasional flashes of humor and his kindliness towards students once they had demonstrated that they were seriously focused on plant pathology. He was as famous locally, and appreciated as much by his extensive grower clientele in Wisconsin, as he was internationally. Among his many awards and achievements are president, APS, in 1943; election to the National Academy of Sciences in 1945; winner of the prestigious Award of Distinction conferred by APS in 1970; and corecipient of the 1978 Wolf Prize in Agriculture (often considered to be second in prestige only to the Nobel Prize). His hometown of Racine established in his honor in 1959 a lectureship endowment that continues to this day, and the grateful National Kraut Packers Association provided funds for greenhouses built in 1961 and named in his honor (the plaque, shown elsewhere in this book, still stands in the Walnut Street facility).

A. J. Riker

Albert Joyce Riker

A private, unassuming but determined individual, Albert Joyce Riker was born in West Virginia in 1894 and became one of Keitt's first graduate students at Wisconsin. He graduated in 1922 and was immediately hired by the department, a measure of the esteem in which he was held even at an early age. During his career, Riker was interested in diverse academic subjects, ranging from white pine blister rust and vascular wilts to publication and library issues at the far extreme (Sequeira 1994). He made his greatest mark by using his influence behind the scenes to shape forestry as a discipline in this state and for studies with his students on bacterial diseases, especially crown gall. He stood his ground and was vindicated in early, heated scientific controversies with the famous bacteriologist E. F. Smith and with George McNew, who would become head of the Boyce Thompson Research Institute. Riker and his wife, Regina, authored the famous manual *Introduction to Research on Plant Diseases* (1936), which was the dominant text of its kind for some 30 years (Sequeira 1994). Tissue culture work from his laboratory, among a few others, involved what became known as the transforming principle in tumor induction and set the stage for later breakthroughs in using the bacterium to engineer plant transformations. He received many honors, including the Eighth International Botanical Congress Medal (1954); presidency of APS (1947); and elected membership to the National Academy of Sciences (1951) (Sequeira 1994).

One of the first group photos of the early department. Jones (far left) and next to him, Keitt, among other staff and students, 1916.

An early graduate laboratory, 1914. Note the abundance of preserved specimens in the museum jars. For a description of the spherical object in the wooden stand to the right of the jars, foreground, see illustration on the next page. To the right of the stand, note the old Bunsen burner. In the left background is a paraffin oven for histology and a cylinder, likely of carbon dioxide, for use with the freezing microtome attached to the bench.

R. E. Vaughan's summer class in the laboratory, 1919. Note the illumination system designed for microscopy on the bench, right foreground. Light from the large incandescent bulb passed through a spherical vessel containing copper sulfate, which provided a monochromatic beam. Students are arranged in pairs, one light source per pair. Again, the prevalence of museum jars is evident on shelves in the background!

R. E. Vaughan's class in the "field" — the disease garden with the Horticulture building to the left and Agricultural Engineering in the rear, 1919. Vaughan was among the first and most distinguished of Extension pathologists in the USA. It is in tribute to him that the Vaughan–Bascom Professorships are named, with funding provided by the generosity of his family.

Charlotte Elliott: Accomplished Phytobacteriologist and First Female PhD

Charlotte Elliott

Charlotte Elliott, born in 1883 in Berlin, Wisconsin, completed her undergraduate and MS studies at Stanford University. After a short period of teaching and further studies elsewhere, she came back to Wisconsin to become a student with L. R. Jones. She completed her PhD thesis on halo blight of oats in 1918. She was among the early cohort of students to enter Plant Pathology at Madison and was the first woman to graduate with a doctorate from our department. She then was recruited into the USDA in Washington, DC, by the famous bacteriologist E. F. Smith, who became her supervisor, friend, and mentor for many years.

Elliott published numerous scholarly papers, probably most famous among them the ones that established the role of the flea beetle vector in the epidemiology of Stewart's wilt of corn, including a report in *Science* (Elliott and Poos 1934). This proved not only to be the linchpin of the disease cycle but set the stage for development years later of a simple but effective forecasting system for disease severity based on a temperature index that reflected the overwintering survival of the vector. She wrote a widely acclaimed book, *Manual of Bacterial Plant Pathogens*, which, as the title implies, focused on the pathogens themselves rather than their hosts. This was published initially in 1930; a comprehensive revision appeared as a second edition in 1951 shortly after her retirement. These well-organized, comprehensive works represent seminal contributions in an era when such books were essentially nonexistent. She was an enthusiastic amateur naturalist and her life beyond laboratory science included such avocations as music, cooking, travel, drama, literature, and painting. She died in 1974. Elliott's career has been recounted by Matta (2008) and Robert and Moseman (1976).

Our three homes over the years!

Plant Pathology was initially housed (1910–12) in Agricultural Hall where L. R. Jones had his office. The teaching laboratory was in Science Hall.

Plant Pathology then moved (1912–64) to occupy the portions of the second floor of the Horticulture building and third floor of the adjoining Agronomy Department, the latter now known as Moore Hall (after R. A. Moore, former chair of Agronomy). Initially only the Horticulture portion stood and was occupied by three departments: Agronomy, Horticulture, and Plant Pathology. In 1932 construction of the Agronomy wing was completed. The undated photo looking southwest across Linden Drive shows the Agronomy wing (left) facing east and Horticulture (right) facing north onto Linden. Note the old cars in the parking lot.

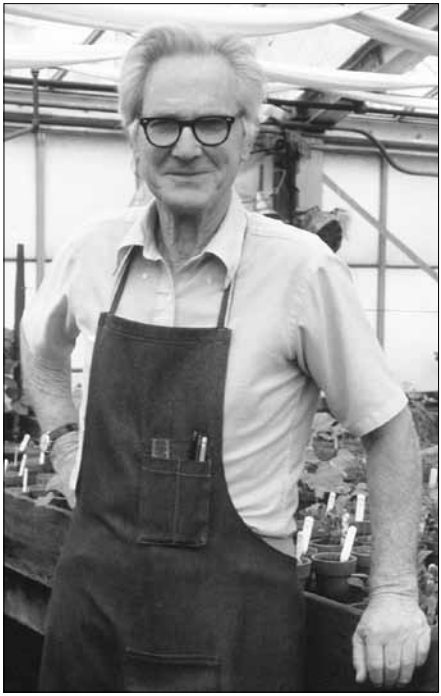
Groundbreaking for Russell Laboratories, current home for Plant Pathology, late fall, 1962 as seen looking west from the Horticulture building. The unimposing metal shed, lower right corner, was the Army ROTC building, site of student demonstrations during the Vietnam War era.

Russell Laboratories under construction, early 1963 (above) and nearing completion (below). In the photo above, J. E. Mitchell poses with one of the construction workers. Dr. Mitchell spearheaded this big project and was immersed behind the scenes organizing the design and construction. In aggregate, this investment would have amounted to a diversion of weeks if not months of his time. Everyone who has since inhabited Russell Labs owes him a personal debt of gratitude.

Cecil Edmund Yarwood, 1907–81

by David Teakle (University of Queensland, Australia)
and Milton Schroth (University of California, Berkeley)

[Editor's Note: Cecil Yarwood obtained his PhD in our department in 1934 under the direction of J. G. Dickson. From Madison he went directly to Berkeley where he spent his entire career. In his time he was one of the preeminent pathologists in the world, a prolific writer and astute observer, probably best known for his seminal work on the obligate pathogens, notably the powdery mildews and rusts.]



Cecil Edmund Yarwood

Cecil's lifelong career in scientific plant pathology started almost by accident. After finishing high school at 15 years of age, he took over management of the family farm near Huntingdon, British Columbia. Life on the farm involved growing crops, such as hay, corn, sunflowers and squash, for the dairy cows, pigs and poultry. Having an unusually inquiring mind, Cecil carried out detailed observations and experiments on the farming activities, which are recorded in two diaries. The untimely early death of his father meant that the family, a widowed mother and four children, was initially financially dependent on him. He seemed destined for a career as a practical farmer. Despite this assumption, his mother encouraged him to enroll in agriculture at the University of British Columbia. He embarked on agricultural studies which included plant pathology; the latter phases of his education and essentially all of his professional life thereafter were in the USA.

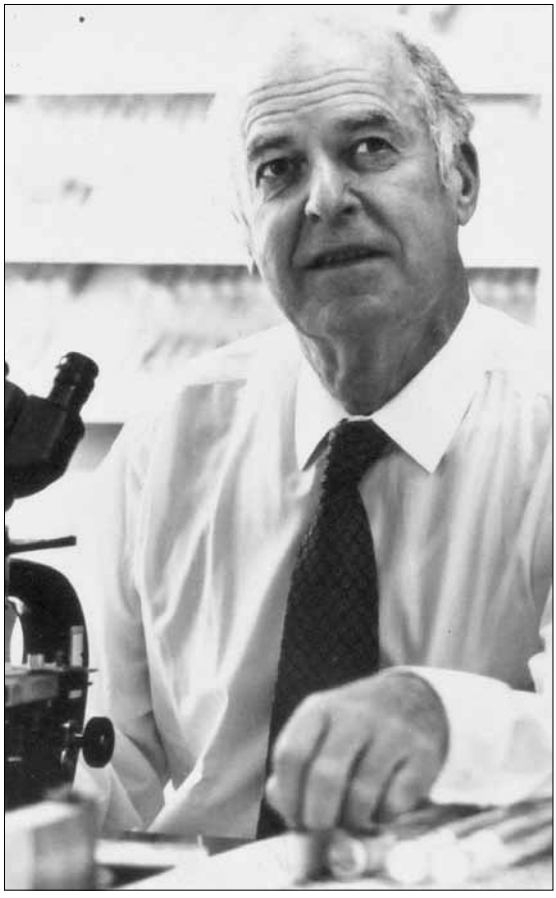
Cecil was devoted to his profession and to his family, someone who seems to have been the embodiment of the person who works hard and plays hard. He

pursued life with a single-minded determination and an independent spirit, as the following anecdotes convey.

Long before physical fitness became a fad, Cecil became well known on the Berkeley campus for his athletic nature. He always jogged to work early in the morning. One day a policeman stopped him because he looked suspicious and asked him why he was running. Cecil said, *"I am running to my laboratory."* The cop (thinking he had said "lavatory") replied, *"Don't you have one of those at your house?"* Cecil never liked to waste time so that was why he was running. As well, he often measured the distance to any regular destination by counting the number of steps he took to get there. He could tell you how many steps it took to go from his lab to the gym by three different ways. He also had a routine during the noon hour of swimming at the university gym, alternating one lap underwater followed by a couple of laps on the surface.

Cecil found it difficult to tolerate anything that interfered with his work. One morning while he was running to work, a dog ran out from a house and caused him to fall heavily. He continued walking. Later that morning one leg became very sore and swollen. He received medical attention and was told that he had a broken kneecap. The leg was encased in a plaster cast. He tolerated this impediment to his freedom of movement for two weeks, but then while sitting in his bathtub at home, he cut off the offending plaster cast with clippers. His family and his doctor were appalled when they learned of this unapproved action, and the doctor required Cecil to sign a document accepting full responsibility for removing the cast without authorization. To everyone's relief and surprise, his leg mended perfectly, and he soon resumed his running.

On a visit to Australia following retirement, Cecil died of a heart attack just before completing a 4.5 km walk to a daughter's home in Brisbane. He had been examining a powdery mildew of clover at the University of Queensland. His single-minded approach to plant pathology and exercise remained to the end. Over his remarkable career, Yarwood published hundreds of papers and some called him a 'phenomenologist.' He shrugged it off and frequently said, *"I make the discoveries and let somebody else work out the underlying mechanisms."*



W. C. Snyder at his microscope, circa 1970. He came east from California to study with Walker and obtained his PhD in 1932 for research on Fusarium wilt of peas. He then returned to the west coast where he remained on the faculty of UC Berkeley for his career, though he was sought out internationally for his advice and traveled extensively. A gifted scholar who was admired by students, growers, and his scientific peers alike, he is commonly regarded (according to his colleague, Milt Schroth) as being one of the most important, popular, and influential faculty members of all time in Plant Pathology at UC Berkeley. Snyder received many awards and rose to various positions of leadership. Among these were as recipient of the Ruth Allen Award from APS, chairman of Plant Pathology at UC Berkeley from 1961–70, and President, American Phytopathological Society, 1960. Alone or with colleagues and some 75 students whom he trained, Snyder wrote prolifically in the areas of fungal taxonomy, genetics, and sexuality. With his colleague and friend, H. N. Hansen, he was the world's authority on *Fusarium* and will be remembered by generations of graduate students for his seminal papers on the species concept in that notoriously difficult genus.

Extension pathologist R. E. Vaughan in the field shortly before his retirement in 1949, comparing healthy and yellows-infected cabbages.

Glenn S. Pound: An Exemplar of Leadership in the Mid 20th Century

by Paul H. Williams

Glenn Pound

People who would have conversed or worked with Glenn Pound would have recognized that they were in the presence of a person who had the characteristics of a great leader. Born in 1914 in Hector, Arkansas, the son of a country school teacher, Pound received schooling that fostered a love of language, history, and science. He was married at 18 to Daisy and their 71 years together were dedicated to the well-being of others. Throughout Glenn's career, Daisy provided essential support and her gracious hospitality. With the savings from years of successful share-crop farming of cotton, spinach, and onions in south Texas, the young couple pursued their college educations at the University of Arkansas, followed by Glenn's PhD in 1943 in plant pathology at the UW–Madison with J. C. Walker.

His first years after graduation were with the USDA in Mt. Vernon, Washington, where he literally saved the cabbage seed industry while supporting a critical need in the war effort. With their vegetable seed supplies from Holland and Denmark cut off, the peoples of Russia and Ukraine were in dire need of cabbage, a primary source of vitamins in their diet. During World War II the need was met by shipping cabbage seed produced in the fields around Mt. Vernon through the 'back door' of Alaska. However, in 1943 cabbage seed production was plum-meting due to the ravages of cabbage viruses. Within a year Pound had broken the virus disease cycle by isolating the cabbage seedling transplant beds from the seed production fields, thereby preventing the transmission of the aphid-borne viruses. Seed yields increased over 100 percent and the Russians had their cabbage. Today, Pound's contribution remains a legend among the seed-growing families of Mt. Vernon, and is his most highly cherished contribution to plant pathology.

After the war, Pound returned to plant pathology at Wisconsin. It was not long before his attributes of leadership were recognized and in 1954 he was

chosen by his colleagues as their chairman. Pound was known for his administrative efficiency, incisive decisions, and astute judgments. In his office he operated from a large table whose top was always clear but for a jar of sharpened yellow pencils, a single yellow pad and a telephone. As an interview or phone call concluded, the pencil and writing pad came out and within minutes the response was written, and off to the typist. He never took work home.

Glenn S. Pound examining the interior quality of his *Fusarium*-resistant radish cultivar "Red Prince," ca. 1960.

One of Glenn's great strengths was his mastery of written discourse and rhetoric. He was a lucid orator. His reports and speeches were meticulously researched and crafted: they began with relevant historical context; built to the salient points; and ended with his opinion or perspective of the issues. I always enjoyed his directness and the seemingly endless colorful vernacular with which he punctuated his discourse. Well do I remember an early research project I was conducting on cabbage clubroot samples mailed to me from around the world. One morning the postman walked into the departmental office, next to Pound's office, holding a small package well out in front of him on the tip of an umbrella. The secretaries immediately upped and left the room, so strong was the stench from the rotting cabbage inside. Knowing instantly who it was for, Pound rushed into my office, "*Paul, that package could stink a fly off a gut wagon, get it out of here!*"

Glenn Pound's personal narrative in *With One Foot in the Furrow*, chapter 3, The Second Generation, 1940–64, documents clearly his years in the department. His vision as chairman prepared the department for the transitions that it would undergo in the following 50 years. He understood the need for uncompromising adherence to the highest standards of science and scholarship; at the same time he recognized the need for faculty to maintain a balance between applied and basic research. In the 1950s the department was gaining the reputation of becoming academically inbred. Acutely aware of the need for 'fresh blood' in the departmental professoriate, Pound negotiated the appointments of

Luis Sequeira, Richard Durbin, and Arthur Kelman. His efforts secured new space for a burgeoning department and resulted in the building of Russell Labs. It is ironic that he would never enjoy the results of his efforts toward the building of Russell Labs, for on the day the department was to move in, he was appointed Dean of the College of Agriculture.

Though he was a person of great personal warmth and generosity, Glenn was not without his strongly held notions of public decorum and deportment. Two such prejudices were his aversion to shorts and to beards. I recall vividly that in my first week as a student, working in shorts on a warm September afternoon in his greenhouse with the temperature over 100 F, he greeted me with, "*Well, Paul, I see you are wearing your underwear today!*" I never flinched and continued to wear shorts. He never mentioned it again. His aversion to facial hair on men was well known among the students of my class cohort. Students who expected a job recommendation from the chairman were advised to shave their beards. Later as Dean of the College, a memo from his office, penned by his associate dean, General (retired) Robert Hughes, instructed faculty to "*remove all facial excrescences*." The day that memo arrived was the day that a number of faculty began growing beards! I wondered what Glenn thought about the facial hair on university Presidents Chamberlain and Van Hise, Deans Henry and Russell, and Professor Babcock.

Perhaps his most defining personal characteristic was his enduring sense of institutional loyalty founded on a deeply held belief that to hold a position at the University of Wisconsin–Madison was one of great privilege. The idea of entitlement was antithetical to him. He was of the generation that regarded the practice of a faculty recruit negotiating for salary and fringe benefits as unconscionable. An eloquent passage from his assessment of our discipline on the occasion of the 60th anniversary of APS is, in part, *"as individuals, we must return to a position of strong institutional loyalty for it is the institutional base from which our profession must grow and such bases are not built without some individual sacrifices for the larger objectives."*

Glenn Pound would hold with distinction the position of dean for 15 years. The "Pound years" in the history of the College of Agriculture are aptly portrayed by John W. Jenkins in his *A Centennial History: A History of the Agricultural and Life Sciences at the University of Wisconsin–Madison*, Chapter 6, An Expanded Vision. With that expanded vision Glenn Pound shepherded the college through a crucially important period in its growth from 1964 to 1979. He stands with Harry Russell as one of the great deans of our college. Summarizing the Pound years, Jenkins quotes an editorial from the *Wisconsin State Journal: "Pound is recognized as a primary builder of the nation's ranking agricultural college. But above all he was a 'university citizen' who worked to bring the benefits of the university to all the people in the spirit of the Wisconsin Idea."*

Glenn Pound on the USDA bureaucracy:

[Editor's Note: A committee established in 1969 by the National Research Council of the National Academy of Sciences in response to a request by the Secretary of Agriculture was asked to evaluate the quality of science in the agency and in agricultural research in general. The distinguished committee, chaired by Glenn Pound who was at that time Dean of our College of Agriculture, presented its landmark report in 1972. Known thereafter simply as "The Pound Report," the 464-page document with 20 key recommendations was nationally acclaimed for its candor, rigor, and insight. In most respects, the conclusions and recommendations are probably as true today as they were almost 40 years ago. One recommendation that was implemented, and for which recent generations of agricultural scientists should be thankful, was the formation of a competitive grants program (now known as the National Research Initiative) within USDA. Some excerpts follow below; for the full report, see Pound 1972.]

> *The primary thrust of research administration should be to increase the number and quality of ideas. All aspects of administration should support, not compete with, this function. Far too many administrators try to fit the scientist and his program to the red tape of housekeeping. Bureaucracy, by its very nature, creates forces that run counter to the factors of research productivity. Bureaucracy tends to tie the administrator's hands by providing rigid guidelines for developing goals and for managing scientists, thus reducing individual freedom, motivation, and creativity. Though large, complex organizations such as the USDA must live with bureaucracy as a means of insuring a degree of coordination and control, they must at the same time seek to reduce the impediments bureaucracy places in the path of discovery. (pp. 14–15)*

> *Agricultural research is suffering from an inadequate interaction with the basic disciplines that underlie it, as well as from a paucity of outstanding scientists (p. 42) … It is extremely important that research in the sciences basic to the mission of the USDA be supported vigorously by the USDA (p. 43) … The scientific stature of personnel engaged in agricultural research is subject to several determinants including the native ability of those attracted into agriculture, the training they receive, and finally the research atmosphere in which they work. The Committee believes that to produce top flight agricultural scientists there should be little distinction between training in agriculture and training in the basic sciences. (p. 58)*

Glenn Pound on the origin and development of plant pathology (1968)*:

> *As I view our development, our headwaters have been of two primary sources; namely, academic biology, largely in the setting of Europe, and practical agriculture, largely in the setting of America (p. 1) … In consideration of the pattern of our heritage it would seem to me that one of the greatest questions before us is, 'to what extent should we, to what extent can we, to what extent dare we, remain both academic and pragmatic?' (p. 5)*
>
> *We are experiencing a steady retreat from the applied research field, and this is likely to increase, because scientists are going to adjust their programs to provide security for their professional development. Is this marked change of emphasis ultimately to advance our profession or will it result in a serious imbalance in our structure? … I do not suggest that emphasis on basic research is inappropriate, far from it. It is appropriate for our productive capacity can accommodate it and the ultimate security of our economy and of our discipline depends on it. However, we dare not forsake production research. We must do both, concurrently, and in balance! [sic] Plant Pathology must maintain an agricultural orientation. (p. 11)*

[*Editor's Note: The above text is taken from a talk that Glenn Pound gave in 1968, "A midstream view of plant pathology," on the occasion of the 60th anniversary of the American Phytopathological Society. The manuscript apparently was never published.]

Students in front of the old Babcock Street greenhouses, ca. 1953. Front row, left to right, with their eventual positions indicated, if known: William Skoropad (University of Alberta), Ivan Thomason (Nematology, UC Riverside), Albert Paulus (Plant Pathology, UC Riverside); back row: Robert Tinline (Agriculture Canada), Dave Kline (North Carolina), James Horton, Hugh Wenham (New Zealand), Seymour Van Gundy (Nematology, UC Riverside), Charles Pierson (USDA).

Al Hildebrandt meets with an international visitor, ca. 1958.

Dr. Fulton teaching his virology lab in the Pathologium, March 1962. Left to right: Bob Fulton, Don Gordon, Geoff Marks, Susan Humphries, and Henry Mee.

The 1962–63 Plant Pathology Graduate Colloquium Council, left to right: Charlie Main, Wayne Wilcox, Adib Saad, Don Gordon, Rennie Stavely, and Lowell Black.

The 1963–64 Plant Pathology Graduate Colloquium Council, left to right, back row: John Martens, Phil Arneson, John Howell, Don Huisingh; front row, Denis Lachance, Lowell Black, Jack Mitchell (faculty advisor).

J. C. Walker: A Giant on Whose Shoulders We All Stand

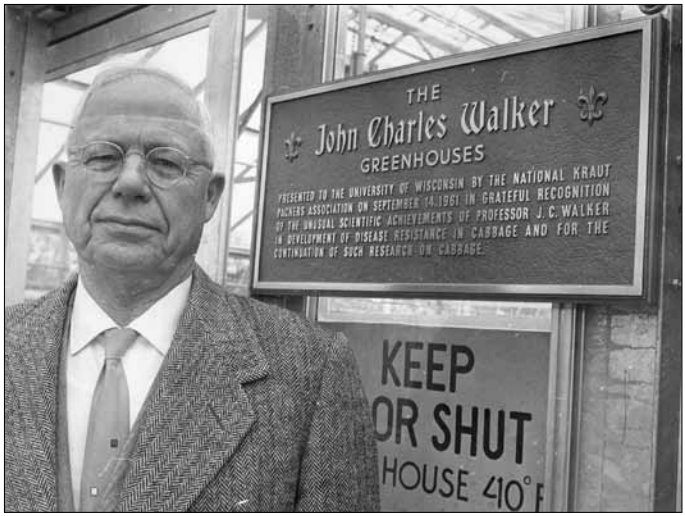
by Paul Williams

I remember J. C. Walker as the man portrayed in the memories of his students and colleagues and documented through their personal perspectives in the chapters of *With One Foot in the Furrow*. The most complete description of him is found in the biography written by his student and colleague, Glenn S. Pound, in the *Annual Review of Phytopathology,* 1979. He was truly one of the giants on whose shoulders our profession and our department were founded. I came to know "Doc," as his students affectionately referred to him, when he was in his late 60s and early 70s and transitioning toward retirement from a career of exceptional dedication and distinction in plant pathology.

He was a man of great intellect, humanity and generosity, actively engaged in civic affairs, a staunch Republican and a member of the Wisconsin Board of Electors, and possessing an innate sense and love of history. Time spent in travels with him, whether through the back roads of Wisconsin or on the highways across the country, was filled with his richly detailed historical narrative of people, places, events and circumstances that spanned the social, political, academic, and agricultural spectrum. As he answered a particular question or was making a point, a listener often wondered where his narrative was going, so many were the details of the meanderings. (Doc's students recount their struggles to stay awake through all the "excruciating detail" of his post-lunch lectures for PP 120, the Vegetable Crops course.) Yet I learned that he would inevitably arrive at the point, the listener the richer.

When it came to talking research and plant pathology, he was all business. Students quickly learned to be prepared before discussing their ideas with him. I remember Ken Barker and Charlie Main carefully timing their visits with him by checking with Audrey Dunlap as to whether "Doc was in a good mood." When giving an opinion or advice, he was often so direct as to be thought unfeeling. I never felt that way myself, but some of his early students said Doc had mellowed a lot as he grew older. In meetings he spoke little, but when he did, people listened.

It was well known that he was a terrible driver. On one trip in the Central Sands, as he was driving along pointing out damage on cucumbers to Ken Barker and me, he drove completely off the road. From that time on, I drove!

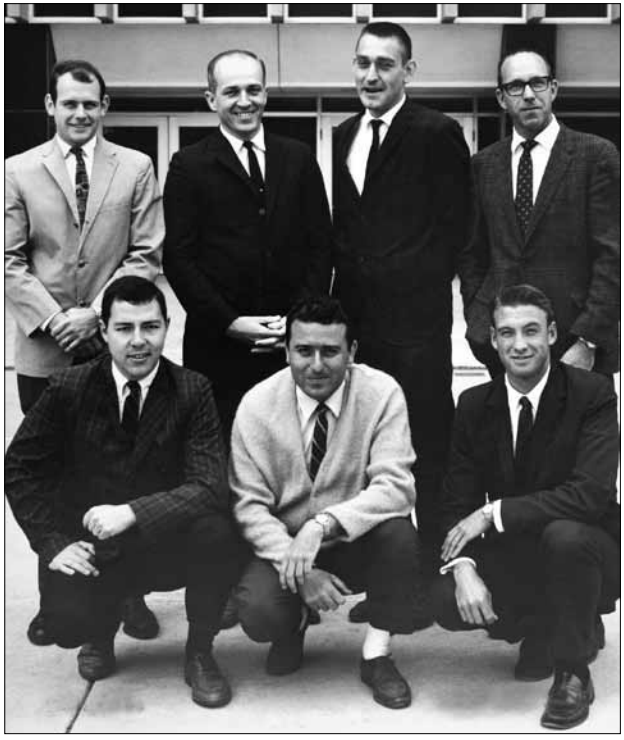


J. C. Walker next to the plaque commemorating the gift of new greenhouses by the National Kraut Packers Association in tribute to Walker's extraordinary accomplishments in cabbage research. This plaque still stands, as do the greenhouses, part of the Walnut Street range.

My wife, Coe, reminded me of her first introduction to Doc in 1962 at the Plant Pathology Department's annual fall reception in Great Hall of the Union. It was a terribly formal affair where students and young faculty and their wives were introduced to senior faculty and their wives, deans and other invited dignitaries in a formal reception line. I had invited my new girlfriend, Coe, as my date that evening. Upon meeting Professor Walker, she commented that he reminded her of her grandfather. I was mortified. Doc just beamed.

Walker on the future of plant pathology …

> *It is obvious that beginners in plant pathology, as well as those established in the field, if they are to stay there, must adopt these techniques* [in physiology, genetics, chemistry, and bacteriology] *and, more important, adapt them to pathological problems. The consequence of this trend obviously is more and more specialization within plant pathology. Already we see cults developing who refer to themselves as plant virologists, plant disease physiologists, chemotherapists, disease epidemiologists, plant nematologists, microbial geneticists, and I presume just around the corner, plant disease molecular biologists. This is all to the good because to make basic progress we must not only specialize, but also reach out to gain the advantage of mingling in allied fields. I am not so much concerned that plant pathology will disappear like the exploding atom. There will always be plant disease problems and crop losses from disease. What I am concerned about is that these 'speciality' groups will lose plant pathology. There is the real danger of being cut off in space without landing gear* (Walker 1963 pp. 2–3).



ABOVE: A little pick-me-up in the local bar at the end of a hard day of classes, 1966! Note the gentlemen's attire. Left to right: Jeff Wyman (Entomology) with Howard Harding, Johannes Klink, and James Strandberg. According to Jeff, this photo was taken at the Amber Grid on University Avenue on a Friday afternoon after Introductory Plant Pathology lab (Howard was the TA).

LEFT: On the steps of Russell Labs, 1968. Left to right; front row, John Hartman, Sami Saad, Jim Steadman; rear, Jon Watterson, Bob Pinney, Noel Keen, Rick Durbin.

Remembering Noel Keen

by Patricia McManus

Noel Keen

At the time of his death (2002) Noel Keen was president of the American Phytopathological Society and among a handful of preeminent physiological/molecular plant pathologists of his era. He earned his PhD in Plant Pathology in 1968 in our department under the guidance of Paul Williams and then joined the faculty at the University of California, Riverside, where he remained for his entire career.

Noel's remarkable accomplishments in science, his professional service, and a partial list of his countless awards were presented in the July 2002 edition of *Phytopathology News*. That article provided a glimpse of the personal attributes that made him not just an outstanding scientist but a cherished colleague, mentor, and friend to so many. Not surprisingly, those traits were already apparent in the young Noel Keen when he arrived on Paul Williams' doorstep to pursue his PhD. Paul states bluntly that "they broke the mold after making Noel Keen."

Unbounded energy, intensity, and total commitment to the scientific process distinguished Noel as a student. He had no fear of failure, because he was driven more by the process of science and its mechanisms rather than the outcomes. There were no disappointing results if the process in getting the results was pure. Noel embraced the rigor of chemistry and biochemistry, which were his lifelong tools in doing plant pathology research. When Noel did research, he became immersed in the quest. At least a dozen publications resulted from his PhD research. Paul Williams suggested that Noel compile his published papers into a thesis, rather than writing a separate document for the sake of writing a thesis. This procedure is now the norm, but 35 years ago it must have been revolutionary.

Noel was a strong-willed student in a department of strong wills. His contemporaries might recall his colorful vernacular and lack of self-censorship. Paul

Williams prefers to remember him as a "diamond in the rough." Beneath the gruff exterior was a sensitive and thoughtful person who cared deeply about others' feelings. He was incredibly generous with his lab mates, spending hours training them and explaining concepts without a trace of arrogance or impatience. He was seemingly unaware of his exceptional intelligence and talent.

Noel's intensity, and for that matter, his colorful vernacular, spilled out of the lab and onto the volleyball court and soccer field. Intramural sports were a major social activity at the UW in the 1960s, with students, staff, and faculty on the same teams. Just as Noel was not afraid to question the science of his superiors, he was unabashed in criticizing their moves on the court or field. He was a physical player, who incorporated the tackles of American football and bloodshed of rugby into soccer. According to Luis Sequeira, one always wanted to play on the same team as Noel, rather than oppose him!

On the first anniversary of Noel's death, UC Riverside named its former Bio-Agricultural Library, "Noel T. Keen Hall." The renovated facility houses advanced instrumentation for genomics and related research directly relevant to Noel's investigations into molecular mechanisms of pathogen recognition by hosts.

[Editor's Note: the above article (with minor revisions) was written by Patricia McManus and appeared in the 2003 issue of The Pathogen.]

Former grads discussing science and undoubtedly other things in the bar. Facing the camera, at left, is John Bancroft followed by Albert Paulus, Ray Grogan, and Bob Shepherd. More is said about the distinguished careers of Paulus and Grogan elsewhere in this volume. Bancroft was a noted plant virologist initially at Purdue University and later at the University of Western Ontario; Bob Shepherd's career at UC Davis and the University of Kentucky was highlighted by his discovery with collaborators Wakeman and Romanko of the first plant virus containing DNA (1968), (later shown to be double-stranded), and election to the National Academy of Sciences (1988).

Don Hagedorn: A Full Life

By Bob Rand

The men in front of the men's room! Don Hagedorn (left) and Woody Hare (right).

When I reflect back on 25 years of memories of Don Hagedorn, I can't help but smile. He was a man who loved his career, but more than that, he also truly enjoyed his life and lived it to the fullest, surrounding himself with good friends, good food, and plenty of fishing. He became more than just a valued member of the department, he also became a friend and confidante to students and staff alike. Don was supportive of the staff and did whatever he could to help them: advice, encouragement, a shoulder to lean on during a difficult time. When he taught PP 300 lab, many students would say of him in their course evaluations … "You are just like my grandpa — warm, loving, caring." Don thought he was too young to be compared to grandpas! Because he treated everyone as his equal, he earned the respect of not just the university president, but also the farmer.

Although Don was a renowned plant pathologist, he never took himself seriously. He was just an ordinary guy who loved people, his family, fishing, and his career (peas and beans). Don had a wonderful sense of humor and a very distinctive laugh. He often laughed the loudest when the joke was on him. He loved fishing! He once gave a demonstration to Don Peterson and Don Boone on how to catch a walleye, and during the demonstration, he did! We all laughed, what a memorable moment on the Churchill River. No one was more surprised than Don. At fishing camp, Don was the sandwich-maker extraordinaire. The peanut butter and jelly were spread uniformly to the very edge of the bread. Not just a glob in the middle. This standard is still practiced today in fishing camp. His three-ply (three slices of bread) sandwich is a staple for lunch on the Churchill River.

Don was extremely neat and well organized: a place for everything and everything in its proper place. His desk was the neatest of the entire plant pathology faculty. Don was perhaps the best dressed faculty member in the department. His

Bob Rand (left) and Don Hagedorn (right) with a steelhead at a (secret) Alaskan stream.

clothes were of good quality, fashionable, and he loved color, red being his favorite. His attire for Badger football games was red shoes, red pants, red shirt, and red cap.

As an advisor, Don wanted his students to work hard and play hard. Sometimes it was difficult for them to know when to work and when to play. Eventually the students learned how important play is for mental well-being and academic achievement.

I'll close with a story that many of you may not know. Don grew up on a pea and wheat farm in Moscow, Idaho. His father was one of the cofounders of the Crites-Moscow Pea Seed Co., which is still in operation. Don was working in the field, harvesting peas during one of Dr. Walker's visits to the pea seed production area of Idaho. While Walker was there he recruited Don to Wisconsin to attend graduate school. Walker told Don to be in his office at 8 a.m. sharp on Monday morning. Don said "I won't be graduated by then!" Dr. Walker said "I'll take care of it, you be in my office Monday." Thus began Don's career at Wisconsin.

I love this story, not just because it shows how much simpler entry into graduate school used to be, but also because of how much it reveals about Don's character. Even early in life, he had the courage to recognize and grab hold of a great opportunity, though it meant taking his life in a completely new direction and moving across the country on a week's notice. Standing there in that pea field 40 years ago, Don couldn't have imagined the impact he would have in the field of plant pathology or known how many people would count him as friend and mentor.

Plant virology research discussion at the bench, 1969. Left to right, Gus de Zoeten, Jim Steadman, John Hartman, and Bob Copeman.

Celebration of the Gene Herrling retirement, 1969. Left to right, Arthur Kelman (chair of the department), Herrling, and Glenn Pound (Dean of CALS). Hired in 1928 as a member of the academic support staff, Herrling actually began work in the department in 1919 as a student hourly dish washer, thus serving some 50 years. Through his career, Herrling had various roles, most notably that of skilled photographer and draftsman. The Herrling Visual Arts Facility (currently room 436) is named in his honor and supported in part by earnings from an endowment provided by the Herrling family.

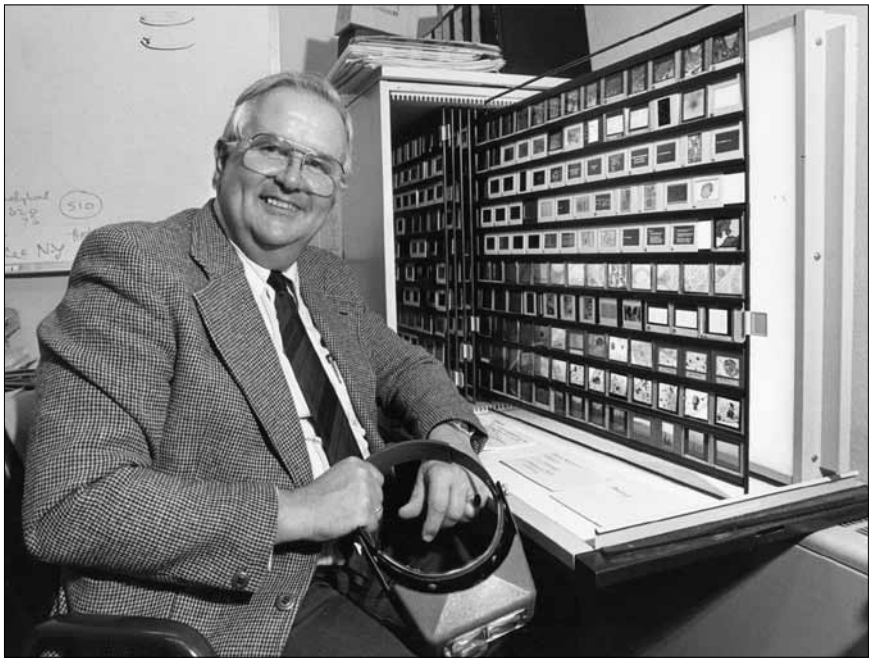
Two departmental stalwarts: Audrey Dunlap (left) and Susan Daugherty (right) at a picnic, 1966. Audrey served in the office from 1948 to 1975, eventually becoming the manager. Susan began work as a specialist in Don Boone's program in 1951; later she was in charge of the stockroom and assisted with laboratory materials for classes until she retired, after 33 years of service, in 1984.

The food is almost ready! The 'boil over' stage culminating the traditional Door County fish boil as observed by students in the summer field course (PP 559) at the cabin of Dewey and Doris Moore, Sturgeon Bay, ca. 1980. The annual class visit to the Moore's camp for a swim in Green Bay and dinner was a highlight of these class trips for generations of students.

Tree planting ceremony at Windsor Castle on the outskirts of London, 1980. Prince Philip the Duke of Edinburgh (center), Gene Smalley (right). The tree at left is a Dutch elm disease-resistant selection 'Sapporo Autumn Gold' developed by Smalley and colleagues. He was invited to England as part of a campaign to plant disease-resistant elms in Europe. Dutch elm disease first appeared in Wisconsin in 1956 and posed such a threat that the state legislature appropriated special funds for two new faculty positions at Madison — one in Entomology assumed by Dale Norris and the other in Plant Pathology, for which Smalley was recruited from UC Berkeley in 1957 upon completion of his graduate studies under the renowned H. N. Hansen.

Gus de Zoeten: Plant Virologist Extraordinaire and Bon Vivant

by John Andrews



Gus de Zoeten

Gus was one of those individuals who lead interesting, unusual lives. He was born in Indonesia and during his youth survived four years in a prison camp following the Japanese invasion of that country during World War II. After the war, he and his family moved to the Netherlands. There he received his early education and served in the Dutch Royal Navy as a weather forecaster for two years. This military experience set the stage for a comment he made to me years later when he was department head at Michigan, and I was chair at Madison, that *"one problem with faculty these days is that they don't know the difference between a request and an order!"* He did his graduate work in plant pathology at UC Davis and it was in California that he fell in love with the Sierras and became an avid hiker, camper,

and skier. Following postdoctoral studies at Berkeley, he came to Wisconsin in 1967 and was with us until 1990 when he was recruited by Michigan State University.

Gus was a preeminent virologist whose program was focused on the cytopathological effects of viruses to the plant host. He taught in PP 601 (Plant Pathogens and Pathogenesis; forerunner to PP 505) and gave the lectures and later also taught the labs in Plant Virology (PP 706) after Bob Fulton retired. He was the seminar organizer for a decade and a hallmark of the de Zoeten seminar era was his habit of promoting attendance by yelling "*seminar time!*" up and down the hallways and into the open doorways of Russell Labs at about 3:15 every Tuesday afternoon. As a colleague, he will probably be remembered most for his intelligence, steadfastness, and candor.

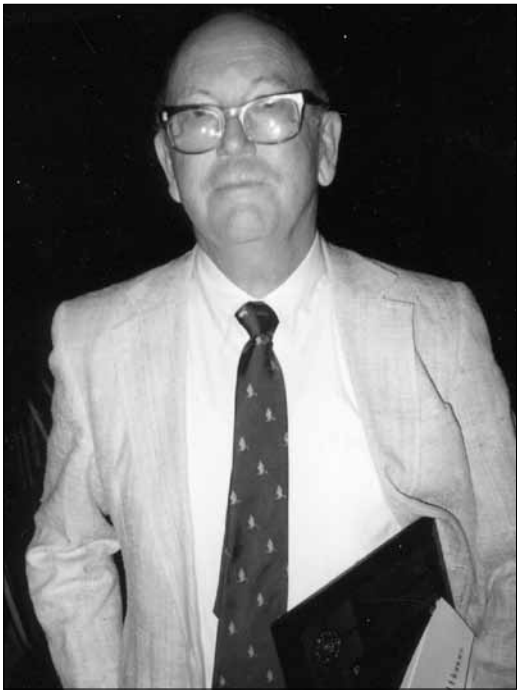
Gus set a good example for how to master the challenges of a productive scientific career while being an involved parent who enjoyed other of life's pleasures. He and his wife Ineke entertained frequently in their Shorewood home. Dinner invitations to the de Zoetens were coveted as the evenings were always memorable. Gus saw that the liquor and wine flowed, as did the conversation, and Ineke was a gourmet chef. As parents, they involved their children in the usual activities such as soccer and fishing, but skiing held a special passion and was approached almost fanatically. As soon as fall semester ended each December, everyone would bundle into the family station wagon and drive nonstop to a western resort such as Snowbird, Utah. They also returned regularly to the Netherlands to visit relatives. Gus related the story of one of those expeditions roughly as follows: When the children were small, the parents used to give them a sedative to help them (and thus their parents!) survive the long plane trip. On one such occasion, they administered the medication in Chicago only to find out later in the evening that the flight to Amsterdam had been cancelled. Oblivious to this setback, the children, of course slept peacefully while Gus and Ineke and some 200 other passengers spent a sleepless night pacing about the O'Hare airport. At 6 a.m. the next morning everyone boarded the plane, the children by now reinvigorated, talkative and boisterous, along with their weary parents and all the other disgruntled passengers. Few adults slept much better on that flight than they had the night before!

Recalling the old days! Discussions at the 75th anniversary, left to right, Dewey Moore, James Jensen (1935 grad under Duggar and later department head at North Carolina State), Charles Nusbaum (1934 grad under Keitt and later William Neal Reynolds Professor at North Carolina State), and Douglas Maxwell, then chair at Madison.

Gus de Zoeten in an ebullient mood at the department's 75th anniversary reception, Wisconsin Center, 1985.

We taught them plant pathology … and other life skills! John Mildenhall reenacts a beer-drinking stunt from his student days at the 75th anniversary.

Recipients of the APS Ruth Allen Award, 1987. Steve Lindow (center) with his mentors Chris Upper (left) and Deane Arny (right) were recognized for their seminal research on phyllosphere ice-nucleating bacteria.



At the same 1987 APS meeting, Ray Grogan received the coveted Award of Distinction. Grogan completed his PhD research with Walker (1948) and went on to a stellar career at UC Davis where he was admired for his insightful research and encyclopedic knowledge of basic and applied plant pathology. He was sought out by growers of numerous commodities for his diagnostic skills and sage advice; in the lecture room or laboratory, he had complete intellectual versatility across the disciplines of virology, bacteriology, and mycology.

Plant Pathology 559 summer field course students with their counterparts from the University of Minnesota, ca. 1987. In the background, the big bus affectionately known to generations of students as 'The White Whale' was chauffeured throughout the state by Deane Arny, course instructor.

Flora Berbee and Doug Maxwell celebrate at a lab party, 1987.

Eugene Smalley: Plantsman and 'Old China Hand'

By Ray Guries, Department of Forest and Wildlife Ecology

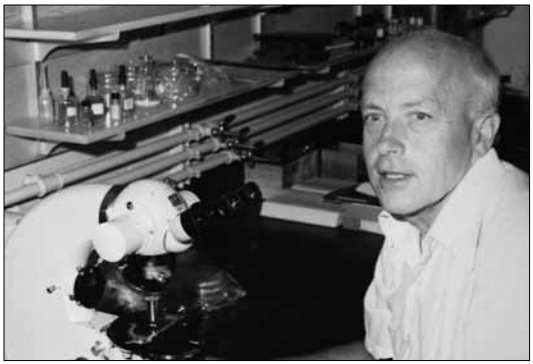
Eugene B. Smalley

Eugene B. Smalley will always be remembered as the 'father' of the elm breeding program at the University of Wisconsin. Years after his passing, we still receive correspondence and e-mails for him seeking information or seeds from one or more of the program's elm selections. Gene was rightfully proud of the program and each patented Dutch elm disease (DED) resistant clone developed through his patience and vision. Beginning in 1957, Gene began to amass a large collection of elm germplasm. Over time, the Asian accessions proved most useful in his work and with each passing season Gene focused more attention on Chinese accessions for elm breeding.

In 1983, Gene seized upon the opportunity to spend several months in China lecturing in plant pathology but also studying elms. As one of the first American scientists in decades to travel in China, Gene was a cultural and scientific curiosity who attracted attention wherever he went. He returned to the US with thousands of photos and slides of China and a newfound enthusiasm for the country, its people, and its forest resources. Thereafter, no evening at Gene's home was completed without sitting through a slide show during which time he gauged your worth as a guest by how many carousel trays of slides you could watch before bolting for the (locked) door. You were literally a 'captive audience.'

In 1995, I had the good fortune to travel in China for three weeks with Gene and several other elm experts with support from the USDA's International Cooperation and Development office. Gene was identified as the 'team leader,' a role that suited both him and the team. He was our authority on protocol and manners, and he served as our official toastmaster whenever we were pressed into a round of competing toasts. One particular round of toasts in Nanjing (seven or eight vigorous choruses of *Gan bei!!*) left Gene completely incapacitated for a day but he soon returned to action.

Perhaps the best anecdote from that trip concerning Gene's diplomatic skills involves our arrival at a small agricultural college in Yongling, Shanxii Province.



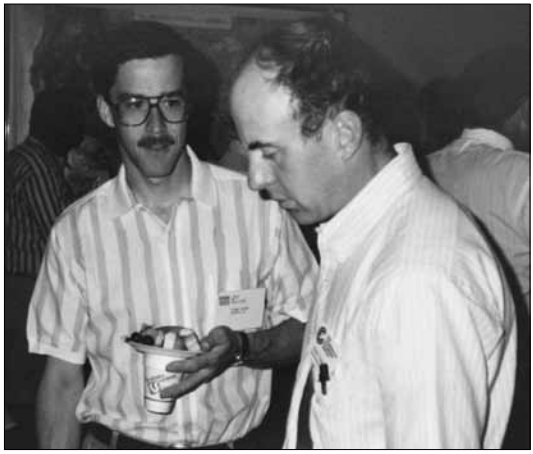
Eugene Smalley in his laboratory, ca. 1989.

Our guide, a pleasant young woman who knew nothing about forests, trees or plant pathology, struggled to provide accurate translations of science-based discussions, but she did like Professor Smalley's even temperament and adherence to a tight schedule. Unfortunately, our guide mistook a group of Chinese faculty near the guest house as our hosts, while our actual hosts were waiting elsewhere. We exchanged pleasantries (indirectly, of course) for more than 30 minutes before Gene realized these fellows had no idea who we were or why we were there! With a few more handshakes and bows, Gene adroitly extricated us from this embarrassing situation and we were ultimately united with our real hosts. Similar events that required Gene's patience and tact were commonplace, but none of us created an international incident and all returned with their health intact. By the end of the three weeks, it seemed clear that Gene had missed his life's calling, but at the age of 60 he had no interest in a Foreign Service career.

Anyone who visited Gene and Joan at the so-called 'Smalley Mountain Sanctuary' knew that his love for plants extended well beyond trees. By the 1990s he had amassed a sizeable collection of orchids, especially from the genera *Phalaenopsis* and *Papiopedium,* and the native *Cypripedium,* but other species as well. In retirement, Gene's years of training in mycology were put to good use — his study filled with orchids that spilled over into his living room and den. Breeding and growing orchids was not an accident — the precise cultural requirements of orchid seedlings are not unlike the precise cultural requirements for many fungi. As each little orchid thrived, it earned a place in his showcase. Finally, he built a large and elaborate plant room in his basement, complete with lights on timers, shade cloths, shower curtain screens and cement blocks — lots of cement blocks. No one would mistake this for a casual hobby — it was a full-time commitment. Gene and Joan became members of the local Orchid Growers Guild and volunteered at the annual Orchid Quest show. Following Gene's passing in 2003, Joan decided that the collection had far outgrown her ability to manage it. A large and enthusiastic crowd of family, friends and orchid lovers descended on Smalley Mountain Sanctuary for two days during the summer of 2003 to acquire one, several or many of the orchids Gene had grown — and in some cases bred — to carry on his legacy and honor his memory. To this day, my wife remarks every year when "Gene's orchid is blooming."



Veronica King (left), Mike Schaeffer, and Patricia Herrling (right). Veronica joined the department in 1964 and following a career of some 41 years, retired in 2005. She served in the main office as secretary, stenographer, bookkeeper, as well as a key staff person in the Wisconsin Seed Potato Certification Program. Mike Schaeffer joined Plant Pathology in 1987, where he has held several support positions, primarily as a mechanic and general craftsman. Currently, he is an instrument shop supervisor and building manager for Russell Laboratories. Patricia Herrling served the department as librarian between 1984 and 2000, being succeeded by Steve Cloyd.



LEFT: Former grad students Jon Duvick (left) and Ned Tisserat (right) in discussions at an APS Divisional meeting, 1989.

BELOW: Members of the department, friends, and several former students of Luis Sequeira join to celebrate his career and retirement at a science symposium held in his honor, 1993. Front row, left to right, Dave Coplin, Doug Cook, Paul Williams, Luis Sequeira, and Gus de Zoeten. Bill Fett is in the second row between Cook and Williams.

Diagnosing plant disease! The summer field course (PP 559) at a stop in 1994. Left to right, front row: David Maxwell, Kristen Marshall, Steve Hanson, Beth Kazmar, and Su-Chiung Fang. Back row: Al Ellingboe, Alice Alegria, James Buck, Jann Joseph, Steve Millett, Tim Maloney, Julie Meyer, and Craig Grau.

Santa Claus (Paul Williams) visits the departmental Christmas party at the Eagle Heights Community Center, 1995.

Doug Maxwell (left) with Mark Nakhla and undergraduate Angela Lanie examining a wild tobacco species, *Nicotiana benthamiana*, infected with a begomovirus originally from tomato, ca. 1997.

Getting ready for the Birkebeiner! The Allen lab group sallies forth, left to right, front row: Yan Liu, Joy Zarate, Amilcar Sanchez Perez; back row: Enid Gonzalez, Jill Swanson, Jennifer Clifford, Jian Yao, Annett Milling, Zomary Flores Cruz.

Jian Yao demonstrates the correct recovery maneuver after a fall!

Bob Rand and Jennifer Parke examining peas, 1989.

Arthur Kelman (left) visits the department from his retirement home in Raleigh, NC, 2002. With Kelman, left to right, are Helen Kuntz, Eloise Hagedorn, Jim Kuntz, and Don Hagedorn.

Susan Hirano counting bacterial colonies, 1989.

Brian Hudelson (right) lectures to the summer class (PP 559) in a ginseng plantation, 1994.

Arthur Kelman — A Man for All Seasons

by Luis Sequeira

A request from the chairman of the Centennial Celebration Committee to write about that extraordinary man and dear friend, Arthur Kelman, is one that I appreciate deeply but I cannot comply without some sadness, because of Arthur's recent passing (June 2009). The request is to provide anecdotes and other elements from the lighter side of his life. Arthur interacted with so many people throughout his life that if I had chosen to, I could have collected numerous anecdotes from students, assistants, and friends alike. Rather, I have chosen to describe Arthur as I

Arthur Kelman

knew him, and hope that his impact on the department will become evident from the few vignettes that I have been able to recollect.

Long before I met Arthur, I knew of him from several publications, including an excellent review that he published in 1953, entitled "The bacterial wilt caused by *Pseudomonas solanacearum*." That review, which is very useful even today, is typical of Arthur's approach: thorough, well-organized, rich in detailed descriptions of the literature, and excellent in his analysis of the significance of the various contributions. In 1956, I attended a meeting of APS in Atlanta where I listened to Arthur describe a simple means of preserving cultures of that bacterium (in distilled water) but, hard to believe, I was too shy to approach him and describe some of my own work. Yet, upon my return to Costa Rica, where I was working for United Fruit Company, I managed to convince the research director in Boston that Arthur would be an excellent consultant. At the time, Moko disease of bananas, caused by the same bacterium, was the center of my research responsibilities at the new Coto Research Station.

Eventually, Arthur arrived at Coto 47, a collection of a few bungalows, a rather primitive laboratory and little else in the midst of an oppressive jungle along the rail line that connects the town of Golfito with the Panamanian border. Bananas were being planted in this new division, and Moko disease was already a big problem. Arthur spent a couple of weeks at this unlikely location and after numerous visits to the field, he became aware of my notion that the source of the bacterium was the wild *Heliconia* species that grew everywhere. We made plans to study the various strains of the bacterium, their pathogenicity, control, etc. Arthur was immensely helpful because of his profound knowledge of the literature. But, it could not be all business. My boss as the time, Ira Hubbard, arranged for four of us to travel to Golfito for a fishing trip that included use of the manager's fancy boat, normally reserved for the big shots from Boston when they visited the division.

The problem was that Arthur was not interested in outings or fishing. A highly conservative person when it came to personal attire, he had trouble dispensing with his tie even in the oppressive heat of the banana plantations. When we arrived at the pier in Golfito, most of us remained in the back of the boat, along with the fishing equipment, beer, and food. But not Arthur; he selected a spot at the very front of the boat, his camera secure across his shoulder. He told me later that he did this because he did not feel safe in a small fishing boat. Whether he was prescient or not, I can't say, but most of us were perfectly happy fishing (no luck), eating, and drinking beer in back of the boat in the midst of a beautiful, sunny day. The captain chose a route that brought us close to the coast, on our right, and, on our left, to a small island that had a rocky promontory. That promontory prevented the captain from watching a huge wave that was approaching us: a tsunami-like phenomenon probably born from some cataclysmic event far in the Pacific Ocean. By the time most of us and the captain realized what was happening, however, it

was too late to try to turn the boat so as to front that gigantic wave. We were hit from the side. As the wave broke over the small island, all of us in back of the boat just had enough time to hang on to the nearest post. We were hit so hard that the boat nearly toppled over. When we recovered from that hit, the back of the boat was full of water and we had lost every bit of fishing equipment, cameras, beer, food, etc. that we had. Immediately, we were all busy bailing out the water that threatened to sink the boat. We looked like a bunch of drenched rats, but did not lose anyone, which was a miracle. I immediately searched for Arthur, who had been all alone in front of the boat throughout the whole event. He had managed to hang on, somehow, and he kept his camera and did not get wet, which was quite unbelievable. All we could think of is that as the back of the boat nearly sank from the weight of people and water, the front of the boat rose and was not hit as hard. I have described this event in some detail only to illustrate an important aspect of Arthur's personality. He was cool and collected throughout. Always generous and analytical, he refused to make a big deal of the tsunami event and, upon our return, he thanked Ira Hubbard for an interesting trip.

Over the next few years, we saw Arthur quite regularly in his role as consultant and we collaborated extensively. He sent his graduate student, Charles Averre, to work with me for an entire semester. As a result, we provided, in the literature, the first evidence of the distribution of different strains of a bacterial pathogen in the wild. I admired Arthur's sincerity and a personality that attracted people to him. He had charisma; people listened to him when he talked. He was sensitive to people's problems and aspirations. On various occasions he remarked that problems are caused quite often by people who lack "antennae," a feature that allows insects to test the environment around them.

As our research projects progressed, Arthur suggested that I take leave to work with him in North Carolina. This offer, as it turned out, was quite providential. In late 1959, I had a serious disagreement with the vice president for research. As a result, he vowed to move me to the main laboratories in Honduras. I knew that I had no future with United Fruit as long as that person was in charge, and rather than to move to Honduras, I requested leave to work with Arthur at North Carolina State University. This was approved and, in January of 1960, I moved to Raleigh with my family. Arthur, his wife Helen, and son Philip could not have been more gracious and hospitable. At the university, I was intensely happy doing research for over a year, going back to my early interest in hormone metabolism in plants. In the meantime, the research VP was fired by United Fruit and the new management asked me to join the staff at Norwood Laboratories at the end of my leave. Norwood was a white elephant created at great expense by the VP outside Boston. I didn't see much future in that and began in earnest to look for another position. I was right. The company closed the Norwood Laboratories two years later.

I describe in a later chapter the circumstances that led me to Wisconsin. A couple of years after I joined the department, Glenn Pound announced that he had agreed to become Dean of the College of Agriculture, and established a committee that would search for his replacement. I could think of no one who could fit that bill better than Arthur Kelman and I indicated my strong support to the committee. Evidently, others agreed after Arthur's interview and he was offered the position. He arrived in the department in July of 1965, a few months after the move to the new quarters in Russell Laboratories. Thus, he inherited a strong tradition of excellent administrators (Jones, Keitt, Pound) and a group of strong senior professors who frequently disagreed on almost any issue, but who closed ranks when the department had to make important decisions.

It did not take long for Arthur to establish his style of management. In contrast with Glenn Pound, who was direct and efficient but allowed little room for discussion, Arthur searched for everyone's opinion when controversial issues came up for discussion at staff meetings. The fact is that Arthur had already approached everyone involved and knew precisely what was going to happen. There were never any surprises at staff meetings. He was calm and impartial. He knew exactly what to say on all occasions. He had a strong sense of humor, although he was in the habit of repeating the same stories many times over the years. Primarily, the staff appreciated his kind demeanor and his ability to prevent confrontations. His house became the center of numerous social interactions, particularly when visitors arrived in the department. He established high standards for the department and he managed to convince the USDA to establish a Pioneer Research Center in our department, under the leadership of Richard Durbin. Arthur's idea was to have the five members of the USDA group focus on resistance to a single disease. As it turned out, each member chose a separate disease problem and took off in different directions, much to Arthur's dismay.

In the 1970s, Arthur had to deal with a lot of turmoil at the university during the Vietnam War demonstrations. Teaching and research were affected. Some of our students joined the demonstrations and Arthur dealt with them in a positive and generous manner. Although highly liberal in political outlook, Arthur managed to maintain a very impartial attitude in a department that was highly conservative.

Most impressive was Arthur's ability to teach the basic course in plant pathology and to guide several graduate students to do research on storage diseases of potato, in spite of the demanding role of chairman. When he left North Carolina State University, he had already been named a Distinguished Professor and it did not take long for the University of Wisconsin to bestow a similar honor. In 1976, he was elected to the National Academy of Sciences, where he was an influential member of the Council. He served the American Phytopathological Society on numerous committees and, eventually, as president. He insisted in bringing professional help to run the society's business. When I complained openly that

this would be too costly, he reminded me that I was talking out of ignorance. Indeed, the move to professional help turned out to be one of the wisest and most rewarding changes for the Society.

By the time he retired in 1989, Arthur was one of the most widely respected professors at the University of Wisconsin and had received numerous awards, too many to list here. At his retirement party, one of his sisters complained that Arthur was responsible for her many hours of "solitary confinement" when they were growing up because of Arthur's habit to appeal to their mother any time he was teased. Arthur was the youngest in a large family in Providence, Rhode Island, and the frequent target of his many brothers and sisters. As an adult, though, he maintained a deep affection for all members of his family.

A scene from 'Deane Arny Day,' 1994. Left to right, Elizabeth Kazmar, James Buck, Jim Blodgett, Deane Arny, Ke-Ning Li, Steve Wraith, Zhengyu Huang. For several years in the mid-1990s, the students organized festivities in tribute to Professor Arny. Typically, there were scientific talks in the morning and social activities at the local park in the afternoon.

Plant pathologists one and all! Left to right: Peter Rodgers, Barrett Gruber, Tom Hammond holding daughter Abigail, Jian Yao, James Scott.

John ("Jack" as he is more commonly known) and Flora Berbee at a reception held in their honor at Blackhawk Country Club, 2007. The Berbee family provided a generous endowment to the department through the UW Foundation for the "John and Flora Berbee Wisconsin Distinguished Graduate Fellowship in Turfgrass Pathology." Prior to retirement, Jack was on our faculty (1957–88) as a forest pathologist; over the years, Flora held various positions on campus, including instructor in the Zoology Department, doing research on oak wilt, and providing research support in John Andrews' program.

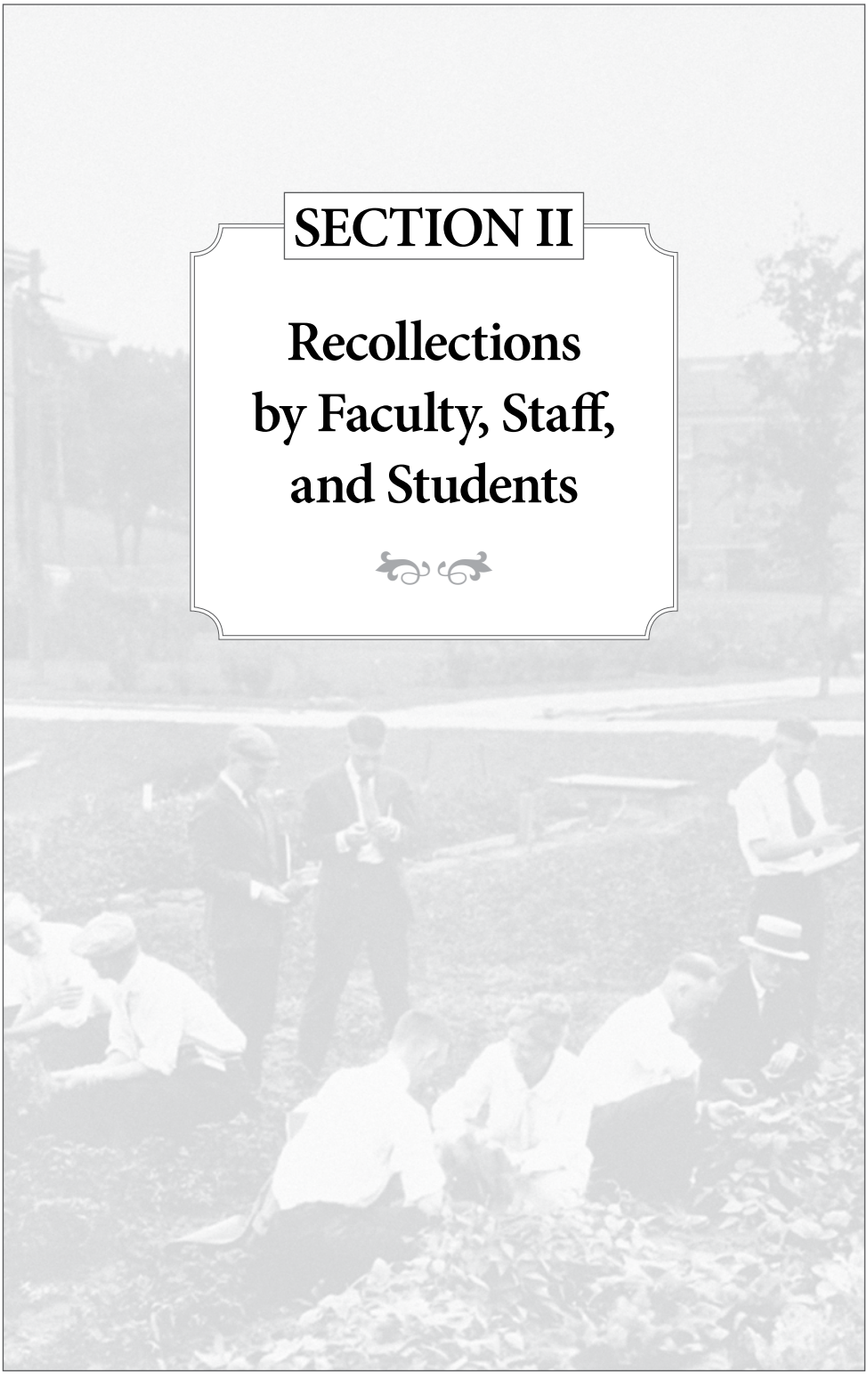
Graduate student retreat, Kemp Biological Station, 2009. At the back, left to right: Muthu Venkateshwaran, Nasim Begum, Alejandra Huerta, Anna Seidel, Jonathan Jacobs, Ken Frost, Geraldine Maynaud, Lingyun Hao, Teresa Koller, Ana Cristina Fulladolsa; front, Karen Lackermann, Victoria Seitz.

Hernan Garcia-Ruiz leading the Ascoscores on to victory, ca. 2005.

Murray Clayton congratulates Tom Dettinger for winning a staff award, Allen Garden reception, 2009.

SECTION II

Recollections by Faculty, Staff, and Students



On the Shoulders of Giants

By Paul Ahlquist (Paul J. Kaesberg Professor of Plant Pathology, Oncology, and Molecular Virology; faculty, 1984–present)

Paul Ahlquist

One of the outstanding features of Plant Pathology over the years has been its deliberate ability to integrate a wide range of activities spanning applied and basic research. One expression of this integrative outlook was the department's willingness to accept and nurture our group's program in fundamental virology. In 1984, through a process initiated in discussions by chair Doug Maxwell and other faculty with Paul Kaesberg, chair of the Institute for Molecular Virology, I became the fortunate holder of a joint appointment between the two units, an arrangement that has greatly benefited my professional development.

Because of the joint nature of this appointment and the location of our group in Molecular Virology, several buildings away from Russell Labs, I had some initial uncertainties about how I would be viewed. Thus I was very gratified and remain extremely grateful that Plant Pathology has always accepted and treated me as a full member. That this relationship extended well beyond a few phrases or mere encouragement was repeatedly demonstrated in the form of crucial material support at many critical junctures. This generous, inclusive approach, continually maintained through a succession of chairs, was particularly instructive to me as a young faculty member and has been extremely valuable for many practical issues in research, teaching and administration. In turn, for me, balancing time and involvements in multiple university units has been challenging, but very rewarding. Moreover, these experiences and the general ethos of Plant Pathology had the benefit of fostering an inclusive outlook and greater willingness to become involved in new or broader directions in research and other endeavors.

The multidisciplinary nature and other valuable characteristics of Plant Pathology, of course, reflect foundations established by early leaders and maintained and evolved by later ones. In this and other respects, we have benefited greatly from a succession of dynamic figures who have also contributed illustriously at the campus, national and international levels. Two of the most notable among these leaders are Arthur Kelman and Luis Sequeira. With regard to multidisciplinarity and the synergism of basic and applied studies, e. g., both were consistently concerned with using basic research to reveal the underlying causes of biological

processes, and simultaneously with bringing the results of such inquiries to practical application. Thus, through their own programs and their roles as department leaders, they did much to establish the environment that supported my effective inclusion. By the time I joined the faculty, Arthur's and Luis' statures as international researchers and professional leaders were long established. Consequently, others can much better discuss many aspects of their careers and contributions. Nevertheless, it seems appropriate to briefly comment on the continuing impact of their values, characters and accomplishments on later generations of researchers, both through direct mentoring and as models in a larger sense.

Arthur Kelman was among the first faculty members that I met in Plant Pathology. Though I only partly comprehended the depth of his accomplishments at that time, he immediately impressed me with his straightforward, personable but incisive nature. It was clear that he knew how to size up a situation, how to decide on a course of action, and how to deal with people to accomplish what was necessary. The fact that, in Arthur and others, Plant Pathology had faculty of such obvious depth and competence was a major attraction. A lesser but still impressive feature was that Arthur usually wore a tie, since up to that time the only Madison faculty member that I had known who favored ties was Nobel laureate Howard Temin.

As time went on, I came to better understand that the features that I had noted in my early impressions of Arthur were partial reflections of a much larger set of skills and disciplines, whose development had carried him through a remarkable

Paul Ahlquist (center) with Andrew Bent (left) and Luis Sequeira (right), Allen Centennial Gardens reception, 2009.

array of accomplishments in multiple fields and organizations. As older faculty know, but younger members may not fully realize, even a subset of this list is stunning, including, e.g., numerous roles in the American Phytopathological Society (many committees, Council Member, Vice President, and President), the International Society for Plant Pathology (major founding member, Vice President, and President), the USDA (Chief Scientist, National Research Initiative Competitive Grants Program), the Council for Agricultural Science and Technology, and many other organizations.

Of course, this partial list omits Arthur's World War II military service, outstanding teaching record, decades of university administrative service, and groundbreaking research sufficient to garner numerous awards including election as a Fellow of APS, the American Academy of Microbiology and the AAAS, and as a member of the National Academy of Sciences (NAS). Moreover, Arthur served multiple major roles in the NAS hierarchy and in its research and reporting arm, the National Research Council. Arthur's influence in the Academy was so great that former NAS President Bruce Alberts, in a public speech in Washington, DC, early in his tenure, said "The only person who really understands how the National Academy functions is Arthur Kelman."

One important lesson of Arthur Kelman's example for a young faculty member was that, even though one could not aspire to such a level, much could be accomplished with commitment, focus, a willingness to embrace new solutions and to work with others, and steady, hard effort. The corollary was that, without these features, little would likely be accomplished. These lessons were reinforced and others provided by Luis Sequeira. Unlike me, Luis could and did operate on Arthur's level in both research and national service. Indeed, while each had many unique accomplishments and honors, Luis and Arthur had major roles in many of the same key organizations, by the simple expedient of both making a nearly clean sweep of the recognitions and involvements in their fields. Thus, among many other achievements, Luis has had (and in some cases still holds) major roles in APS (numerous committees, President, APS Fellow and APS Award of Distinction), USDA (Chief Scientist, NRI Competitive Grants Program, and other major advisory roles), NAS (elected member, NAS Council member, and other offices) and the National Research Council, as well as leadership roles in the National Science Foundation (NSF National Science Board) and other key organizations and agencies.

The presence of two such strikingly successful faculty members with similar characteristics of simplicity, directness, innovation and hard work suggested that Plant Pathology was doing some important things effectively, and that there were valuable things to be learned from these paragons. Thus, it was my great good fortune to have multiple occasions to interact with Luis Sequeira in my early years on the faculty. As part of this, some of my first teaching was conducted jointly

with Luis in Plant Pathology 601 and its successor, PP 710, which combined background lectures on pathogen-host interactions with critical student discussions of primary literature. This provided many opportunities to begin to understand how Luis viewed and analyzed research problems, from which I (along with the students) hopefully extracted some approaches that we also could apply. I also had the opportunity to work with Luis on some committees, which offered distinct insights into his outlook and operation in other spheres. In these and in other interactions, Luis was very helpful and generous to me at multiple stages of my career. In addition to the substantial direct benefits of his guidance and generosity, this willingness to take time for a junior colleague in the midst of his demanding schedule of national obligations was another important lesson.

Since Arthur, and later Luis, retired from active department service, many changes have occurred in our staffing, directions and environment. Like the entire national research enterprise and the university as a whole, we face times that combine unparalleled opportunities with significant challenges. To meet our new, changing situation, we will have to forge and implement new solutions that transcend past approaches. Paradoxically, such shifting circumstances make the examples of Luis, Arthur, and other outstanding colleagues in and out of Plant Pathology even more relevant for our guidance. If we collectively hope to see farther to chart our course into the future, we must be prepared, with due acknowledgment, to stand on the shoulders of such giants by learning from their values and accomplishments. To fully appreciate their examples, it is important to remember that paths seem much smoother looking back than forward, and that then, as now, success was not preordained. Many worthy priorities competed vigorously, and actions had to be taken with courage in the face of major uncertainties. Knowing that our predecessors advanced in the face of equal or greater challenges and seeing Plant Pathology's continued embrace of fundamental values, such as commitment to shared purposes and willingness to evolve to meet new opportunities, gives me substantial confidence in the next phase of our story.

Finding My Balance

By Caitilyn Allen (faculty, 1992–present)

Caitilyn Allen

I joined the University of Wisconsin, Department of Plant Pathology in the fall of 1981 as a beginning graduate student. I left the following summer to earn my doctorate at Virginia Tech, and then did postdoctoral work for two years in Lyon, France. After that I returned to Madison for a second postdoc in the lab of Luis Sequeira, and then joined the faculty. This circuitous career path made it possible for me to experience the department as a grad student, a postdoc, and as assistant, associate, and now full professor.

In many ways the institution has remained constant over the years, particularly the sensual qualities of place such as the miasma of mothballs from the insectarium that identifies the third floor, or the sharp whiff of carbon dioxide from the melting dry ice in the basement cooler. The basilisk stare of L. R. Jones still follows one down the second floor hallway. However, other aspects have changed dramatically. When I arrived in 1981, the department was secure in its reputation, even perhaps a little smug (or so it seemed to a lowly new graduate student). In seminar I sat near the scholars whose review articles had drawn me to plant pathology, towering giants of the field who could ask acute questions despite having dozed through much of the talk. It appeared to me that a third of the faculty were forest pathologists, which seemed about right given that I understood Wisconsin to be a woodsy place. Similarly, mycology was the dominant subspecialty, in keeping with the importance of fungal plant pathogens. We now have a much smaller faculty and we worry about maintaining even minimal strength in these areas. Indeed, we are deeply concerned that we'll lose our ability to train plant pathologists in the broad sense of the word: scientists who study the diseases of plants, with the ultimate aim of managing them to improve crop yields.

This is not to suggest that we are a dismal place in the twilight of our decline. Faculty have come and gone, but vibrant, energetic research activity is constant. A steady stream of students, equipment and supplies pours into Russell Labs, while out flows an equally constant stream of scientific publications, Extension accomplishments, and credentialed degree recipients. It's my impression that one of the major changes over the past 30 years is that Plant Pathology is now much more closely integrated with the rest of the university. We could mourn the fact that Plant Pathology 300 teaches 60 students a year now where once it enrolled 100, or

we could celebrate the fact that each year we teach over 200 students from across the university in Plant Pathology/Botany 123 ("Plants, Parasites, and People"). Our department may have fewer faculty, but now we have trainers who are mentoring Plant Pathology graduate students in the departments of Agronomy, Entomology, Horticulture, and Microbiology. Many Plant Pathology faculty are themselves trainers in other degree programs who bring students from Plant Breeding/Plant Genetics, the Biotechnology Training Program, Cellular and Molecular Biology, and the Microbiology Doctoral Training Program to do research on plant-pathogen interactions in Russell Labs.

In part, this reflects the ascendancy of plant-pathogen interactions as important model systems for basic biology research. It's both less expensive and less controversial to do host-microbe experiments with plants; you can inoculate hundreds of plants for less than the cost of a statistically meager ten BALB/c mice, and never worry about animal rights activists picketing your building. But more importantly, the more we study host-pathogen interactions, the more we see that key mechanisms are conserved across kingdoms, from the signal transduction pathways that alert eukaryotes to the presence of an invading microbe to the specialized secretion systems that both plant and animal pathogenic bacteria use to subvert their hosts' metabolisms. As plant-pathogen interactions have moved into the mainstream of pathogenesis research, our department has increased its level of collaboration and interaction with biologists all over campus. Some of our faculty are regularly funded by the National Institutes of Health and it's now common to see a token plant pathologist or two speaking in major symposia on virulence and host defense mechanisms.

This increased overlap and interaction with the basic biosciences and medical sciences brought a new breed of graduate student and a significant cultural shift to our department. Many of our students have never worked on a farm and are quite unfamiliar with crop production in any form. Attracted by the beauty and accessibility of our model systems, they are sometimes uncertain of their relationship to agriculture. At the same time, a recent APS survey of employers of plant pathologists revealed that many are unhappy with the narrow quality of our students' preparation. They complain that our students are familiar with only one or a few crops or pathogens, and that they are fixated on basic research even though the available jobs demand applied research skills. These employers are seeking scientists who can set up field trials or resistance breeding programs, while recent graduates may feel alarmed at the prospect of learning to calibrate a sprayer.

It's not hard to understand how this came about. Plant pathology faculty all over the country labor under a system of unequal and dueling incentives. On the one hand, as plant pathologists we have a mandate to develop sustainable plant disease control strategies and train the scientists who will continue this work into the future. On the other hand, to support the training of these students and our research,

we compete for external grants. Much external funding is preferentially awarded to precisely the kind of focused, basic research that generates undesirably narrow students. Faculty are thus encouraged to avoid applied research or even working with more than one biological system. This, despite the fact that such a diverse, applied approach is precisely what is needed to meet grower needs and train our students broadly. How can our department (and others) avoid this contradiction?

Every other July, I get to observe the miracle. A city-bred graduate student eager to make progress on his or her PhD research is grouchy about wasting precious summer days taking the required field course on Diseases of Economic Plants (PP 559). After the second week, or sometimes even the first, the attitude changes. "Did you know," the student asks anyone who'll listen, "that if we get any more rain this month the white mold is going to take the whole snap bean crop?" A few days later, I overhear, "You could totally see that it was a soil-borne disease — it was spreading right downhill from the irrigation drip!" By the end of the summer, after exploring corn fields, golf courses, orchards, cranberry bogs and, of course, the seed potato farm, the students are hooked. They are excited by the sheer diversity and dynamic biology of plant diseases in the field, and they are touched by the importance of plant disease in the lives of farmers. That one course has rescued many a lab rat from a lifetime of pipetting at the bench, or at least instilled a healthy respect for the challenge and the potential of outdoor plant pathology. And, whatever their eventual career path, PP 559 graduates acquire a permanent sense of their discipline and their professional identity.

A similar transformation was wrought on many of the students who took a course on Tropical Plant Pathology that I taught with Doug Maxwell in 2005/6. We spent the fall semester in the classroom learning about diseases of major tropical crops. Some were familiar, like potatoes and rice, but others, like oil palm, cassava, and sugarcane, were new to all of us. The class spent the January break in Guatemala, visiting everything from the small hillside *milpa* (mixed-cropping) plots that feed the poor to vast plantations producing melons and bananas for American supermarket chains. Guatemalan poverty is striking and agriculture is central to most people's lives. One small grower, whose cucumber crop was suffering badly from cucumber mosaic virus, greeted us at the edge of his muddy field with: "You're plant pathologists? Thank God you've come!" In that moment the students saw vividly that their work could have an impact beyond a publication in *Molecular Microbiology* or even a few extra bushels per acre for an industrial-scale Midwestern corn grower. Most of our students are idealistic and seek a life's work that is both intellectually stimulating and useful on a human level. I became convinced that we must teach and design research programs in ways that draw students into the critically important problems of agriculture. These go well beyond incremental profit increases to controlling pesticide use, ameliorating soil erosion and carbon emissions, preserving biodiversity, and reducing poverty and hunger. Seeing agriculture and plant diseases on the

The Allen research group, 2009: (left to right) Jacob Scherf, Annett Milling, Nasim Begum, Lavanya Babujee, Jonathan Jacobs, Fanhong Meng, Caitilyn Allen, Alejandra Huerta, Jennifer Clifford, and Beth Dalsing.

human scale in a farming-centered culture highlighted all these problems and attendant opportunities. It was, in short, inspiring.

In fact, that is more or less how it happened for me. In 2003, when I was absorbed in the details of motility gene regulation in the bacterial wilt pathogen *Ralstonia solanacearum*, a quarantine strain of this bacterium was accidentally imported to North America on geranium cuttings grown in Africa and Central America. Because of my familiarity with the basic biology of *R. solanacearum*, a US-based geranium company invited me to consult on ways to exclude this pathogen from their facility in Guatemala. When Doug Maxwell learned I would be in Guatemala, he arranged for me to also visit the fields where he and his collaborator Professor Mejia were selecting tomato lines for resistance to tomato yellow leaf curl virus (TYLCV). Their trials were being spoiled by another disease that caused rapid catastrophic wilting. Other tomato growers around the country were having similar problems and crop losses were mounting. Doug wondered if the culprit might be *R. solanacearum*. This is how I met Luis Mejia, a contained but passionate plant geneticist who introduced me to tropical agriculture and its complex relationship to his country's history as we drove for several days over the bumpy roads of Guatemala. I had brought with me some diagnostic immunostrips for *R. solanacearum*, and field after field told the same story. A widespread epidemic of bacterial wilt was indeed underway on the tomato-growing central plateau. I subsequently joined Doug and Luis in a refocused breeding program to select tomatoes resistant to both TYLCV and *R. solanacearum*. This has led to my ongoing engagement with applied tropical plant pathology, including the

above-mentioned field course and several other collaborations on bacterial wilt management in the tropics.

Now I work (struggle, actually) to create a balance in my research group. I strive to both discover the biochemical mechanisms underlying plant pathogenesis, and to do research with the potential to directly reduce the suffering that bacterial wilt causes for the world's poorest farmers. In the process, I hope to expose those in my research group to the wider world of agriculture, and the role they could play there. This perspective is also an important element of my classroom teaching, where I find the occasional human anecdote anchors a biological concept as well or better than an outline or a diagram.

Certainly, exposing our graduate students to disease in the field, especially in the fields of the developing world, is not a panacea for the challenges that confront our discipline. We must also find the flexibility, creativity, and energy to change the way that we structure our degree programs. This will include revising our curricula together, working harder at our teaching individually, and goring a few sacred cows. In addition, we need to more effectively present our work in all its variety and importance to the larger world, from our deans to our granting agencies. However, when I consider all the changes that have swept through our discipline in the hundred years since our department was founded, I am confident that we'll find the strength and the wisdom to adapt. And if we need some inspiration, we can always tag along on a PP 559 field trip.

Some Things I Learned

By John H. Andrews (faculty, 1976–present)

Introduction to Madison

John H. Andrews

We had stopped in front of the photographic collage entitled "Leaders in Our Formative Years" outside the main office on the second floor: "*Tell me what you know about these plant pathologists*," my host said, his kindly smile failing to put me at ease as I realized uncomfortably that I was on the spot. The only person I knew anything about among those 13 imposing scholars was J. C. Walker. (Of course, virtually every aspiring plant pathology student of my generation knew about Walker and, hence, Wisconsin because essentially all introductory courses used his famous book. Madison was referred to by us, with awe and reverence, as "Mecca.") We then proceeded into his office where the questioning continued, now focused on his collection of ornate plastic models of various pathogens — I recognized correctly a T–4 bacteriophage and a root-knot nematode, but stumbled on something that looked like an expanded baseball bat. What I finally identified in desperation as a sporangiophore of *Pilobolus* (even though I knew it was not a pathogen!) turned out to be an oidium of *Erysiphe.*

Thus began my job interview at Wisconsin in July 1975. My gentle but persistent interrogator was the famous plant pathologist and department chair, Arthur Kelman. We had met the night before when I arrived at the Madison airport for the first time. Following a drive through the campus, where he pointed out such attractions as Russell Laboratories, the Natatorium, the Biotron, and Nielsen tennis stadium, Arthur took me to his home where I met Mrs. Kelman, a pleasant but rather formal person. There, I made a 'big splash,' quite literally, by spilling my beer over the coffee table and onto the shag carpet in their immaculate living room. Given this fiasco and an inability to distinguish myself on the quizzes noted above, I have often wondered why I was hired! Presumably I must have given a reasonable seminar.

Seaweed Pathology and Apple Scab in the Midwest

The next time I appeared in Madison was on a frigid afternoon, January 2, 1976, after a flight that originated in Montreal. (I had been raised mainly in the Quebec countryside near the Vermont border. But it was in Montreal, charming and civilized city of my birth, that I had begun my scientific career as an undergrad some 13 years earlier at the Macdonald campus of McGill University. In going there, I had

followed the sage advice of my high school science teacher, Stan Hardacker, and I was subsequently drawn into plant pathology after taking an introductory course taught by the charismatic taskmaster W. E. Sackston. After a convoluted route that included academic studies in Maine, California, Cambridge, and Vancouver, I now found myself at the airport at Mecca.) There to greet me — a fresh, naïve, eager assistant professor in the area of "integrated control" — for the first time was Jack Mitchell, recently appointed department chair.

This faculty position was newly created when J. Duain ("Dewey") Moore, formerly in fruit pathology, had been promoted to Director, Agricultural Research Stations. Rather than rehire specifically in his area, the department had opted for something new — "integrated" control — then a buzzword for a pest control approach acclaimed by entomologists. In my youthful audacity, the fact that I knew essentially nothing about integrated control did not intimidate me, and I was delighted to discover when talking to the faculty during my interview that they didn't know much about it either. Rather, as I started out, there was more-or-less gentle nudging by some of the faculty to move me in the direction of fruit pathology because that was the slot Dewey had vacated. No directives, just suggestions. Thus I came to experience the great Wisconsin philosophy of letting each person reach for the stars in his own way. I did acquiesce in part by beginning a research program on apple scab, caused by *Venturia inaequalis*. But I was determined to continue a project I had started on my own as a postdoc at the University of British Columbia on seaweed pathology. That disease processes might affect life in the oceans, and how such phenomena would compare with terrestrial pathosystems, had fascinated me ever since I took courses in phycology and ecology at the University of Maine as an MS student years earlier. As seaweeds were hard to find in the Midwest, I began research in the local lakes and eventually focused on an introduced, submerged weed, Eurasian watermilfoil.

Every beginning student in plant pathology learns about apple scab and this was the extent of my knowledge on that subject. I began to read the literature and realized that essentially the whole approach to control had centered on fungicides, going all the way back to the first days of inorganic formulations. These were generally effective but they had shortcomings typical of chemicals. Moreover, the life cycle of the pathogen suggested to me that biological control might work and the pathogen had the intriguing feature of alternating between a saprophytic phase in leaf litter on the orchard floor and a parasitic phase in leaves (and fruit) during the growing season. So, in a program that began in 1976 and continued into the 1990s, I studied biological control from theoretical and practical standpoints. Probably our most significant discovery was of an antagonistic basidiomycete, *Athelia bombacina,* which colonizes apple leaf litter and prevents *Venturia* pseudothecia from maturing in the spring, thereby breaking the life cycle. This offered the potential to integrate a biological approach during the dormant season with

Linda Kinkel lectures John Andrews on a Mississippi riverboat, Prairie du Chien, during the social outing at the Fifth International Symposium, Microbiology of the Phyllosphere, held at Madison, 1990.

judiciously applied fungicides during the spring and summer. The initiative and insight of my first student, Chris Heye, led to our patenting this leaf litter treatment, which was licensed to a major agricultural company.

The biological control studies expanded into a major thrust in phyllosphere microbiology that was to last throughout the remainder of my career. In the early days, with the help of people like Chuck Kenerley, Flora Berbee, Rick Nordheim (a professor of statistics, fortunately!) and many undergrads, grads, and postdocs, we investigated the nature of the leaf habitat from the standpoint of the colonizing microbe, and from there explored the dynamics of fungal community assembly. In one of our theoretical studies, I viewed leaves as conceptually analogous to transient habitat patches, i. e., islands. We (Flora, grad student Linda Kinkel, and I) applied MacArthur and Wilson's famous theory of island biogeography to the analysis of species arrival (immigration events) and departure (emigration events) from the leaf "islands" during the growing season. From here, I moved into basic ecological studies on the nature of selection pressures in the leaf habitat (*r*- and *K*-selection), starting what would be a long-term collaboration with Robin Harris of the Soil Science Department. In the 1990s our phyllosphere studies included a very interesting but brief detour into medical microbiology, when I learned from the literature that a fungal pathogen of humans, *Sporothrix schenkii*, had been linked to sphagnum moss bogs in Wisconsin (most of the sphagnum moss produced in the USA is harvested in Wisconsin). From this work emerged the important practical finding that harvested, dried moss should be kept dry until immediately before

use to avoid extensive colonization of this dead substrate by the fungus. (Florists and nursery operators typically wet the moss for an extended period before use so that it is ready when needed for floral arrangements or packing about bare-root trees.) After Bob Patton retired in 1987, his technician, Russ Spear, joined my program. We focused increasingly on developing and applying molecular fluorescent probes, advanced microscopy, and image analysis techniques to visualize the leaf landscape and to directly quantify spatial patterns of colonization.

Concurrently, for about 20 years, we had an entirely separate program on aquatic pathology. The only unifying theme between this and my larger effort in terrestrial pathology was the common goal of integrated control. While I never found lakes nearly as exciting as the ocean, we did learn quite a lot about milfoil in nature, as well as how to grow it for pathology experiments in the laboratory. Since in those days (and likely still so), no plant pathologists were working on seaweeds or submerged weeds (as opposed to floating aquatic weeds), all of my postdocs and technicians were from the disciplines of botany, limnology, or water chemistry. A side effect of this program was that I also learned some basic fungal biology, aspects such as the phenomenon of microcycle conidiation. Apart from the papers and review articles and personalities of the times, two interesting events stand out in my mind: I organized the first symposium ever convened on seaweed pathology, which featured distinguished phycologists and marine mycologists, held as part of the 3rd International Congress of Plant Pathology in Munich in 1978. Then in 1985, I was asked by the Public Intervenor's Office, Wisconsin Department of Justice, to chair a 12-member task force to investigate the perennially controversial topic of the use of herbicides in the Madison area lakes. I found that this assignment required patience, persistence, and tact to orchestrate the occasionally volatile meetings. These continued over the course of a year with diverse scientists, most of them senior to me, and were followed by the challenge of editing all the contributions into a coherent, factual document. Like many things, this experience, though a big diversion, seemed worthwhile in hindsight. Our 196-page report was widely distributed in Wisconsin, going through two print runs of several hundred copies, and became used nationally as a case study for determining management options in aquatic weed control.

Learning that Teaching and Research are Complementary

Within days of my arrival I was given the job of being a faculty advisor for students in our then-burgeoning undergraduate major in plant pathology (in those days we had two or three dozen students in the curriculum). This is a role I have played ever since, though now all of my advisees are in the biology major. I was also told, politely, that we needed a plant pathology undergraduate club and that it would be nice if I led in organizing it. This organization featured socials, frequently in the homes of the faculty, informational sessions that I presented on careers, etc., and various outings. The club remained active for many years while enrollment was high.

My first instructional assignment was in the basic course, Plant Pathology 300. I remember well the days of feverishly preparing my lectures and teaching with Arthur Kelman and Steve Slack. I also taught one of the lab sections. From there I moved into many different courses, some of which I developed (such as PP 525: Comparative Ecology, and PP 560: Integrated Pest Management) or completely restructured (e.g., PP 611: Techniques). Ultimately, over my career I would teach as the sole or joint instructor in 14 courses, many outside the department. As the new appointee in "integrated control" I was also assigned the big political task of starting a MS program in IPM, as well as several of the requisite new courses (such as environmental law). Initially this curriculum took the form of an alternative MS track in our department; years later, after countless debates and meetings, it was approved by the Regents as an independent MS (IPM) program on campus. This was a tough assignment for a junior, untenured faculty member because of the immense time-drain related to new program approvals process. More stressful was the fact that, coming on the heels of the DDT era and Rachel Carson, it encountered stiff and occasionally explosive opposition from entrenched senior faculty in CALS who viewed IPM as a threat to their bailiwicks of conventional pesticide-dominated approaches.

Beyond the political intrigue of IPM, I learned a lot by reading an enticing new body of literature in agroecology and population biology. I encountered the ideas and eloquence of giants in the field, such as John Harper of the University of Wales (with whom I was destined to do a sabbatical leave in 1986–87). This prompted me to see plant pathology and all of microbiology through the eyes of a plant or animal ecologist and it revolutionized my thinking. I had to read broadly because I had to teach elements of plant and insect ecology, as well as pathogen biology, in the IPM course. But this wellspring of new ideas fired my imagination and reshaped my approach to research. In turn, as my research generated results relevant to general ecology, the examples were incorporated into my lectures and reflected in how I organized the courses. In fact, I became so enthused with an integrated, conceptual approach to ecology that I wrote a book on the subject (*Comparative Ecology of Microorganisms and Macroorganisms*, Springer Verlag, 1991). Although I never rose to the exulted rank of being universally acclaimed a superb teacher by the conventional criteria, there were moments of some joy and satisfaction, probably most notably on the occasion that a student (not one of my own!) elected to take one of my courses for a second time because he enjoyed it so much the first time!

Forays into Administration

Given the lineage of gifted pioneer leaders of the department, I considered it both humbling and an honor to serve as chair from 1998–2004. This was an era of intense space constraints for offices and labs, a period when several faculty retired but also when five new faculty arrived in the space of six years. No sooner had Mike Schaeffer and Tom Dettinger heroically renovated a laboratory in record time

for a new arrival than the process had to begin anew for the next person. Though these years necessitated a major diversion away from my research program, and were a period of great personal stress for me, I learned a lot about myself and others. I left this assignment with many good memories of the people who worked hard and often unheralded for the department. And I felt that I had accomplished a few important things. Among these were leading the faculty in establishing principles related to space and teaching assignments in what was then a highly contentious era; reconnecting with our alumni and restitution of the annual newsletter, *The Pathogen*; establishing a program of departmental financial support for students to attend annual scientific meetings; establishing an annual departmental awards ceremony; replacing most of our aged vehicle fleet; instituting a major renovation program for the autoclaves (which were progressively failing after continuous use since the construction of Russell Labs in 1965); and major reconstruction of the safety ventilation (fume hood) system for all of Russell Labs.

Since I had advocated strenuously as chair that our department reassert its presence within APS circles, I agreed to run for APS Council and ended up serving in the executive for 7 years, culminating with President in 2005–06. This took a lot of time but was very gratifying and much could be said.

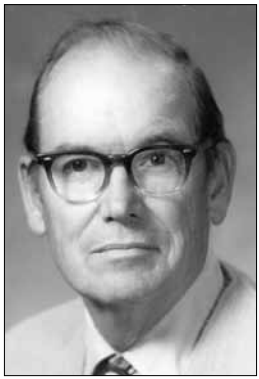
Since 2006 I have been Director of the Officer Education (ROTC) Program on the Madison campus. This experience returns me back past my days as a student protester during the Vietnam War to my earlier military roots and those of my family. Service to this program has been particularly enjoyable because of the exceptionally high caliber of student cadets in ROTC and their enthusiasm, respect, and esprit de corps.

Recollection

At the outset of our second century, we should pause to think from whence we came and where we are headed as a department. Each one of us has been the beneficiary of an extraordinary, unique academic legacy purchased by the 'blood, toil, tears and sweat' (not to mention vision and intelligence) of our forefathers. We have, in our time and by combination of some talent and chance, come to be in the remarkable academic environment that is Madison and this department. The challenge of each new generation of staff and students is to demonstrate that it can rise to meet the expectations of our stellar predecessors. Actually this has been said before — by Tom Hanks who lay dying, to Private Ryan who he had just saved, in that famous movie. The words were "*Earn it*."

70 Years at Madison

By Deane Arny (faculty, 1943–84)



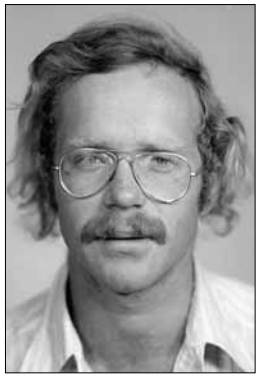
Deane Arny

I came to Madison in 1939 on a scholarship from the Wisconsin Alumni Research Foundation and became a research assistant jointly in Agronomy and Plant Pathology. For my PhD, I studied the inheritance of resistance to the barley stripe disease caused by *Helminthosporium gramineum* under the direction of J. G. Dickson and H. L. Shands. In 1943, I became an instructor in Agronomy and Plant Pathology, i.e., I belonged to both departments. Later I was asked to select with which department I would be affiliated, and I chose Plant Pathology. Over the years I studied a number of diseases of corn, small grains and alfalfa caused by bacteria, fungi and viruses. The discovery of the ice-nucleation activity of *Pseudomonas syringae* led to the study of epiphytic bacteria related to frost damage to plants and its possible control by the application of non-active bacteria. This was in cooperation with Upper and Lindow. For a number of years I was in charge of the summer field disease course (now called PP 559). For several years I was involved with the Steenbock Library Committee. I served two years at the young University of Nigeria and six months at the Andalas University of Indonesia. I also had a six months' study leave at Wageningen, the Netherlands.

Deane Arny pouring plates in his laboratory, ca. 1980.

My Life and Times as a Turf Student at Madison

By Bob Avenius, Class of 1981



Bob Avenius

It's been a long time since I really sat back and thought about the Plant Pathology Department but I'm reminded of it every day. I'm fortunate that in my current position at the TruGreen Company I still use the knowledge and experiences gained from the Plant Pathology Department at UW–Madison. As an undergraduate in Soil Science I didn't even take Intro to Plant Path until the last semester of my senior year. In hindsight I always regretted waiting so long to take that course because it was there that I had my first inkling of what I really wanted to do. There were numerous guest speakers and I remember thinking that careers in turf and ornamentals sounded very intriguing.

After graduation I worked for a year at Blackhawk Country Club and decided that being a golf course superintendent was not for me, so I applied to the Plant Pathology Department and John Andrews was my advisor for the IPM program. Whenever I think about John Andrews, two pictures always come to mind. The first is a very serious man in his office, window behind him with microscope on one side. The other is John in red and white striped bib overalls at Plant Pathology events. Over the years it seems that I remember this period in my life as snapshots in time versus a full-length feature film. The snapshots I remember are as follows:

- Dr. Smalley's class in plant pathology techniques in which you could either take the final exam or isolate flyspeck on apple. Needless to say, isolating flyspeck was my preferred choice! When isolating this pathogen I didn't even know it existed but in my yard today I have four apple trees and they seem to get flyspeck on a regular basis. I never pick up one of those apples without thinking about that class.
- Telling Dr. Gayle Worf the first thing one morning that the fungicide test trials at the local golf course were accidentally sprayed over and that the work there was lost for the summer. The golf course superintendent didn't want to tell him, so I had to break the news! Dr. Worf didn't even blink an eyelash; he accepted the fact and we started up again. No harsh words, no facial expression about the lost work, but so impressive to the young man telling him the bad news.

- Riding my bike to the Plant Pathology Department in the morning during winter. In January I always knew how cold it was by what was freezing. If there was frost on the moustache only, it was a tolerable cold, but when your eyelashes had little icicles on them then it was always below zero. But the icicles disappeared almost immediately after I entered Russell Labs.
- Going to Babcock Hall for dairy products with friends from the department. It seems that many of the problems or issues were solved, or at least seemed better, while consuming ice cream.
- The other thought that seems to stand out for some reason that eludes me is that there was one time that all of the professors brought down to the lab on the first floor their extra or old equipment for others to use. I remember looking at a slide projector that had the ability to load two slides, one out and one in, and thinking how advanced the carousel projector was compared to this. Today someone is looking at the carousel projector and thinking how archaic is this!

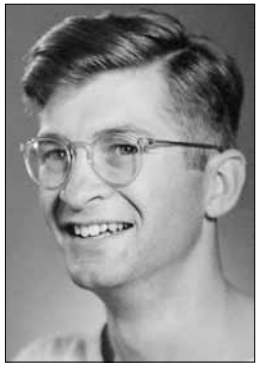
I could go on with other snapshots but I'm sure everyone has their own to review in their minds.

The only other thought that I really wanted to express is that even though I don't remember the coursework very well, the process I learned to solve issues was well ingrained. I also never fully appreciated the devastation that plant diseases can cause until you have experienced it, or had to explain to someone that it's too late to do anything about the disease problem.

Over time I have realized that professors should be acknowledged for all the ways they have influenced your life besides what you have learned in classes. I feel privileged to have attended the Plant Pathology Department at the University of Wisconsin–Madison and relish the memories I have of the people and the place.

From Rhode Island to Wisconsin

By Carl Beckman, Class of 1953



Carl Beckman

I arrived in Madison, somewhat intimidated, in June of 1947. I had just come from Rhode Island State College, one-tenth the size of Wisconsin, and from a department of little note, except in turf studies, to a department that was noted worldwide.

In my first meeting with A. J. Riker, my major professor in Forest Pathology, I was expecting to hear some truly sage words of knowledge, maybe even of *wisdom*. The words I can readily quote are these: "We are here to give you an opportunity. It is up to you what you do with it." That was Riker's *modus operandi* and he stuck with it — and, most surprisingly, it worked!

We had summer field plots at the Wisconsin Forest Nursery in Wisconsin Rapids and in the Nekoosa-Edwards Paper Company forests nearby. But it was a long haul and a waste of time to drive all the way up from Madison every day. Besides most of us had been in WW–II and had families by then. Riker to the fore! He managed to wangle some surplus house trailers from somewhere and have them hauled to an oak grove at the Forest Nursery. He also provided an account for us to use for needed supplies at a nearby hardware store. We also had advice and help from the staff of the forest nursery. Riker had provided the opportunity. It was up to us to establish a working summer field station.

The "we" were the recently robed Assistant Professor Jim Kuntz, and students Bob Patton, Jack Berbee, and me. Well, we trenched and ran and joined pipes and pitched them to be able to drain them for the winter. Then we connected water and electricity and bottled gas into three housing units and a laboratory complete with a newly designed and installed (by us) transfer chamber with a large pressure cooker-sterilizer — just like in Riker's methods course. A bulldozed road giving access to the units was appropriately named "Opportunity Row."

Well, for me, it continued that way for a total of six years, but at the three-year mark Riker asked me if I would like to take on a full-time job on an Atomic Energy Commission grant he had been awarded. Here was an opportunity, and it was clearly up to me what I did with it. I took it! Jim Kuntz had noted the spread of oak wilt outward from central trees. For the next three years I worked with isotope and other tracers to study the rates of water flow through and between forest trees. At one point, we were checking out the roots of some oak trees adjacent to a stream

and Jim, my confidant and friend and opportunity-infected Field Boss, arranged for a fire truck to wash out part of the root systems. Over several years we invited more recent students to join in the experience. We finally checked out 15 species of forest trees. Eight of the 15 species produced functional root grafts, thus forming colonies of trees within each of those species. It was through these grafts that oak wilt spread so rapidly once within a cluster of trees. It was the first time such grafts were proven to be functional.

I left the Plant Pathology Department 56 years ago, having had several exciting opportunities, and with a rich and diverse experience. Marvelous!

What I Remember

By Peter Blenis, Class of 1982

Peter Blenis

Thinking back to Madison, I remember places: Babcock Hall (with its ice cream, cheese and yogurt), the arboretum, residence at "Emerald City," the Shell and the Terrace. I also recall numerous events: traveling to APS conferences in Washington and Minneapolis–St. Paul, the field course, softball, skydiving, the field trips on the white bus, and the many parties.

However, although it is a cliché, the best and strongest memories are of people. Most of those from whom I took courses, Drs. Andrews, Arny, Burdsall, de Zoeten, Fulton, Maxwell, Mitchell, Patton, Slack, Sequeira and Smalley, were in mid-career. As such, they had a combination of knowledge, experience, and enthusiasm that enabled them to be excellent instructors. The teaching style was more didactic than is often the fashion today, but it was effective in transmitting knowledge. With a broad knowledge of all the elements of plant pathology, we graduates emerged with a solid platform for continued learning in pathology, regardless of where we went after Madison. My own supervisor, Dr. Bob Patton, was exceptionally well-traveled and well-read and possessed an encyclopedic understanding of forest pathology. Yet I remember him most for being a gentleman: gracious, even-tempered, tolerant, and willing to let his students learn from their own mistakes. Fortunately, Russ Spear was always hovering over the lab to ensure that my mistakes (generally) posed no threat to life or limb. I am indebted to both of these men.

I am particularly grateful for my interactions with my fellow graduate students. Given the talents of my peers, and the top-rank status of the department, the environment might have become quite competitive. Yet it did not; the atmosphere was collegial, friendly, and accepting. Neither before nor after graduate school have I been surrounded by so many clever people of my own age. They came to the department from a great diversity of places, both geographically and intellectually. The result was a bounty of discussions. Although topics spanned a wide range across science, politics, and "God, truth, love, death and the universe," and the tone varied from serious to playful, the conversations were always rich and sincere. Although we were quite aware of the history and accomplishments of the department, there was a certain healthy skepticism of tradition, not disrespectful, but merely the realization of a process of "sifting and winnowing" that was fitting in a great institution.

Recollections of Plant Pathology 559

By James Buck, Class of 1998

T'was the night before something:

Soybean … corn … soybean … corn. It's our weekly van trip for the summer field course! Another yell, 'Frog Eye!!' — whether you find it or not. This became our rallying cry as we walked field after field. Soybean … corn … soybean … corn. Frog Eye!! Frog Eye!!

During one overnight trip we had wolfed down supper and sat around the fire swapping stories. Finally it was time for bed and off to the tents:

James Buck

A short time later not a creature was stirring,
not even a mouse

The students were nestled all snug in their beds,
while visions of frog eye danced in their heads

I had just settled down for a long restful nap

When out of my tent mate there arose such a clatter

Holy cow! It was loud enough to wake the dead! How could he sleep through that?
During a short lull in the racket I heard the sound of a tent opening. Zzzzzzzzip

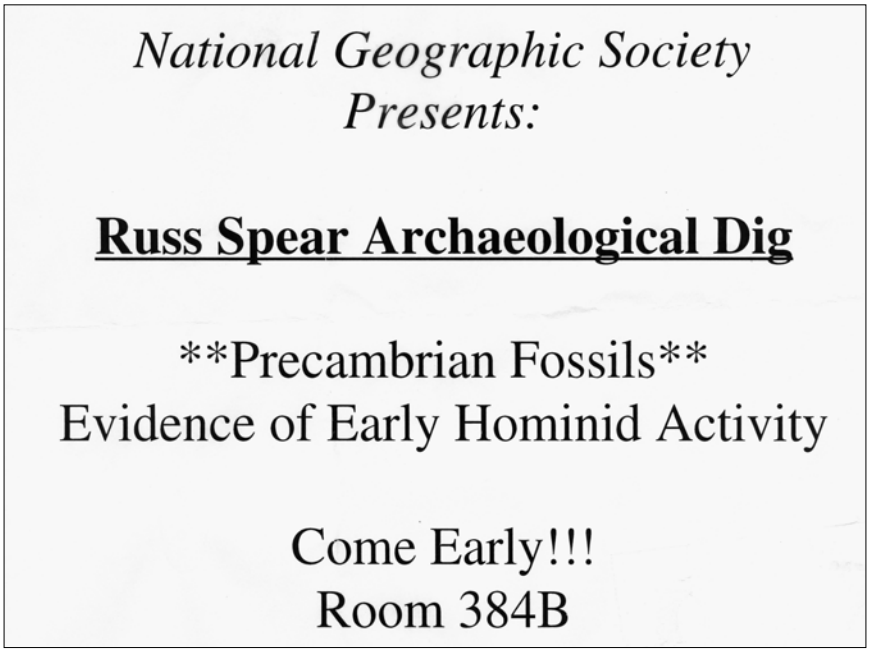
I sprang from the bed to see what was the matter

When, what to my wondering eyes should appear, but David in tighty whities almost floating in air!

He spoke not a word, but went straight to his work

He emptied his bladder; then turned with a jerk

But I heard him exclaim, as he dove out of sight, "Happy field course to all, and to all a good-night!



Adventures in Potato Pathology

By Amy O. Charkowski (faculty, 2001–present)

Amy O. Charkowski

My lab group works on a range of pathogen genetics and detection projects, and my scientific career goal is to improve control of at least one plant disease on at least a regional scale. My educational goal is to train students to appreciate the complexities of plant-microbe interactions and to be able to ask useful questions about these interactions. Whether anything that I or my students do will be useful a century from now, none can know, but with every scientific paper we write archived electronically, at least it is unlikely to be forgotten.

It is also unlikely to be read by very many people. Should my daughter ever wonder what I did in the lab, all she will need to do is search the internet. However, I doubt that she will ever ask, "Mom, what did you do in plant pathology?" Rather, I expect to hear, "Mom, why did you spend all those hours at work rather than with me?" Or, as she currently signs it, "Dad, you go to work, not Mom." So, apart from needing to pay my bills, why do I do this?

It is because working in science and agriculture makes me happy and this is enough of a reason. I enjoy watching and guiding plants, students, and even organizations as they grow and change. I enjoy the travel to new locales and meeting interesting people, something that this job has in abundance. And, I hope to improve agriculture, even if only in a small way. This may stem from research in my lab, but it is more likely to come from the success of a small program that I administer. The origins of this program, the Wisconsin Seed Potato Certification Program, predate that of the Plant Pathology Department by several years. It includes an inspection and certification program, housed in Antigo, and a farm located just west of Rhinelander, that supplies Wisconsin growers with seed potatoes. Approximately $120 million in potatoes sold in the US can be traced back to this program each year. Therefore, to have a beneficial impact on agriculture, all I need to do is not mess up. I feel that I am tempting fate by just writing this. As I write, I also wonder if this program will still be in place 100 years from now or if changes in technology, markets, or even climate, will drive it into oblivion.

The seed program officially started in 1913, but its roots go back nearly a decade earlier and were fostered by Dr. R. A. Moore, of the UW–Madison Horticulture Department. In collaboration with local farmers, Dr. Moore led those in the UW–Madison College of Agricultural and Life Sciences in identifying

challenges in potato and vegetable production and in finding solutions to these problems. Among Dr. Moore's lasting contributions are the comprehensive bulletins that he edited and published annually for Wisconsin farmers.

These bulletins have answered many questions I have had about aspects of the day-to-day life of agricultural scientists 100 years ago. We no longer publish such comprehensive booklets of our work, rather we scatter it among scientific journals, society newsletters, and grower magazines. This has led me to wonder what things I take for granted today about our daily life that people 100 years from now may wonder about.

These bulletins also answered one of my most basic questions. How did the professors get from campus, in Madison, to the growers in a time when cars were rare and roads in Central and Northern Wisconsin were even rarer? I learned that it was just a century ago, in 1910, that Drs. Moore and Webster, along with F. R. Crane, the principal of the Dunn County School of Agriculture, first used a car for their Extension work. Prior to 1910, and throughout that decade, agricultural scientists traveled via Better Farming trains. These trains could be several cars long, with cars dedicated to dairy, sheep, poultry, fruit, grains, land clearing, road construction, and of course, potatoes. In Wisconsin alone, agricultural scientists would make over 200 presentations each summer and might have taught up to 30,000 or more farmers and their families through lectures and demonstrations. They spent considerable time away from their families on these railcars and both the camaraderie and acrimony among the professors must have been far more intense than today.

Today, like Crane, Moore and Webster started doing a century ago, I drive a car when I need to visit farms or visit the seed program facilities in Antigo or Rhinelander. Reaching these locations by passenger train is no longer possible. I meet with and provide information to only a small fraction of the people that my predecessors did. We have only 25 seed potato farms left in Wisconsin and many of them work directly with industries that provide assistance with horticultural management rather than with university researchers. Wisconsin is considered a leader in seed potato production technology and, therefore, my work also brings me to places as far from home as Morocco, Israel, China, and Peru. Two excerpts follow from a log I keep of travel for an international project to improve seed potato production in North Africa and the Middle East.

From a trip to Morocco in 2007.
Observations, March 22, 2007:

I am writing this from Hotel Kerdous in the Anti-Atlas Mountains while the Moroccans and Lebanese party the night away with Berber musicians hired from a small town near Tiznit. One of the musicians is the grandson of a famous Berber

musician, Haj Belaid. The hotel is like a pink castle perched on the side of a pink mountain. The mountains are dry and rocky, with streaks of white and brown and veins of buried silver. Plants similar to those in Arizona grow here, cacti, agave-like plants, acacia and date palms. The sides of the mountains are terraced, but I see no evidence of crops on the terraces, perhaps the season is wrong or perhaps it is the lack of water. Morocco is in the midst of a drought, the rains which usually come in November and last through March did not arrive until January and have already stopped.

There is no easy way to get from Madison to the midway point between Tiznit and Tafrout, which is where Hotel Kerdous is located. I left from Madison on Tuesday evening at 6:30 and arrived in Agadir at midnight on Wednesday. My colleague, Mr. Arifi, met me at the airport and we drove to the hotel, arriving here at 3:30 a.m.

In Agadir, Mr. Arifi and I loaded my two very heavy suitcases (one clothes, one lab supplies) into a small silver car and set off into the darkness. The sky was very clear and the stars very bright. We were in Tiznit within an hour and drove around the central circle, which has at least six roads leading off of it, trying to figure out which one led to Tafrout. Of course, although there were signs for everything else, there was no sign for Tafrout. Mr. Arifi used the direct and effective solution of picking up a young man (homeless?) sitting outside at 2:30 a.m. on a quiet dark street and having him direct us through the traffic circle and along a dark street to the right road out of Tiznit. We dropped him off on the edge of town with a wad of dirhams as a tip. About twenty minutes and several kilometers later, Mr. Arifi asked if my laptop computer was still in the car, wondering if the young man had taken it. Despite opportunity, he had not.

This part of Morocco is very dark at night. There are no street lights and people do not leave outside lights on by their houses. All of the windows were dark, which at 3 a.m., they probably should be. We drove along a curving hilly road in the mountains that reminded me of Highway 1 in Marin in that it was very narrow and one side was sheer rock while the other was a 100 meter or so drop off a cliff. We were both relieved to make it safely to the hotel and I fell asleep almost immediately upon reaching my room.

Our meeting started out troubled, the projector bulb was broken, then later the cable for a second projector was faulty. The hotel does not have a conference room, so we tacked a sheet across one wall of a bar to use as a screen and held the talks in the bar. An armed guard sits outside, hired due to comments from the locals who wondered why Israelis and Americans were at Hotel Kerdous. Amusingly, the bar had a rack of deer antlers, just like one might see in Wisconsin.

The most interesting parts of the discussions were the land tenure problems caused by Muslim law, which requires that the land be split among the descendants in a complicated fashion, which results in many small farms that are difficult to manage.

From a trip to Egypt and Israel in 2008. Observations, March 28, 2008:

After escaping from a blizzard in Wisconsin, I arrived in Cairo today around 3 p.m. and met up with the rest of our group to take a bus to Taba, which is in the Sinai. On the way to Taba we went through a tunnel under the Suez Canal. I got a brief glimpse of a ship traveling through the canal, a very odd sight since the canal itself was not visible. All we could see was a ship traveling through the desert.

Later, as we were about to enter a mountain pass to bring us down to the Red Sea, we could see the lights of Eilat nearby. The tension on the bus became very high because people were nervous that we would accidentally enter Israel and "they will shoot us, then check our passports." The bus driver blinked his lights and an oncoming truck, driven by an Egyptian driver, pulled over. The driver let us know that we were on the right road to Taba and not about to accidentally cross the border, and the tension went down a bit. Many hours of driving through the desert later, we arrived at the Hotel Sonesta Taba, the location of our meeting. As Indrissi pointed out, we followed Moses' path, although we made better time from Cairo through the Sinai desert.

Egypt is similar to Morocco in some respects, but even as a non-expert, I noticed some differences. The desert is drier, often with no plants at all, and sandier. The people are more religious. Along the highway to Suez, there were green roadway signs with the 99 names of Allah and with short prayers for safe travel. More of the men were wearing western style dress, although there were plenty to be seen in robes, and more of the women were covered head-to-toe.

At the Dead Sea with growers.

The hotel employees are nearly all men, who live for months at a time in barracks near the hotel, but out of sight around a corner. All the food we can eat is included in our hotel fee, but water is expensive and guarded. Aisha has remarkable skill at distracting the man guarding the water so that others can sneak a glass from the tap. I wonder if guards at water taps are in our future at home. This place, where nothing grows, is a strange place to meet to talk about agriculture, although it is appropriate for a meeting that will focus mainly on how to grow potato with saline water.

Concluding Thoughts

What will the future bring? To my forebears, online meant a train car, but now my colleagues and I are online in a different fashion. We now use websites, email, blogs, and smart phones to pass on information and recommendations. Surely these exciting new means of communication will be antiquated and unused a century from now. Beyond the issue of communications, I believe that the most dramatic changes in seed potato production will be brought about by the technology revolutions that are currently driving biological sciences into new directions. For example, DNA sequences, which used to be expensive and laborious to obtain, can now be decoded in minutes, providing new options for pathogen genetics and detection. I believe that the route to future success requires continued close association between potato growers and researchers.

My Unforgettable Experience: Dreams and Realities

By Luigi Ciampi-Panno, Class of 1979

Luigi Ciampi-Panno

There is always one particular day in our lives that changes everything. I was a Master's Degree student at North Dakota State University, a great school with great professors. But I wanted to go further and deeper into Plant Bacteriology. The place to go, in those years (1975), was the Plant Pathology Department (PPD) at Madison, Wisconsin.

By the end of February, a friend and I traveled by car for a personal interview with Dr. Luis Sequeira and to find more about a research assistantship granted by the International Potato Center. I was pleased with what we found out and accepted the challenge to go to Madison, and the sooner the better. In our return trip

to North Dakota we were caught in the middle of one of the worst blizzards in history. I recall being dragged off the road by a highway patrol officer, who told us: if you keep going you are on your own! We remained stranded close to the Twin Cities in a Holiday Inn for two days. When we reached our families, Fargo was under more than a foot of snow, with homes and cars impossible to reach. That was my first experience related to UW and the PPD. Everything is still so clear in my mind, though far away in time.

So I went back to Madison, this time with my wife Renate and my son Carlos Alberto, to start what would become an incredible experience. My advisor told me from the beginning: when you finish, you are going back to Chile! There you must depend on your own skills, and not fancy equipment! I must emphasize that in this advice, Dr. Luis Sequeira was absolutely right. I put all my effort towards learning a lot from my professors and to understanding new topics, both simple and complex, and how to apply them in Plant Pathology, but not to depend on sophisticated lab facilities.

Today, I understand the importance of having basic knowledge and how to apply it to field situations. The most fundamental thing that I realized from the beginning probably was that the plant-host relationship is a key issue. This process was unique and different for each disease, and for me in particular, was of special interest where fungi and related filamentous microorganisms are involved. When I returned to my Austral University of Chile (Valdivia), I felt that I could do many things with my doctoral knowledge and that I could improve many things around me. Also, I learned that things sometimes (or always) do not work the way you wish! It took me years of hard work in order to harvest in the Garden of Eden! And learning this fact of life — harvesting from effort and sacrifice — comes late in your life. You must publish and show your capabilities in order to get tenure and have a productive academic career.

The learning process at the PPD at UW was surrounded by mystique and hard work. I remember that Literature Review and Research Seminars were very difficult. All the faculty members were there, always, and they asked challenging questions. But, this was part of our education, to learn and be examined on our mastery of new knowledge. TGIF was great and we became, as always, customers of the Copper Grid on University Avenue, and the many pizzerias on State Street. Also, I recall being invited several times to socialize at Dr. Kelman's and Dr. Sequeira's homes. At the beginning the atmosphere was kind of formal, but slowly, after a few beers, things became very friendly! One thing, conversation was not related to work or research, so topics were about people, experiences, families, your country — in other words to learn about who people are and to develop other kinds of relationships, more human and tolerant. This was positive for many of us for two main reasons. The first is that you depend many times on other people, and a team is more powerful than being alone; the second is that when you socialize

you do not talk about work; there are many other things that can be discussed. People around you get bored if you insist on one topic.

Luis Sequeira with students in his phytopathogenic bacteriology course, Valdivia, Chile, 1983. Luigi Ciampi is at far left in the front row.

The arrangement of eight floors of Russell Laboratories, among which the PPD is distributed, created links of people organized mainly by floor. So my buddies in those years were Bill Fett (no longer with us), Omar Tortolero, Dave Webster, Lois Nadolny, Liz Barlow, and Ed Halk. There were many others, mostly Latin American; among them, Gustavo Granada, Jorge Victoria, Enrique Fernández, and Ruperto Hepp, who left this world and passed away in 2007. He was a great friend and professional who created many good things at the Faculty of Agricultural Sciences (Universidad de Concepción, Chile).

A character was Steve Vicen, his realm was the photo lab on the second floor, remember him? Yes, he was the king of drawing and taking pictures and always demanded a bottle of good brandy, of course made in Wisconsin. Today, to prepare tables and graphics is not a big deal, but back them, in the seventies, everything was handmade. No Mac, PC or digital camera. Steve's buddy was Gary Gaard, who was in charge of the electron microscope lab. What a couple they were, contributing to my unforgettable years. I also recall a technician who used to work in the basement, do not recall his name, but he would tell me the story of the historic Battle of Midway. He always started the same way: "I was there; I was there, serving the ship's batteries!"

In October 1983, I was able to get some funds and to organize here in Valdivia, Chile, a Plant Bacteriology Course. Among the invited professors were Dr. Luis Sequeira (UW), Dr. Mortimer Starr (U. California), and Dr. Ann Vidaver (U. Nebraska), all famous phytobacteriologists in those years. The students and professors were very enthusiastic, and the topics given were the first ones that went deeply into bacterial-plant relationships. The good thing was the practical emphasis: a lot of laboratory work for the class.

I believe that the most important thing that I value now is the unique relationship, a kind of link, which develops through the years with your advisor. It is a way of sharing knowledge and skills. This process is part of the mystique that I mentioned before that pertains to the UW and my experience in the Plant Pathology Department.

Today, I feel I have achieved many career goals. In 1999 my work on bioencapsulation of antagonistic bacteria to control plant pathogens was awarded with "The

Alcatel Prize for Technological Innovation in Latin America." More recently, one of my patents on a formulation to biocontrol *Rhizoctonia solani* was awarded a First Prize in the contest "South of the World Patents" organized by the Universidad de Concepción (Chile) and the World Bank. Also this innovation was selected by Innova-Corfo (Chilean Government) and its implementation is being accelerated by the Global Commercialisation Group of the IC^2 Institute of the University of Texas, Austin. In 2002 I was a visiting scientist for about three months at Oregon State University, where I spent all my efforts to write my first Plant Pathology book.

A recognition that meant a great deal to me came from my hometown, Florence, Italy, in 2008. The Provincial Government awarded me, and other Tuscans spread through South America, the Silver Banner, a recognition given to citizens who have contributed to science in foreign countries. During my teaching time — I retired in 2008 keeping only research and doctoral students — I achieved one of my goals: to publish two books, the first in 2002: *Introductory Plant Pathology*, and the second one in 2006: *Mycological Plant Pathology*. Both are in Spanish and are designed for Latin American students. I believe that they are in our Plant Pathology Memorial Library.

Greetings to all. Long live the Plant Path spirit and camaraderie!
Luigi Ciampi, Valdivia, Chile 2009

At the Nexus

By Murray Clayton (faculty, 1984–present)

History is a sequence of random events and unpredictable choices, which is why the future is so difficult to foresee. But you can try.

Neil Armstrong, July 19, 2009.

Murray Clayton

On the eve of my interview at UW–Madison, I had no idea that I would be taking a position in a plant pathology department. Indeed, coming from a statistics faculty position at the University of Guelph, I could hardly be a typical candidate. On the other hand, nine years prior to interviewing in Wisconsin, I had no idea I would be a statistician, either.

I started a BMath degree from the University of Waterloo, Ontario, with the intent of getting a major in pure mathematics. I was attracted to the abstraction

of pure mathematics — like many people, I guessed that statistics would be dull stuff concerned with the census, or the amount of coal mined in Pennsylvania. A summer job as a research assistant convinced me otherwise — I came to see statistics as a creative science concerned with extracting information from data; it provided a way to use mathematics and enjoy its beauty, while not wallowing (too much) in the arcana of abstract theory. Thus I added a statistics major, the fact that I very nearly failed my first statistics course notwithstanding.

Without any particular career path in mind, I focused my PhD work at the University of Minnesota on theoretical statistics, leaving with a thesis on Bayesian sequential sampling of observations whose distribution comes from a Dirichlet process, which itself provides a measure on the space of probability measures relative to a dominating measure on an appropriately defined sigma-algebra.

That may seem obscure, and it is. And, of course, its connection to plant pathology seems remote, at best.

No matter. PhD in hand, I was off to my first job as an assistant professor at the University of Guelph. Although I was happy to be back in my native land, I quickly grew disenchanted with the statistics program at Guelph, and so I reentered the job market. From my graduate school days I knew that UW–Madison was a superb school, with an absolutely top-ranked statistics program.

My application to Wisconsin resulted in a call from the Statistics Department to seek some clarification. Was I aware that there were really two jobs available, one in the College of Agricultural and Life Sciences and one in the Medical School, that they would be joint appointments in Statistics and some other department, and that they would involve statistical consulting with other scientists?

Although I considered myself to be a theoretical statistician, at Minnesota we were required to take a considerable number of applied courses, and I found them thoroughly enjoyable. Moreover, I had a keen interest in science in its broadest sense, although I had only studied a limited amount of chemistry and physics. Consulting, then, would be fine, I thought, and besides, I had been assured that I could pursue whatever theoretical research I wanted to.

So, in addition to interviewing in the Statistics Department, I also interviewed in the departments of Human Oncology, Animal Science, Poultry Science, Dairy Science, and Plant Pathology. Chris Upper, Susan Hirano, Doug Rouse and I had lunch at Lombardino's, talking about spatial patterns of disease, ice nucleation, and related matters over slices of pizza. I also met in the Riker Conference Room with several graduate students and faculty.

I was hooked. It was obvious that the plant pathologists were a hard-working, brilliant, successful group of scientists working on fascinating problems, and, as a bonus for me, had a genuine appreciation for statistics. I was offered the job, I chose plant pathology as my joint home, and moved to Wisconsin.

Men at work! Statistical consultation in progress. Murray Clayton (center) with Tom Tabone (left) and Peter Crump (right).

The department chair at the time, Doug Maxwell, did a good job of hiding his shock (dismay?) when he learned that the last biology course I had taken was in 10th grade. He, and many others inside and outside of the department, were skilled, patient teachers, and my potential baptism by fire proved to be an exhilarating, rewarding experience, *which continues to this day.*

At the time, it seemed extraordinary that a group of plant biologists would provide such a welcoming home for a statistician, but I have come to see that as reflecting an element that is fundamental to our discipline. Jim Moyer, at North Carolina State University, has expressed well the idea that the essence of plant pathology lies in interaction: at the nexus between plant and pathogen. I believe that that model extends further to include, within the discipline, the interaction of a vast array of scientists with manifold interests and talents. Biochemists, virologists, bacteriologists, nematologists, mycologists, epidemiologists, entomologists, plant physiologists, geneticists, and so on, *and so on*, comprise the field of plant pathology. Surely it is one of the most interdisciplinary fields of study in the sciences, spawned long before interdisciplinarity came into vogue.

I don't think my route to plant pathology is that unusual — I think many of us arrive in the discipline as a result of some "sequence of random events and unpredictable choices." *How lucky we are,* then, to be able to work on problems of real, immediate import, with colleagues from such an array of backgrounds and perspectives. *How lucky I am*, to have fallen into a position that allowed me to use statistics, a tool that I enjoy and find fascinating, in direct association with a broad range of scientific problems.

Many years ago, there used to be a group of (rather senior) faculty who would meet once a month in a room at the Medical School. They represented a range of disciplines themselves, but the purpose of their meeting was to learn more broadly what was happening on the campus in the sciences. Thus, each month some (usually junior) faculty member would give a presentation on his or her research. Arthur Kelman invited me to a number of these sessions over time, and I think he was proud that he could help give me some broader exposure to the sciences. I didn't have the heart to tell him, however, that I was getting that type of exposure, every day. How lucky, and rare, is that?

While we might want to linger over a celebration of our lot, Neil Armstrong's comments also challenge us to try to predict our fate, and it is in the broad context of our department that I want to do so. Today we are facing a major economic slowdown causing large-scale unemployment, uncertainty and collapse in the banking and automobile markets, and massive debts for most state governments. At the current APS meetings the plenary session is devoted to "Achieving Scientific Excellence in a Changing Environment." Change, in this context, refers especially to the challenges arising from: "Calls for increasing efficiency, shrinking budgets, and consolidation of traditional operating units." Likewise, across our university we are encouraged to find ways to simplify, consolidate, and economize.

How does our department fit into these societal and economic changes? How do we respond to these pressures? More broadly, what will we, and our university look like 200 years from now? Will these even exist? The university didn't exist 200 years ago, and of course, this centennial marks the anniversary of a department that barely existed 100 years ago. Today, however, the amount and quality of scholarly activity in all its many forms, and the vitality of our academic community, make the extinction of these entities seem difficult to conceive. But even the last 25 years have seen dramatic shifts in our science, and in our department. What next?

The current economic crisis has been blamed, in part, on the inability to correctly predict market trends and behaviors. The forecasting business is risky, without doubt, and so it seems dangerous to try to forecast the future of a department. Perhaps not too dangerous, though — a variant of the anthropic principle could be in play: if the department and university vanish, then it's unlikely anyone will be around with an interest in reading this essay.

To put this on a more positive note, let us posit a process of evolution, a process of natural selection, which applies to disciplines and departments. We can easily guess that our department and science will look much different 100 years from now. However, the essential interdisciplinary nature of our work provides us with the ability to adapt and survive, and grow, as a department and as a science. If we possess the wisdom to adapt, our breadth and diversity could provide us with the resilience to respond to that "sequence of random events and unpredictable choices" that impact our study.

Push the analogy further: plant pathology will continue and will thrive if it contributes, and if the value of that contribution is perceived. This last point is important; I happen to work in the intersection of two disciplines, plant pathology and statistics, which have a number of characteristics in common, not least of which is a sense of not being sufficiently valued in the larger scientific community. Statistics often seems to be viewed by many mathematicians as a rather pedestrian and not too complicated sub-branch of mathematics. Physicists and chemists hold to the same view. Now substitute biochemistry or genetics for mathematics; plant pathology for statistics.

In both statistics and plant pathology, the work is highly interdisciplinary, and perhaps for this reason, they tend to be studied mostly in graduate school. For that reason, both inside and outside the academy, they fail to garner much of the limelight. Statisticians lament the dominance of computer science as *the* base for informatics; plant pathologists feel left behind when breeding is cited as *the* solution to problems in the supply of food and fiber.

And yet. And yet … In our shrinking economy, we seek better, cheaper, safer food supplies. We yearn for oil independence through the use of bioenergy. We see damage to our ecosystems and aim for greater sustainability. And we hear louder and louder calls for "systems-based" approaches to solving these problems. It seems to me that we are technically well-positioned to be leaders in advancing these causes. We have the capacity to play a dominant role; our downfall will come if we take an insular, blinkered view.

Change is difficult, but essential. And so, as we reflect on the last 100 years of our history, I hope that we value it for its lessons, its successes, and the justifiable sense of pride that it provides. But I also hope we don't fall so in love with our history that we are blinded to our future. There is a sequence of random events and unpredictable choices lurking around the corner.

Wisconsin Remembered

By John Duniway, Class of 1969

John Duniway

Overall, I had a terrific experience as a graduate student in Plant Pathology at the University of Wisconsin. I arrived in 1964 with a BA in Biology from Carleton College. I knew a little about research, but not much specifically about Plant Pathology. The situation on the UW campus and in the department at the time allowed me to learn quickly. With the support of Rick Durbin, I was given a research opportunity that finally took me in directions new to plant pathology. With additional help from Wilfred Gardner in Soils, my thesis research helped launch a research career that included physical water relations and soil-borne *Phytophthora* spp. I should also acknowledge Chris Upper as one of the more constructive critics of my thesis research. I finished my PhD and left Madison in the summer of 1969, ducking around National Guard troops to turn in my thesis and final paper work on the Hill. The big bomb (Sterling Hall) went off shortly after I left. Those were interesting social times in Madison, but it was still a good environment to be productive and learn.

John Duniway discussing progress of his thesis research with mentor Rick Durbin (right), 1967.

I will be forever grateful to a number of people who were in Plant Pathology while I was in Madison. There was a very lively contingent of fellow graduate students and postdocs who were helpful and enriched my experience. There are too many to name here, but some have become long-term professional colleagues. Several faculty were very supportive and excellent role models for me. Aside from those mentioned already, most notable in this regard were probably Arthur Kelman, Jack Mitchell, and Luis Sequeira, but I grew through my interactions with many others both in and outside of the department. Looking back, the years 1964–69 were remarkable for me in Plant Pathology in Madison. Thanks for the opportunity and experience!

Why Wisconsin? My Emerging Perception of Field Crops Extension Plant Pathology

By Paul Esker (faculty, 2007–present)

Paul Esker

Why did I come to Wisconsin? Why did the department hire someone with a background in plant pathology and statistics? Why am I not working in a statistics job where newly minted PhDs can make $125,000 per year? These have been some of the questions that I have received since I came here in late summer 2007. Of course, the question "Why Wisconsin," was not asked of me by my family, since I grew up in the state, but it is still very relevant because agriculture and the demands on a faculty member have changed. While the rich history of the department is one reason I decided to accept the offer, I would not be telling the whole truth if I didn't admit that a similar position at another institution would have been just as interesting to consider. Many of us who have recently joined the ranks of faculty have had to balance opportunities and costs to accepting offers from different departments around the US and globally. My own approach would not necessarily be one I recommend to others, but at this moment, I feel it has enabled me to jump into the many issues that face our growers in the state and establish connections more quickly. I have thought about my decision over the past two years and what has struck me interestingly is that every day, there is something new, something interesting, something frustrating, but nothing dull.

Impression #1: It was much easier to negotiate for a position when I was out of the country! What, you say? For those not familiar, I interviewed for my position at

Paul Esker (center, rear) with his research group in the field. (left to right) Brian Whyms, Chakradhar Mattupalli, Jennifer Jirak, Karen Lackermann, Mai Neng Kha, Robert Carey, Nancy Koval.

Wisconsin one week before I left for Brazil to work for three months. I was offered the position while checking my email sitting in the São Paulo airport waiting to return to Porto Alegre, where I worked. I don't know … I just felt that asking questions was much easier by not having the option to visit the department again. The negotiations went smoothly and the distance made me think and visualize how I might approach my program in a way that would have been quite different if I could have made another visit.

Impression #2: People or equipment? You can talk with many people and have your head spin. "You should invest in equipment because…" or "You should invest in people because…" At the end of it all, trust your instincts. I decided to invest in people and feel that my program was to take off more quickly. Was it easy? No! I can assure you that you do learn on the job how to deal with the different personalities. But, in the end, the field crops plant pathology program has been able to tackle projects across multiple areas and I think the intellectual synergism as people learn from one another has been unbelievable. Much like cultivating a crop, cultivate people!

Impression #3: Did I match the following… "Perhaps more than any other group of crops, the agronomic crops require someone with extensive knowledge of the cropping

as well as the diseases…" (Page 99, *With One Foot in the Furrow*). I had to give this statement by Professors Wade and Worf some thought. Yes, they did one unbelievable job matching that statement when they hired Professor Grau! With the dramatic change over the years to fewer and fewer field crops researchers, I knew I had big shoes to fill. But, that really isn't the point of the impression, rather as I read that statement in the chapter on Extension, I had to ask if I really fit that description. I didn't grow up in a traditional agricultural background, rather gravitated to agriculture during my undergraduate days. My formal agricultural training was in Iowa, where, adapting a line from the movie *Blues Brothers*, we had both types of crops: "corn" and "soybean" (and a few others)! Returning to Wisconsin has provided numerous interesting challenges for agronomic crop production due to the diversity of the cropping system. Overall, I completely agree with the statement of Professors Wade and Worf, in that a person conducting research and Extension in the agronomic crops must be willing to think about the whole system. This has never been more true that in the past year, when Dr. Shawn Conley (Agronomy) and I were asked to study "Soybean Stress." A pretty generic topic, but to growers, it does not necessarily matter what is the primary versus secondary cause, rather how they can manage the system and remain profitable. As such, it is that the interplay between the disciplines is open and honest in order to tackle such questions on multiple fronts.

Impression #4: Information delivery. Realistically, at the end of the day, my job is about information delivery. This isn't that different from years past. With increases in technology from computers to mobile devices, etc., it is the speed with which information needs to be delivered that has changed. As such, we really do need to use a diverse mix of methods in Extension in order to more effectively deliver the different pieces of information. I was struck by a colleague's comment during a talk I presented regarding how plastic corn and soybean production (i.e., acres sown each season) was in the US Growers are willing to make major changes as the market dictates and this increases the need for the most reliable and up-to-date information, both before planting, during the season, and after harvest.

Impression #5: Learn something every day! There are very few places where each day can bring you something new to learn. Grower questions are challenging and *interesting*; students' questions are challenging and *interesting*; colleagues' questions are challenging and *interesting*! I will leave it to you, the reader, to decide what I mean by *interesting*! Ultimately though, it is this dynamic of discussions and questions that keeps things interesting. Amazingly, my impression is that many students and stakeholders assume you have the encyclopedia of information just stored and waiting to be processed or delivered. I shouldn't give away trade secrets, but one of the best things about the internet is the ability to be on the

phone with someone and answer questions where you have just been able to track down the best answer, oh say, five seconds earlier!

Impression #6: I would not change my decision! Has every day been perfect? Well, no! Time balance between research and Extension and other demands in the department is difficult. On the whole, though, there is a reason that the UW has such a rich history and it is privilege to work to continue that tradition.

How Did I Get Here and Where Am I Going?

By Amanda J. Gevens (faculty, 2009–present)

Amanda J. Gevens

My interest in plants began as a young child while working on a vegetable farm, and became more focused in plant disease during a summer job working with Cornell Cooperative Extension in New York. Those experiences were significant in piquing my interests in agriculture and the challenges facing successful agriculture. While scouting cabbage and potatoes in New York, I learned to appreciate the destructive power of plant diseases; the rest is history.

I am motivated to work in plant pathology by two things, first and foremost, the need of growers for disease management information. Growers are not only producing food, feed, and fiber required for life and living, but, more basically, are running a business to support themselves, their families, and oftentimes, employees and facets of the local and regional economy. I never lose sight of this. Secondly, I'm motivated by my basic research interest in how plant pathogens work, live, spread, change, and interact. It never ceases to amaze me that plant pathogens can be so small and yet so mighty. Some pathogens, such as potato late blight, have changed the face of nations and continue to have negative social and economic impacts.

Challenges that I currently face as an Extension plant pathologist with a partial research appointment boil down to management of time and money. There are so many excellent questions that can be developed into projects and graduate student programs, but realistically, I must choose those projects that 1) provide advancement of disease management practices for vegetable producers and 2) are fundable. One of my Extension challenges is wanting to (and often needing to) be in all corners of the state at the same time. Advances in the technology of

Amanda Gevens setting up a cabbage field trial with a grower cooperator and University of Florida researchers in northwest Florida, 2007.

communication have helped tremendously, but there is never a substitute for face-to-face interaction with growers in their own fields.

My UW experience is in its infancy; however, I do feel at home here in many ways. I began my post on July 1, 2009, and have been busy learning the ropes both in the field and within the department and college. I have felt fortunate to have a very helpful and supportive Extension vegetable team. Additionally, my predecessor, Dr. Walt Stevenson, has been a tremendous resource for information and guidance as I lay the groundwork for my developing program. I have been enjoying the campus (albeit the construction projects are a bear to navigate this summer) and the greater Madison area. This is an excellent place to work and live.

My research program directly feeds into my Extension program. I am working to build a research group of graduate students, post docs, and technical staff with a 'team' approach. I hope to also have my students and staff actively involved in portions of my Extension programming. My program will ultimately have a strong footing right here in the state of Wisconsin but will also involve regional, national, and international interactions with other researchers across disciplines and institutions.

Everything I Needed to Know about Plant Pathology I Learned in Graduate School

By Dennis Halterman (faculty, 2004–present)

Dennis Halterman

People often ask how I became interested in plant pathology. When I was first asked this question after joining the USDA/ARS at UW–Madison, I had to pause and think for a moment about how I might answer. Up until joining the faculty in the Department of Plant Pathology I had always thought of myself first as a molecular biologist or molecular geneticist. I grew up as the child of science and math teachers so an interest in education, teaching, and research has been ingrained in me for quite some time. My parents both grew up on corn and soybean farms and I gained an interest in agriculture through my grandparents and uncles by working on their farms during the summer months. Therefore, although my recent education has been in basic research, my passion has always been to be able to apply my knowledge towards improving agricultural crops.

Having had no formal education in plant pathology, my experience with the subject was primarily through my research projects. My undergraduate education at Cornell College in Mt. Vernon, Iowa, was focused on biology and biochemistry, although the lab classes were related to plant molecular biology. I was principally exposed to the field of plant pathology during my graduate education at Purdue University. There, under the direction of Greg Martin, I studied the molecular mechanisms involved in *Pseudomonas* resistance in tomato. The basic research that I accomplished had only moderate applicability to the field, although it was helpful in understanding the processes involved in host recognition of pathogens. My postdoctoral work at Iowa State University with Roger Wise involved studying host genes responsible for resistance to powdery mildew in barley. Again, our research had only minor direct applicability to the field, since the genes we were studying already were being used for resistance breeding. Therefore, to answer the original question, my interest in plant pathology derived from a greater interest in agriculture and molecular biology. When I was exposed to plant pathology through research, I found the subject to be quite fascinating. UW–Madison was an ideal place to further my career.

Upon joining the Department of Plant Pathology at UW–Madison in 2004, I found the mix of basic and applied research that I had been looking for. I have taken to heart the examples set by the scientists that have come before me and the philosophy set forth by members of the department to "keep one foot in the

furrow." My position has allowed me to apply my expertise in molecular biology and biochemistry towards crop improvement. Being able to work with a crop that is important to the state, such as potato, is an added benefit. As I continue my career in the department, I plan to enhance and extend my research towards the translation of results obtained in the laboratory to improvements in crop production in the field. Fortunately, potato has no shortage of diseases and my research program includes a mixture of both new and old pathogen problems.

With advances in genome sequencing and high-throughput analysis of gene regulation, we are in the position to develop new approaches to tackle some of the most persistent potato diseases. I believe the future of plant pathology is going to rely heavily on bioinformatics. Pathogen genomes are being sequenced regularly and soon host genome sequencing will become a more regular occurrence. There will be a great deal of information to piece together and scientists must be educated in the ways of translating this information into something useful that can lead to crop improvement. To any budding plant pathologists who might be reading this, please take these points to heart. Strive to not only educate yourselves with the basics, but also try to think about what science will be like 10–15 years down the road and prepare yourself accordingly. Certainly, everything that you need to know about plant pathology will NOT be learned only in graduate school.

Why UW Plant Pathology?

By Tom Hammond, Class of 2007

Tom Hammond

Two years after my undergraduate studies, I found myself at Worcester Polytechnic Institute studying a plant virus while working towards an MS in Biochemistry. Perhaps somewhat common among those with an inclination towards science, I had sought this degree thinking that it would help me become a medical doctor. But my work on a simple pathogen of turnips quickly changed my mind about medicine. This is because I was finally starting to 'see' the fascinating relationships that exist between plants and microorganisms, and when it came time for me to apply to a doctoral program, medical school was no longer of interest.

Luckily, my advisor at the time had sent me to several scientific meetings, including the UW "Arabidopsis" meeting. Although I found Madison to be a wonderful city, the nightly gatherings on the Terrace probably had a larger role in convincing me that UW was right for me, and the

Plant Pathology Department seemed a logical choice given my new found fascination with plant-pathogen interactions. Having never been one to enjoy traveling, I gambled that I would be accepted even if I declined the opportunity to revisit the campus during one of the prospective student weekends. To my surprise, however, a similar program at another university quickly rejected my application (I don't want to name particular programs, but I probably won't be giving any future talks at Berkeley). It was immediately apparent that I had greatly overestimated my value as a prospective doctoral candidate. So after a night of restless sleep, I contacted the Plant Pathology Department to be included in the upcoming interview weekend. Soon after the call, I realized that I had panicked unnecessarily; my acceptance letter had just arrived and was waiting for me in my mailbox.

Bonding Time

I was part of a large group of students who entered the department in the Fall of 2001. Most of us were given desk space in the B–70 basement office of Russell Labs. Since I was the only student to remain there for the duration of my doctoral studies, it seems that students typically prefer offices close to their chosen labs, or, just not in the basement. However, there were advantages to a B–70 desk space: First, it was relatively quiet (as long as Tom Dettinger was not sawing/hammering something in his nearby work room); second, there was plenty of space; and third, it was a great way to hide from your advisor. Of course one did need to adjust to the lack of sunlight and the large roach population. With respect to the latter, soon after settling in B–70, Angie Peltier (Grau lab) and I saw a roach crawl out of the microwave oven. Amazingly, it crawled out immediately after she had used it to heat up her lunch! Luckily, I quickly learned to enjoy eating my lunch cold.

Although most of my time was spent roach-dodging in B–70 or performing experiments with *Aspergillus nidulans* on the eighth floor, I did manage to leave Russell Labs occasionally. For this I owe an enormous debt of gratitude to the other graduate students and my wife. Without them, I likely would have worked continuously, possibly only leaving the building to drop off sequencing reactions for analysis at the Biotech Center. Some of our favorite hang-outs were the UW Terrace, Genna's, Brocach, the Great Dane, the Irish Pub and that 'bar with a tree set right in the middle of it.' More innocent activities included beach volleyball next to the Natatorium, "Glow in the Dark' bowling at Schwoegler Lanes, Madison Mallards baseball games at Warner Park, ice skating at Tenny Park, sledding at Elver Park, or camping, hiking and swimming near Devil's Lake. Jian Yao (Allen lab) successfully organized our near-champion intramural soccer team, cleverly named the 'Ascoscores' by Jian Yao and Barrett Gruber (McManus lab), while I organized our last-place softball team of the same name. In addition to these activities, some of my most fond memories (or forgotten memories) were the many

graduate student parties, typically hosted by students Isabel Munck (Stanoz lab), Enid Gonzalez (Allen lab) and Nichole Broderick (Handelsmen lab), and often organized around a holiday such as Halloween, New Year's, and St. Patrick's Day. I have been told that one particularly fun party ended with me sleepwalking and dumping several expensive bottles of liquor down the drain, falsely proclaiming that "I would never touch the stuff again!"

We were also fairly good at socializing during the work week. When I was active in the Plant Pathology Colloquium Committee (PPCC), the first thing we did was change the name to the Plant Pathology Graduate Council (PPGC). (Because the PPGC was also involved in hosting departmental cookouts, another popular interpretation of the acronym (courtesy of Nate Schroeder, MacGuidwin lab), was "Peter (P. Rogers, Stevenson lab) Puts on a Good Cookout!" The second thing we did was to restart weekly informal student-postdoc gatherings, which we eventually called 'SAPS.' I again credit Nate Schroeder with the witty name. For example, plants have 'sap,' or those who didn't participate in SAPS may have referred to those who did as 'saps.' Officially it stood for 'Student and Postdoc Seminar.' The goal of SAPS was to entice graduate students and postdocs to participate in a weekly plant pathology journal club that included free or subsidized pizza. The meetings drew a large group and in later years Jennifer Clifford (Allen lab) and other members of the PPGC were successful in arranging for faculty to come and give career advice, ethics lectures, or other hot topics during the SAPS meetings.

My Most Memorable Experience

It would be wonderful if my most memorable moment as a graduate student involved an experiment proving a groundbreaking hypothesis. Unfortunately, it did not. My most memorable moment came during an overnight trip to Kemp Station as part of the summer field course (PP 559). This was one of my favorite courses because it gave us "molecular-oriented" students an excuse to get out into the field and act like "traditional" plant pathologists.

After arriving at Kemp Station, the students scurried around the lodge choosing their beds. I was particularly happy to get one of the top bunks on the screened porch. Since I was also very excited to get out and enjoy nature, I was only slightly displeased with what I assumed were mouse droppings on the bed. Thinking nothing of it, I brushed them off the bed and headed down to the lake. There, Jian Yao, Frances Yap (Charkowski lab), Min Zhu (Rouse lab) and I took a small motorboat for a quick spin on the lake, only to find out that were quickly lost and had no idea how to get back to the dock. After a seemingly endless time spent skirting the edge of the lake looking for the camp, we finally found it. I thought for sure the other students would have already sent out a search team for us, but it seemed as no one thought anything strange of our extended trip.

Well, after an evening of talking around the campfire (and trying to put a dent in the obscene amount of beer we had purchased for the occasion), we retired to our chosen sleeping quarters. The next thing I remember is being startled awake by a loud screeching noise, which I quickly traced to a bat hanging from a beam inches from my face. Perhaps because of my terror, I recall that the bat looked a lot like something out of a vampire movie, with a furry little face and shiny white fangs. Trying my best to remain calm, I tightly cinched the sleeping bag over my head and whispered down to Ken Frost (Rouse lab), who was in the bunk below me: "Ken, can you hear that? There's a bat in here!" Ken, who is famously laid-back, woke up just long enough to mutter "Don't worry about it, just go back to sleep." Soon realizing he was not going to be any help and also assuming that the whole lodge was bat-infested, I thought I had better get as low to the floor as possible. So covered head-to-toe in my sleeping bag, I slid off the bunk to the floor, inched myself to a vacant sofa (in case there were also rats), and somehow managed to fall asleep to the sound of the bat flapping its wings as it flew up and down the length of the porch.

The next day I learned that bat droppings/guano can look a lot like mouse droppings and bats that are active at night probably do not have rabies. However, I also learned that bat bites are virtually undetectable, so just to be safe I convinced my doctor that I should get the series of inoculations necessary for rabies vaccination. Luckily for me, it's not as painful as it used to be.

Challenges, Influences and Confidence-Building

When not socializing with other students, being harassed by bats or (towards the end of my doctoral studies) helping my wife care for our baby girl, I think I managed to learn a lot about becoming a scientist. Much of this knowledge came from working with or among the Plant Pathology faculty. During my nearly six years in the department I came to view all of them as role models for certain aspects of my developing career. They are truly an inspiring group of scientists.

Of course, my most important role model and the biggest influence on my developing career is Dr. Nancy Keller, my PhD advisor. She introduced me to the exciting possibilities of fungal genetics, helped me find a fascinating research project, led me through some tough times including research and course mishaps, and offered useful advice on everything from research goals, work/life balance and the 'politics' of a scientific career. I also hope to be able to replicate her kind yet demanding nature as a graduate student mentor. In Dr. Keller's lab, wanting a PhD is not enough. This is something that seems rare nowadays, but it makes successfully attaining a degree under her mentorship truly rewarding, and offers her successful students a boost of confidence as they move onto the next stages of their careers.

The biggest source of anxiety during my graduate and postgraduate career is identical, wondering if I will ever be able join the ranks of my role models.

Unfortunately, it is possible to harbor this anxiety for quite a long time. A graduate student hoping for a future academic position could work for 10–15 years, including master's, doctoral and postdoctoral training, followed by a five year assistant professorship before this question can be settled. Then there also exists the possibility of making it all the way to tenure-review, only to be denied tenure. My fellow graduate students and I were made quite aware of this harsh reality when it happened to a popular assistant professor in the Plant Pathology Department. However, my fond and recent memories as a graduate student in the Plant Pathology Department have convinced me that the reward of becoming an academic scientist is worth the risk. Additionally, I am grateful to faculty members who have encouraged me to continue along this path; their kind words are among my most cherished memories as a graduate student.

Reflections of an 80s Grad Student

By Mary Ann Hansen, Class of 1984

Mary Ann Hansen

In the spring of 1979 when I was applying to graduate schools, the plant pathology program at the UW–Madison was one of the two top-ranked plant pathology graduate programs in the nation. I chose the UW Plant Pathology Department not only for its reputation, but also for its flexibility. By the time I had to make a decision about which graduate school to attend, I also had an opportunity to spend a year in Denmark working for the Farm Advisory Service and the department agreed to defer my fellowship for a year. When the time came to reaffirm my intention to matriculate at the UW–Madison in the fall of 1980, I was lying sick in a bed in Denmark with hepatitis, contracted while bicycling through southern Europe. The UW Plant Pathology Department agreed to defer my fellowship one more time to the fall of 1981. In the meantime, they offered me a 6–month salaried position as a lab specialist in the lab of the advisor with whom I had indicated an interest in studying: Dr. John Kemp.

At the time, John Kemp was working with recombinant DNA and transformation of plants using *Agrobacterium tumefaciens*. The early 80s was a very exciting time for molecular biology. The first techniques for recombinant DNA had just been demonstrated by Boyer and Cohen at the University of California, San Francisco, and Stanford University in 1973, so the experiments being done

in Kemp's lab at the time were pioneering. As a lab specialist I was involved in running some of the gels that showed successful transfer of a bean gene into a sunflower plant via *A. tumefaciens*-mediated transformation. It was exciting to be a part of the *Agrobacterium* research group. So many different genetic manipulations were suddenly possible using *Agrobacterium* as a vector.

One of John's graduate students at the time, Cindy Fink, was working on a project moving opine genes from one *Agrobacterium* strain to another. Cindy successfully demonstrated that both octopine and nopaline synthase genes could be stably maintained in one transformed *Agrobacterium* strain, and, ultimately, cotransferred and expressed in plant tissue. I remember Cindy being ushered out of the room where her Master's defense was taking place. She was worried about whether or not she had passed her defense, but when she, with great trepidation, went back into the exam room, she was offered the opportunity, upon completion of a small amount of additional work, to earn her PhD instead! This created quite a buzz among the graduate students, most of whom would have to put in many more long hours before they would obtain data considered worthy of a PhD.

The excitement in the Kemp lab came to a head when *Newsweek* magazine called to say they wanted to interview John and film the lab. Everyone was nervous and excited, although it quickly became clear that what was foremost in everyone's minds was not so much the science, but rather what to wear on the day of the filming! In the end, most of us got very little footage, but John Kemp and his "sunbean" plant appeared in the August 10, 1981, issue of *Newsweek*, alongside such current topics as "The Royal Celebration" (the marriage of Princess Diana and Prince Charles) and the new Reagan tax cuts. John's work, showing that the "bean gene" actually expressed bean protein in the transformed "sunbean" plants, later published in *Science*, was used to demonstrate that, as far as the future of recombinant DNA was concerned, anything was possible. According to the *Newsweek* article, "*if speed breeding proves workable, custom-made plants are certain to become a new growth industry*" — prophetic words, indeed.

In the early 80s, when biotechnology companies were in their infancy, John Kemp chose to leave the university to work for Agrigenetics, Inc., a new biotech company in Madison. As a result, I had to decide what to do next with my graduate career. I took the opportunity to make a radical change to something I had been considering more and more: an applied plant pathology project in which I would be able to work with "real" diseases in the field. Dr. Craig Grau graciously took me on as a Master's student and I began to work on anthracnose of alfalfa, caused by *Colletotrichum trifolii*. My day-to-day research activities changed dramatically from conducting tidy, somewhat predictable lab experiments to confronting the practical problems involved in setting up field experiments, dealing with unpredictable weather, and combating mite infestations of lab cultures. Luckily, Craig was a good advisor, the students in the lab were an amiable group, and field work

appealed to me, so the shift to a new lab turned out to be a positive one. The move down to the second floor from Kemp's penthouse lab had an added attraction: often, at odd hours, I would hear the haunting sound of madrigal singing from the stairwell. Fellow grad student, Cindy Morris, whose lab was on the third floor, was a member of a madrigal group that practiced in the stairwell. Apparently the Russell Labs stairwell had just the right acoustics!

Over time I learned a lot about anthracnose of alfalfa working with Craig, but I felt lacking in practical experience with plant diseases in general. I was intrigued with Sister Mary Francis Heimann's job as diagnostician in the UW Plant Disease Clinic and wanted to learn more about plant disease diagnosis. There was no specific track in the UW graduate program targeted to a career in diagnostics; however, PP 559, the summer field course, provided an opportunity to see different aspects of production agriculture and diseases affecting the crops. Graduate students took weekly trips all over the state in an old white school bus, affectionately known as the "White Whale," with Dr. Deane Arny as our able chauffeur. We visited local fields of small grains, corn, and soybeans, trudged through cranberry bogs in the Wisconsin Sands area, and visited cherry orchards in the northern part of the state. Most of these trips involved no bathroom stops, Deane Arny being the kind of guy who always found his own latrine right behind the bus and who apparently expected us to do the same. One of the big trips of the summer involved a drive to Lake Michigan and the annual "fish boil" and camp-out in Door County. On the night of the camp-out we hoped to see the Northern Lights, which I had never seen. I remember my friend, Caitilyn Allen, and I waking in the middle of the night to the sound of another grad student rustling our tent to let us know the show was on. Alas, after that I remember nothing — I fell back asleep and missed the display! I have never had an opportunity to see the Northern Lights since.

PP 559 piqued my interest in diagnostics, so when I saw a flyer on the bulletin board (that was how we got information in the pre-internet days!) about summer internships in Extension, I wanted to learn more. UW–Extension had a program at that time in which students could apply to work in one of the local county Extension offices over the summer. My field research was complete by the summer of 1984, but I still had to write and defend my thesis. I was offered an internship in Wood County and, although I'm sure he wondered if I would ever finish my degree, Craig was characteristically supportive about my taking the internship. I spent much of my time at the Wood County Extension Office attempting to diagnose plant problems in the office and observing plant problems in the field and landscape. I will never forget how, with great confidence, I diagnosed the cause of yellowing in a homeowner's honey locust tree as a nutrient deficiency problem. Only much later in my career as a diagnostician at Virginia Tech did I realize that the honey locust cultivar 'Sunburst' is supposed to be yellow! Despite my early propensity for misdiagnoses, I was bitten by diagnostics work and gained confidence in my diagnostics skills that summer.

I was grateful that, although a break for this type of internship was not a standard part of the UW Plant Pathology Department's graduate program, I had advisors and administrators who were willing to bend the rules and support my participation in the Extension program. Once again, I was glad I had chosen the UW Plant Pathology Department for that flexibility.

I spent the evenings and weekends that summer handwriting my thesis. I remember my brother calling to inform me that he had heard of a new thing called a "word processor" that would save me a lot of time typing my thesis. Unfortunately, there was no similar invention for illustrating one's thesis. The standard protocol for making graphs and tables in the 80s was to ingratiate yourself with Steve Vicen, the lion of the drafting room, and hope that he would let you use the calligraphy pens and drafting table when you needed them. Those who were on Steve's bad side were doomed. Photographs had to be taken well in advance in order to have the films developed in time to physically glue the pictures onto the pages — grad students of the early 80s understood the original meaning of the term "cut-and-paste"!

Before I could defend my thesis, I had to satisfy the departmental requirement for giving a seminar. I remember how petrified I was to stand in front of the whole department for my first seminar. The department had recently acquired a video camera and had started videotaping the seminars, adding another level of anxiety to the event. If it hadn't been for fellow graduate student, Melodie Putnam, delivering a small bottle of Kahlua to the shelf under the lectern before my seminar, I'm not sure I would have made it through.

In Fall of 1984, I passed my defense and had saved up enough money to honor one of the graduate student traditions of the era: treating all the graduate students in the department to drinks at a local bar. More than one graduate student chose to flunk his or her prelim or defense rather than face the hordes of thirsty grad students at the Copper Grid at the end of the day! The celebrations at the Copper Grid reflected the generally strong sense of camaraderie among the graduate students. The professors were also a friendly, tolerant group. When a group of us showed up for a party at John Andrews' house with our sleeping bags, insisting the event had been billed as a slumber party, we weren't turned away. And when an alarm, set to encourage an early end to the weekly evening epidemiology discussion session, went off under Doug Rouse's chair, he calmly reached down, turned it off, and went on unfazed. Craig Grau probably epitomized the meaning of the word "tolerance" — he didn't blink an eye when lab mate, Eric Holub, and I returned to the lab one day and confessed to having wrecked the state vehicle!

I hated to leave Madison, but by the time I passed my defense, I had landed a job as manager of the Plant Disease Clinic at Virginia Tech in Blacksburg, Virginia. My first summer on the job was daunting. I had to learn to diagnose many different diseases on the vast array of crops (some of which I didn't even recognize!) that

grow in Virginia's three distinct geographic zones. Much of what I had learned in graduate school, both in my research with Craig Grau and in courses, such as John Andrews' plant pathology techniques course, Gene Smalley's mycology course, Luis Sequeira's bacterial plant pathology course, and the summer field course, became immediately relevant. It was also helpful that, in addition to my new colleagues at Virginia Tech, I had a supportive group of UW colleagues, both among the faculty and my cohort of graduate students, to whom I could turn with my many questions. I have continued to rely on them ever since.

As I look back after 25 years in diagnostics, I realize that most of the skills I use on a daily basis, I learned in graduate school at the UW–Madison. Although I was not very skilled in diagnostics at the time I came to Virginia Tech, I brought to my job a solid background in plant pathology, laboratory techniques, preparing talks, and writing. These skills have served me well as my job has evolved over the years to include not only diagnostics, but also teaching, Extension presentations, writing, and international work. In fact, while diagnosing diseases in a tomato field in West Africa in 2002, I found that I was applying skills I had learned in my field and coursework in Wisconsin two decades earlier. Even my early experience in a molecular biology lab has helped me in my career: I now co-teach a course called "Domesticating the Gene" about how humans have changed plant genomes over the millennia; part of the course covers the very transgenic crops about which the authors speculated in the 1981 *Newsweek* article. But I would have to say that, above all the things I learned in Madison, the one lesson that has served me best, from Virginia to the wilds of Africa, is a lesson I learned from Deane Arny in PP 559: don't be afraid to pee behind the bus!

Breakfast with J. C. Walker

By Michael J. Havey, Class of 1984

Michael J. Havey

When I was a student, the other graduate students and I would meet at the Memorial Union's Terrace to enjoy a few beers and reflect upon the founding faculty of the Department of Plant Pathology at UW–Madison. At the APS meeting in Ames, Iowa, in 1983, the department organized a celebration for J. C. Walker's 90th birthday. If my memory serves me correctly, Walker was living at that time in Sun City, Arizona, and received departmental support to attend the APS meeting. The department sponsored an evening reception for Walker, with lots of people in attendance. Walker was lucid and in good health and spirits. Being one who always showed the utmost respect for the pioneers of Plant Pathology at Wisconsin, I stood in a long line of people and eventually shook Walker's hand and shared a few brief words with him. After greeting everyone in attendance, Walker was surrounded for the rest of the evening by Wisconsin faculty and former students. After a few hours, he was obviously tired and left the reception.

My wife Olszyna and I were staying in Friley Hall on the Iowa State campus in a small dorm room with no air conditioning. I remember that it was very warm and humid the night of Walker's reception. After a poor night's sleep, we got up early and decided to go to the ISU Memorial Union for breakfast. We went through the cafeteria line and came out into the dining room with our trays. The room was essentially empty and I put my tray down on the first table. Then Olszyna whispered to me that the "old professor" who we met last night was sitting off to the side and was waving at us. I looked up and saw Walker sitting by himself waving in our direction. I could not imagine that he was signaling to us, so I looked behind me to see if someone else was there. No one was. We walked over to Walker with our trays and asked if we could join him. He said that of course we could, "That's why I was waving at you!" I was very impressed that he remembered that I was one of many students in Plant Pathology at Wisconsin (obviously he did not remember our names).

We sat down with Walker, ate our breakfast, and asked him about the early days of Plant Pathology at Wisconsin. He was very open, frank, and I might say less than complimentary about a couple of faculty members! (However I will not document those aspects of his story!) I was interested to know how the Department of

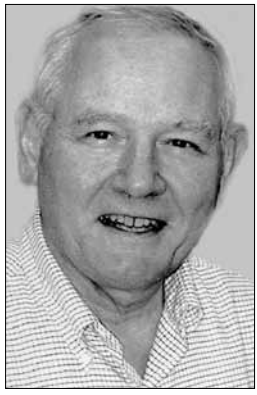
Mike Havey (standing) presides at a game of Plant Pathology Trivial Pursuit held as part of the departmental Christmas party in Union South, 1983. The official recorder (although the manner in which she tallied the score remains highly suspect) is Mary Ann Hansen at the blackboard. Some of the members of the teams at the tables are, from left to right, Paul Williams (captain of team 1), Luis Sequeira, and Doug Maxwell; to the right of Maxwell is John Andrews fully equipped with party hat and swim goggles, captain of team 2. Seated to the left of Williams is an observer, Hei Leung. The recollection is that team 1 was victorious, either because of Hansen's scorekeeping or because Paul Williams kept pressing his buzzer incessantly.

Plant Pathology got such a nice new building (Russell Labs), while Agronomy and Horticulture remained in the Hort/Moore complex. Walker said that in the late 1950s and early 1960s, the former building was very crowded. In an effort to lobby for a new building, he had invited some members of the Wisconsin legislature to visit Hort/Moore to see firsthand how crowded space was there. The legislators agreed to send their people for a visit, but they could only come on a Saturday morning. Walker said that he made sure that all of the plant pathology labs were full of people on this particular Saturday morning. The group was impressed by the number of people working on a weekend, and their crowded conditions. The visitors reported back to their bosses and eventually Russell Labs was built as a new home for Plant Pathology.

Presently I work as a vegetable breeder and geneticist. Disease resistance is always an important aspect of any plant breeding project. As the years have passed, my program has used techniques and germplasms developed by Walker, including the cucumber line 'SMR18' and the famous Wisconsin temperature tanks to select for pink root and *Fusarium* resistance in onion. So, even today Walker's research continues to have a significant impact on vegetable improvement!

Thoughts on 40-plus Years in the Department

By John P. Helgeson (USDA and faculty, 1966–2003)



John P. Helgeson

I joined the Department of Plant Pathology in September 1966. One of the things that attracted me to the position here at the University of Wisconsin was the formation of the "Pioneering Research Laboratory." The new lab added three new faculty members to the department and this was probably one of the lures that Glenn Pound used to pry Arthur Kelman away from a tenured, endowed professor position at N. C. State. Initially the laboratory consisted of the leader, plant pathologist Rick Durbin, a biochemist (Chris Upper) and a plant physiologist (myself). John Kemp, another biochemist, joined the group in 1968.

The late 60s and early 70s were really fine times for basic research and for research funding. When we arrived, we were promised a great deal of freedom to choose research projects and to follow developments where they might lead. Each staff position also came with some fixed research support and a position for a support scientist for each of the team members.

The initial plan for the USDA people was to fully integrate them into the department. To a large extent this was accomplished, at least initially. We were eligible for Graduate School funds that were provided to new faculty. We participated in teaching and in service to the department, the college, and the university. For example, over the years I was a member of the Graduate School research committee and the Graduate School administrative committee. I served on the Biotron committee, the crop physiology committee and eventually chaired the campus institutional biological safety committee. In the department I taught in several courses and directed the seminar program for several years.

The University of Wisconsin was a very different place in the late 1960s from what it is now. The Vietnam War was in full swing and campus protests were very loud and even violent. As there was no faculty senate, the faculty met as a committee of the whole. I remember walking to the Union Theater on a sidewalk lined on either side with screaming students who waved banners demanding that the faculty vote on a resolution to condemn the war. The campus army ROTC building, T–16, was located in a wooden barracks-like building across the street from Russell Labs. At times tear gas wafted into our building. Perhaps the students were so vocal then because there still was a draft. The thought that one might be conscripted and then

be shot at in Vietnam really did focus some minds. Things quieted down dramatically after the bomb went off in Sterling Hall. At the time I lived some three miles away from the campus but awoke with a start at the explosion. The Physics postdoc who was killed in the blast sang next to me in the tenor section of the Festival Choir.

I marvel at the changes that have taken place in lab equipment over the years. I remember paying $450 for a dual floppy disk system that allowed random access to 256 kb of data on 5-inch vinyl disks. About that time I went to our chair, Jack Mitchell, and requested $1500 to double the RAM of my computer (from 15 to 30 Kb). Our first scintillation counter used solenoid fingers to enter data from punched tape. Today one simply dials in the sequence of bases one wants synthesized by the DNA synthesizer and then sits back and waits for the product!

The late 60s were also quite different in dress and hairstyles. Chris Upper and I arrived about a week apart in September 1966. At the time we both had crew cuts. (For a while one member of the faulty had trouble telling us apart; see photo next page.) We also dressed much more formally. Ties and sport coats were the norm when one was teaching, and often at other times. Not many people bother to wear anything but jeans these days.

My research program evolved greatly over the years. In this space I can only describe a few directions and, unfortunately, won't have space to mention and thank many of the postdocs, graduate students, specialists and undergrads who helped me along the way. I am truly grateful for the many people who helped in so many ways. I hope that I will be forgiven for the omissions and inaccuracies that follow.

Prior to coming back to Madison I had been working on cytokinins and Chris Upper had been working on gibberellins. Both types of plant hormones profoundly affect tobacco tissue cultures and both are produced by plant pathogens. Might these tissue cultures be a useful tool for understanding disease resistance? To set up such a system, Chris, Geri Haberlach and I measured effects of cytokinin concentrations and the modifications generated by gibberellic acid added to the medium. Eventually we moved on to study sugar depletion of media and tissues as limiting factors in growth.

Arthur Kelman sent to his colleagues at North Carolina State to obtain seeds from some special tobacco lines that carried a gene for resistance to the black shank disease. Geri, John Kemp, Doug Maxwell and I started to develop a tissue culture system for studying the disease and Chris, Geri and I clearly showed that the gene conditioning the resistance could be expressed in the cultures.

I remember one set of experiments particularly well. We were interested in seeing if light intensity or temperature affected the resistance of the cultures. The Wisconsin Biotron had just been finished and one facility was the "cross-gradient" room where temperature varied from 15 to 32 C along one axis and light varied from about 30 to 1100 ft-c along the other. We had 16 different carts, each with 30 petri plates set to obtain the 16 different conditions that this permitted. We placed

Gentleman scientists ready for action in the 1960s era! John Helgeson (left) and Chris Upper (right), professors and members of the departmental USDA Unit.

small rings of sterile tygon tubing on each of the 6 pieces of tissue in each of the 30 plates on each cart. It took us about 4 hours just to inoculate each of the 2880 tissue pieces with a drop of zoospore suspension! Each day we would spend about 4 hours reading the progress of the infection or hypersensitive reaction in the case of susceptible and resistant tissues, respectively. Each experiment gave us what we would have needed 16 growth chambers to obtain. Best of all, the Biotron people wanted to fill their space initially so our experiment was free!

Later, Geri, Al Budde, Luis Sequeira and I studied the modification of resistance expression by cytokinins. With high cytokinin concentrations in the medium, the hypersensitive reaction of the line carrying the resistance gene was suppressed and the resistance was not obtained. These results were similar to those that Victor Dropkin, Chris and I had noted in 1969 with tomato root cultures treated with cytokinins. The hypersensitive reaction to the root knot nematode was suppressed and the seedlings of a resistant variety became susceptible.

About this time Rick Durbin, Martin Wilson, Peter Conrad and Chip Styer, were looking at protoplasts isolated from tobacco leaves and their potential use in somatic hybridizations. This led me to think of another direction, the production and somatic hybridization of protoplasts from many different *Solanum* species related to potato. Perhaps we could do some of the same sorts of studies with potato, a plant that supports rather than kills people.

I obtained seeds of a number of wild potato species from Bob Hanneman at the USDA gene bank at Sturgeon Bay. Geri, Sandra Austin, Marlette Baer, John Pohlman, Greg Hunt, Rich Novy and I set out on a whole series of experiments to obtain viable protoplasts from the leaves of these species, to fuse them to potato protoplasts and to regenerate whole new plants from the fusion products. Initially we concentrated on *Solanum brevidens,* a species that is highly resistant to potato leaf roll virus but can't be crossed with potato. In fact, plants of *S. brevidens* don't even form tubers. With the somatic hybrids we were very lucky. We found that the somatic hybrids of potato and *S. brevidens* actually formed tubers, were highly resistant to potato leaf roll virus and could be backcrossed to potato. Resistance could be passed on to progeny from crosses with susceptible potato lines. We were off and running a project that was to last until my retirement in 2003.

One aspect of this work was actual field experimentation with the somatic hybrids and their progeny. For a plant physiologist who had never worked in the field this was a truly radical change! It was great fun to go to the field and escape the telephone that always seemed to ring at inopportune times. In 1994, a severe late blight epidemic hit potato fields in Wisconsin and other major potato producing states. At that time, our group was working with Walt Stevenson and Vaughan James to select early blight resistant lines from crosses with somatic hybrids between *S. bulbocastanum* and potato. Amazingly, some of these plants were also highly resistant to late blight. The sight of fields blackened by late blight, but with green islands of resistant plants, was truly spectacular. With my video camera I shot a short sequence starring Walt Stevenson and Luis Sequeira. I sent the tape to Washington and a week later two national program administrators descended on us to view the fields. It was late August by then and, fortunately, the USDA administration still had some contingency funds left. These were provided to us so we could expand our work in Madison.

The new USDA funds, along with the newly awarded NSF potato genome grant, gave us the resources to map and eventually isolate a gene from *S.bulbocastanum.* This gene, when transformed into a susceptible potato gives excellent resistance, even in Toluca, Mexico, where the disease probably originated. This took us about nine years and I must acknowledge a whole group of collaborators. With mapping tools developed by postdocs Christie Williams, and Mitch McGrath, postdoc Kristine Naess was able to map this resistance to chromosome 8 of *S. bulbocastanum.* Eventually Jim Bradeen, Kristine, Sandra Austin, John Raasch, and Susan Wielgus, along with Jiming Jiang and Junqi Song in Horticulture isolated the gene responsible for the resistance and transformed it into a susceptible potato line. Just before I retired in January 2003, we got the final confirmation that the transformed susceptible plants were resistant to late blight both in the field and in the lab. We hope that some day objections to GMO's can be overcome and these potato

lines, containing a gene from a wild potato, can be used to decrease the excessive fungicide use now employed to protect the crop.

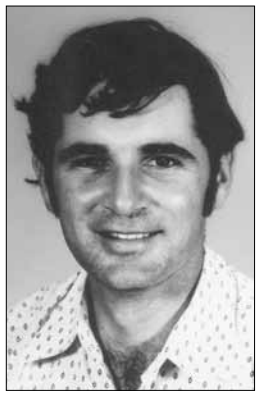
When I arrived in 1966, the department had been in the new Russell laboratory building for less than two years. J C. Walker had retired just two years previously, Glenn Pound had just moved to Ag Hall and the new department chair, Arthur Kelman, had come from North Carolina the previous year. Since I joined the department, 43 years have elapsed and there have been many changes. In 1968, 24 plant pathology faculty members were housed in the new building. Today, a glance at the web site for the department reveals that only 15 faculty are housed in Russell Lab. Then we reveled in the beautiful new space! Now the building is deemed grossly inadequate.

The numbers of faculty may be down but there has been one very positive change. There were no women on the faculty in 1966. In fact, it would be more than 20 years before we had a tenured women faculty member! Today we can boast that six of the 15 members in Plant Pathology are women and two others, who were once housed in the building, have moved to the new microbiology building. So the department has evolved in many ways from the one I joined in 1966. The future will provide many challenges to those who carry the torch today. I wish them great success.

Dale Frame, field and greenhouse staff, 1956–84 (left), John Irwin (center), and Deane Arny, 1994.

Recollections of My Time at the UW Plant Pathology Department

By John Irwin, Class of 1980



John Irwin

While 32 years have elapsed since I first arrived in Madison, my memories of the time spent there are very vivid. Little did I realise that on that day in mid-July 1977 when my wife Hilary, our 2 year old daughter Genevieve and I stepped off the plane, it would be the start of an experience which would so profoundly influence the rest of our lives. We still have very fond memories of the three years spent in Madison, which we regard as our second home. Our daughter Vivienne was born there in 1978.

I went to Madison to complete a PhD in plant pathology/plant genetics with the primary interest being in breeding for disease resistance. At that stage I had worked as a plant pathologist in Australia for six years, and had funding support from Australian industry and my employer, the Queensland Government. While this prior experience was a help, I quickly found I had a lot to learn in the fields of genetics and breeding, and in a lot of other areas to which I had received little previous exposure. At that time there were about 55 postgraduate students in the department along with over 30 faculty members. Dr. Jack Mitchell was chair, and he led an extremely collegial team. The faculty showed a sincere interest in the academic and personal development of the postgraduates. The communal coffee room on Level 4 was the scene of many thought-provoking discussions. A large attendance always materialised for the morning break.

Scientific excellence and industry relevance were the goals, and this was something that undoubtedly imprinted on the postgraduate core. In the rest of my career, I have never seen the same level of dedication and enthusiasm for the discipline exhibited anywhere else. The same comments apply equally well to the Agronomy Department where I spent considerable time working on my plant breeding minor. Across all departments the standard of postgraduate coursework subjects and teaching was extremely high, with a lot of the subjects being based on the current literature.

I have thoroughly enjoyed the rest of my scientific career, and have tried to emulate UW's ethics. I can honestly say that I have at least the same level of enthusiasm for my work (alfalfa genetics and breeding) that I had at the start of my career. Many people at UW have subsequently provided me assistance in

Australia. Luis Sequeira was International Visitor to a national research centre in tropical plant pathology I ran for 14 years. Without the support I received from Luis, my job would have been a lot harder. Ed Bingham and I still work together on alfalfa breeding; we are in daily email contact. John Andrews has contributed significantly to our education activities at UQ. Craig Grau and Doug Maxwell have provided help with my research over the years. These are only a few of the interactions that have continued on long after my departure from UW.

The technical staff were also a great lot of people. Every one of them went out of their way to be helpful. The late Dale Frame, in particular. was a great friend to me. He was of great assistance with the glasshouse activities, and he and I spent not a small amount of time fishing. I often reflect on those nice little trout streams running through farms near Black Earth. Hilary and I also enjoyed the little towns like New Glarus and Mount Horeb, which we would often visit on a Sunday afternoon.

On reflection, we have nothing but great memories of UW. That the Plant Pathology Department is celebrating its Centenary is a very significant event. It can be well proud of its past achievements, and can look forward to building on them. While the faces may change, the same spirit of achievement, I am sure, will continue to prevail.

Perceptions and Aspirations from the Grass

By Jim Kerns (faculty, 2008–present)

Jim Kerns

I was sitting at my desk at North Carolina State University preparing a manuscript for publication when my advisor, Lane Tredway, appeared at the door. In his hand was a job description from the University of Wisconsin–Madison. He then said, "What do you think about moving to Wisconsin?"

Before I continue, let's go back a few years. I think it is important to give a little background on myself. I am a native of Wheaton, Illinois, though I only lived there for seven years. My family moved to Texas, specifically, Houston and McAllen. The next journey with my family was to North Carolina. I attended high school there and participated on the varsity baseball and golf teams.

After high school I enrolled at North Carolina State University in the Agronomy program. During my undergraduate studies I worked in two research labs, those of Dr. Charles Peacock and Dr. Wendy Boss. Peacock's program focused on turfgrass

physiology and culture. I helped him with various fertility, establishment and physiology studies. In the Boss lab, where I spent six months, I was first introduced to molecular biology. At the time, she was working on a NASA-funded project whose goal was to determine the mechanisms behind gravitropism.

Although Dr. Boss's research was extremely interesting, I was more passionate about the research I did with Dr. Peacock. My two favorite disciplines during my undergraduate studies were Soil Science and Plant Pathology. When the time came to pursue my graduate education I applied to programs in both disciplines. After a long debate, I decided to attend Texas A&M University to study phosphorus export on turfgrass sod. My particular project focused on determining phosphorus and nitrogen leaching and the effects of compost applications on soil physical and microbial properties.

During my Master's project my mother passed away from a rare form of cancer. Admittedly, I lost my focus on my graduate work for a while. However, with help from my major advisor and fellow students, I was able to salvage my degree.

After regaining my focus, I decided to pursue a PhD. I spoke with David Shew at North Carolina State University and he mentioned that a new assistant professor, Lane Tredway, was doing really well. I had a great conversation with Lane and after a visit I decided to go back to North Carolina State.

My PhD research focused on the etiology, epidemiology and management of Pythium root dysfunction. I had the rare opportunity to get back to plant pathology basics by performing Koch's postulates, morphologically identifying *Pythium* species, and investigating the optimal temperatures for infection. The department at North Carolina State will always be very special to me because of the outstanding training and mentoring it provided. More importantly, North Carolina State is where I met my beautiful wife, Anna!

Now back to the subject of moving to Wisconsin. As Lane placed the description on my desk I started to think about my application. Truthfully, I never thought I would get an interview, especially considering I was finishing my PhD research at the time. I submitted my application packet and at the APS meetings in July of 2007 I met many of the search and screen committee members. As I recall, my talk started around 8 a.m., the room gradually filled with many of my turfgrass pathology colleagues. As I approached the podium I noticed that Walt Stevenson entered, followed by Murray Clayton, and then Caitilyn Allen. My level of nervousness increased exponentially when I saw them enter the room.

A few weeks after APS, my phone rang and Dr. Allen was on the other line. When she introduced herself, I thought for sure it was a call of rejection. However, she informed me that I was given an interview! WOW! I was so excited I ran down to Lane's office to tell him. The news spread throughout our department faster than *Pythium* blight in a perennial ryegrass sward. Then the rumors about the Plant Pathology Department at UW–Madison began to surface. I heard things

like, "You're going to the pressure cooker," "Do they even know what Extension is", and "They are rough on new faculty." Well, this was very concerning to me; even though they were rumors, there must be some fact behind these statements. Finally as I was lamenting over these comments, a faculty member at North Carolina State said, "Go and find out for yourself!" I took that two ways: stop worrying and accept the fact you got an interview, and go and judge them for yourself.

My interview was at the end of September 2007 and I thought it went really well. I thoroughly enjoyed my interactions with everyone in the department and after the final day I sent an email to Lane saying I think I've found a home if they'll have me. Despite the fact that my interview went well, I was not confident that I would get the job, basically for two reasons — I was inexperienced and that I could not start until May or June of 2008.

It was a Saturday in mid–October. My wife and I had traveled to Boone, North Carolina, for an Appalachian State football game. It was homecoming weekend. The game had just started when my cell phone rang. The area code of the caller was vaguely familiar but I did not immediately recognize it. I answered the phone and the person said, "Hello Jim, this is Murray Clayton." Right as Murray spoke his name, ASU returned a punt for a touchdown. The crowd erupted in cheer leaving me to run out of the stands asking Murray to hold on. I was very embarrassed! Murray informed me of the department's intention of offering me the turfgrass pathology position. I was told the offer letter would be drafted shortly and emailed to me.

After I closed my conversation with Murray, my hands were shaking with excitement. I remember having a difficult time scrolling through my contacts to call Lane and my family. Lane Tredway's reaction was priceless. He was just as excited and maybe even more excited than I was! We had both worked very hard to get to that point. To say the least, I was not very interested in the football game after my conversation with Murray.

Turfgrass pathology has a remarkable history in the Department of Plant Pathology at UW–Madison. Two graduates of our department, John Monteith, Jr., class of 1923 and Arnold S. Dahl, 1931, wrote the first comprehensive publication on the nature and management of turfgrass diseases. Although our department did not have a permanent turfgrass pathologist until Gayle Worf was hired, I claim the birthplace of turfgrass pathology was at Madison! I am enthralled to be a part of the legacy of turfgrass pathology here. It would be absolutely fantastic to have my picture (like Dr. Worf's) placed somewhere at the OJ Noer (hopefully somewhere other than the bathroom) when I retire.

My first year in the Department of Plant Pathology has been fantastic. The rumors I heard about the department were incorrect. Everyone has been very helpful and the university wholeheartedly supports assistant professors. I think the rumor of UW–Madison being a pressure cooker stems from the idea of excellence. Personally, I enjoy being part of a university that strives to be the best.

Not only have I enjoyed working with my Plant Pathology colleagues, my turfgrass colleagues have been a joy to work with as well. Having three young colleagues in turf really makes my job more enjoyable and less stressful. I do think it's funny that Dr. John Stier is the "old guy," yet he has only been here for 12 years. Nevertheless, the turf group is very young and extremely active. We currently have 11 graduate students amongst the four of us. For a state with only 5.5 million residents, that's a pretty powerful turf team. I am looking forward to helping the team move into a regional center for turfgrass research and education in the future.

Future is a good word to focus on for the remainder of this chapter. Being a relatively new hire, I do not have all the colorful stories that many of my more senior colleagues do. Therefore I think it is more appropriate to state my vision for my program at UW–Madison.

Turfgrass is an important industry for Wisconsin. The turfgrass industry contributes over a billion dollars a year to the state's economy and is responsible for employing almost 50,000 people. Wisconsin has a very large and supportive turfgrass industry that yearns for education. Presently, the environmental impact of turfgrass swards has come to the forefront of the public. Basically, as far as many people in the United States are concerned, turfgrass is a plant that is not needed. However, it is well known, although not widespread publicly, that turfgrass swards are more environmentally friendly than rain gardens and prairie systems when maintained properly. Turfgrass swards can be maintained effectively with minimal inputs.

My goal for the turfgrass pathology program at UW–Madison is to investigate the etiology, epidemiology and management of Wisconsin's important turfgrass diseases, and use that research to help turfgrass managers implement sustainable management strategies. Much of the basic biology of very common turfgrass diseases such as dollar spot, anthracnose, rust and necrotic ring spot is unknown. By understanding the biology of these diseases better, we will be able to help turfgrass managers effectively manage turf diseases with minimal inputs. With the recent economic downturn, we are also putting an economic component in all of our research projects. For example, we are working on developing and validating a dollar spot forecasting model. To emphasize the benefits of using a forecasting system, we are calculating how much golf course superintendents can save by spraying fungicides based on our model.

The overarching goal of my program is to provide sound, sustainable management recommendations that are based on research conducted throughout Wisconsin. Of course, one of my major goals is to obtain tenure and if that happens, I have another career goal. One of the only disappointing aspects of my job was the lack of a teaching component. I understand that three-way appointments are next to impossible to evaluate, so I see the rationale for not having teaching as a formal component. However, if I complete the tenure process successfully, I would like the opportunity to teach Introductory Plant Pathology. I know I probably should

not make this particular aspiration public, but I do feel very strongly about it. One of the main reasons I chose plant pathology as my discipline was because of the instructor of our introductory course, David Shew. Although teaching that course was extremely time-consuming for him, he genuinely enjoys teaching his discipline to undergraduates. I guess I want to experience for myself the rewards of teaching a large undergraduate course.

Finally, a major component of my program is the Turfgrass Diagnostic Lab (TDL). We provide diagnostic services to all turfgrass managers of Wisconsin and throughout the Midwest. My vision is to expand the TDL into a self-supporting entity with a permanent, full-time diagnostician. I want the TDL to become the premier turfgrass diagnostic lab in Midwest.

I am truly lucky to have the opportunity to participate in our department's Centennial publication at such an early stage in my career. As I continue my career I know I will have many interesting stories of interactions with the turfgrass industry and my colleagues in the Department of Plant Pathology and I look forward to sharing those in the future.

Making the Most of Your Grad Student Days

As told (largely) by Linda Kinkel, Class of 1988

[Editor's Note: The following piece, with minor modifications, appeared originally as an interview with the editor of the 2007 Pathogen.*]*

Linda Kinkel

In 1983, three young, aspiring plant pathologists came together as lab mates under the tutelage of Professor John Andrews in the Department of Plant Pathology. Linda Kinkel, Caroline Young, and Mark Boudreau, all idealistic and ambitious in different ways, supported each other in the quintessential graduate student experience — spending long hours in the lab, sometimes sleep- and social-life-deprived. They recently reflected on their time together and the influences that guided them down their successful career paths.

The three graduate students ended up together by chance, with the common interest each had in biological control and ecology. *"Caroline came from England, which brought a different perspective. I was a Midwestern girl from St. Olaf, a liberal arts college,"* said Linda Kinkel, now a professor of Plant Pathology at the University of Minnesota. *"Mark came from a different place. Caroline and I came to do science,*

Linda Kinkel (left), Cindy Morris, Mark Boudreau, and Caroline Young at the joint APS/CPS annual meeting, University of Guelph, Ontario, 1984.

while Mark came to pursue sustainable methods. Mark's perspective made Caroline and me think differently about our work. Each of us evolved to see each other's worldviews in a way that was really neat." Mark Boudreau came to UW after several years running an organic gardening program for the Urbana Park District. After earning his Master's at UW, he went to Oregon State University for his PhD, during which he was awarded a Fulbright Fellowship for research in Kenya. Mark went on to teach at Eastern Illinois University, Warren Wilson College in North Carolina, and Clemson University. He now runs his own science consulting company based out of North Carolina and also pursues a career as a science writer. *"My experience* [at the UW] *was very seminal and important. It was intense. The department is very good, world class, very challenging, with high standards. And John Andrews epitomized that approach, creating a bond among his students,"* said Mark about his experience in the department. The alumni each acknowledge that the mandatory meetings John held each Saturday morning with his graduate students were a "rite of passage," often followed by the three going to lunch together to share in each other's successes and concerns.

Caroline Young, now back in England, had a postdoc in the UK after earning her degree from UW. She now works for ADAS, a privatized equivalent of the U. S. Extension service. The company provides independent research to farmers and the government, and Caroline is working on projects on field lettuce, barley, and oilseed rape. She credits UW for her plant pathology expertise. *"Linda and Mark were a very positive influence — they were always good at answering questions, always very giving of their time, and generally got me through the difficult times, whether they know it or not,"* adds Caroline. *"I would like to add that there were many other people in Russell Labs who gave me lots of help and encouragement."*

Now, Linda describes her efforts to be a first-rate parent and do first-rate science — what she aspired for over 20 years ago. And she continues to be inspired following the careers of her colleagues from UW. *"Look at what they're doing, that is so cool. We shared that exact dream when we were 25. We had those conversations*

at 12 or 1 a.m. in the lab," says Linda. *"None of us are CEO's, or work at Wal–Mart, we are doing exactly what we came to Madison to do. Each doing the science we cared about then. John Andrews gave us the tools, UW–Madison gave the skills, and none of us lost the skills we came for. That's the inspirational piece, but they're doing it."*

As far as advice for current graduate students in a similar lab like these three alumni, Linda encourages students to take advantage of this unique time. *"Be passionate about it. It's a gift to be able to immerse yourself in your work. Part of this [experience] is your relationships with grad students. Embrace those people who can be so important in your life. The field is not that big, you will track each other for your whole life. We shared this great intense period of time in our lives together, all our hopes and plans and big dreams. I am proud of how we each have now spun off into very different productive lives in plant pathology or related fields, working hard to translate our education into something meaningful."*

Our Lives in Plant Pathology

By James E. Kuntz and Helen Hartley Kuntz
(as recounted by James Kuntz; faculty 1947–84)

I was born in Leipsic, Ohio, a German-Dutch farming community, where, at an early age, I helped my grandfather with farm chores (my first introduction to plant pathology). My interest was stirred in high school where General Science included a section on "Diseases of Farm Crops" in which their symptoms, causes, and cures (if known) were studied. Also, I listened closely to farmers, discussions at farm meetings, and county agents.

Jim & Helen Kuntz

I intended to enroll at The Ohio State University to study agriculture, but Ohio Wesleyan University offered me a scholarship; hence, I registered in biology, including microbiology. In my senior year the department chairman said, "You must go to Graduate School." I chose the University of Wisconsin where he arranged for me to have an assistantship with B. M. Duggar in Plant Physiology. In two years I received a Master's Degree and transferred to Plant Pathology as a student and assistant to J. C. Walker. Duggar did not hesitate to turn me over to Walker, since he said that Dr. Walker was a "fishing buddy of his."

Forest pathology discussion in the field. Jim Kuntz (center), Bob Patton, (left, in white shirt), and Earl Hanson (right, in jacket and partially obscured by branch) with class.

Later, wedding plans were made with Helen Hartley of Troy, Ohio, a student in Library Science, for a Christmas event. When so informed, Dr. Walker insisted that I return promptly for the exam week! Therefore, we came back quickly, sitting on our suitcases riding in a troop train (no honeymoon)!

In the spring I left before classes had ended, and in the fall I returned after classes had started. In the summer the field work was established at the Truck Crops Field Station at Petrifying Springs Park in the Kenosha area. Glenn Pound returned to Madison, and I was in charge of Doc Walker's vegetable field experiments. Wally Reiner, my wife, Helen, plus local farm boys, and guarded German war prisoners were the field helpers. Frequently my research on spinach viruses was done at night by field truck headlights. In one instance in late May over Memorial Day holiday, Helen drove the tractor pulling the planter in a late snowfall, while I planted the young cabbage plants.

In Extension we worked on spinach, cabbage, and tomatoes with the area vegetable growers. My later responsibility was to improve and select varieties of tomatoes, culminating with tomato "Wisconsin 55."

Helen's participation in Plant Pathology began in the summer of 1943, when she became volunteer cook for the grad students living at the lab. With everyone pooling their food stamps and from field plot samples, we all survived the bride's cooking.

After receiving my PhD, I joined Dave Walker (Doc Walker's brother) working with the Cabbage Seed Company in Racine as a breeder, pathologist, and salesman. (At this time there was a national effort for research to produce vegetables for the US and our Allies under the Lend-Lease Program.)

After one year, A. J. Riker requested that I return to Madison as forest pathologist in cooperation with other departments in research in this new division of Forest Pathology and Forestry. Soon after, Robert Patton was hired to teach forest pathology. The Wisconsin Conservation Department, US Forest Service, and other agencies provided outstanding financial support, cooperation, and assistance. My research was on hardwoods, while Patton's was on conifers.

My major responsibility was oak wilt — its pathogens, host range, means of spread and control, and other diseases for research during the summer with graduate students at various field stations, with the main one at Griffith State Nursery at Wisconsin Rapids. Riker's philosophy was that "the campus extended throughout the state." With support, I visited research stations in European countries from Norway to Spain and included the international conference where I presented a research paper in Switzerland in 1957. Meanwhile, I taught farm short course, introductory plant pathology, plant disease control, and guided graduate students from the U. S. and many foreign countries.

From 1970–72, the Department of Plant Pathology sent me to Nigeria in West Africa as Dean of the newly established Agriculture Departments of the University of Ifé, where I taught plant pathology. We in the Plant Science Department developed research facilities, modern greenhouses, a photo laboratory, and a farm field station. During my "R & R" we visited research stations in West Africa and East Africa. At a meeting of US farmers on a tour in Ethiopia, I reviewed the Wisconsin-Ifé agriculture program, which their leader said was "outstanding."

While I was involved in administration, Helen rearranged the Ifé agricultural library for better circulation of materials. In later years (1977) when the Plant Pathology library in Russell Labs was being considered for merger with Steenbock Library, Helen was offered the position of departmental librarian, so that the Plant Path Library could remain in the department. For seven years until retirement in 1984, she was the librarian.

I retired in 1984, sold the last Ohio farm, and sponsored the Kuntz Environmental Education Center at Pine Lake at Westfield, Wisconsin.

Stranger in a Strange Land: My Introduction to the World of Plant Pathology

By Karen Lackermann, Class of 2010

Karen Lackermann

Unlike some of the other people who are contributing their recollections for this Centennial project, I don't yet have a long history in this department. When I graduated from college two years ago, I had no idea what to do with my undergraduate biology degree. I had never considered plant pathology as a potential field because to be honest, I'd never heard of it. Even now, I often stop and think about how amazing that is. I joined the department in the fall of 2008 feeling unprepared and uncertain about my future, but also ready to flex my mental muscles in a new arena. I will do my best to describe the combination of excitement and apprehension I felt as I entered graduate school and tried to find my way in this new and often mystifying plant pathology world.

I spent two weeks in Madison during the fall of 2007 meeting with a handful of professors from an assortment of life sciences departments. One of the first people I met was Craig Grau, who spent over an hour telling me about his research and career. He spoke with a passion that made plant pathology sound fascinating and progressive and critical to a world dependent on agriculture. On his recommendation, I met with Paul Esker, a professor who was new to the department and was taking over the role of field crops pathologist. After meeting with him twice, Paul impressed me with his thoughtful approach to graduate student education. He was full of ideas related to possible research projects, but his focus wasn't just on how I would fit into his research program. For instance, when he learned about my interest in Extension, Paul changed the focus of my project to give it a direct Extension focus. I thought I had gotten through the difficult part by finding an advisor I wanted to work with, but Paul made it clear that he had to wait until he had heard about funding before he could offer me a position in his lab. For two months I waited anxiously not just to hear if I'd been admitted to the department, but also if I'd be able to join Paul's lab. I was so thrilled when all the pieces came together and I could start to imagine myself as plant pathology student.

Seeing the new class of students go through the first days of classes and the confusion of starting in a new lab, I can't help remembering the thoughts I had at this same time last year. After spending an entire summer imagining my life as a graduate student, I was now facing the reality. Although I had spent a summer

working in a research lab as an undergraduate, I really didn't have a clear idea of what to expect from graduate school. Did having a half-time appointment really mean that I was only working half time? Would I be smart enough to succeed in graduate classes? How would I come up with a relevant scientific question to research when I was entering a field I knew so little about? In four years of college, I hadn't taken a single botany course. Would people notice that I didn't remember the difference between a stamen and a style? The week before school started I had cold sweats imagining that I was going to be quizzed about the light and dark reactions of photosynthesis as soon as I walked into Russell Labs. I knew that it was just a matter of time before my ignorance of the Calvin-Benson cycle became public knowledge and I would be sent packing before I even had a chance to begin. One year in, that fear has yet to be realized.

By the end of my first two weeks, I felt like I was living and breathing plant pathology. Every single person that I knew in Madison was in some way connected to Russell Labs. When I wasn't in classes, I spent my time reading papers full of terminology I'd never heard. I made a long list of terms to define, including words like silage, dockage, and lodging that I was embarrassed for anyone to know I had not mastered. There were many lectures during Plant Pathology 300 where I felt like I was being taught the vocabulary of a new language. During my four years as an undergrad biology major, I spent very little time studying fungi, and I certainly never imagined that one day I would know the names of dozens of fungal structures. With enough Latin names and life cycles to make anyone dizzy, I did my best to learn this new plant pathology language, even resorting to the invention of silly mnemonics and poems to remember features of specific diseases.

My new plant pathology life wasn't just restricted to the classroom. In early September I spent a weekend bonding with my lab group as we cleaned 10 years of dirt and abandoned field supplies out of the plant path lab at the Arlington agricultural research station. Although this may not sound like a fun way to spend a Saturday, we were out of the lab, getting dirty together and laughing about it. There was just as much dirt but a bit less laughter the following week when I spent my first day in the field collecting soil samples. The ground felt like cement, the soybeans were dry and scratchy, and I was sure my fingernails would never be clean again. Over the next couple months I spent a lot more time in the field, harvesting ears of field corn and hauling corn stalks around. I loved these fall days and relished the opportunity to get out of the lab and work outside.

Paul didn't forget my interest in Extension, and during the spring of last year, he gave me the opportunity to be a presenter for the first winter wheat workshops held in Wisconsin. This would be my first experience with Extension and I was both excited and nervous as I prepared for the first of three workshops. When we arrived at the Rock County Fairgrounds, we discovered that instead of the 20 people we'd been expecting, there would be 50 people. Although I had practiced my talk and I

Karen Lackermann (center) in corn plots with other members of the Esker research group (left to right) Jennifer Jirak , Paul Esker, and Chakradhar Mattupalli.

knew I was prepared, I couldn't keep my whole body from shaking as I stood up in front of the room and spoke to people whose livelihoods were centered on agriculture. I was sure they'd be able to tell I was a phony who hadn't grown up on a farm and didn't know the difference between a chisel plough and a cultivator. Why would they take me seriously when I had so little real experience in agriculture? However, once I got through the first five very nervous minutes, my arms had stopped their embarrassing shaking and I found that the experience was completely exhilarating. By the end of my half-hour talk I'm sure I was grinning like an idiot and I couldn't wait to go through the whole thing again the next week. Anyone who's ever had a similar experience will understand what a powerful confidence boost I felt that day.

My first field season was an exhausting experience. By coincidence of weather and developmental stage of my wheat, I started my field work the weekend before my second semester final exams. Paul and I estimated that it would take me about eight hours to collect all the samples from my Janesville location, which, with 480 plots was my largest site. My plan was to collect the samples on Saturday, assess them Sunday morning, and then get to work on my PP 505 take-home exam, which was due on Monday at 3 p.m. I got to the field around 9 a.m. that Saturday morning and quickly realized this was no 8-hour task. By 6 p.m. that evening I was less than half done and I was feeling both exhausted and demoralized. My back was screaming and it seemed possible, after about 1000 clips of my clippers, that my fingers might never straighten out again. The thought of having to go back

and do it all again the next day had me perilously close to tears. To push myself through the next day and many more like it over the next few weeks, I started to imagine that I was some sort of endurance athlete, competing in a grad school triathlon I hadn't really trained for. I had a task that had to be completed and no one else was going to do it for me, so I'd better get to work and finish the job.

By 3 p.m. on Sunday, I was on the road back to Madison, not to go straight to bed as I might have wished, but to start the second leg of my imagined endurance event. I stayed in Russell Labs until 11 p.m. that night assessing my samples, looking for tiny flecks of leaf rust and mentally haggling over necrotic leaf spots. I felt like I was drowning in wheat leaves and everything was taking so much longer than I'd planned. I knew my samples wouldn't last long and more than that, I couldn't afford to fall behind on the assessments. The last leg of my triathlon still loomed large—those final exams that I now felt ill-prepared for had fallen to a low priority. Out of necessity, I spent a mere three hours on the PP 505 exam, running it to the plant path office five minutes before the deadline.

My life was now consumed by wheat—I collected samples in Lancaster the next day, squeezed in my statistics final on Wednesday, and sampled in Chilton and Arlington on Thursday and Friday. Boxes of wheat stems piled up in the fourth floor walk-in cooler as I spent all the hours I wasn't in the field doing assessments. I was in the zone: wheat stems flying around, headphones in, feeling more machine than mere grad student! The wheat wouldn't stop developing, and I was collecting my second round of samples only eight days after that first long day in Janesville. Over the next four weeks, I worked longer hours than I've ever worked, some days seeing the night cleaning crew both coming and going. By the end of my field season, I was pretty sure I didn't want to see another wheat plant ever again. To be honest, the thought of going through the whole process again next year still makes me feel a bit queasy. However, with a couple months of distance, I'm able to see that I really learned a lot from my field work — and not just about wheat diseases. I was able to stick with a project even when my body and a lot of my mind were begging me to quit. And despite my claim that I never want to see another wheat plant again, it's actually pretty thrilling to feel like I've gotten to know a system inside out. It's even more thrilling to be able to use that knowledge to be able to help growers learn about diseases that they encounter in their fields.

The process of writing down these experiences has been both more demanding and more satisfying than I originally expected. I thought I would have difficulty filling even one or two pages, so I've been amazed at the number of thoughts, emotions, and moments that have flown from my memory onto the page. I think that what I have written honestly captures my feelings about some of the major milestones of my first year in the department. Although at times this graduate school life has been difficult and demanding, I think that with a bit of distance, I'll see how much the challenges have helped me to grow both personally and

professionally. One of the greatest rewards has been that in the midst of the pace and pressure of graduate school, I have met an array of amazing people: fellow graduate students who support me, faculty members who challenge and inspire me, staff who keep me grounded, and growers who remind me why I chose this field in the first place.

The Path I Took From Plasmids in Fungi to Rice Genomics

By Sally Ann Leong (USDA and faculty, 1983–2008)

Sally Ann Leong

In 1982, I interviewed for a faculty position in the department as an NIH postdoctoral fellow in the laboratory of Donald Helinski at the University of California, San Diego. I had been studying the role of *Rhizobium meliloti* in the production of heme found in alfalfa leghemaglobin. My graduate work at the University of California, Berkeley, had involved studies of plant pathogenic bacteria and the role of siderophores, high affinity iron transport agents, in phytopathogenicity. I had been wedded to studies of plant-bacterial interactions and was considering pursuing this line of investigation as a new faculty member. However, during the interview, Doug Maxwell, as well as another faculty member whom I do not recall, independently asked me if fungi had plasmids. The Helinski laboratory was world-renowned for its basic studies of plasmid biology in bacteria and human cells and Don was recognized for this work as a member of the National Academy of Sciences. I was aware of the yeast 2 plasmid but not of other examples of fungal plasmids.

After I received the offer for a faculty position, the question of fungal plasmids and their potential as cloning vehicles for plant pathogenic fungi began to take over as a research priority in my mind. Fungi represent the most important class of plant pathogens and little had been done to investigate molecular mechanisms of fungal pathogenesis. In Don's lab I was at the center of investigation of plasmid biology and their engineering for recombinant DNA technology. I spent a few months combing the literature on this topic, attended the first conference on fungal molecular genetics sponsored by American Society of Microbiology, and then wrote a USDA NRI grant on the development of transformation systems for fungal plant pathogenic fungi before arriving in the department. The grant was

funded as I arrived, opening the door to these investigations. My path to enter new fields and pioneer research began as an independent investigator.

I next decided that I wanted to work on *Ustilago maydis* to pursue studies of iron transport and pathogenesis in a fungal system. Rick Durbin suggested that I focus on *Fusarium* spp. *Phytophthora* spp. represented an important group of phytopathogens important to Wisconsin. All three systems were noteworthy from a genetic perspective with the availability of some basic efforts to develop crosses and understand mating type and genetic linkages.

Since I represented the field of molecular biology research, I was quickly invited to work on many systems by my colleagues and their students. Hei Leung, a student of Paul Williams' lab, had written to me prior to my arrival encouraging me to study *Magnaporthe grisea*, the cause of rice blast disease. At the time I decided to focus on the three species mentioned above but soon began working on *Fusarium oxysporum* in collaboration with Paul Bosland, a student with Paul Williams, *F. oxysporum* in collaboration with Jens Mullen, a student with Don Hagedorn, *Xanthomonas* f. sp. *phaseoli*, and bean gemini virus in collaboration with Bob Gilbertson, a postdoctoral scientist with Don Hagedorn and Doug Maxwell, *Phytophthora* spp. with Helga Forster, a postdoctoral scientist with Doug Maxwell, *Pseudomonas solancearum* in collaboration with Luis Sequeira, and *Aureobasidium pullulans* with Len Yourman, a graduate student with John Andrews to study phylloplane ecology using the reporter gene β-glucuronidase. Soon my laboratory was populated not only by my first graduate students Deborah Samac and Jun Wang, and postdoctoral scientists Corby Kistler, David Holden, Jim Kronstad and Dan Cullen, but by many guest workers. Allen Budde was a USDA support scientist in the lab as my appointment was also as a USDA, ARS scientist. Tom Kinscherf was a technician in the lab until he joined the laboratory of Kyle Willis.

All of the projects required a great deal of effort because of the novelty of the work. DNA had not even been isolated from many plant pathogens and this was a challenging and laborious process. We had five Beckman ultracentrifuges in continuous operation to purify DNA for cloning and other analyses. Today commercial DNA isolation kits have replaced these difficult procedures and a microfuge is all that is needed to isolate DNA from plant pathogenic fungi and bacteria.

Corby Kistler quickly made the exciting discovery of the presence of linear plasmids in the mitochondria of *Fusarium oxysporum*. Further, these plasmids showed DNA polymorphisms that correlated with pathogenic specialization. Deborah Samac also found linear DNA plasmids in *Fusarium cucurbitae*. These were cloned and characterized and not found to have any special role in phytopathogenicity or virulence. Nevertheless, they provided some of our first evidence of plasmids in plant pathogenic fungi and insight on the application of DNA polymorphisms to typing of fungal plant pathogens.

Sally Leong in her lab with students, 1989.

This discovery spurred other studies of Restriction Fragment Length Polymorphisms by Paul Bosland and Jens Mullen in *Fusarium oxysporum* spp. that attack crucifers and pea, respectively, by Helga Forster in *Phythopthora*, and Bob Gilbertson in *Xanthomonas phaseoli* spp. These studies led to the establishment of important evolutionary relationships of different sub-specific groups of these organisms.

A second major effort of the lab focused on the development of transformation systems for *Ustilago* spp. and later *Aspergillus* spp. In particular, efficient protoplast formation and regeneration systems were elaborated and selective markers for transformation were developed based on native gene promoters from these fungi.

I spent a week in England during my first year in Wisconsin visiting the laboratory of Robin Holliday who, along with David Perkins at Stanford, had established *Ustilago maydis* as a genetic system. Robin had isolated many mutants and created a rudimentary genetic map of the organism. He provided me with protocols for working with *Ustilago* and some type strains of opposite mating type that he had used in his genetic work. We used these strains to develop our transformation system and to subsequently study the molecular biology of high affinity iron transport and mating type control.

One of our biggest challenges was to develop a functional selectable marker for the above fungi. We unsuccessfully tried many heterologous gene markers

from yeast and other fungi and found that it was crucial to have a transcriptional promoter from the native organism. Two different approaches were used to find such promoters. One involved the identification of highly conserved genes across evolution, including heat shock protein 70 (*hsp*70) genes and glyceraldehyde–3-phosphate dehydrogenase (GAPDH) genes.

I was active on campus in the *E. coli* club and learned of the successful cloning of *E. coli* homologs of *hsp*70 genes by Carol Gross's lab using the *Drosophila* and yeast gene *hsp*70 genes from Betty Craig. However, it was not until Robin Holliday was visiting the campus and was talking in the *E. coli* club about the heat shock response in *Ustilago*, that the thought of using yeast and drosophila genes to find *Ustilago* homologs became clear to me. I immediately pursued this and successfully cloned three *hsp*70 homologs from *Ustilago*, which David Holden studied in detail. Together we constructed the first *Ustilago* DNA transformation vehicle using the promoter of one of these genes fused to the hygromycin B phosphotransferase gene, which confers resistance to this drug. Later, graduate student Tim Smith characterized the *Ustilago* GAPDH gene, but we never relied on this promoter, as the *hsp*70 gene worked sufficiently well.

Jun Wang had already successfully created protoplasts and a regeneration system for *Ustilago* and quickly established evidence for integration of this plasmid vector in the *Ustilago* genome of drug resistant cells. Tom Kinscherf, who had developed an electrophoretic karotype for *Ustilago*, showed that the transforming plasmid was associated with a specific chromosome. Jun soon constructed a large insert cloning vehicle and he and Jim Kronstad made comprehensive genomic DNA libraries of *Ustilago* for gene discovery. Jun, with Allen Budde, had already isolated and characterized a number of iron transport mutants of *Ustilago* and began to isolate the wild type genes by transformation with these libraries. Jim pursued the *b*- mating type locus of *Ustilago*.

The laboratory successfully identified genomic DNA clones for several iron transport genes and the *b* mating type locus. Jim Kronstad isolated and studied multiple alleles of the *b* mating type locus. Jun Wang and postdoctoral scientists Baigen Mei and Zhiqiang An identified and characterized the *sid1* gene, an ornithine-N–5′ oxygenase. Postdoctoral scientists Christophe Voisard, Peilin Zhu, Jim McEvoy, and Zhiqiang An and graduate student Qin Zhao identified and characterized the regulatory gene *urbs1*, a repressor of iron transport genes. Eunice Froeliger isolated and studied the two alleles of the *a* mating type locus. Graduate students Guillaume Gentil and Walter Yuan, along with Allen Budde, identified and characterized the *sid2* gene, encoding a multidomain peptide synthetase involved in siderophore biosynthesis. Susan Li developed a chromosome labeling method using PRINS and the *b* mating type alleles.

Gene disruption studies established that these iron transport genes did not affect phytopathogenicity while the *a* and *b* mating type loci were essential for

Sally Leong and Mark Farman on the beach at Asilomar, California, during the Fungal Genetics Meeting, ca. 1991.

pathogenicity. *Ustilago* is not pathogenic as a haploid yeast, so these results were not unexpected.

More recent work from the Kahman lab in Germany using different iron mutants has revealed a role for iron transport in phytopathogenicity and this finding has been extended to many other plant pathogenic fungi and bacteria by other researchers. Thus the original hypothesis I proposed as a graduate student in 1976 has been supported now for a number of plant pathogens.

While I had wished to continue my work with *Ustilago* to conduct deeper studies of chromatin regulation of iron transport and to investigate other iron genes and pathogenesis, granting agencies and colleagues in the field did not support me since our initial results were negative. Further, the iron transport systems of human pathogenic fungi were being studied more and more intensely and my funding for a plant pathogen from the National Institutes of Health could no longer be justified. Without funding, I was forced to abandon my work on this system.

In the late 1980s, I was approached by the Rockefeller Foundation to work on a genetic map of *Magnaporthe grisea*. This opened up a new international research program in my laboratory with collaborations with the International Rice Research Institute and other labs in Asia and Europe and the USA. With postdoctoral scientists Mark Farman, Dan Skinner and James Smith, visiting scientist Naoto Nitta, and Allen Budde, a series of genetic maps based on RFLPs and genetic markers was established. These maps served as a framework for the subsequent genome sequence analysis of this fungus. Mark Farman and Dan Skinner also created an electrophoretic karyotype of the *M. grisea* genome. From the genetic studies of James Smith, Mark was able to clone by map-based cloning, the *AVR1-CO39* gene, an avirulence gene corresponding to the *Pi-CO39* gene for rice blast resistance to *M. grisea*.

A key element of our success in the map-based cloning of *AVR1-CO39* derived from the use of Achilles Cleavage to determine the size and physical orientation of the walk involved. I had attended a Human Genome planning meeting on campus in the late 1980s and Waclaw Szybalski's new method of genome cleavage was mentioned. He was not there, but all night I was thinking of how that might work and how the lab might apply this to genome studies in *Magnaporthe*. As with the heat shock genes, the next day I found out more about this method. Waclaw introduced to me to his student Dan Koob who was working on developing the approach in *E. coli*. Soon we were applying the method in the *M. grisea* genome. This was yet one more example of the incredible research environment that the University of Wisconsin–Madison offered.

Parallel work on repetitive DNAs, discovered in the process of creating the genetic map, led to the identification of a variety of typical eukaryotic transposable elements, including SINES, retroelements, and inverted repeat transposons, by Mark Farman with visiting scientists Yukio Tosa and Satoru Taura, graduate student Pradeep Kachroo and collaborator Bharat Chattoo. Yukio Tosa used these elements to develop an evolutionary framework of type *M. grisea* strains in the collection of Hijimi Kato based on DNA fingerprints. Visiting scientist Sam Gnanamanikam and collaborator Susan McCouch developed an online database of this molecular information. Technician Jack Hirt created a GIS map of the distribution of pathogenic lineages from India based on molecular fingerprints, giving a geographical view for the first time of the possible origin and movement of lineages.

Molecular studies of the *AVR1-CO39* gene were initiated by Mark Farman and followed up by visiting scientists Narayan Punekar, Masahiro Nomura, and Yukio Tosa, and graduate student Dominic Lazaro. This work revealed that the gene encoded a small polypeptide, which caused a reduction in expression of a Green Fluorescent Protein (GFP) reporter gene when transformed into resistant rice leaves. These results suggested that the AVR gene product caused a cell death response in resistant rice lines. No impact of transformation of this gene occurred on GFP expression in susceptible rice lines. A US Patent was issued for the use of the *AVR1-CO39* gene.

With the Genome Center of Wisconsin on the University of Wisconsin campus, the DNA sequence of 431 kbp was determined in the region of the rice genome corresponding to the *Pi-CO39* resistance gene that confers resistance to *AVR1-CO39*. Mark Farman had shown that resistance segregated as a single dominant locus, and postdoctoral scientist Rajinder Chauhan mapped the location of the resistance gene and identified overlapping Bacterial Artificial Chromosome clones covering the locus. Annotation of the genes in the region revealed three classes of resistance gene candidates with one existing in a large family. Collaborative work is continuing on functional analysis of these candidate genes in the laboratory of Mark Farman, who is now a professor of Plant Pathology at the University of Kentucky.

Additional studies on rice genomics included the construction of an optical map of the rice genome with collaborator David Schwartz and studies on the application of genome array technology, melt curve analyses, and comparative sequence analysis to the discovery of DNA sequence variation among rice and finger millet genomes with bioinformatic scientists Shulan Tian, Jacob Kitzman, and Sandra BonDurant, and collaborators Katrien Devos, Shailaja Hittalmani and members of the Rice Coordinated Agriculture Project.

My journey from assistant to emeritus professor opened many new research vistas from fungal molecular biology to fungal and grass genomics. With 3,757 scientific citations logged for this corpus of work as of October 2009, I am now turning my attention to the needs of veterans returning from the wars in Iraq and Afghanistan, seeking ways that can help heal the wounds of war and provide meaningful vocation using equine-assisted therapy and applied equine podiatry.

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Some Reflections on the Main Office, 1910–2010

By Marleen Steinmetz Lippert (staff, 1957–98)

My story begins in 1910–11 when the department was first established and Professor L. R. Jones was appointed chair. Because my story revolves around "business and administration," I have chosen to reflect on the "Main Office" and how it evolved over the many decades leading to the 100th year of its existence. The technology for running an efficient office changed drastically through the years, just as the laboratory/scientific equipment changed as experimental techniques became more sophisticated.

Marleen Steinmetz Lippert

In outlining some of the early budgets, I noted that, consistently, each budget contained funds to purchase chemical supplies, sundry supplies, photographics,

Paul Williams (left), Arthur Kelman, and Tom German with Marleen at her retirement party held at Gene Smalley's farm, 1998.

charts and illustrations, and travel funds — the dollar amounts ranging from $100 to $350.

In 1910–11, the budget included $2,600 for scientific apparatus ($2,000) and furniture and fixtures ($600), seeds ($25), chemicals ($250), etc. The office would have had perhaps one desk for Alma Steinmetz, the "Head" secretary, whose official title was "Clerk"; a telephone and stationery were mentioned in the budget for 1911–12.

In 1912–13, added to the telephone budget was telegraph expenditure. No budget items were listed for salaries, and it wasn't until the budget for 1913–14 that the salary for Alma Steinmetz was given as $45 per month or $540 per year. There was no mention of a budget item for office supplies. Perhaps that is why I found on a number of occasions going through the early budget boxes that the pages were fastened together with straight pins! Paperclips were available, but not easily accessible. It is interesting to remember that office supply stores per se were not readily available.

In the 1914–15 budget, Alma Steinmetz was paid $50 per month or $600 per year. No office supplies allotment. However, a Zeiss microscope stand and a graduated incubator were purchased for $500 as well as a soil thermograph for $50.

The 1915–16 budget included funds for a part-time office assistant. No salary given, but it was the first time that the title "stenographer" was mentioned.

The 1916–17 budget lists two office staff, one foreman, field help, and a charwoman. Interesting! Up to this point, no major changes have appeared in the office operation.

The 1917–18 budget shows Alma Steinmetz now at $750 per year along with an open half-time position at $300 per year.

With the budget year 1919–20, the use of staples has begun.

The 1920–21 budget year shows Miss Steinmetz at the "princely sum" (one of Audrey Dunlap's favorite expressions and she had many) of $1,230 per year, with a half-time stenographer paid from the Smith-Lever Project at $520 per year.

Moving along, Miss Alma Steinmetz married Sears P. Doolittle, Plant Pathology PhD sometime after 1922, and Miss Clara Sleicher came on the scene as the new "Head Secretary."

On November 1, 1921, Al Steinmetz, Brother of Alma Steinmetz, joined the department as a Junior Technician. The 1928–29 budget also lists Al Steinmetz as a Technical Assistant for $1,800 per year and Eugene "Gene" Herrling as a lab aid for $1,320. The 1929–30 budget lists Al Steinmetz as a junior technician again and Gene Herrling as an assistant technician.

But I digress. So we return back to the Main Office. The 1929–30 budget indicates the office had an additional employee, Ada Connolly, with the title Junior Dictaphone machine operator. So another piece of equipment, as an upgrade to the office had been purchased and Ada was hired as the operator. By 1930–31, Miss Sleicher had a junior clerk stenographer and a junior Dictaphone operator. Also, both Al and Gene were listed in the budget as junior technicians.

In the budget for 1931–32, Al is now listed as head gardener and Gene Herrling as "laborer".

In 1936–37 Clara Sleicher now has the title of secretary stenographer, who, along with the junior Dictating machine operator and a junior clerk stenographer make up the office staff. Still, there is no mention of recently purchased office equipment or a budgeted amount for purchases.

In looking at these early budgets, it is evident that these were very lean years, with World War I and the Great Depression making a huge impact on available funds. The major portion of the budgeted dollars was spent on salaries for faculty, staff, assistants, clerical staff, and extra labor.

Moving along to the post–World War II years, Audrey Dunlap is now the head secretary beginning in Plant Pathology on December 5, 1948, following the retirement of Miss Clara Sleicher. Audrey became only the third head secretary in Plant Pathology. During her tenure from 1948 through 1974, many technical changes were made in the Main Office, as well as our move from 205A Horticultural Building to Russell Labs. We had Royal, Remington, and IBM typewriters, an IBM Mag-Card (a forerunner to the computer), adding machines for our desks, and an A. B. Dick mimeograph machine (Audrey would not have a ditto machine in the office — she said it didn't make good copies); all these updates made a secretary's work easier. The Verifax copy machine gave way in recent years to the xerox copy machine, and we had a collator. Audrey also introduced the Steelcase products into the office — file cabinets, good chairs for the secretaries and metal desks designed for secretarial use. The secretarial staff grew along with the faculty, staff

and students. Throughout her years as head secretary, she always made a genuine effort to keep the departmental office up-to-date regarding equipment so that it would be possible for her staff to work efficiently and effectively.

I would like to give a partial quote from a letter Professor George W. Keitt wrote on May 1, 1957, regarding Audrey: *"I have known Miss Dunlap since December 5, 1948, when she entered upon her duties as secretary of the Department of Plant Pathology, of which I was chairman from 1930 to 1955. This is a large department with an extensive and complex program, employing about 100 people. The administration of such a department is a very heavy and exacting responsibility, and the departmental secretary is a key person in this administration. In the 46-year history of the department, we have had only three departmental secretaries. They were chosen with great care and all have rendered excellent and devoted services."*

On January 1, 1975, I, Marleen Steinmetz Lippert, was promoted to departmental secretary to the chairman. I am the niece of the first departmental secretary, Alma Steinmetz Doolittle, the daughter of Al Steinmetz, and the fourth and last departmental secretary of the department as it had been known. I began work at the "princely sum" of 92 cents per hour in 1957 when I was 17 years old, under the strict tutelage of Audrey Dunlap.

By the time I retired in July 1998, many additional technological changes had been made, the most important being the advent of the computer. We started out with the Wangs and gradually moved into the PC's. No more typing manuscripts up to seven plus times on green paper before the final typing on good bond paper! We were also introduced to the fax machines, and the scanners that went along with the computers, and the use of e-mail. And, there was no longer carbon paper for general use. Appointment forms and requisition forms were carbon-backed! What a relief!

So, my story ends here. We've traveled through time from that simple office of a desk, chair, telephone, stationery, etc., to a department that no longer has a "departmental secretary" per se, but to a department that now has administrative duties shared with the other departments in the building. Those staff members present in the Main Office have the most up-to-date, sophisticated office equipment available. What a privilege. May it always be so.

A Nematologist Among Pathologists

By Ann MacGuidwin (faculty, 1984–present)

Ann MacGuidwin

I didn't carry the title of Plant Pathologist until I walked through the doors of Russell Labs in 1984. Now I wear it proudly, a 25-year veteran of the department and one of its senior members. I introduce myself as a Nematologist because my passion for these invisible animals and the soil ecosystems they live in is what draws me to work every day. "A professor in the Department of Plant Pathology" closely follows in my professional description because it is that affiliation that provides the sense of purpose to my studies. Solving problems that hamper food production was what lured me into an academic career and it is what keeps me interested and satisfied with my professional life.

The path that led me to the UW was twisted and full of surprises. My undergraduate training was in psychology/zoology at Michigan State University. My interests wandered through sociology, history, and anthropology, but it was the population biology and behavior of animals that excited me the most. I graduated in a little over three years and only then realized I had paid no attention to the practical application of my interests or employment opportunities. My solution was common to the times — I slung on a backpack and traveled through Europe and Africa for almost two years. I worked as a volunteer in a facility in Kenya that cared for injured and orphaned animals and lived my dream of handling lions, cheetahs, leopards, giraffes, rhinos, chimps, and more. I loved the animals, but when thinking about "What's next?" it was the people who pushed me to study agriculture. I was a "city kid" and though I couldn't recognize most of the crops I saw in Africa, I could see the issues and problems of producing an ample and safe supply of food. I remember thinking about Norman Borlaug, the father of the Green Revolution and a guest lecturer in one of my college classes, as we drove through Africa and realized how much time and effort people devoted to growing food. I returned to the US determined to follow a career in agriculture.

How I fell into nematology is a story in itself, but once there I realized it was the perfect way to merge my interests in ecology, animals, and agriculture. I earned my MS degree at the University of Florida, a location chosen to formalize my experience with subtropical regimes, studying interactions of nematodes and pine beetles. I returned to Michigan State for my PhD and worked on a project that dirtied my shoes in fields of carrots and onions. My major professor, Dr. George

Bird, held a joint appointment in Entomology and Plant Pathology. Determined not to repeat the mistakes of my undergraduate years, I considered both disciplines to be my training ground with the hope of maximizing my employment opportunities. I had the rare opportunity to teach the nematology course the year Dr. Bird was on sabbatical and discovered that I enjoyed the classroom almost as much as the bench. That experience is probably what clinched my hire by the UW.

I interviewed at the UW three months after finishing my degree and one month before the birth of my first child. I wore glasses instead of contacts for my interview seminar, deluded that this accessory would draw people's attention away from my huge pregnant profile. A few of my future colleagues looked shocked and dismayed at my condition, but it is with great affection and appreciation that I recall the response of Arthur Kelman, Luis Sequeira and others. They seemed genuinely happy for me and ready to adventure into hiring a woman with a family. It was a first for the department, a social experiment that confirmed the hypothesis that mothers can be scientists!

I pushed the envelope again with the birth of my second child only two years into my pre-tenure purgatory, and yet again with a third pregnancy as I maneuvered through the tenure process. A few heads shook because there was no stopping of the tenure clock in those days, but for the most part my colleagues deserve kudos for their support — both professional and personal. In 1986, the first but not last, baby shower was convened in the conference room. The shower was a surprise (to say the least!) and it was a gleeful Walt Stevenson who lured me into the party by making me think a project we were working on was in crisis. At that time the portraits of L. R. Jones and others hung in the library so they didn't witness the event and I remember wondering, as I opened presents of baby sundries and shared cake with Walt, Doug Rouse, Steve Slack, Arthur Kelman and other faculty, how our founding fathers would have reacted to the scene.

In 1984 the department had been without a nematologist for 20 years, but nematodes had not faded from the scene. Walt Stevenson and Eldon Shields, an IPM specialist, tackled nematode problems on mint. Jack Mitchell and then Doug Rouse studied the role of nematodes in the potato early dying disease and Doug enlisted me on a project before my first day of work that lasted well over two decades. Walt and Steve Slack invited me to join in studies of the potato rot nematode and I was on hands and knees examining tubers in the field during the summer of 1984. Doug Maxwell, chair at the time, tried his best to interest me in field crops, but the potato world grabbed me first and I began a lifelong study of root lesion nematodes in potato production systems. Nematology at the UW began in the 1950s with the discovery of the potato rot nematode, so it seemed only fitting to carry on the potato tradition. Over time I ventured into the field crops arena too, particularly soybean, drawn by the enthusiasm of Craig Grau. I replaced Craig as the UW representative to a nematology regional committee and I still, after all these years, pass greetings back

to Craig every time we meet. Although my colleagues seemed relieved to lighten their nematology research, they became supportive and productive collaborators in many projects over the years.

My most enjoyable connection to Wisconsin agriculture has been working with potato growers participating in the Healthy Grown ecolabel program. Potatoes marketed under this label are certified for compliance to IPM practices and environmental standards that are truly groundbreaking. The program represents a collaboration of growers, the UW, and the World Wildlife Fund. I serve on the advisory board to the project and lead research projects with the goal of decreasing soil fumigation, a practice used to mitigate yield losses due to root lesion nematodes and *Verticillium*. In 1984 fumigation was new and exciting and only a handful of growers even knew what a nematode was. Twenty-five years later most potato growers have their soil tested for nematodes, fumigate because population densities are above threshold, and wish they didn't. I work with the Wisconsin industry to maintain their competitive position in the national market and to transition to diminished reliance on soil fumigation in the future. The growers are impressive field biologists and exchanging knowledge with them has shaped the way I view the world and address my science.

As is the case for some others in the department, I circulate in multiple research worlds and the descriptors used to categorize my program vary widely. As a nematologist, I sometimes speak a language foreign to my colleagues and study phenomena that they do not consider. This is often frustrating, but the diversity of ideas and backgrounds is also one of the things I value about working in a plant pathology department. Bucking convention, my colleagues consider nematodes as microorganisms on occasion, so my lab often looks to the entomologists in Russell Labs and *C. elegans* research groups for animal biology. If I could change one thing in our department, I would maintain at least two, faculty-directed programs devoted to each of the pathogen groups. Despite budget crises and retirements, we've maintained essentially that structure for all but nematology, a discipline devoted to the most abundant animal on the planet!

The 75th anniversary publication went to press as I arrived and I had little sense of the department, its impact on the outside world, and my place in it. As I reflect to write this chapter, the reel of memories that plays through my head shows faculty meetings. I've witnessed over 225 gatherings of the faculty, staff, and students and if I could make a documentary of the department, I would use the announcements, discussions, and soliloquies delivered in that venue to tell the story. The story is all about the people, and our story is a great one.

Four Decades and Counting

By Douglas P. Maxwell (faculty, 1968–2001)

Douglas P. Maxwell

While I was at Cornell University (1963–68), the University of Wisconsin was always spoken of as the elite Department of Plant Pathology. Thus, when I joined the department on April 1, 1968, I felt privileged to have the opportunity to come and serve with such a distinguished group of plant pathologists. This is my story, which could have only taken place here. I was allowed to change my career over the years, which some may say wandered in unimaginable ways from my original assignment as the forage grass pathologist.

Starting a research program on diseases of forage grasses was not a simple task, as the diseases were unfamiliar to me and their importance was unknown. Thus, an initial effort focused on identification of diseases and an assessment of the losses in yield and nutritional quality. This resulted in the clear conclusion that even if the major leaf spot pathogens were controlled by breeding for resistance there would be a small gain to the farmer. So, the forage grass projects were terminated and I assisted R. R. Smith in Agronomy with his breeding program for disease resistance in red clover. These efforts resulted in development of selection methods for northern anthracnose resistance, studies on rust and virus resistance, and culminated with the release of Arlington red clover.

During these early years, I was encouraged to continue a project that would result in some publications — getting tenure was an issue. As a PhD research project, I had characterized the biosynthetic pathway (a new enzyme, glyoxylate dehydrogenase) for oxalic acid production in *Sclerotium rolfsii*. Oxalic acid, a pathogenicity factor, was also produced by *Sclerotinia sclerotiorum*. It was found to have a different enzyme, oxaloacetate acetylhydrolase, thus, a different pathway. These studies led to our team's interest in determining where along the hyphae that cell-wall degrading enzymes and oxalic acid were excreted. A collaboration with P. H. Williams, Martha Maxwell, and others showed by light and electron microscopy the clear distinction of hyphal organelles, such as spherosomes, lysosomes, Woronin bodies and especially microbodies. Eventually, glyoxalate dehydrogenase was found to be associated with a cellular fraction rich in microbodies. One of the most exciting moments was when Martha stopped by the laboratory for Plant Pathology 300 (Introductory Plant Pathology), which I was teaching, and told me that she had taken 54 sequential images from the tip to the first

septum of a hypha of *S. sclerotiorum*. When the images were assembled, the collage was over 25 feet in length and showed a remarkable internal organization of organelles.

Another major change occurred (mid–70s), when CALS administration decided not to fund clover research with Hatch funds, but rather a project on alfalfa instead. At this time there was a new and major disease of alfalfa caused by *Phytophthora megasperma*. A seedling assay was developed and inheritance studies of resistance were completed by my students, as well as ultrastructural studies of host and non-host reactions to *Phytophthora* species. I devoted time to solving the relationship between *P. megasperma* and *Phytophthora sojae*, cause of root rot of soybeans. Biochemical (isozymes) and molecular (restriction maps of mtDNA) approaches were used to name a new species, *P. medicaginis*. This was one of the first examples where biochemical and DNA data were used as the major basis for delineating a fungal species. These methods showed that *P. medicaginis* and *P. sojae* coexist in soils as separate populations.

During the 1980s, I served as the departmental chair and will comment more on these issues at the end. But my research program took a major change, which was to impact on my next 25 years. This came about, not because of my interest, but because I was asked in 1984 by the director of the Bean/Cowpea Collaborative Research Support Program (CRSP), funded by the U. S. Agency for International Development, to become associated with a bean breeding project between scientists at CNAPF in Goiana, Brazil, and Donald Hagedorn in our department. In 1986, this project changed focus from fungal and bacterial diseases to molecular characterization of *bean golden mosaic virus* (BGMV), a tropical whitefly-transmitted ssDNA virus (a geminivirus) in Latin America. Neither R. Gilbertson, postdoctoral fellow on project, nor I had experience with molecular biology techniques, so assistance was provided by Sally Leong and Paul Ahlquist. Thus started our careers (Gilbertson is still working on geminiviruses at the University of California, Davis) with these viruses. We characterized the BGMV isolates from Brazil, Dominican Republic and Guatemala, as F. Morales CIAT thought that these might be different. The project started in earnest when J. Faria and S. Hanson joined the team. Thus, the four of us started cloning and sequencing these three BGMVs. After two years we had full-length clones and sequences for these clones for the original three isolates plus *Bean dwarf mosaic virus* (BDMV). Phylogenetic analysis indicated that the isolates from the Dominican Republic and Guatemala were similar to the original sequenced isolate (R. Goodman, University of Illinois), and were eventually named *Bean golden yellow mosaic virus* (BGYMV), and that the isolates from Brazil and BDMV were in distinct clades. With this information, specific DNA probes were used in detection of these viruses.

After cloning these viruses, the next step involved determining if the DNAs would infect plants. Only the two DNAs from BDMV were infectious when rubbed on the leaves of the tobacco species, *Nicotiana benthamiana*. All attempts

by Gilbertson to infect bean with the DNAs of BGMV or BGYMV failed. This information was needed as our next goal was to use rDNA technologies to transform beans and engineer resistance. Unexpected assistance came in the form of David Russell from Agracetus, Middleton, Wisconsin.

Doug and Martha Maxwell in a tomato field near Cairo.

Russell suggested that he "bombard" beans with gold particles coated with the clones of the viruses. To our amazement, it worked! Agracetus contributed in two other ways to the success of our begomovirus research. Their particle gun was used to transform beans; unfortunately, these beans with the viral coat protein gene were not resistant. The other contribution was extremely significant as Agracetus had access to polymerase chain reaction (PCR) thermal cyclers (none were known to be present on the UW–Madison campus). Gilbertson and Maria Rojas were the first to use PCR techniques to characterize begomoviruses. This approach revolutionized the molecular characterization of these viruses. Another turn of events, which involved Maria, happened on my first trip to Costa Rica in June 1990. She introduced me to her brother, who was a major tomato grower in the San Jose area, and he showed us the devastation of his tomatoes by an unknown disease. Maria then showed, by using the PCR technology and sequence data, that the disease was caused by a begomovirus. But it was the seriousness of this problem in Costa Rica and our detection of begomoviruses in tomatoes grown in Florida that caused me to focus our team's efforts on tomato-infecting begomoviruses.

The next major development in my career resulted from the organization of the Second International Symposium on Geminiviruses and Whiteflies in 1998 in Puerto Rico. At this meeting, I received from H. Czosnek a tomato hybrid, FAVI 9, which had been developed by F. Vidavski at Hebrew University of Jerusalem. Also, M. Lapidot from Volcani Center, Israel, gave a main presentation on the development of resistant germplasm to these viruses, and he shared these inbreds

with me. Earlier in 1992, an international meeting in Guatemala City on bean-infecting begomoviruses was held, and I meet Luis Mejia, who played the most important role in the remainder of my professional career. These two sources of resistant germplasm were given to L. Mejia, who had secured funds from the Guatemalan government to set up field plots to evaluate tomato germplasm. I visited these plots in summer of 1988 and was amazed to see that tomatoes could be grown in Central America. Both sources of resistance were effective and, thus, our tomato breeding project was born. Armed with this encouraging information, we obtained two grants: one from the USAID program called Collaborative Development Research (CDR); and the other from the USAID program, Middle East Regional Collaborative (MERC) program. Both projects involved H. Czosnek and M. Lapidot. The CDR project was centered in Guatemala with L. Mejia and the MERC project involved colleagues from Morocco, Tunisia, Egypt, Israel, National Palestinian Authority, Lebanon, and Jordan. Both of these projects involved using public sources of begomovirus-resistance to breed inbred lines with resistance to the local begomoviruses. Also, the work involved development of PCR-based molecular markers for detection of the introgressions from wild tomato species, which had contributed to resistance. After many field evaluations, inbred lines with high levels of resistance were available. The next issues involved the use of these inbreds to develop tomato hybrids for the local markets. The project in Guatemala is more advanced in this respect. Going from an academic project to commercial project has been my most recent challenge, and in many ways the most difficult. This has involved making arrangements for intellectual property issues, starting a seed company in Guatemala, Semillas Tropicales, and developing and testing tomato hybrids for Central America. Currently, five tomato hybrids are being marketed in Guatemala, Salvador, and Honduras. For the MERC project, many students were trained, inbred lines are available, but funding has stopped before these can be brought to commercialization.

Research was a significant part of my career, but two other areas were important. Teaching introductory plant pathology, disease and pathogen physiology, and plant virology occupied my major teaching efforts. Administrative responsibilities occurred over a period of nearly 15 years. Positions included: departmental chair, interim assistant dean for student affairs, interim codirector of the Wisconsin Seed Potato Certification Program, interim executive associate dean, and interim director of the Center for Integrated Agricultural Systems. For this chapter, some reflections on my 10-year term (1980s) as departmental chair are most relevant.

Being chair is an opportunity to serve the good of the faculty and the department. Goals were set, which included a revision of the graduate curriculum, even distribution of department support for each faculty program, hiring faculty in all pathogen areas, continuing to support a balance of basic and applied faculty, and providing an atmosphere where each faculty member could achieve his or her

maximum potential. Several outside forces impacted greatly on the department during this decade. One of the major ones was the State budget deficit. The first of what has become an annual exercise in budget reduction began in 1980. During the next 10 years, most technical support for faculty was eliminated, general support for faculty was decreased, faculty positions were lost and the number of State research assistantships was decreased. To provide "fairness," a charge-back system was started.

The future of any department depends on the faculty and the graduate students. First, the graduate students: many of the recent and current leaders of our Society and profession were trained during the 1980s. For faculty: Leong, Parke, Ahlquist, MacGuidwin, Handelsman, Clayton, German, Ellingboe, Goodman, Willis, and Jeffers were hired in this decade.

The 1980s decade was a time of change, and was the coming of age of molecular biology. Two faculty hires greatly fostered this change: Leong and Ahlquist. Many graduate students and faculty sought them out for advice.

Lastly, I would like to comment on three programs, which were started or had major changes in the 1980s. One was the ginseng disease management program, which was so ably led by J. E. Mitchell. Second, after many discussions, CALS administration agreed not to join the potato breeding program and the Potato Foundation Farm at the newly donated Stark Farm. Finally, another program started by P. Williams, may be the highest impact program ever initiated by a faculty member in our department, the Wisconsin Fast Plants. This program has brought plant genetics and plant biology to thousands of school children.

It has been a wonderful 40+ years; and because of the flexibility that was granted to me, I believe that the University of Wisconsin–Madison was the right place for me. May future faculty and students believe that "one foot in the furrow" is an appropriate philosophy on which to build a career.

Acknowledgements

My achievements would not have been possible without the continuous assistance and support of Martha D. Maxwell, who ably assisted my research group and edited all manuscripts and many of my students' theses. I was fortunate to have many wonderful postdoctoral fellows, scientists, graduate students, undergraduates, greenhouse and laboratory assistants, and visiting scientists. A special note of appreciation to my colleagues: Etlar Nielsen, Paul Drolsom, Richard Smith, Gayle Worf, Stephen Diachun, Larry Satter, Paul Williams, Paul Ahlquist, Francisco Morales, Josias Faria, Robert Gilbertson, David Russell, Hanokh Czosnek, Favi Vidavski, J. F. Wang, John "Jay" Scott, and especially Mark Nakhla, Michael Havey and Luis Mejia, as well as many others. My mentor for administration and teaching, Arthur Kelman, was a constant inspiration.

Midstream

By Patricia McManus (Vaughan–Bascom Professor; faculty, 1995–present)

Patricia McManus

To commemorate our department's Centennial, the veterans are asked to reflect upon how their experience at Wisconsin has shaped their life or career. The newcomers are invited to write about what attracted them to Wisconsin and what they hope to achieve here. As I write, I am completing my 14th year on the job, which puts me smack in the middle of these extremes on the continuum of a career. I have been here long enough to know which keys unlock which doors, but alas, I carry a heavy chain of keys because I have not acquired the status to hold a single master key. Thus, I shall comment on what I've discovered behind the locked doors, en route to earning a coveted master key.

In 1995 I was in the enviable position of having two faculty job offers in the area of fruit crop research and Extension. But there was never any question that I wanted the job at Wisconsin, a fact that I could not contain and that probably cost me dearly while "bargaining" for a start-up package. Following the interview at Wisconsin I wrote in a letter (yes, a letter on paper!) to then-chair Craig Grau, "it's hard to imagine someone not wanting to join your department if he or she enjoyed the positive interview experience that I did." Although I now regret shooting myself in the foot from a bargaining standpoint, Craig and the department were quite generous, and the years that followed have been very good.

Perhaps the best thing about Wisconsin—what attracted me and what keeps me here—is the passion my colleagues have for science, teaching in all its forms, and agriculture, in general. I've shared a lab suite with Glen Stanosz my entire time in Madison. After all these years, he still lights up when finding the perfect stage of a fungus, especially one that he's had to coax into sexual reproduction by adjusting the lights and temperature "just so" in the incubator. John Andrews, whose writings on microbial ecology fascinated me as a graduate student, turned out not only to have a keen scientific mind but also was a tremendously supportive, good-humored mentor early in my career. Craig Grau's unreserved passion for plant pathology (or, optimist that he is, "plant health") is simply contagious. Caitilyn Allen stays at the top of her research field while excelling at teaching and balancing a heavy service load. Chats with emeritus faculty—too many to single out here—have always helped me keep things in perspective during stressful periods.

Dan Mahr and Teryl Roper, my fruit Extension counterparts in entomology and horticulture, respectively, personify excellence in Extension and helped me fully appreciate the value of teamwork. Teryl has moved on to administration and Dan is talking of retirement. I can only hope that some of their talents have rubbed off on me during those many hours in the car traveling to all corners of Wisconsin.

My work to date has focused mostly on apple, cranberry, and tart cherry. I take great pride in the fact that George Keitt, an icon in the department and one of the best fruit pathologists ever, is my academic great grandfather (*i.e.*, he was the major professor of my major professor's major professor). We regularly cite his 1937 cherry leaf spot treatise, because no study since has come close to matching its depth or breadth. Likewise, it was Keitt's apple data that W. D. Mills in New York used to predict apple scab infection periods. My Extension presentations and articles on apple scab often refer to spraying based on Mills infection periods, which growers today can determine by punching a few buttons on their computer or field weather station. Sometimes I remind growers of the seminal role that UW researchers played in generating the data on which the scab prediction system is based.

I've mentioned just a few predecessors and contemporaries who have influenced what I research, what I teach, and how I go about doing both. No group of people, however, has influenced the direction of my Extension program as much as the fruit growers of Wisconsin. Having been trained to think that plant diseases were very important, it was an eye-opener to learn that growers do not really care about diseases per se. Rather, they want to make money selling fruit. If I am called out to investigate a problem in the field, they are not satisfied when assured that their problem is "not a disease;" they want to know what caused the problem, how to fix it, and how to prevent a recurrence. They do not care what department you are from; if you are from the UW, you are all pretty much the same, and above all, you should have the answers. I once shouldered the blame when the Badgers had a losing football season. On another occasion, a woman asked me if I might know what was wrong with her sick cat. During my first year on the job I learned that the PhD in plant pathology was merely the beginning of my education.

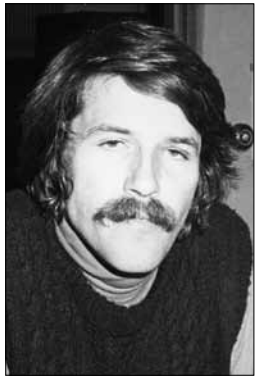
That interview follow-up letter alluded to earlier in this essay is revealing. Some terms, such as "budget constraints" and "sustainable practices," are timeless. Other passages are so embarrassing that I can hardly bear to read them! But in one paragraph I mention the powerful intellectual environment at the University of Wisconsin–Madison, something I recognized as an undergraduate majoring in botany and which again became apparent during my interviews at Wisconsin. The phenomenon is wonderfully described by Robert Scheffer (a distinguish alumnus of our department and a valued mentor to me during grad school at Michigan State University) in *With One Foot in the Furrow*, the history of our department's first 75 years. When asked to comment on how the "Wisconsin Experience" affected him, he wrote:

There was an additional and very important factor at Madison that is much more difficult to define and express. We all (students and faculty alike) had a pervasive feeling that we could and must accomplish something of scientific or practical significance: that we could accomplish anything, academically speaking. Such ambience was more evident at Madison than at almost any other place.… It is a fragile condition, but a precious one that must be preserved.

Dr. Scheffer's comments are now 25 years old and reflect his experience at Wisconsin during the early 1950s. Why, as a student, did he sense the urgency to succeed? Why did I not consider my other job offer? And what keeps me motivated today? It boils down to people. Interesting science can be found anywhere on the planet. But interesting colleagues are something to cherish, and it's they who create the special ambience that Dr. Scheffer described. He would be pleased to know that the "fragile condition" remains precious and is fully preserved as we celebrate our 100th anniversary.

The Relationship Between Skiing and Geraniums

By Tomas Pastalka, Class of 1980



Tomas Pastalka

My career at the Department of Plant Pathology in Madison got started on the snowy slopes in Aspen, Colorado, in the mid–70s. I was a ski instructor at the time and one of the members of my class was Dr. Smalley. He was a mediocre skier and excellent plant pathologist and I was the same, except in reverse. We both wanted to improve our weaker points. Moreover, I had a girlfriend in Chicago at the time and I thought that being in Madison would bring me into a closer but still safe distance from her. Dr. Smalley thought that those were excellent reasons for me to apply to the graduate program in Madison. I did get accepted to Dr. Hildebrandt's lab by using different reasoning.

I started to learn about the elimination and detection of viruses in geraniums as well as various tissue culture techniques and their use in virology. After many failed attempts, I did manage to isolate and describe several latent geranium viruses using callus cells grown from geranium leaves. I enjoyed the academic as well as social life on and off campus. It has been some time now but I still remember friendships that

I developed with Chris Heye, Dr. John Andrews, Dr. Berbee and others. In time I developed resistance to the arctic cold of winters and steamy heat of summers. I also managed to get married and divorced before I even received my degree.

But I did complete my studies in 1980 and my carefree years ended. Surprisingly, I got a job offer in a tight market and moved to San Francisco to work for the California Department of Food and Agriculture (CDFA) to work on Dutch elm disease (Dr. Smalley's specialty!). Since then I have worked on many different projects in the CDFA, concentrating lately on another invasive fungal species, *Phytophthora ramorum*, causal agent of Sudden Oak Death.

Four intrepid coureurs-de-bois on the Kickapoo, 1976. Left to right, Russ Spear, John Andrews, Tomas Pastalka, and Joanne Easton. For many years, a departmental canoe trip down the Kickapoo River was a traditional rite of spring.

Lessons from Wisconsin

By Albert Paulus, Class of 1954

Albert Paulus

Albert Paulus graduated from the University of Wyoming with a BS degree in Agronomy in 1950 and then received an MS in Botany in 1951. I was offered a graduate scholarship in the Plant Pathology Department of the University of Wisconsin at Madison in 1951 and graduated with a PhD in 1954. My summer duties in Wisconsin were to run an Extension and research program with growers in the Racine and Kenosha area of Wisconsin and also I worked with members of the Entomology Department. Our housing was on a beautiful golf course between the two cities; Lake Michigan was a few miles away and so the climate was fantastic.

Professor Glenn Pound was my major professor and he and his family gave me excellent support while I was at Wisconsin. We normally had to go to Kenosha to set up research plots before the semester was over in the spring. Professor Pound said I should go down on Saturday to check on the tomatoes we had planted earlier. So I asked fellow graduate students Dennis Hall and Don Lindbergh if they would like to go with me to dust the tomatoes for control of an insect. Upon arriving in Kenosha we removed the duster from the shed but could not get the engine started. I had noticed in the newspaper that Warren Spahn was pitching in a baseball game, that very Saturday in Milwaukee. So I said maybe we should go to the ball game and Warren pitched a fantastic nine innings and did not allow any runs to be scored by the opposing team. So on Monday Professor Pound wanted to know if we did the dusting and I said no but that we went to the baseball game and Warren pitched a no-hitter. Professor Pound told me in very specific terms that if the insects damaged the tomatoes I was in deep trouble. One or two weeks later I went back to Kenosha with Professor Pound to look at the tomatoes and biological control had taken over and it was a beautiful tomato field. Needless to say I was saved by fantastic biological control.

The lessons I learned at the University of Wisconsin and my field experience with growers near Kenosha and Racine were extremely helpful to me when I moved to Riverside. At Wisconsin, the graduate students working on vegetable diseases were associated with Professor Walker's group and this included professors Pound and Hagedorn and a USDA researcher, Dr. Larson. One found out in due time that Dr. Larson had excellent financial support. If you needed stakes, slides, etc. he was most generous in helping you in your time of need. I made several trips with

him to Kenosha and anybody who passed the USDA vehicle going more than 45 mph was not obeying the laws of the highways in Wisconsin. One learned early in the game that Professors Walker and Pound checked your greenhouse space each morning and would give you a hint about your plants in the greenhouse. A very nice person was Gene Herrling who was the photographer for the department and was extremely helpful to the poor grad students. I should not forget the lovely ladies in the Plant Pathology office who helped us in many ways in our years at the University of Wisconsin and the chief of this office had very firm rules in regard to our numerous requests. Professor Pound developed a radish breeding program for control of Fusarium wilt of radish. We met in Waukesha to plant breeding lines in the peat bogs and 28 days later evaluated resistant plants. I never found out the final results of this program but remember the research plots were very close to the beer halls of Milwaukee. Professor Pound decided after two years of tomato trials in our rented land in Kenosha that Wisconsin could not compete with Ohio in the production of tomatoes.

Professor Walker was trying to breed for resistance to clubroot in cabbage. We would plant cabbage transplants every 30 days in the Kenosha area on farms that had severe disease. He would pick the best two lines and they would be planted again later with some new additions of resistant materials. The next experimental plantings indicated the best two lines previously resistant were going down with the disease. Excellent resistance was hard to obtain. He stated this was the most difficult disease he had ever worked on in his whole career.

I will not forget the lovely parties at the Hasty Tasty bar across the street behind the greenhouses where we all gathered for a drink or two after someone passed their prelims. Many problems were solved in this environment. I also remember the morning cup of coffee and lovely pastry at Rennebohm's drug store while the weather outside was l0 degrees below zero.

The lectures in the classroom and working with faculty and fellow graduate students in Wisconsin were also helpful in my new job in California. I enjoyed working with growers and plant pathology faculty in solving disease problems in the field and greenhouse. My position allowed me to visit similar colleagues in various countries such as England, France, Scotland, Ireland, Australia, New Zealand, Egypt, Pakistan, Moldova, Colombia, Brazil, Germany, Holland, Austria, Greece, Israel, Guatemala, Panama, Ecuador, Chile, Canada, Italy, Russia, Spain, Belgium, Switzerland, Mexico and Prague in the Czech Republic. Later in my career I was honored by my peers by being named a Fellow of the American Phytopathological Society; elected President, Pacific Division of APS; and served on the APS Foundation Board.

Lost in (Viral) Translation

By Aurélie Mamisoa Rakotondrafara (faculty, 2011)

Aurélie Mamisoa Rakotondrafara

In 30 years and plus, I have lived longer abroad than in my own home country, Madagascar. I master foreign languages better than my native tongue (shamefully my mom would say!). I have been infused by different cultures and traditions from three different continents. I have seen no frontier, having moved to Rome, then back to Antananarivo and from Ames to Heidelberg. While remaining true to both my roots and beliefs, I believe that this unique blend of experiences is what I can offer to the department as the first new member for its second century. What brought me to join the University of Wisconsin? SERENDIPITY!

My life has been colored by so many amazing and unexpected turns. I could describe it as hanging tightly to a rope and you just go for the ride. This is the ride for thirst and curiosity for knowledge, which I hope to never lose. After I received my Maitrise in Microbiology-Biotechnology at the University of Antananarivo, Madagascar, I applied for and was granted a Fulbright Fellowship to start a Master's degree at the Department of Plant Pathology at Iowa State University, Ames, Iowa, in fall 1999. It is important to understand that the economical and social pressure in Madagascar provided no support or encouragement for anyone to pursue higher education. "You had better get married now, otherwise you will never find a husband if you get more degrees!" a friend even warned me. But science was my call. Was there some fear? Of course! Not only had I never been separated from my family (traditionally, one would leave "home" only to get married) and my English was basic high-school level, at that time, I was not even sure what PLANT PATHOLOGY was about! My Oxford English-French dictionary could not help me to perceive the difference between "wilting" and "withering," "blotches" and "speckles"! Talk about culture shock: I originally thought I was going to Hawaii! I did not realize I was traveling to Iowa until the Fulbright officer asked me whether I was ready for the winter!

Soon the fear became transformed into fascination. I discovered the world of plant viruses through the mentorship and guidance of Allen W. Miller, my MS and later PhD advisor. Allen is himself a UW graduate (1984). I want to acknowledge his key role in my scientific and career development and his trust in my potential, despite my lack of experience when I joined the lab. My MS research project

focused on the detection and the role of the small viral ORF6 protein encoded by *Barley yellow dwarf virus* (BYDV), one of the most economically important pathogens of small grains. I soon personified the virus as a "he." How could I not? "He" was in my mind day and night. I was perplexed at how tricky "he" was and what "he" was capable of doing to get what "he" wanted.

"Have you found the protein yet?" my loving parents would ask me over the months (and years) to come as their expression of unconditional support. My dad, Charles Rakotondrafara, a statistician and economist by profession, has always been very pragmatic: "*Des chercheurs qui cherchent on en trouve, des chercheurs qui trouvent on en cherche*" (Researchers who search can be found, researchers who find are searched for). Despite the initial struggle, I was reassured that this was my path.

In 2002 I had majored in Molecular and Cellular Developmental Biology for my PhD. The research project had evolved beyond the search for a protein into the mechanism of regulation of viral translation. Many viruses have evolved unique strategies to trick the plant defense system and to ensure expression of their encoded proteins, which are keys for successful infection. BYDV relies on a long-distance interaction of the 5′ and 3′ ends of its mRNA. This association is mediated by what we referred to as "kissing loops." If the "kiss" does not occur, the virus just fails to infect. I knew that those viruses had some sense of romanticism and fatalism in them!

"What is the relevance of my research and its application for farmers?" — a hardcore field pathologist would always ask this question. I would vehemently reply that by understanding how a virus hijacks the protein synthesis machinery one could foresee a target for resistance! And that was my statement when I applied for the Pioneer Hi-Bred International Fellowship in Plant Breeding, which later sponsored my PhD, and seven years later, my research interest statement for this faculty position at the University of Wisconsin.

The dissertation was successfully completed and it was time to move. My fascination for uncovering unorthodox mechanisms of regulation of gene expression led me to apply as a postdoctoral trainee in the lab of Dr. Matthias Hentze, a sage in the field of translation control. The lab is based at the European Molecular Biology Laboratory (EMBL) in Heidelberg, Germany. Do I speak German? No. Do I have relatives and friends in Germany? No. Good science is happening there and I could only believe that "one could not be an egg forever: either hatch or rot" (from C. S. Lewis). There was no other option than hatching! Thus, I received the postdoctoral EMBO Long-Term Fellowship and moved to Germany in August 2007. I left the US, plants and viruses, and shifted into the world of oncogenic mRNAs, which are capable of overcoming the tight regulation of translation and are aberrantly over-expressed during tumor formation. One day a postdoc in the lab showed a plant model system in one of his slides and referred it as "Arabidopsis."

I needed to interrupt him and I said "That is not Arabidopsis, that is *Nicotiana benthamiana*." And my colleague looked at me perplexed and replied: "Anyway, it is the same!" That was when I realized that I had landed in a different world.

While my postdoc training has been a steep learning curve and honed my grounding in the mechanism of translation, I soon realized that I missed viruses and knew that one day I would go back to that field. That day came faster than expected. It was mid–July 2009: my second year as a postdoc just finished, I had two ongoing collaborations, I had received the prestigious European Marie Curie postdoctoral fellowship, I was confident with my German and had started to understand the German system (five months to get internet and phone connections!). I was surprised and very pleased when I received the personal invitation from Amy Charkowski to apply for the open position as an assistant professor in plant virology at UW. Was I ready for such a challenge and responsibility? I knew that I would, one day, follow such a career path. But, so soon? Allen Miller, with whom I have maintained a close relationship after leaving his lab, responded to my questions when he wrote to me, *"I remember when I was a postdoc, I thought no way am I ready to be a professor, but then who is?"*

All was confirmed when I landed in Madison, Wisconsin, in October 2009 for the two-day interview. It felt like going back to a familiar place and there was no need for the faculty to sugarcoat how harsh the winter could be. My conversations over sushi with Jeri Barak and Jim Kerns, the recently hired assistant professors, quickly dissipated some misconceptions about the rigors of the tenure track. Obtaining tenure is challenging and stressful but it is feasible and it does not (and should not) take away the joy of science. Tom German, the virologist in the Department of Entomology, through our brainstorming of experimental ideas, revived my passion for viruses. Was it a test when he asked for my thoughts on how to solve a cloning problem of one of his students? Who knows! But I just enjoyed it. Amanda Gevens, the new field pathologist and her "tale" of the puzzling outbreak of *Tobacco Rattle Virus* in the potato field, was a teaser for my brain. Could it be a mutation within the virus that increased the nematode efficiency of transmission? My brain was just running 100 miles/hour and adjusted quickly to the jet lag. And not the least, I was impressed by the dynamism of the graduate students (who were my toughest interviewers, by the way!) and I felt right to advise them on how to plan their next move! No matter the outcome of the interview, I had learned much about myself and my aspirations. And then Murray Clayton's phone call came on a Saturday afternoon: the job was mine. It was the sign that the virologist in me has its chance to sprout or, according to my dad, that all is falling into place.

Curiosity has been my driving force through my career. As I embark in this career, I hope not only to further explore new fields of research and build a strong plant virus research program, but also to share my enthusiasm for scientific knowledge through mentorship and teaching. My research interest revolves around the

mechanism of plant viral translation. My passion for viruses is that they are obligate parasites that fully depend on their host for each step of their life cycle; they have evolved unique strategies for survival at the expense of the host. A virus relies mostly on interactions of its genome and encoded-proteins with host factors. Knockout of such specific factors or even subtle change in their properties can trigger lack of compatibility in plant-virus interactions and a failure by the virus to infect. Natural recessive resistance against plant viruses often involves mutations within the host translation initiation factors. To understand how these mutations can result in resistance genes, it is crucial to know how RNA viruses are translated. I believe that this research topic will hold great promise in advancing our understanding of the intricacy of plant-pathogen interaction, and molecular strategies for engineering resistance in plants. Importantly, it opens new avenues to bridge applied and basic research and is in synergy with the goal of the Plant Pathology Department in strengthening interdisciplinary and collaborative research.

Serendipity brought me to Wisconsin and I can expect further amazements as I embark on this new ride!

Working and Learning Together

By Bob Rand (staff, 1965–2008)

Bob Rand

Although our department has changed in so many ways during the time I served, some things have remained constant. In particular, graduate students always were and continue to be the lifeblood of the department. During the past four decades approximately 330 students have received their graduate degrees. I have worked with many of the students and have known most of them. These experiences were one of the more memorable aspects of my job over the years, and I have been present during the formative years of many individuals who went on to be great scientists and teachers.

The dynamics of the graduate student body have changed considerably during the 43 years I have worked in the department. It seems to me that during the early years, the students were a closer knit group than today. They celebrated together when someone passed prelim exams or their thesis defense. The oral prelim was a big event in the life of a graduate student. If they passed, and unfortunately not everyone did, this was cause for a huge party. The final exam (defense) was important too, and though it was anticlimactic, it was still celebrated until late into the night. These celebrations

involved the entire department, not just the particular lab of which the student was a member. Hosting a prelim party was expensive and it took the host a while to financially recover from such a party.

Students also socialized together quite a bit. They participated in intramural sports—ultimate Frisbee, soccer, and softball and the Hasty Tasty or HT was a prominent establishment in the life of graduate students. The HT was the place of choice for celebrations and a place to go at the end of the week. At 4:00 on Friday afternoons the students and several faculty would go to the HT for beer and conversation. Many times the party would move to a graduate student's apartment. The pizza and beer were delivered and the party continued. Friday night was the only night Russell Labs was dark, no one was working. All the other week nights, including Saturday and Sunday, the lights were on and the students were working. At that time the philosophy was work hard and play hard and they did! Students were usually at work at 8 a.m. and came back in the evening after dinner to work until 11 p.m.

I have been around long enough to witness many other changes in the department. When I first arrived, all the faculty had field research projects. I was one of the first academic staff members to be hired; up to that point there were people called the Gardeners who were assistants to the faculty along with the graduate students. The Gardeners were a diverse group who were very skilled at growing plants or taking care of field plots and they could be counted on to help with tasks ranging from pollinating cabbage to grafting trees. Many grew up on farms; they had a strong work ethic and loved the outdoors. You could learn all you wanted from these guys about hunting, fishing, trapping, or digging ginseng. They were characters, and fun to have as colleagues.

Many of the graduate students did the work for their professor that undergraduates do today. They helped their professor with his projects during the day and did their work at night. One of the first things Don Hagedorn did when he arrived in Madison to attend graduate school was to hoe Dr. Walker's beet plot. Dr. Walker took Don to the field and told him, "Don, you have everything you need: hoe, lunch, and water jug. I'll pick you up at 4:00."

In the 1960s, 10 a.m. was department coffee time in the conference room (594). This coffee was for faculty only. Graduate students and staff would go to Rennebohm's or The Pine Room. Mrs. Hauser would make the coffee and Minnie would wash the cups and saucers. Eventually, the coffee was expanded to include everyone. However, like many things, as the culture of the department shifted, the department coffee disappeared; nowadays there are coffee pots in each lab. Personally, I miss the department coffee. It was a great time to visit and learn more about the faculty in an informal setting.

Over the years, I've participated in a large number of projects with graduate students, faculty, and other staff members. Many of the people I worked with

Bob Rand holding a Northern Pike.

became good friends and colleagues as a result of the work we did together.

The first pea plot Walt Stevenson planted during his graduate study consisted of 500 plant introductions and susceptible controls, replicated three times. The year was 1969 and the plot was situated where the UW Hospital complex is located now. Walt was looking for resistance to *Pea Seed Borne Mosaic Virus* (PSbMV), a recently discovered pathogen. The two of us went out to plant on a beautiful bluebird Saturday using a V-belt planter. I pushed the planter and Walt put in the seeds. After an hour or so of planting, Walt asked if I was tired of pushing the planter. I told him I was doing fine and we continued planting. This conversation was repeated a few times during the day and I kept pushing the planter and Walt kept putting the seeds in. All the bending took its toll on Walt. The next day, his back was hurting so much he could hardly move — it had been killing him during planting and I didn't realize it because he didn't tell me! Planting the peas wasn't the end of my involvement with Walt's project. We also had to inoculate the plot with PSbMV, which was also physically challenging. For the inoculation, we used a small generator that powered a pump to which we attached atomizers and infiltrated the "clamshell" of the pea plant with the virus. There was a lot of bending and squatting and I can remember the pain in our backs and knees. Walt certainly had a great introduction to field research and the difficult parts of his first-year experience didn't deter Walt—he had a pea plot each year during his graduate career at Wisconsin. The last plot was located where the new power plant is located on Walnut Street. During Walt's career at Wisconsin he planted several plots each year, although the improved mechanical planters currently used were a big improvement over the V-belt planter that the two of us struggled with all those years ago.

I was also extremely fortunate to work with Professor Don Hagedorn (known to most as Doc Hagedorn). Doc always encouraged and supported me in all my efforts and gave me many opportunities not available to most staff members. For instance, I was one of the first academic staff members to attend professional meetings. Doc provided the means for me to attend the Wisconsin Canners and Freezers Association meetings, APS, the Bean Improvement Cooperative, and the National Pea Improvement Association meetings. Because I attended these meetings I got to know many scientists from other universities and the USDA, and also people in the food processing industry and the seed industry. Overall, the people in the processing and seed industry are wonderful people and I have Doc to thank for many of the long friendships I developed.

Doc was frequently called to go out to the field to diagnose diseases of peas and beans for the canning companies. I usually went with him and it was a terrific learning experience. The disease symptoms in the field often look different from the pictures in a textbook or compendium. Sometimes the answer was obvious, other times it involved detective work to find out what really happened.

I also visited seed company variety trials with Doc and observed the new varieties being developed. It was always interesting to see the ones in the pipeline to possibly become a variety in a year or two. I found it fascinating how slow the breeders were to incorporate disease resistance into new varieties. They were usually more interested in the horticultural and agronomic traits than disease resistance. Fortunately, that attitude has changed over the years and disease resistance is now an important component of developing a new variety.

This department has been my home for my entire career and I've seen countless students, faculty, and staff come and go during that time. Many of the individuals I worked with and for over the years became lifelong friends. Although many of the details have changed over the years, at its core this department remains a place for faculty and students to learn from one another and work hard together to solve problems that matter to growers in Wisconsin and around the world.

The Back Door to Plant Pathology

By Luis Sequeira
(J. C. Walker Professor Emeritus; faculty, 1961–93)

Luis Sequeira

The request from the chairman of the Centennial Celebration to write about my professional career at the University of Wisconsin is made much easier by an earlier article that I wrote for *Annual Review of Phytopathology,* entitled "On Becoming a Plant Pathologist: The Changing Scene" and published in 1988. I explained in that article that I was trained as a mycologist at Harvard University, but that my interest in hormone metabolism brought me in contact with a fungus that causes premature leaf drop of coffee trees. This sparked an interest in plant pathogens in general, but agriculture was hardly part of the curriculum at Harvard. This explains the title of this article.

I became a plant pathologist as an on-the-job training necessity. Upon returning to Costa Rica after a year's postdoctoral in Brazil, the only job that I could find, after many months of searching, was with United Fruit Company in late 1953. They needed a mycologist in Honduras who could examine the changes that occur in the soil microflora upon flood fallowing, then the only practical means to control Fusarium wilt of bananas. I never got there. A new wilt disease of bananas was causing problems in a new division in Coto, in southwest Costa Rica, and I was asked to take a look. Little did I realize that this was the beginning of an 8-year sojourn in one of the most remote corners of Costa Rica. The new disease turned out to be Moko disease, caused by a bacterium (*Pseudomonas,* now *Ralstonia, solanacearum*) and the problems related to developing control procedures marked my conversion to plant pathology and a lifetime of interest in this pathogen.

My first responsibility was to set up a laboratory. In spite of the remote location and the obvious disadvantages of limited facilities, there were interesting things to do. The job remained a one-man operation for a long time. It was hard work. I had to learn how to test fungicides for control of banana leaf spot (Sigatoka) disease, to do soil analysis for major elements, to control insect problems of the most varied sorts, and on occasion, to test the water supply for coliform bacteria. There were herbicides to be applied and I had to become knowledgeable about farm equipment, fungicide spray systems, etc. Hardly the subject of a Harvard education. I gained respect very quickly for the work of Extension personnel. Over

the years, additional staff arrived at Coto and my job became more manageable. Throughout, I retained my early interest on host-parasite interactions and longed for an opportunity to work with one of our consultants, Arthur Kelman, at North Carolina State University.

I have always been impressed by the fact that a single event, sometimes minor, can force you to make a decision that affects the rest of your life. In my case, a serious disagreement with the Vice President for Research of United Fruit in late 1959, was responsible, eventually, for my joining the staff of the Department of Plant Pathology at the University of Wisconsin. How that happened may be of interest to my readers.

I had worked very long hours at Coto and realized, soon after I arrived, that in that division of the company nothing moved without the approval of the manager, Mr. Block. In those days, division managers were lords and masters of their territories, and were quite independent of the Board of Directors in Boston. Block was immensely helpful to me in providing the laboratory facilities, housing, and transportation at Coto, and, in addition, the spray equipment and labor to do all the testing of fungicides, insecticides, herbicides, etc., that was an important part of my job. Block, however, also had a profound dislike for the vice president for research in Boston, a person who felt that production and research should remain independent of each other. When he arrived in Golfito for a visit in late 1959, Block did not meet him, as was customary. The Research VP was miffed by this apparent oversight. That evening, at dinner time, he proceeded to blame me, as head of the Coto Station, for Block's attitude towards him. He said that I was too friendly with Block, and that this was not in the best interests of research. He vowed to transfer me to the main laboratories in Honduras. He chided and insulted me in front of my staff, which I found particularly demeaning. I did not argue, but I got up and left the meeting, intent on submitting my resignation. I knew that I had no future with United Fruit so long as that man was in charge. My wife suggested that rather than to resign or accept transfer to Honduras, I should request leave for a year to work with Kelman in North Carolina. I requested this leave the very next day and, to my surprise, the Research VP approved it.

I moved to Raleigh, North Carolina, in January of 1960 and was intensely happy working in Arthur's laboratory for over a year. I returned to my early interest in hormone metabolism in diseased plants. In the meantime, my nemesis was fired by United Fruit Company, which was not too soon, and the new research administrator asked me to join the Norwood Laboratories at the end of my leave. I did not think that Norwood, a laboratory built out of a refurbished mansion outside Boston, had a future for me, and I proceeded to look for a new position in earnest. I was right. Norwood Laboratories were closed two years later.

After a year in the academic environment at Raleigh, I knew that I could not return to the military-like system of the Research Department of United Fruit

Company. Everything in that department was generated at the top; projects were approved or cancelled without explanation. As an example, I had run across a disease of bananas in Coto that was unlike any of the virus diseases that I knew. I proceeded to show that this new virus disease was mechanically transmitted and included these results in my monthly report. Not long after mailing that report, I received a telegram from the manager in Boston with a terse command: "Eliminate all, repeat all, virus-infected plants in your greenhouse." Evidently, managers would rather ignore a new disease than learn about it. At other times, orders from above would cause great turmoil in my crowded schedule. I would get messages such as: "500 lb of Vancide 50 arriving S. S. XXX next week. Please test for Sigatoka control." There was no concern for the fact that I had to drop everything I was doing and make arrangements for test areas, helicopter schedules, spray equipment, and personnel. In addition, after months of hard work, I knew that publishing the results was not a possibility.

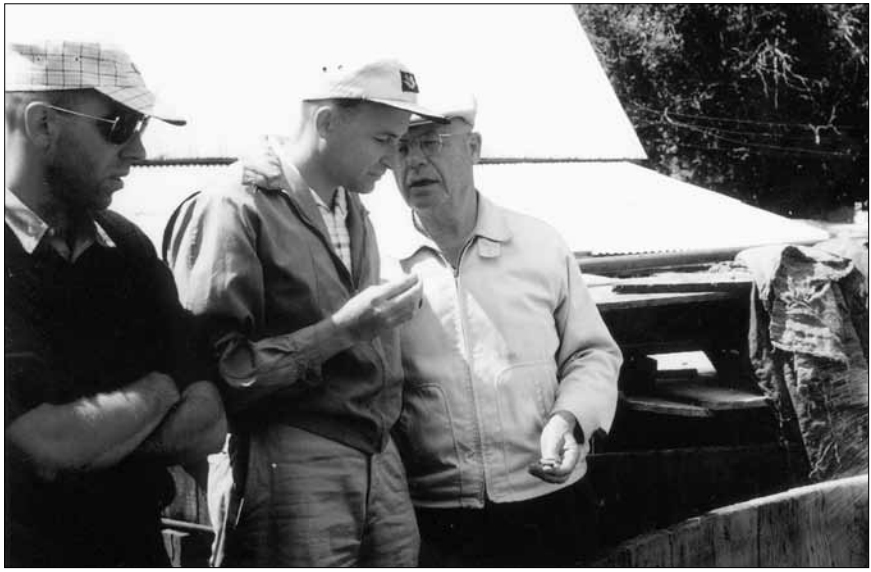
While working in Arthur's laboratory, I became a good friend of one of his graduate students, Ellsworth Maine ("Ellie") who had interviewed for a position in plant pathology at the University of Wisconsin in Madison, and was prepared to accept the position if offered to him. Unfortunately, while completing his PhD thesis he became ill and was diagnosed with a particularly aggressive form of leukemia. He went home to be with his family and succumbed to the disease a few months later. Thereafter, Glenn Pound, chairman of the Department of Plant Pathology at Wisconsin, asked Arthur if he knew someone else who might be qualified for the position. Arthur mentioned my name and, eventually, I agreed to interview for the position after I talked with Glenn at the annual meeting of APS in Green Lake, Wisconsin. That interview took place in Madison during an extremely cold day in January 1961, and I worried about my family's possible reaction to the harsh winters in Wisconsin. Glenn was most persuasive, however, and I accepted the position.

I arrived in Madison in August 1961. For someone with an interest in disease physiology, the facilities at the department in Wisconsin were appalling. The department's well-established reputation was based on greenhouse and field work. Physiology was a new endeavor that Paul Williams, as a new assistant professor, and I had to pursue without adequate equipment or facilities. Two things kept our hopes alive: a new building was underway and the government's support for basic science was increasing rapidly in the post-Sputnik environment. I was impressed by the cohesiveness of the staff of the department and by the quality of the graduate students. The staff included some very well-known plant pathologists (Walker, Riker, Pound, among several others) who had strong opinions on almost any issue, but who closed ranks when the department had to make important decisions.

Two things were very different for me as I arrived in the Department of Plant Pathology. First, I was free to do research on any topic that I chose. Second, there were no funds to do the research. I learned very quickly that at the same time

that I prepared lectures to teach the graduate level course in plant pathology, I had to prepare proposals for research from several foundations and the Graduate School. In addition, I was given the responsibility of dealing with vegetable crops, including lettuce and carrots that were grown on muck soils. My farm experience with United Fruit Company came in handy in dealing with growers who were facing a variety of disease problems in their crops. To me, the most interesting was a root rot complex of lettuce, a disease of unknown origin. The disease could be eliminated by steaming the soil and, evidently, was the result of a biological agent. That agent (eventually identified as a bacterium by a researcher at Davis, California) multiplied in the lettuce residues that were incorporated in the soil after harvest. For years thereafter, that disease became the center of my field and greenhouse research and, over the years, most of my students were involved in planting, weeding, irrigating, and harvesting lettuce during the summer. Eventually, we found a source of resistance in a wild lettuce and, following a standard backcross selection program, we were able to release two lettuce varieties that had high levels of resistance to root rot and were of acceptable quality.

I was fortunate that, over many years, the National Science Foundation, the Rockefeller Foundation, the USDA Competitive Grants Program, the International Potato Center (CIP), and several other donors supported my research interests in bacterial wilt and its agent. My main emphasis was in host-parasite interactions, but I never lost the notion that the results had to lead, in some way, to the development



A faculty field trip! (left to right) Rick Durbin, Luis Sequeira, and J. C. Walker at a pickle factory, ca. 1963.

of control of the disease in the field. I still hold to that notion. Numerous potato varieties with resistance to bacterial wilt, for example, were released by CIP as a result of our breeding work.

From my teaching experience as a TA at Harvard I knew that I enjoyed teaching, but did not realize until I started my career at Wisconsin that teaching would become such an important part of my life. I believe that I taught graduate and undergraduate courses, either as formal courses or seminars, every semester of my entire career until I retired in 1993. I enjoyed teaching, particularly at the graduate level, and still think that this was my most important contribution at Wisconsin. Over the years, I was fortunate to receive numerous awards for my research activities but, surprisingly, not for teaching, which I believe I did better than research.

One obvious advantage of joining a department with a strong international reputation is that you are very quickly asked to serve in university committees, to help with the activities of the professional society, to give advice to growers, etc. I served on the Council of the American Phytopathological Society for many years, and was president of that society in 1985. I enjoyed my activities as reviewer and editor-in-chief of *Phytopathology*, and, eventually, as editor-in-chief of *Molecular Plant-Microbe Interactions*. I served in Washington as chief scientist of the USDA's Competitive Science Program, and, after retirement, I worked for the World Bank for six years, and for the National Science Board, also for six years. Membership in the National Academy of Sciences in 1980 was an important honor. Being at the University of Wisconsin made all this possible.

20 Years in the UW Plant Pathology Department: A Perspective from the Inside

By Denise Smith (staff, 1991–present)

Denise Smith

I began my career in the Plant Pathology Department in 1989 as a Masters student in Doug Maxwell's lab, and then took a position as a research specialist in the forest pathology program in the department where I continue to work today. When I first arrived, my main interest was in pathogenic fungi, particularly ones that cause tree diseases, but there wasn't a spot available in an appropriate lab at the time. Dr. Maxwell offered me a chance to work on geminiviruses and I jumped on it. I didn't entirely understand what I had gotten myself into, but it worked out well. I guess I had an idea somewhere in the back of my head that the shortest path isn't always the best path. Yes, you can get from A (mycology) to B (forest pathology) by going through V (virology). I learned molecular biology skills that were applicable to any organism, traditional plant pathology techniques in Plant Pathology 611 (no longer taught) and PP 559, and the process of "how to do science."

I also learned how to deal with a multicultural environment. There were several foreign students and visiting scientists in our lab so there were always conversations in Spanish/Portuguese and Arabic going on. I didn't understand most of it but when the voices got raised I did understand that it was time to water the plants in the growth chamber! This international mixture led to some interesting potluck dinners. I would like to thank my former lab mates for introducing me to some wonderful Dominican, Costa Rican, Brazilian, Jamaican, Indonesian, Lebanese, and Egyptian dishes. Unfortunately I don't know what the Thai food tasted like; it just burned! We often played Pictionary at lab parties, which proved to be challenging at times. Because most of our international visitors were from warmer climates, they had no idea what some of the words meant. For instance, one participant was totally puzzled by the word "snowshoe."

There have been a lot of changes in the department since I was a student. Students come and go, of course, but there has also been a lot of turnover in faculty and staff in recent years. If you left the department more than 10 years ago you probably wouldn't recognize a lot of the faculty and staff. Most faculty departures have been due to retirement, although a small number moved on to other opportunities. Unfortunately, some of the positions haven't been filled and we now have fewer faculty than we did 20 years ago. Staff departures can be attributed mostly to

difficulties in obtaining funding to pay staff; many staff, especially research staff, are no longer supported by the state or university and rely entirely on grant money for support. Other staff have moved on to other positions for various reasons and a small number have retired. The research staff that remain are often much more than technicians; many manage entire research projects, do their own research and assist in guiding grad student research.

Some social traditions are still in existence but have changed format over the years: for instance, the holiday party (formerly a Christmas party with Paul Williams starring as Santa Claus) is no longer a potluck supper at the Eagle Heights Community Center. For a few years it was held at Union South as a pot luck supper on a Saturday, then changed to a weekday after-work hors d'oeuvres party and was held in the teaching lab for a couple of years. In recent years it has been held at the department chair's house on a Saturday evening. Of course, we still go to the Memorial Union Terrace to celebrate a successful thesis defense and the dairy store is still across the street. The other popular hangout when I was a student, the Badger Tavern, became a sub shop 15 years ago and the bar on the other side of the block hasn't been nearly as appealing.

If you come to visit, you shouldn't have any trouble finding us: we are still in Russell Labs despite the talk of a new building. That's probably still far in the future. Some remodeling and modernizing has been done, but there hasn't been any progress in eliminating the giant cockroaches in the basement!

Extension Vegetable Pathology — Then and Now

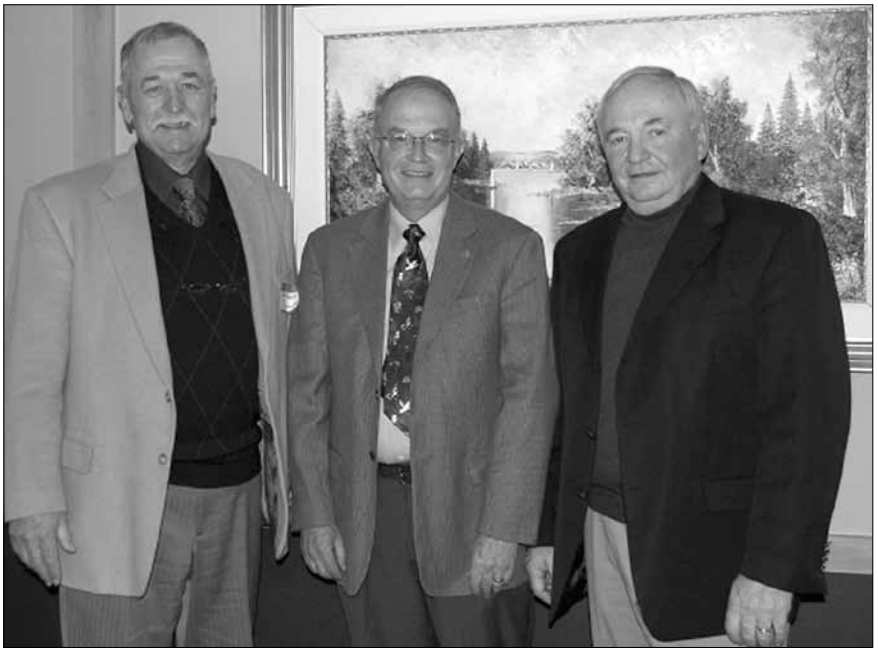
By Walter R. Stevenson
(Vaughan–Bascom Professor Emeritus; faculty, 1979–2008)

By Walter R. Stevenson

Our department has a long and important history in dealing with the many disease problems facing vegetable producers in Wisconsin. Beginning with the appointment of R. E. Vaughan in 1915 as the first Extension plant pathologist, followed by Earl Wade in 1949, myself in 1979, and the appointment of Amanda Gevens in 2009, we continue to provide critical coverage in the area of vegetable crop pathology.

During my career as a faculty member spanning over 35 years (seven at Purdue University and the last 29+ at UW–Madison), I've witnessed many changes that affect how we deliver information to our clientele. When I began my professional career in 1972, we had no desk or laptop computers, cell phones, or digital technology. Presentations were largely relegated to color and B/W slides along with hand-prepared overhead transparencies. Text slides were typed onto white paper, photographed and the black-on-white images placed in glass or plastic slide mounts. In the late 70s, diazo-chrome technology allowed us to have color backgrounds for our text slides and, very soon, most presentations had text slides with blue backgrounds with white letters. Sitting through a four-hour session with numerous speakers, each having blue slide after blue slide, would dull the mind of even the best student. Slide preparation software was in its infancy, but we soon began to use the large mainframe computer at the UW Computing Center (MACC) to make slides with colorful graphics. The process was time-consuming and at times very painful, but our clientele were grateful for the effort to add some pizzazz to our presentations. This transitioned into the purchase of Polaroid slide-making equipment that allowed us to use our own newly purchased desk top computers and software to prepare our own slides. With a few days to a week of lead time and plenty of planning, Extension presentations began to incorporate this new technology and our clientele responded very favorably.

We soon learned that the UW Medical School had purchased a very expensive high resolution slide imager, which they were eager to share for a price and thus we began to format our slides on our PC's, email the slides over to Medical Illustrations and obtain the finished slides in as few as 24 hours. With over 50



Walt Stevenson (center) with Jeff Wyman (left; former chair of Entomology) and Larry Binning (right; former chair of Horticulture) at Walt's retirement party, Blackhawk Country Club, February 2008.

clientele meetings per year and often multiple topics covered at each meeting, the idea of shortening the preparation time was very appealing. The improved technology helped to improve both the quality and timeliness of our Extension presentations. We made thousands of slides over at Medical Illustrations at considerable expense, but our clientele benefited from the effort.

Fast forward to 2009 and Extension programming is light-years easier and more effective. Our Extension group now typically has desktop computers in their offices and at least one laptop used for everything from data analysis, disease forecasting, email, electronic newsletters to be sent worldwide with the push of a button, state-of-the-art computer graphics and even free national and international calls. Our presentations use outstanding graphics plus an array of video to enhance the educational experience for our clientele and students. While we once lugged overheads and slide projectors to and from meetings, we now carry the entire presentation on small "flash drives" the size of a thumb. These tiny devices plug into laptop computers that are connected to small powerful projectors which fill meeting rooms with colorful and interesting information. Some of the newest projectors literally fit into the palms of our hands and cost a fraction of the expense for equipment used a decade ago.

Communication in the course of our statewide duties during the 70s and 80s was a bit different from today. Talking by phone to growers often required perseverance. Either we made all of our calls to growers before we left the campus for travel throughout the state or we stopped enroute at a pay phone booth to return calls, schedule appointments or coordinate meetings. If you wanted to talk to a grower, you either called early in the morning, during lunch or in the late evening, giving you three narrow windows per day for communication with clientele. It often took days of repeated calling to reconnect with growers seeking disease management information and solutions often arrived too late to be useful. Newsletters were typed onto carbon stencils, mimeographed, and hand-stuffed into envelopes for mailing. What began as useful and timely information was often stale or of limited value by the time it arrived at the farm.

By the mid–80s, communication began to change quickly with the advent of cell phones and fax machines. We now talk with clientele with tiny digital telephones that fit conveniently into our pockets. Growers carry cell phones in their pickups, tractors, and harvesters so that we can efficiently answer questions, plan meetings and keep everyone on the same page throughout the growing season. Film cameras sit unused in our offices and we now use high quality digital cameras to capture information for future use in publications, presentations, and problem solving. Our clientele also use digital camera technology to send us pictures of problems they are facing so that we might provide help in solving problems in almost real time.

Today's technology is progressing at an accelerated rate, opening up new possibilities for instant communication, teaching, and problem diagnosis. As an example, I recently purchased an Apple iPod Touch for what I thought would be improved access to news and weather. What I found was an instrument that provides access to email, web-based information, real-time news, sports and weather, podcasts and videos covering a range of topics, and thousands of helpful applications that are easily downloaded. What a difference one of these handy devices would have made in my Extension career! I can easily see this type of technology in the hands of every one of the clientele I've worked with over my career. Imagine sharing presentations on current research, disease diagnosis, pesticide application technology and improved safer approaches to disease management in the field. A new outbreak of late blight and current remedies could be shared in video format with every grower in the state in a matter of minutes. Just imagine the miles and time saved with small investments in this new technology. The training possibilities for our clientele and students using this new technology are endless. In today's world, we are communicating with clientele in ways we only dreamed about just a few short years ago!

Crop responsibilities and the geographical impact of our Extension roles have changed dramatically over the years. In our department's early years, faculty with Extension appointments covered all crops and generally spent the vast majority

of their professional careers within the borders of our state living the "Wisconsin Idea." They provided clientele throughout Wisconsin with educational opportunities and science-based solutions to their diverse crop problems. Extension plant pathologists, if they were fortunate and there were no pressing matters in the home state, were able to attend regional and national meetings of professional societies. At some point during my career there was a transition of focus whereby those of us with Extension/research split appointments were encouraged to participate in national committees, national and international professional meetings, out-of-state grower educational conferences, and to play leadership roles in international outreach and research programs. The "Wisconsin Idea" has expanded to include not only the citizens of Wisconsin, but citizens of the nation and the world. In our global economy, it makes sense that we should be sharing our expertise worldwide, as well as learning the lessons that the world has to offer.

Throughout my career, I've been part of a commodity-oriented team that crossed disciplines, departments and universities. Our potato and vegetable team at the UW was a close-knit group working together with the potato and vegetable industry to solve current problems, and always looking ahead to proactively solve potential problems on the horizon. We met with the various components of this industry multiple times each year in educational meetings and field days. Each week throughout the growing seasons, our team prepared timely newsletters on relevant topics, helping growers to achieve improved pest control with a minimum of pesticide use. In some cases, we've worked with three or more generations — sons, fathers and grandfathers — providing 24/7 support throughout each growing season. Every now and then you find an "Aha moment," when growers come to understand the messages you've been delivering in different formats for several years and then begin to implement new practices on their farms that truly make a difference in how they farm and control diseases. These efforts helped to position the potato and vegetable industry as a "green," environmentally involved industry that is providing unanticipated positive benefits to growers in terms of additional marketing opportunities and income. Our team framework served as an effective example for other groups at the UW and on a national scale.

As I look back at the past 35+ years of my career, I see a continuum of change that has accelerated recently. There was really no way in my early career to predict how I would interact with clientele in today's world. Part of the change was due to rapid advances in technology, but in today's budget, we really are forced to work more efficiently with fewer people and resources to solve the increasingly complex problems confronting our clientele. I wish I had a crystal ball to see ahead a decade or more so that I could pass this insight on to my successor. All I can say for certain is that change will occur, and our success and the success of our clientele depend on how we adapt to these inevitable changes.

Recollections of the Department of Plant Pathology

By Paul Tooley, Class of 1982

Paul Tooley

I graduated with my BS in Plant Pathology in 1978, MS in 1980, and PhD in 1982, so my perspective may differ from those who obtained only one or two degrees at Madison. I arrived in the summer of 1976 from New York, following studies at the State University of New York College at Purchase. Madison drew me in search of broader plant science course offerings than were offered at SUNY, and to reconnect with my Wisconsin roots — my birthplace was Madison, and both sides of my family originate from the Sauk County area. There are many fond memories of summer visits to the farm growing up, and all we would do with our grandparents, uncles, aunts, and cousins.

I shopped around among the Botany, Horticulture, and Plant Pathology departments and was taken with the breadth and scope of work going on in Plant Pathology. Especially impressive were the overall quality of the facilities, the electron microscopes in the basement of Russell Labs, and the eight floors of research, so I decided to declare an undergraduate major in Plant Pathology. A young faculty member named John Andrews was my assigned advisor and I remember meeting with him for the first time in his office to chart my path. There were not many undergraduate majors in Plant Pathology at the time, and he gave me the individual attention needed to help me balance my schedule and complete the requirements of the major each semester.

I became more familiar with the department while working for Drs. A. C. Hildebrandt and D. J. Hagedorn part-time during the semester and full-time in the summers — learning much from them and meeting the graduate students in their labs. I especially enjoyed working with Bob Rand and Dr. Hagedorn in the bean root rot plots in Hancock in the summertime. Dr. Hagedorn was a wonderful man who treated us all very well. We ate in good restaurants strategically located near the research plots. He also knew the cantaloupe breeders and at the end of the day would pick up some nice ripe melons that we would take to our motel room, which was just across the street from a Dairy Queen. His genius was to cut the ripe melons in half, then take them across the street and have them filled up with soft serve vanilla; this was just the thing to cap off the work day on a warm summer evening.

Following my BS in Plant Pathology, I began to look for graduate opportunities in the department, and Dr. Hagedorn recommended Dr. Craig Grau, a new

faculty member who had statewide responsibility for diseases of several major crops, including soybeans and alfalfa. Craig was a wonderful person to work with and his knowledge, energy, enthusiasm, and good nature made his program unparalleled. We traveled to the shores of Lake Michigan where a myriad of soybean diseases were affecting the large growers, and had plots naturally infested with *Phytophthora* root and stem rot, *Sclerotinia*, brown stem rot, and many others. I performed my MS and PhD work there on *Phytophthora*, and it was not uncommon to put in long days in the field. It was a chance to study plant diseases firsthand, learn from Craig's vast experience, and work on my thesis project. Some days we'd work late. As the sun set we would rest, leaning over on the planters, enjoying the breeze and reflecting on the day's work and more.

The early 80s were wonderful years to be in school and live in Madison. There was of course a routine of classes, research and, in between, the cadre of graduate students would band together to share successes and disappointments in the watering holes on and around campus. We had a graduate student soccer team called the *stinking smuts* for several seasons, and competed against other graduate student teams. Sometimes we were joined by Paul Williams and Doug Rouse. It was a wonderful and cohesive group of students, and many of my colleagues I now see at the APS meetings as successful, advanced career scientists in universities, government, and industry. My basement office, B–70, I liked because it was near the growth chambers where I did some of my soybean *Phytophthora* research. We played darts there occasionally, holding the 'J. C. Walker Cup' tournament now and then, in which we had to throw the darts while keeping one foot in a furrow made of cardboard. His motto had always been to "keep one foot in the furrow"— in other words, never let oneself stray too far from the important field problems on which the department was built. We took his words to heart.

There were many influential people in the department and many wonderful faculty members. Drs. Kelman and Sequeira were highly respected because of their vast experience with plant pathogenic bacteria. Many other equally esteemed faculty in all areas of Plant Pathology made the department a high quality institution. My introductory PP 300 class, which had a campus-wide reputation for being an excellent class, was team-taught by Drs. Kelman, Andrews, and Slack. Then-graduate student Steve Lindow came in one day to illustrate the phenomenon of ice-nucleating bacteria, an amazing demonstration I still remember. The longer I worked here, the more I came to appreciate the level of expertise in all areas of Plant Pathology held by the varied faculty members. Women had not been highly represented as members of the faculty when I began as a student, but by the time I left, new hiring had resulted in the acquisition of several female faculty members, a trend that has continued.

In Dr. Eugene Smalley's advanced mycology class I won the prize for finding the largest fungus on our class foray (an 18 inch conk on the trunk of a tree). For the prize, he gave me three of his Dutch Elm Disease–resistant elm seedlings and

I planted them in the yard of my grandparents' house in Witwen, and my uncle Dale Sprecher's backyard on Highway 60 between Sauk City and Spring Green. Now, years later, many people enjoy the shade of the trees in Witwen while watching the celebrated 4th of July parade there as it proceeds down the main street of the small unincorporated burgh outside of Sauk City.

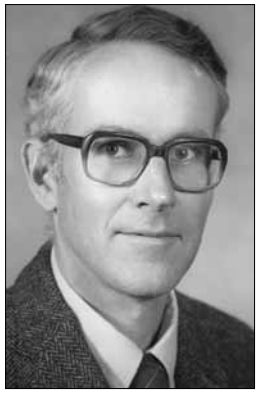
A notable thing about my time in the department was that I believe I was the first grad student to use a word processor to write a thesis. The secretaries had recently obtained large, desk-size Wang word processing units, and one had just been made available to the graduate students. We had to use it in a special office on the second floor. So rather than having to send my thesis to a typist, I was able to work evenings on the word processor and complete things more quickly. This helped me become proficient in using the new 'SHOW' graphics software package just available at the campus computer center and I was able to use it for my thesis figures, rather than do them by hand in pen and ink as was the custom.

Also during my time in the department, a new prelim system was invoked and I was among the first grad students to take it. For me it was optional as I was not due for prelims for another year. It consisted of a lengthy written exam, plus an oral component that was supposed to be on our research. I studied moderately hard over several days, reviewed some basic coursework, and came for the exam. I remember the questions being difficult but doable, and many seemed to involve familiar topics. After a few days, a small piece of paper appeared face down on my desk in B–70, that said 'PASS' on it. I was happy I had passed without the months of study and review often put in for the prelim exam. Many were surprised I had passed, as several more senior students had not passed. I was questioned by several of the faculty about what I had studied, and for how long. Presumably they concluded that I had learned by imbibing all the Plant Pathology around me rather than exhaustively reviewing coursework and notes. Perhaps thinking I had gotten off easily, they pressed me hard when it came time for the oral part of the exam. But luckily I passed it as well and was able to move forward and complete my PhD.

Madison is, of course, the town nobody ever wants to leave and I was no exception. In the summer of 1982, I completed my PhD and we moved to Ithaca, New York, where I had accepted a postdoctoral position with Dr. Bill Fry at Cornell University. I remember the strong feeling of cohesiveness within the department, of pride and appreciation for the capable people surrounding me, and for the excellent classes and facilities. Those years have paid great dividends in terms of my professional development and life goals. After a long and rewarding career in Plant Pathology, I am very grateful for having been a part of the department. As the department celebrates its 100th birthday, probably many others will reflect on their time here with fond memories as well.

Reflections on My 50 Years in the Department of Plant Pathology, University of Wisconsin–Madison

By Paul H. Williams (faculty, 1962–97)



Paul H. Williams

Fifty years ago, as I stepped out of the train in Wisconsin with my bicycle and a small trunk of possessions, little did I know how deeply rooted I would become in the fertile environment that was to be my home at the University of Wisconsin–Madison. The academic and social environment of the department in which I would become immersed first as a student, and later as a member of the faculty, is accurately portrayed in the Department of Plant Pathology's 75th anniversary volume, *With One Foot in the Furrow*.

When I arrived in September 1959, Plant Pathology was a different world than it is today. With 32 professors, more than 60 graduate students, and very little office and laboratory space, it was literally bursting at the seams. Many faculty shared offices and labs. Fifty-two PhDs were granted in the three years that I was a student. Only three of those PhDs were women, none of whom was from the United States. Three years was the norm to obtain a PhD degree. Postdocs were virtually nonexistent. However, as the department entered its sixth decade, the 1960s, it was preparing to undergo profound changes in the social and academic traditions of its past. Fostered by the retirements of the "Big Four" professors, Keitt, Dickson, Riker and Walker, and with the hiring of new faculty from institutions other than Wisconsin, Plant Pathology was reorienting the balance of its research output from crop-focused applied science toward emphasis on research of a more fundamental nature. Its new home in Russell Labs was replete with space, new equipment, and trained staff supporting investigations into the mechanisms underlying disease and disease resistance in plants. Faculty and their students no longer shared labs; rather students, who for years had been thrown together in three large 'bull pens' in Moore Hall and T–18, were now more isolated from each other in the vertical redistribution of laboratory groups over the eight floors of Russell Labs tower. Some who were familiar with the cramped and crowded quarters of Moore Hall and T–18 and the quality of human interaction that such conditions engendered might say that something was lost in the move to Russell Labs.

As is narrated by Glenn Pound in *With One Foot in the Furrow*, my appointment to occupy J. C. Walker's position on the faculty was unconventional by any standards. Early in my third year of grad school, the offer was made to me verbally by Chairman Pound as I stood side by side with him at the urinals in the 3rd floor men's room! I never received a letter of offer, nor signed a contract. I was the last student to be appointed to the departmental faculty directly from being a student (though other former students have returned after acquiring degrees or experience elsewhere). As a newly appointed professor, I received no directives on what research to do or on how to do it. The only advice I received, from Glenn Pound, was "Paul, you will wear three hats. Wear them well." And from Walker, "Whatever direction you take, always remember to keep one foot in the furrow." Pound's and Walker's advice has been the cynosure for my professional life. To have been a professor at one of the great Land Grant institutions in the United States has been my great fortune and privilege.

Over the 100 years of its history, the department has attracted and trained a remarkable array of talented students who have gone on to make important contributions to agriculture, science and human well-being. During the first 50 years of its history, our growth and academic productivity were guided strongly by L. R. Jones and the Big Four's adherence to the mission of the Land Grant University and to the Wisconsin Idea — that the boundaries of the university reached to the boundaries of the state and beyond. Though I was deeply imbued in that tradition by both Pound and Walker, my appointment to the faculty was to strengthen the transitioning of the overall research balance from one which was predominantly focused on the applied cropping areas of vegetables, fruit, cereals, forage, field crops and forestry to that of more basic or fundamental research. (Maxwell, Ch. 5, *With One Foot in the Furrow.*)

I assumed faculty responsibilities in July 1962, with staff and greenhouses that supported Walker's cabbage and cucumber research. In August 1963, Coe Mikkelsen and I were married and then, as arranged at the time of my hire, spent the next eight months at the Boyce Thompson Institute in Yonkers, New York, in the lab of Richard Staples. We returned on the verge of the department's move to Russell Labs. At that time, Glenn Pound informed me that he would be leaving Plant Pathology to become dean of the College of Agriculture at Wisconsin and that I should be prepared to share the responsibilities of advising his six remaining grad students, my former colleagues and lab mates! Thus I started my professional career with students, one and a half full-time gardeners, three large greenhouses, one of which was a new 3-house range built at the Walnut Street site as a gift to the university from the National Kraut Packers Association in support of cabbage breeding and research, and spacious new laboratories in a new building. Then, as now, I clearly understood that these resources were an important part of the legacy of our first 50 years that was being passed on to me. I felt that this legacy

represented an unwritten contract of mutual understanding between the agricultural community of the state, and the Department of Plant Pathology, namely that the department would be mindful and responsive to the needs of the growers, seedsmen, and vegetable processors of the state and nation. I believe that I and the department have honored that contract.

During my first 25 years, I strove to maintain a balance between basic and applied research largely on diseases of cabbage and its relatives and on cucumber diseases. These were the crops for which needs had been identified and state funds allocated as specified crop research assistantships in the department's budgets. Early in my career I became fascinated with the tumor-like pathology of the clubroot disease on crucifers. This research on clubroot continued for many years and engaged the talents of numerous students and visiting scientists. Interest in my research led to collaborations in the publication of several volumes reviewing the state of knowledge in the physiology and biochemistry of plant disease.

The historical precedents established in the early years by L. R. Jones and J. C. Walker and their students of studying the genetics underlying resistance, while breeding for improved quality, proved to be one of the great strengths of Walker's programs that I would continue. The establishment of the Plant Breeding and Plant Genetics Program, in which I represented Plant Pathology, provided an important

Paul Williams with class in the Allen Centennial Gardens.

opportunity for many of our students to acquire the genetics and plant breeding skills to become successful employees of seed companies, government agencies, and academic departments. Over the years, I maintained rewarding collaborations with Professors Warren 'Buck' Gabelman, the carrot, onion, and red-beet geneticist; and Clinton Peterson, leader of the USDA national cucumber, carrot, and onion investigations, in the Department of Horticulture. Many of my students developed multiple disease-screening methodologies that led to the release of over 30 multiple disease resistant cultivars, hybrids, and inbred lines of crucifers including cabbage, broccoli, cauliflower, radish, Chinese cabbage and other Asian brassicas. Interest in my research on the diseases of crucifer crops led to numerous opportunities for travel to countries in Europe and Asia during which I was able to collect *Brassica* seed stocks in search of new sources of genetic resistance.

Early in 1973, as I began seeking new sources of disease resistance among my seed collections and the collections of *Brassica* species housed in the USDA plant introduction stations, I noticed that some collections contained individuals that flowered more rapidly than others. It then occurred to me that I could create populations for each species that would flower and develop seed in less time than the year or more required for many *Brassica* crops. I began a recurrent phenotypic mass selection breeding scheme with the objective of: 1) reducing the time from sowing to flowering and seed maturation, 2) eliminating seed dormancy, 3) reducing the size of the plants so that high population densities could be grown in minimal space. Plant growth and selection was under fluorescent lighting in an environment that was easily and inexpensively reproduced. By 1978 I had created rapid cycling populations for each of the six interrelated *Brassica* species. These 'base populations' were the foundation stocks of what became known as 'rapid cycling brassicas'; RCBs. Flowering times of the base populations ranged from 16–30 days and seed cycles from 40 to 60 days. Initially, phenotypic markers obtained from cytogeneticist Gary Stringam in Saskatoon, Canada, and other distinctive traits that I had collected were incorporated into the base populations to create new genetic stocks. This collection was used in the research of several students and became the basis for the establishment of the Rapid Cycling Brassica Collection, RCBC, (formerly the Crucifer Genetics Cooperative), a program that produces and widely distributes seed of genetic stocks of RCBs for research and education. (See www.rcbc.wisc.edu)

During the 1970s I also used RCBs in the various courses I was teaching and shared seed with colleagues at Cornell and UC Davis. Students and their professors enjoyed using the small, rapidly developing plants. A sabbatical in 1978 at Cambridge University and at the Plant Breeding Institute enabled me to advance the RCB stocks and further demonstrate their utility in both research and education. Arthur Kelman, who was following with interest the development of RCBs, suggested I write an article for *Science* magazine. Following the publication of the *Science* article in 1986, I turned to the development of RCBs for teaching precollege

biology. With writing and brainstorming assistance from my wife, Coe, and her colleague, Jane Scharer, and with support from the National Science Foundation, the Wisconsin Fast Plants Program, WFP, was officially launched <http://www.fastplants.org>. The WFP focused on rapid cycling *Brassica rapa* as the best for classroom use. A number of activities investigating the plant life cycle, physiology, genetics and ecology were developed and teacher-tested in workshops around the US then published as *Exploring with Wisconsin Fast Plants*, the first of many manuals produced. The program also published a biannual newsletter that eventually had a circulation of 16,000 teachers.

An important strategic decision that enabled wide dissemination of the WFP instructional materials was the patent and copyright protection gained by the Wisconsin Alumni Research Foundation. WARF licensed exclusive use of the Wisconsin Fast Plants materials to the Carolina Biological Supply Company. Over the years, Carolina Biological has marketed Wisconsin Fast Plants through their widely distributed catalogue, in science education journals and through instructional workshops for teachers at regional and national science teachers' conventions. The royalty and copyright stream from WARF and publishing companies was directed into the Wisconsin Fast Plants Fund in the UW Foundation to serve program needs.

The start of the WFP Program coincided with a resurgence of interest in science education as a national priority. The National Science Resources Center, a science education initiative undertaken by the National Academy of Sciences and the Smithsonian Institution, incorporated RCBs into their elementary and middle school curricula, "Science and Technology for Children." The Full Option School Science (FOSS) program from UC Berkeley's Lawrence Hall of Science also used RCBs in its elementary plant science units.

The initial success of the Wisconsin Fast Plants Program has grown over the ensuing years with support from the NSF, NASA, Kellogg Foundation and various state, local and institutional sources. For many years the American Society of Plant Biologists has enabled the WFP program to share its most exciting innovations in plant science education with science teachers at the annual conventions of the National Science Teachers Association.

A derivative of the WFP Program has been "Bottle Biology." Upon entering the world of precollege education in 1985 and seeing how impoverished school classrooms were for science equipment, I developed some ideas of how students and teachers could create much of their own science equipment out of plastic bottles and containers destined for landfills; then, with funding from NSF, I launched the Bottle Biology Program. The widely endorsed manual *Bottle Biology* is in its 2nd edition and has been translated into Korean, Japanese, Spanish, and Portuguese. An initiative creating instructional materials for high school agricultural science using Fast Plants and Bottle Biology was supported through the FFA Foundation and produced a teaching manual published by the National Association of Biology Teachers.

International interest in Fast Plants and Bottle Biology continues to grow. In the UK, the Gatsby Trust initiated the Science and Plants for Schools (SAPS) program with Fast Plants and Bottle Biology. Under the aegis of a collaborative space shuttle flight between US and Ukrainian scientists using the specially developed 'Astroplant' stock of RCBs, the WFP Program developed and produced instructional materials in English and Ukrainian, that guided more than 200,000 students in ground-based experiments simulating the zero gravity flight experiments. Today, Wisconsin Fast Plants are grown in schools in many countries.

At the UW–Madison, my interest in improving biology education was shared through regular discussions with a number of like-minded colleagues from various departments. When the Howard Hughes Medical Institute invited the UW–Madison to apply for funds in support of improving undergraduate biology, the group responded by proposing the establishment of a Center for Biology Education, CBE. In 1989, with support from the HHMI and matching funds from the university, I was appointed to direct the CBE and continued in that role for seven years. Collaborations with colleagues in the School of Education led to my joint appointment to the Department of Curriculum and Instruction.

As a plant scientist who was actively engaged in education, I was increasingly sought for my perspectives, and in the years following 1985 it seemed that my bag was always packed. Throughout this period during which my interest and energies were increasingly directed toward science education, I was, with assistance of students and staff, able to maintain my research on crucifer diseases, and also to provide the support needed by cabbage growers, sauerkraut packers, and seed companies. In 1997, I notified the department of my intention to retire from my faculty responsibilities so that I might focus on the needs of the Wisconsin Fast Plants Program and the growing collection of stocks in the RCBC. The dean of the college provided space for my programs in the house that was originally built in 1868 for the manager of the new University of Wisconsin Experimental Farm and, which, in 1962, became the studio of artist-in-residence, Aaron Bohrod. Science House, as it is now called, houses the WFP Program and RCBC offices and staff. Dan and Hedi Lauffer now manage these programs as they reach out across the cyberworld using search engines of Google, social networks, and Twitter, providing not only information and their experience for educational improvement, but also living seeds for change.

My days remain filled with improving the RCB stocks and in working with teachers who understand the importance of having students pursue their own questions while growing their own plants. Fifty years ago I arrived in a department that was to be my home. Every morning of those 50 years I rolled out of bed anticipating that something amazing was going to happen to me that day. And, it did!

Memories and Reflections — An Interesting Trip!

By Gayle L. Worf (Vaughan–Bascom Professor Emeritus; (faculty, 1963–92)

Gayle L. Worf

While growing up on a Kansas irrigation farm in the 1930s I became aware very early that when our crops fared poorly, so did we. Drought and dust were bad enough, but plant diseases also took their toll. All of our crops took turns being affected. Sorghum was affected with "milo disease" — a malady whose etiology was never really determined. We treated our wheat seed with foul-smelling Ceresan (a mercury-containing product!) to control smut, but it did nothing for leaf and stem rusts. Sugar beet viruses and root rot were nearly as bad.

But bacterial wilt was the worst. Alfalfa seed production was our most important crop, and when bacterial wilt yellowed, stunted and killed the crop, it was devastating! As a child, I witnessed what seemed a near miracle at the time. We lived within a mile of a branch experiment station, and Dr. C. O. Grandfield, an eminent alfalfa breeder, tested many alfalfa crosses (in rabbit-control, fenced plots!) in my dad's fields. One line stood out—from it came 'Buffalo' alfalfa, the first bacterial wilt resistant variety—our crop was saved. Dad paid off the mortgage with the seed crop in 1943, and my interest was aroused.

Later, as a county agricultural agent, I continued to witness the effects of diseases upon various crops and plants. And it was then that Wisconsin's Department of Plant Pathology was to have its first effect on me, though I didn't know it at the time. I was fascinated by the story that Dr. Web Sill, a young professor at Kansas State University and a recent (1951) graduate of Dr. J. C. Walker, shared with fellow agents and me. He had determined that an old nemesis, wheat streak mosaic, was carried by the wheat curl mite; the mite and virus over-summered on volunteer wheat, and the combination of volunteer wheat control and delayed fall planting could effectively control it. By coincidence, in that same year Dr. Sill completed his PhD, I had planted wheat on rented land as a college student. Wheat streak mosaic destroyed the crop and with it my hopes of paying off my debts and returning to farming after my stint with the military!

So, after the military and three years as an agent, and with the G. I. Bill about to run out for me, I decided to go back to school to study plant diseases. But where? I decided to ask Professor H. H. Haymaker. He had taught my introduction

to plant pathology as well as field botany courses. He was also a longtime graduate of Wisconsin, having taken his degree from the department in 1927. He gave me several names. Cornell, Minnesota and Wisconsin were prominent departments at that time. I wrote to all three about my interests and eventually I heard from all of them. But it was the prompt airmail response and detail by Department Chair Glenn Pound that impressed me! So I visited the campus, and Dr. Pound introduced me to Dr. D. J. Hagedorn. Two months later I bundled up Mary and my two preschool boys, headed for Madison — and the rest is history as some would say, with Don (Hagedorn) as my major professor. I owe him everything.

When I completed my degree in 1961, there weren't any jobs. I enjoyed the challenge of research and I had wanted to continue in that direction, but the only job available was at Iowa State University, in Extension. I had Extension experience, and I had a family to feed, so I took it.

By tradition the Extension specialist's role was to gather up, package and dispense the information that research colleagues had conducted. At Iowa State University I was a one-man show. I had Extension responsibilities for all crops, and there was only modest back-up research help. Two years later I was invited to join the faculty in a similar position here. At Wisconsin I would join Earl Wade, Wisconsin's Extension specialist and only the second one in its history. He would keep vegetable and fruit crops — I would have the rest. That certainly appealed to me, and there was a fair amount of related research going on in the department. I asked Dr. Pound for a joint appointment between research and Extension. Such appointments are now routine, but while Glenn agreed with the philosophy and encouraged me to function that way informally, it couldn't be arranged officially in Ag Hall at the time. I agreed, I came, and I've never regretted the decision!

But plant pathology was in transition, and Extension was having a hard time in the 60s. The money was now in basic research. The National Science Foundation and other agencies offered financial enticements at the very time that traditional Hatch and state monies that supported field research were dwindling. A powerful (and unnamed) leader in plant pathology was urging basic research as the model for the future, and besides, "all of the important plant diseases have been identified and controlled!" (Or so he said). The Extension specialists' students were county Extension faculty and growers. Problems needing attention were accumulating, but related research was sparse. The clientele had little interest in classical diseases or obsolete control measures and there was little information to dispense. APS meetings were of little value to Extension members. Eric Sharvelle, a very talented and respected Extension pathologist from Indiana, pleaded the case for "applied research" before the national assemblage. Ultimately he resigned his membership of several decades as a symbolic act expressing concern.

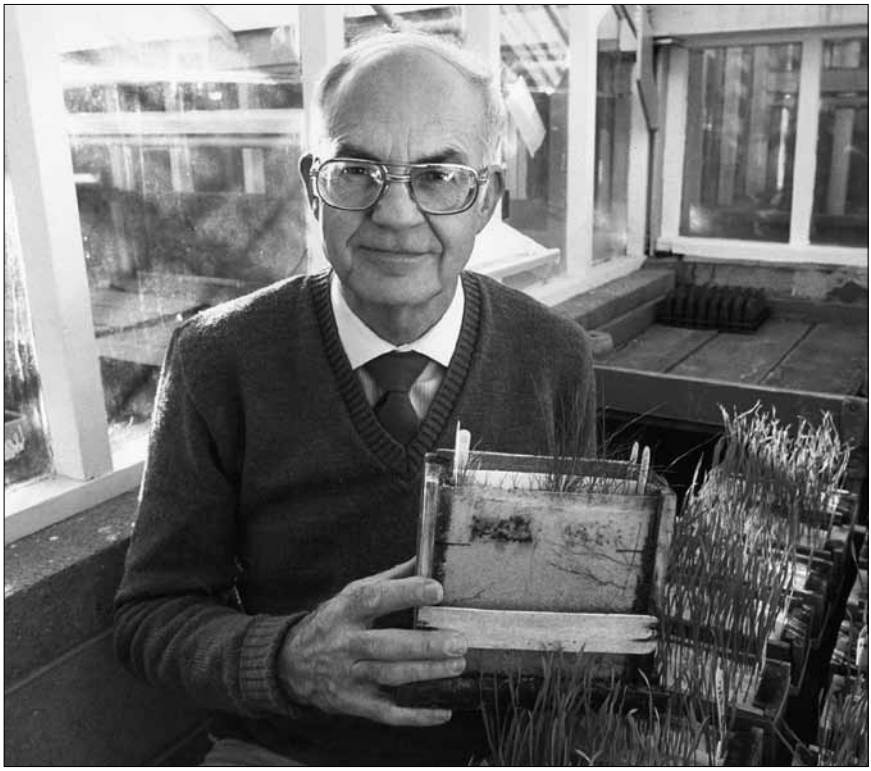
Our department was not unlike others in its zeal to participate in basic research and to obtain those funds. But I want to give great credit to those who

recognized the situation and maintained at least some aspect of applied research. At the risk of overlooking someone, I will list several whose research and knowledge was particularly helpful to me in dealing with field crop and ornamental diseases. I walked hundreds of miles of corn rows, trying to keep up with Deane Arny's long strides during the corn blight years of the late 60s and early 70s. I think we made a great team! The same was true with Gene Smalley's work with Dutch elm disease, and later with corn mycotoxins. I don't think he ever received sufficient recognition for his work. I was given a lot of credit for the educational programs created locally and nationally, as a traditional Extension specialist's role. To say it somewhat boastfully — they were good! They not only saved a lot of elms, some of which still grow on the UW campus, but the effort expanded towards recognition of urban tree care generally. Others, notably Jim Kuntz, Bob Patton, and Dewey Moore made substantial contributions to Wisconsin tree care, and ultimately, the Wisconsin Arborists Association (WAA) emerged in the late 1960s.

One of the big changes that has occurred over the past decades has been the increased role of grower organizations to facilitate applied research and Extension programs. And Extension has played a major role in helping with their creation. The WAA is an example. It has been effective in giving urban forestry an identity in the state, but it has been ineffective in finding research support for the department or college. We have lost much of our historical strength and leadership in forest pathology — started by A. J. Riker, but very ably followed by Bob Patton, Jim Kuntz, and their students. There are a number of reasons for this, but our one remaining forest pathologist, Glen Stanosz, who handles urban forestry as well, could surely use some financial support from clientele who seek and need his assistance now.

There were certainly others who participated in support of my Extension programs. Bob Fulton got involved with a very interesting virus problem of poinsettias. Doug Maxwell, who was initially hired to work on forage diseases, gave me invaluable assistance in my efforts to identify the pathogen causing necrotic ring spot of turf. He also should be credited for his important role of filling in as turf pathologist about the time of my retirement. And Dewey Moore, in his emeritus capacity, was helpful during the two years I filled in as a fruit pathologist.

I was fortunate in one other important area. I had good support from all my department chairs! Arthur Kelman's arrival was especially fortunate for me. He had come from North Carolina, where applied research was significant, and they had an arsenal of Extension plant pathologists. He looked upon the responsibilities that Earl Wade and I shared with a considerable degree of disbelief! He saw us each weekend poring over the piles of disease specimens that had accumulated during the week while we were out in the state. North Carolina had a very effective diagnostic clinic, probably the first in the nation. Prior to Kelman's arrival we had little success in selling the idea of a clinic to the department, and certainly not to higher administration. We all know of his kind of leadership — we began



Gayle Worf with greenhouse plants in an experiment, 1989.

to get some part-time technical assistance soon after his arrival. The money came initially from emerging Federal Pesticide Use Education programs. Our first permanent diagnostic assistant came in 1972 when Dan Opgenorth was employed as a graduate student/diagnostician. Eventually its success depended upon selling all parties on the idea of a fee structure. That was a hard sell! County agents used it as a popular service for their clientele, which along with bulletins, meetings and virtually everything else had been offered for free for nearly a century. The clinic evolved into its present role, with its equally important partner in entomology.

It would be difficult to narrate all the interesting experiences I encountered during my tenure in the department, and I don't intend to try. But a couple of them are worthy examples. The first of these is the corn disease epidemics of the late 1960s and early 1970s. The irony is that corn had been perhaps the healthiest crop in the state for several years — somewhat supporting the "all the important diseases are known and conquered" concept mentioned earlier. When it was my turn to fill a spot in corn production conferences around the state, I was hard-pressed to find something worthwhile to share with growers.

But in 1968 that changed. I had a hint of what was to come when in the previous fall, Gavin Weiss, a wonderful superintendent of the Hancock Experiment Station, asked me to take a look at an interesting problem occurring in a nearby seed corn field. The female inbred plants were yellow, and had distinct leaf lesions. The male inbred showed no symptoms. During the winter I isolated a *Phyllosticta* and demonstrated its pathogenicity in the greenhouse. There was an obscure report in the literature, nothing more. I called it "yellow leaf blight" and thought no more about it, until it began showing up in hybrid corn fields, especially in low areas with continuous corn cropping histories. And seed corn growers reported serious outbreaks affecting the female inbreds throughout the state. During the following winter I collected several dozen combinations of genetically identical male and female inbreds from the seedsmen, and planted them side by side at the Hancock station. By that time Deane Arny had returned from his Nigerian assignment, and we confirmed that this susceptibility was clearly associated with the "Texas male sterile cytoplasm" (Tmsc). Tmsc was used to induce male sterility in the female inbred so that it did not require detasseling. It was used in virtually 100% of hybrid seed corn production throughout the nation at the time.

So in December of 1969, we held an educational meeting for seed corn producers. We had invited only Wisconsin growers, but the word got around, and the conference room at the Ramada Inn was filled to overflowing with growers from all over the Midwest. We showed them our evidence and suggested that they return to detasseling for producing seed that was to be grown in disease-prone situations. I doubt if Elwood Brickbauer, our Extension agronomist colleague, or Deane will forget that meeting. I know I won't! I really got scorched!! "*Young man,*" spoke the booming voice from the back of the room, "*do you know what you're asking? Did you ever oversee a gang of teenage kids, having to supervise and keep the boys and girls separated?*" The tirade went on. I learned later that he was from Iowa and was recognized in the seed corn trade as its leader and one of the early advocates of Tmsc use.

But a few listened. I later presented a seminar to the Funk seed company in Illinois. It was their field that had the first evidence of the disease. They elected to convert 100% of their seed production and, to their credit, they never increased their seed cost when it suddenly became so much in demand two years later.

The next year, 1970, was the year that race "T" of southern leaf blight suddenly emerged, destroying 15% of the crop nationwide and threatening its very existence. I'll not forget the somber feeling when Deane and I drove home after examining a hard-hit field along the Mississippi River that August. Not only was the foliage blighted, but the ears were also being destroyed. Corn was such a major crop — were we witnessing the start of a disaster reminiscent of the great Irish potato blight?

Helminthosporium had somehow found the same cytoplasmic weakness as *Phyllosticta*, and the cure was the same — return to normal cytoplasm and

detasseling by hand. It's healing to have the last laugh! But ironically, 1971 was a drought year in Wisconsin. Neither disease showed up, and many of our growers chose to stay with the cheaper (susceptible) seed that was still available for 1972. This occurred in spite of my pleas for them not to do it. And they paid the price. Not only did they suffer 50% losses, but the remaining crops were overwhelmed by serious stalk rot and Gibberella (pink) ear rot! I was not proud of my poor Extension persuasiveness that fall.

About the same time another foliage disease — one that we identified and called eye spot because of its peculiar symptoms — emerged and caused a lot of confusion. I'll not discuss that further. But I will say that these serious diseases serve as a reminder to society and us that we should not become complacent, assuming that we have the tools and knowledge to deal with problems of the future. They will occur!

The other disease I'll mention was a patch disease affecting turf. For years "Fusarium blight" disease attacked bluegrass, causing very obvious dead rings and patches. The Cincinnati ball park was affected — so was the White House lawn! The variety 'Merion' Kentucky bluegrass had been introduced a couple of decades earlier and had taken the country by storm — Merion was the favorite target. Houston Couch had identified the cause in the early 1960s as a particular strain of *Fusarium roseum*. However, the pathogenicity tests were shaky, and eventually R. W. (Dick) Smiley from Cornell University challenged it openly. The dispute between Smiley and Couch eventually reached a peak not unlike that of the famed Smith-Fischer controversy over the role of bacteria as a plant pathogen a century earlier.

I also had isolated *Fusarium* several times from diseased areas (no surprise!). I could produce some foliar flecks but no root and crown symptoms. Fortunately, our severe outbreaks had subsided with the replacement of Merion with other varieties, but about 1972, as the corn blights were receding, the symptoms of "Fusarium blight" began to recur. Not only were lawns affected, but sod growers' fields had to be plowed under, and the state of Illinois was accusing our growers of introducing it there. So I had to take a look at it more seriously. The primary symptom I saw, in addition to the dead rings and patches, was a serious darkening and decay, especially of the crown. *Fusarium* was present, of course, but microscopically one could always see a dark, coarse fungus both internally and externally. It had a lot of the characteristics of *Gaeumannomyces*, the take-all pathogen. Eventually with the aid of technicians Bob Avenius and Jana Stewart, we extricated a very slow-growing organism that looked suspicious. We inoculated turf plugs as well as seedlings, and after weeks of waiting, identical symptoms began to appear in the greenhouse! We knew we had the culprit, though we didn't know what it was. It didn't sporulate. Not wanting to get embroiled in the Smiley-Couch controversy, we gave the disease the name "necrotic ring spot." Smiley eventually induced fructification of the organism when he was on sabbatical leave

in Australia and identified it as *Leptosphaeria korrae,* an ascomycete somewhat akin to the take-all pathogen.

Incidentally, we also isolated a number of other ectotrophic fungi but could not demonstrate pathogenicity with any of them. One or two produced a significant growth stimulus, and we had reason to believe that some may have been suppressive to *Leptosphaeria*. But we didn't have the time or resources to pursue that or several other interesting turf problems we encountered.

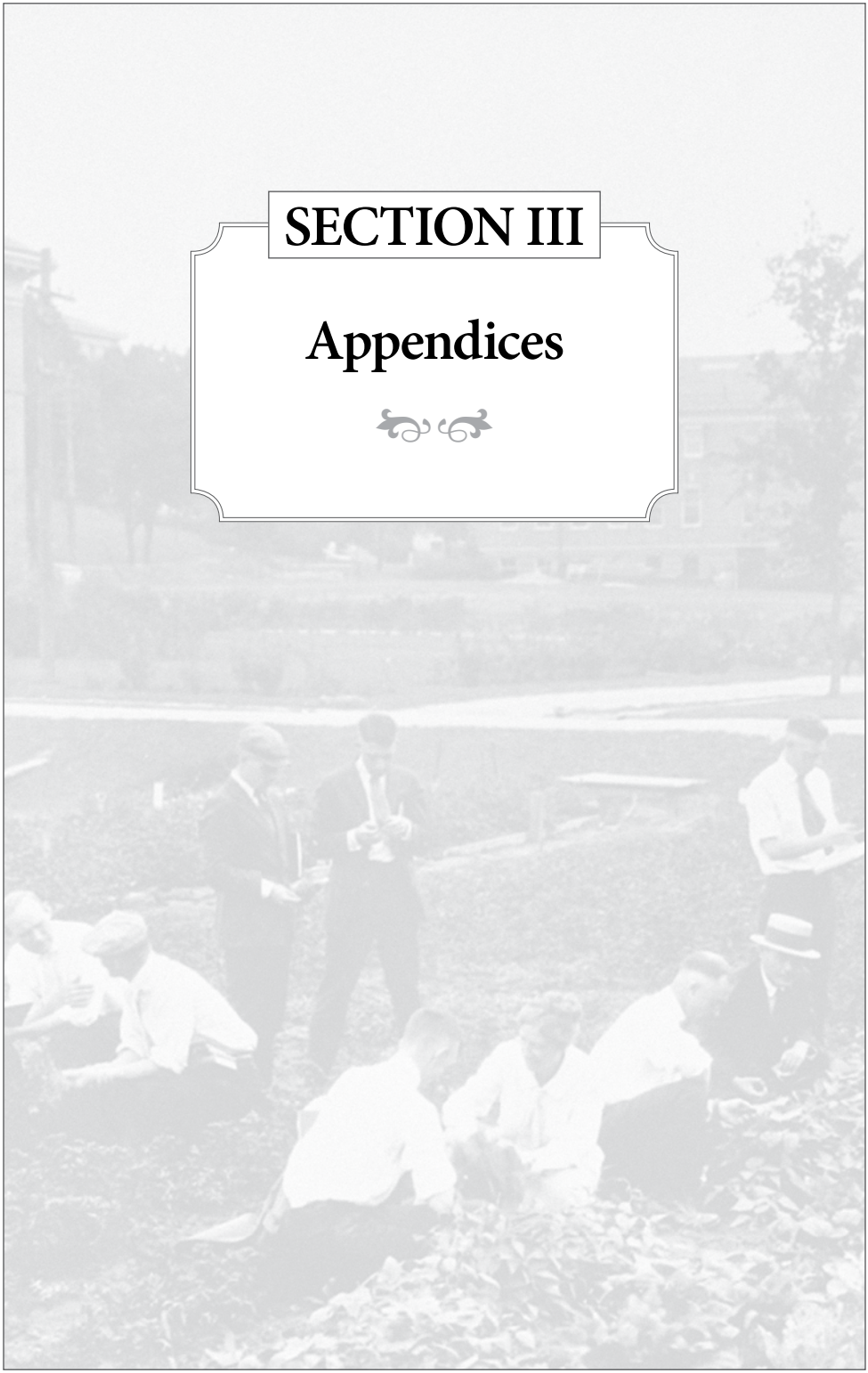
In the current setting it is imperative to have the support of a proactive commodity group. It was pleasing to see such a group evolve — the Wisconsin Turfgrass Association — and with it, the development of the O. J. Noer Turfgrass Research Center and the creation of a turfgrass pathologist position in the department.

Any regrets along the way? There were some, of course. The original structure of Extension within the department provided less opportunity for interaction with graduate students than now. But I enjoyed the close involvement with so many outstanding growers and industry leaders. It was a privilege to see and empathize firsthand with them about their problems and concerns, and to work hard to help them deal with their disease problems. And when the college was encouraged to develop more interdisciplinary projects, I merely smiled: Wisconsin Extension programs already excelled in that process. I probably worked more closely over the years with colleagues in entomology, horticulture, agronomy and soils than in our department! Koval and Wedburg in entomology, Berninger and Newman in horticulture, Brickbauer and Doersch in agronomy are names that come to mind quickly. We developed programs together, traveled together, critiqued one another's presentations — and sometimes even stole each other's punch lines! And while I didn't relish my last two years in the dean's office, it did give me interesting insights, including why administration must act the way it does on occasion.

In all, I can say that the Department of Plant Pathology has been very good to me — before, during, and after my active tenure. My path took a number of interesting twists and turns.

SECTION III

Appendices



Appendix 1: The Collective Faculty

Faculty in front of the portrait of L. R. Jones, conference room, Russell Labs, 2009. (left to right, back row) Jeri Barak, Doug Rouse, Murray Clayton, Dennis Halterman, Paul Esker, Amanda Gevens, Andrew Bent; (front row) Amy Charkowski, Jim Kerns, John Andrews, Ann MacGuidwin, Patricia McManus, Caitilyn Allen, Glen Stanosz.

Appendix 2: The Collective Staff — Madison & Rhinelander

Madison: Office, general support, postdoctoral, and technical staff, including Russell Labs administrative hub personnel, outside Russell Labs, 2009. Front row, left to right: Tom Dettinger, Matthew Moore, Laurie Luther; second row: Danuta Pyzalska, Sara Rodock, Anita Hoffmann; third row: Victoria Seitz, Nancy Koval, Angie Peltier, Ruth Genger, Ann Joy; fourth row: Karen Lackermann, Russell Spear, Lenice Covert, Bob Rand, Ken Scott; fifth row: Denise Smith, Paul Koch, Donna Bucholtz, Yangron Cao, Paul Gunther; sixth row: Steve Jordan, Lavanya Babujee, Annett Milling, Steve Cloyd.

Rhinelander: The Wisconsin Seed Potato Certification Program staff, 2009. (left to right, back row) Robert Coltman, Keith Heinzen, Joshua Kunzman, Jeff Rogers, Jerry Kuczmarski; (front row) Richard Hafner, Dianna Kessler, Amy Charkowski, Jolene Spurgeon, Kevin Bula.

Appendix 3: The Collective Graduate Students

Graduate students in front of Russell Labs, 2009. (left to right, back row) Chakradhar Mattupalli, Ken Frost, Anna Seidel, Austin Meier, Shahideh Nouri, Jonathan Jacobs, Jon Palmer, Yunglong Wang; (center) Jacob Scherf, Teresa Koller, Alejandra Huerta, Chantel Wilson, Erica Yashiro; (front) Monica Chen, Ana Fulladolsa, Maria de Pilar Marquez Villavicencio, Victoria Seitz, Fanhong Meng, Jennifer Jirak.

Appendix 4: MS and PhD Degrees Conferred by the Plant Pathology Department, 1985 (continued from Vol. I) through May 2010

Date	MS Degrees	Professor
1985	Sharie Fitzpatrick	Grau
	Deborah Gottlieb	Andrews
	Eric Holub	Grau
	Alice Jackson	Andrews
	Kimberly Knoche	Fulton
	Alicia Melegarie	Sequeira
	Jens Mullen	Hagedorn/ Leong
	Julie Sanderson	Smalley
1986	Rui Leite, Jr.	Rouse
	Nicholas Rhodehamel	Durbin
1987	Mark Boudreau	Andrews
	Steven Ingels	Ellingboe
	Susan Mahr	Sequeira
	Kimberly Reinke	de Zoeten
	Caroline Young	Andrews
1988	Alan Bertelsen	Andrews
	Melinda Carr	Stevenson
	Gregory Gilbert	Parke/ Handelsman
	Andrea Muehlchen	Parke
	Robert Proctor	Smalley
	Andrew Westra	Slack
1989	James Fuller	Kelman
1990	Daniel Roiger	Jeffers
1991	Abdul Gafur	Williams
	Sri Hendrastuti Hidayat	Maxwell
	Denise Smith	Maxwell
1992	Shamsul Abd Shukor	Grau
	Jajuk Beti	Smalley
	Elisabeth King	Parke
	Maria Rojas	Maxwell
1993	Rebecca Hoogstraten	Maxwell
	Michael Peterson	Upper
	Patchara Pongam	Williams
	Laureano Simon	Allen
1994	Mary Bett	Maxwell
	Chris Malek	MacGuidwin
1995	Elizabeth Kazmar	Parke
	Kristen Marshall	Stevenson
	David Maxwell	Stanosz
	Eduardo Robleto	Handelsman
1996	Yanfen Guan	Allen

Date	MS Degrees	Professor
1997	Alice Alegria	Parke
	Su-Chiung Fang	Goodman
	Dorith Rotenberg	MacGuidwin
1998	Thomas Johnson	McManus
	Daniel Lindner	Stanosz
	Sarah Miller	Goodman
1999	Diane Brown-Rytleski	McManus
	Cui Zhengrong	Handelsman/ Goodman
2000	Lisa Buttonow	Ellingboe
	Huayu Huang	Allen
	Gerald Weiland	Stanosz
2001	Amy Blodgett	McManus
	Nichole Broderick	Handelsman/ Raffa
	Elisabeth Eyestone	German
	Guohong Huang	Allen/ Helgeson
	Teresa Hughes	Grau
2002	Mary McGill	Bent
	Jamie Potter	Maxwell
2003	Gina Foreman	Rouse
	Ann Impullitti	Grau
	Dominic Lazaro	Leong
	Paul Rabedeaux	Grau
	Yolibeth Rangel	Jung
	Elizabeth Scheef	Jung
2004	Joshua Bronson	Stanosz
	Kenneth Frost	Rouse/Jansky
	Nancy Kurtzweil	Grau
2005	Emily Mueller	Grau
2006	Gregorio Sanchez Perez	Allen
2007	Paul Koch	Jung/Grau
	Mary Le Mere	Stevenson
	Dirk Netz	Andrews
	James Scott	Keller
2008	Ismael Badillo-Vargas	German
	Michele Kohout	MacGuidwin
	Kimberley Lesniak	Stevenson
	Elliot Shwab	Keller
2009	Daniel Gerhardt	Charkowski
	Amy Gibbs	Rouse
	Brent Oblinger	Stanosz
2010	Jennifer Jirak	Esker
	Jeffrey Olsen	Charkowski

Date	PhD Degrees	Professor
1985	Alemu Mengistu	Grau
	Cindy Morris	Rouse
	Philippe Nicot	Rouse
	Jay Pscheidt	Stevenson
	Mbudzeni Sibara	Slack
	Glen Stanosz	Patton
1986	Randy McLaughlin	Sequeira
	Willem Stemmer	Sequeira
	Kuo-Ching Tzeng	Kelman
1987	Ayad Al-Heeti	Smalley
	Claudia Jasalavich	Sequeira
1988	Eric Holub	Grau
	Linda Kinkel	Andrews
	Janet MacFall	Berbee
	Melissa Marosy	Patton
	Dennis Matthews	Durbin
	Jens Mullen	Leong/ Hagedorn
	Deborah Samac	Leong
	Jose Souza-Dias	Slack
1989	Robert Bowden	Rouse
	Michael Drilias	Kuntz
	Yong Huang	Sequeira
	Judit Monis	de Zoeten
	Kimberly Reinke	de Zoeten
	Caroline Young	Andrews
1990	Douglas Cook	Sequeira
	Steven Demler	de Zoeten
	Thomas Forge	MacGuidwin
	Brian Hudelson	Upper
	Kimberly Knoche	Durbin
	Robert Proctor	Smalley
	Wei-Dong Wu	Smalley
1991	Gregory Gilbert	Parke/ Handelsman
	Gernot Presting	Helgeson
	Peter Sanderson	Jeffers
1992	Terese Barta	Willis
	Estelle Hrabak	Willis
1993	Eric Adee	Grau
	Ricardo Araujo	Handelsman
	Krishna Ella	Helgeson
	Darmono Taniwiryono	Parke
1994	Walter De Jong	Ahlquist
	Kier Klepzig	Smalley/ Raffa
1995	Zhengyu Huang	Smalley
	Ke-Ning Li	Rouse
1996	Scott Adkins	German
	James Blodgett	Stanosz
	Antonio Gandarillas	Stevenson
	Marcelo Moraes	Goodman
	Kurt Regner	Parke

Date	PhD Degrees	Professor
1997	Orawan Chatchawankanphanich	Maxwell
	Stephen Hanson	Maxwell
	Patchara Pongam	Williams
1998	James Buck	Andrews
	James Karkashian	Maxwell
1999	Kurt Heungens	Parke
	Qi Huang	Allen
	Yun-Sik Kim	Ellingboe
	Louise Laferriere	Allen
	Steven Millett	Maxwell
	Jeffrey H. Shang	Grau
2000	Ricardo Medeiros	German
	Ana Mondjana	Rouse
	Dorith Rotenberg	MacGuidwin
	Shiguo Zhou	Stanosz
2001	Daniel Lindner	Stanosz
2003	Mary Burrows	Grau
	Marek Sliwinski	Goodman
	Gary Vallad	Goodman
	Yongqiang Zang	Keller
2004	Grace Jurkowski	Bent
	Noah Rosenzweig	Stevenson
	Dimitrios Tsitsigiannis	Keller
	Archana Vasanthakumar	McManus
	Gerald Weiland	Stanosz
	Anna Whitfield	German
2005	Nanda Chakraborty	Jung
	Thomas Curley	Jung
2006	Bradley Borlee	Handelsman
	Hernan Garcia-Ruiz	Ahlquist
	Molly McGrath	Andrews
	Mafmudije Selimi	Rouse
	Mee-Ngan Yap	Charkowski
2007	Thomas Hammond	Keller
	Peter Rogers	Stevenson
	Jian Yao	Allen
2008	Bradley Garcia II	Handelsman
	Courtney Jahn	Charkowski
	Isabel Munck	Stanosz
	Angelique Peltier	Grau
	Nathan Schroeder	MacGuidwin
2009	Jennifer Clifford	Allen
	Barrett Gruber	McManus
	Teresa Hughes	Grau
	Hye-Sook Kim	Charkowski
	Zhenyu Liu	Halterman
	Maria Newcomb	Rouse

Appendix 5: Major Offices Held by Faculty, and Honors Accorded Faculty, by the American Phytopathological Society

(for a more detailed accounting, see Chapter 16 by A. Kelman in Volume I)

1. President

1909 L. R. Jones
1937 G. W. Keitt
1943 J. C. Walker
1947 A. J. Riker
1953 J. G. Dickson
1959 G. S. Pound
1967 A. Kelman
1986 L. Sequeira
1990 P. H. Williams
2006 J. H. Andrews

2. Award of Distinction (inaugurated in 1967; only 13 conferred to date)

1969 J. C. Walker
1983 A. Kelman
1994 L. Sequeira

3. Noel T. Keen Award for Research Excellence in Molecular Plant Pathology (inaugurated in 2003)

2009 A. F. Bent

4. Ruth Allen Award (inaugurated in 1966; recognizes "an outstanding, innovative research contribution that has changed or has the potential to change, the direction of any field of plant pathology")

1987 C. D. Upper (shared with Deane Arny, below, and with Steven Lindow, their student)
1987 D. Arny
1988 P. G. Ahlquist

5. Excellence in Extension (inaugurated in 1989)

1989 W. R. Stevenson

6. Excellence in Teaching (inaugurated in 1989)

2000 G. R. Stanosz
2005 C. Allen

7. Fellow (inaugurated in 1965)

1965 G. W. Keitt
1965 G. S. Pound
1965 A. J. Riker
1965 J. C. Walker
1969 A. Kelman
1970 R. W. Fulton
1971 L. Sequeira
1976 D. J. Hagedorn
1978 A. H. Ellingboe
1978 J. E. Mitchell
1979 P. H. Williams
1984 R. D. Durbin
1989 G. L. Worf
1991 D. P. Maxwell
1992 G. A. de Zoeten
1995 W. R. Stevenson
1998 S. A. Slack
2002 C. R. Grau
2007 N. P. Keller
2008 J. H. Andrews

Appendix 6: Faculty Elected to the National Academy of Sciences

1920	L. R. Jones
1945	J. C. Walker
1951	A. J. Riker
1976	A. Kelman
1980	L. Sequeira
1988	T. K. Kirk*
1993	P. G. Ahlquist

*USDA Forest Products Laboratory appointment;
Kirk held a courtesy affiliation with Plant Pathology from 1971 to 1979

Appendix 7: Chairmen of the Plant Pathology Department

1910–1930	L. Ralph Jones
1930–1955	George W. Keitt
1955–1964	Glenn S. Pound
1965–1975	Arthur Kelman
1971–1972	Donald J. Hagedorn (interim; Kelman on research leave)
1975–1980	John E. Mitchell
1980–1990	Douglas P. Maxwell
1988–1989	Eugene B. Smalley (interim; Maxwell on research leave)
1991–1995	Craig R. Grau
1995–1998	Thomas L. German
1998–2004	John H. Andrews
2004–present	Murray K. Clayton

Appendix 8: Staffing Pattern, Plant Pathology Department, 1986–2009

Name	Degree Granting Instit.	Year of Appt.	Year of Budget/Appt. Exit	Remarks
D. K. Willis	UC Berkeley	1986		USDA
D. J. Hagedorn	UW–Madison	1948	1987	retirement
R. F. Patton	UW–Madison	1951	1987	retirement
S. A. Slack	UC Davis	1975	1988	to Cornell Univ.
J. G. Berbee	UW–Madison	1957	1988	retirement
A. Kelman	NC State	1965	1989	retirement
G. de Zoeten	UC Davis	1967	1990	to Michigan State Univ.
R. D. Durbin	UC Berkeley	1962	1990	USDA, retirement
G. R. Stanosz	UW–Madison	1992		forest pathology
G. L. Worf	UW–Madison	1963	1992	retirement
L. Sequeira	UW–Madison	1961	1993	retirement
C. Allen	Virginia Polytech	1992		plant-bacterial interactions
E. B. Smalley	UC Berkeley	1957	1994	retirement
P. McManus	Michigan State	1995		Extension; fruit pathol.
P. H. Williams	UW–Madison	1962	1997	retirement
J. L. Parke	UC Santa Cruz	1984	1998	to Oregon State Univ.
A. F. Bent	MIT	1999		disease resistance
T. L. German	UW–Madison	1990	2000	to Entomology Dept.
D. P. Maxwell	Cornell	1968	2001	retirement
A. O. Charkowski	Cornell	2001		seed potato prog.; bacteriology
S. N. Jeffers	Cornell	1985	1991	to Clemson Univ.
C. D. Upper	Washington State	1966	2001	USDA, retirement
J. P. Helgeson	UW–Madison	1966	2003	USDA, retirement
D. A. Halterman	Purdue	2004		USDA, disease resist.
A. H. Ellingboe	Minnesota	1983	2004	retirement
R. M. Goodman	Cornell	1991	2005	to Rutgers Univ.
G. Jung	Nebraska	2000	2006	to Univ Mass.
P. D. Esker	Iowa State	2007		Extension; field crops
J. D. Barak	UC Davis	2008		bacteriology
J. Handelsman	Cornell	1985	2008	to Bacteriology Dept.
N. P. Keller	Cornell	2002	2008	to med microbiol.
J. P. Kerns	NC State	2008		Extension; turf
S. A. Leong	UC Berkeley	1983	2008	USDA, retirement
W. R. Stevenson	UW–Madison	1979	2008	retirement
C. R. Grau	Minnesota	1976	2009	retirement
A. J. Gevens	Michigan State	2009		Extension, vegetables
A. Rakotondrafara	Iowa State	2011		plant virology

Appendix 9: The Faculty

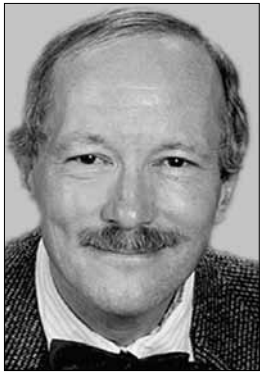
(Shown are faculty with budgeted Plant Pathology primary appointments active during the period 1985–2010. Entire period of service is indicated (D = deceased). Faculty who retired or transferred prior to 1985 appear in Volume I: *With One Foot in the Furrow*)

Paul G. Ahlquist, Professor
BS '76, Iowa State; PhD '81, UW–Madison, Biophysics (Kaesberg)

UW–Madison, Plant Pathology, Molecular Virology, and Oncology, 1984–present
Molecular mechanisms of viral replication, host interactions and pathology

Caitilyn Allen, Professor
BS '81, Maine; PhD '87, Virginia Tech, Plant Pathology (Lacy)

UW–Madison, Plant Pathology, 1992–present
Biology of plant-bacterial interactions, especially genetics of virulence in Ralstonia solanacearum



John H. Andrews, Professor
BS '67, McGill; MS '69, Maine; PhD '73, UC Davis, Plant Pathology (Shalla)

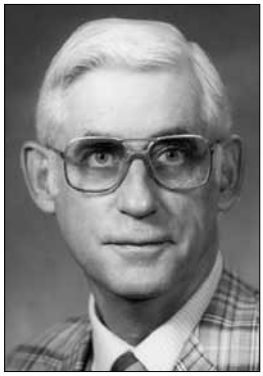
UW–Madison, Plant Pathology, 1976–present
Microbial ecology, biological control, integrated control

Jeri D. Barak, Assistant Professor
BS '93, San Jose State; PhD '00, UC Davis, Plant Pathology (Gilbertson)

UW–Madison, Plant Pathology, 2008–present
Human bacterial pathogen-plant interactions, comparative genomics of plant-associated enteric pathogens

Andrew F. Bent, Professor
AB ’83, Oberlin; PhD ’89, Massachusetts Institute of Technology, Biology (Signer)

UW–Madison, Plant Pathology, 1999–present
Molecular basis for plant resistance to microbial pathogens



John G. Berbee, Professor Emeritus
BS ’49, Toronto; M.Forestry, ’50, Yale; PhD ’54, UW–Madison, Plant Pathology (Riker)

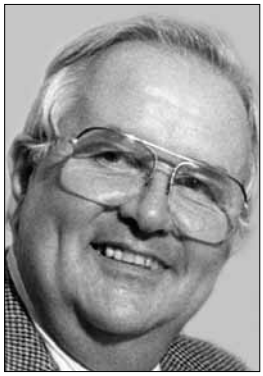
UW–Madison, Plant Pathology, 1957–88
Forest pathology; nursery diseases; mycorrhizae; intensive poplar culture

Amy O. Charkowski, Associate Professor
BS ’93, UW–Madison; PhD ’98, Cornell, Plant Pathology (Collmer)

UW–Madison, Plant Pathology, 2001–present
Molecular plant-microbe interactions, pathogen detection, seed potato production

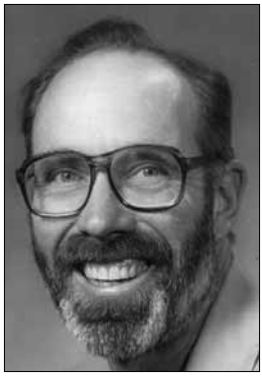
Murray K. Clayton, Professor
B. Math. ’79, Waterloo; PhD ’83, Minnesota, Statistics (Berry)

UW–Madison, Plant Pathology, and Statistics, 1984–present
Statistics applied to the agricultural, biological, and environmental sciences; spatial statistics



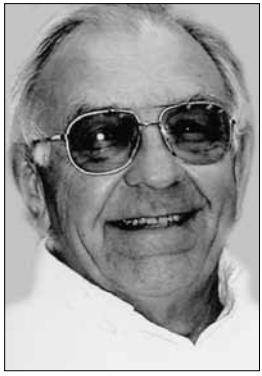
Gustaaf A. de Zoeten, Professor Emeritus (D)
Cand., '57, Wageningen; In., '60, Wageningen; PhD '65, UC Davis, Plant Pathology (Shalla)

UW–Madison, Plant Pathology, 1967–90
Virus multiplication and translocation; mechanism of cross-protection



Richard D. Durbin, Professor Emeritus
BS '52, UC Berkeley; PhD '57, UC Berkeley, Plant Pathology (Baker)

UW–Madison, USDA and
Plant Pathology, 1962–90
Structure and mode of action of phytotoxins



Albert H. Ellingboe, Professor Emeritus
BS '53, Minnesota; MS '55, Minnesota; PhD '57, Minnesota, Plant Pathology (Kernkamp)

UW–Madison, Plant Pathology, and Genetics, 1983–2004
Diseases of field crops; genetics of host-parasite interactions

Paul D. Esker, Assistant Professor
BS '98, UW–Madison; MS '01, Iowa State; PhD '05, Iowa State, Plant Pathology, and Statistics (Nutter and Dixon)

UW–Madison, Plant Pathology 2007–present
Improved understanding of risk factors associated with reduced productivity of field crops

Thomas L. German, Professor
BS '63, UW–Madison; MS '68, Michigan State; PhD '74, UW–Madison (de Zoeten)

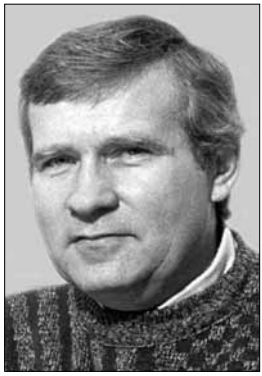
UW–Madison, Plant Pathology, 1990–2000
Replication and expression strategies of tomato spotted wilt virus; vector biology

Amanda J. Gevens, Assistant Professor
BS '99, Muhlenberg College; MS '01, Purdue; PhD '05, Michigan State, Plant Pathology (Hausbeck)

UW–Madison, Plant Pathology, 2009–present
Diagnosis, biology, and management of potato and vegetable crop pathogens

Robert M. Goodman, Professor
BS '67, Cornell; PhD '73, Cornell, Plant Pathology (Ross)

UW–Madison, Plant Pathology, 1991–2005
Plant-microbe interactions; plant and microbial ecology; disease resistance



Craig. R. Grau, Professor Emeritus
BS '69, Iowa State; MS '71, Iowa State; PhD '75 Minnesota, Plant Pathology (Kommedahl)

UW–Madison, Plant Pathology, 1976–2009
Field crop diseases

Donald J. Hagedorn,
Professor Emeritus (D)
BS '41, Idaho; MS '43, UW–Madison; PhD '48, UW–Madison, Plant Pathology (Walker)

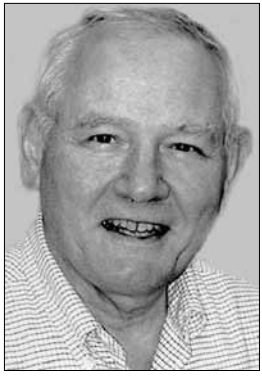
UW–Madison, Plant Pathology, 1948–87
Vegetable pathology; breeding for disease resistance

Dennis A. Halterman, Assistant Professor
BS '94, Cornell; PhD '99, Purdue, Biochemistry (Martin)

UW–Madison, USDA and Plant Pathology, 2004–present
Molecular mechanisms of disease resistance in potato

Jo Handelsman, Professor
BS '79, Cornell; Ph.D, '83, UW–Madison, Molecular Biology (Brill)

UW–Madison, Plant Pathology, 1985–2008
Phytobacteriology; structure and function of microbial communities



John P. Helgeson, Professor Emeritus
AB '57, Oberlin; PhD '64, UW–Madison, Botany (Skoog)

UW–Madison, USDA and Plant Pathology, 1966–2003
Plant physiology and biotechnology; tissue culture; plant somatic hybridization and disease resistance

Steven Jeffers, Assistant Professor
BS '76, UC Davis; MS '80, Cornell; PhD '85 Cornell, Plant Pathology (Aldwinckle)

UW–Madison, Plant Pathology, 1985–91
Fruit crop pathology

Geunhwa Jung, Assistant Professor
BA '88, Chung-nam National Univ., S. Korea; MS '91, Univ. Nebraska; PhD '95, Univ. Nebraska, Plant Breeding & Genetics (Coyne)

UW–Madison, Plant Pathology, 2000–06
Etiology and management of turfgrass diseases

Nancy P. Keller, Professor
BS '77, Penn State; MS '85, Cornell; PhD '90, Cornell, Plant Pathology (Bergstrom)

UW–Madison, Plant Pathology, 2002–2008
Fungal molecular biology, mycotoxins, and fungal genomics

Arthur Kelman, Professor Emeritus (D)
BS '41, Rhode Island; MS '46, North Carolina State; PhD '49, North Carolina State, Plant Pathology (Jensen)

UW–Madison, Plant Pathology, and Bacteriology 1965–89
Phytobacteriology; soft rot bacteria; disease resistance mechanisms; bacterial pathogenesis

James P. Kerns, Assistant Professor
BS ’02, North Carolina State; MS ’04, Texas A&M; PhD ’08, North Carolina State, Plant Pathology (Tredway)

UW–Madison, Plant Pathology, 2008–present
Etiology, epidemiology, and management of turfgrass diseases

Sally A. Leong, Professor Emerita
BA ’76, UC Berkeley; PhD ’80, UC Berkeley, Comparative Biochemistry (Neilands)

UW–Madison, USDA and Plant Pathology, 1983–2008
Molecular genetics of host-parasite genetics; fungal molecular genetics; rice genomics

Ann E. MacGuidwin, Professor
BS ’72, Michigan State; MS ’79, Florida; PhD ’83, Michigan State, Entomology-Nematology (Bird)

UW–Madison, Plant Pathology, 1984–present
Ecology and population dynamics of plant parasitic nematodes

Douglas P. Maxwell, Professor Emeritus
BA ’63, Nebraska Wesleyan; PhD ’68, Cornell, Plant Pathology (Bateman)

UW–Madison, Plant Pathology, 1968–2001
Begomoviruses, molecular markers for resistance genes, breeding tomatoes for begomovirus resistance

Patricia McManus, Professor
BS ’86, UW–Madison; MS ’88, Michigan State; PhD ’94, Michigan State (Jones)

UW–Madison, Plant Pathology, 1995–present
Diseases of fruit crops

Jennifer L. Parke, Professor
BA ’75, UC Santa Cruz; PhD ’82, Oregon State, Botany and Plant Pathology (Linderman, Trappe)

UW–Madison, Plant Pathology 1984–98
Ecology and biocontrol of soil-borne plant pathogens

Robert F. Patton, Professor Emeritus (D)
BSF ’40, Michigan State; MS ’42, Idaho; PhD ’52, UW–Madison, Plant Pathology (Riker)

UW–Madison, Plant Pathology, and Forestry, 1951–87
Forest pathology; white pine blister rust; Scleroderris canker*;* Armillaria *root rot*

Aurélie M. Rakotondrafara, Assistant Professor
Maîtrise, ’97, Univ. d’Antananarivo, Madagascar; MS ’02, Iowa State; PhD ’07, Iowa State, Plant Pathology (Miller)

UW–Madison, Plant Pathology, to begin 2011
Plant virology; molecular mechanisms of regulation of viral gene expression

Douglas I. Rouse, Professor
BS ’74, Ottawa, Kansas; MS ’76, Colorado State; PhD ’79, Penn State, Plant Pathology (Nelson, MacKenzie)

UW–Madison, Plant Pathology, 1979–present
Epidemiology; potato early dying; sustainable agriculture

Luis Sequeira, Professor Emeritus
AB ’49, Harvard; AM ’50, Harvard; PhD ’52, Harvard, Biology (Weston)

UW–Madison, Plant Pathology, and Bacteriology, 1961–93
Phytobacteriology; disease physiology; mechanisms of resistance

Steven A. Slack, Professor
BSA ’69, Arkansas; MS ’71, Arkansas; PhD ’74, UC Davis, Plant Pathology (Shepherd)

UW–Madison, Plant Pathology, 1975–88
Director of Seed Potato Certification Program; potato virology and bacteriology

Eugene B. Smalley, Professor Emeritus (D)
BS ’49, UCLA; MS ’53, UC Berkeley; PhD ’57, UC Berkeley, Plant Pathology (Hansen)

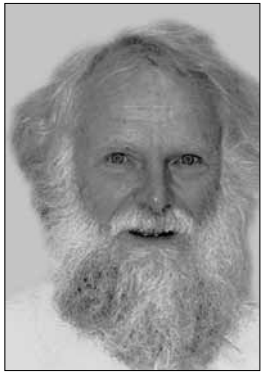
UW–Madison, Plant Pathology, 1957–94
Dutch elm disease; mycotoxins

Glen R. Stanosz, Professor
BS '76, State University of New York; MS '83, UW–Madison; PhD '85, UW–Madison, Plant Pathology (Patton)

UW–Madison, Plant Pathology, and *Forest and Wildlife Ecology, 1992–present*
Diseases of trees, especially those caused by fungal pathogens

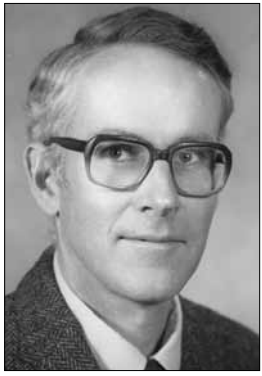
Walter R. Stevenson, Professor Emeritus
BS '68, Cornell; PhD '72, UW–Madison, Plant Pathology (Hagedorn)

UW–Madison, Plant Pathology, 1979–2008
Vegetable Extension pathologist; diseases of potato and mint, fresh market and processing vegetable crops



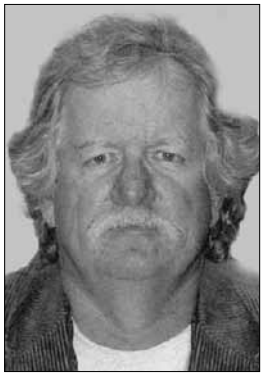
Christen D. Upper, Professor Emeritus
BS '58, Washington State; PhD '64, Illinois, Biochemistry (Gunsalus)

UW–Madison, USDA and Plant Pathology, 1966–2001
Epidemiology of bacterial diseases; phyllosphere bacteriology



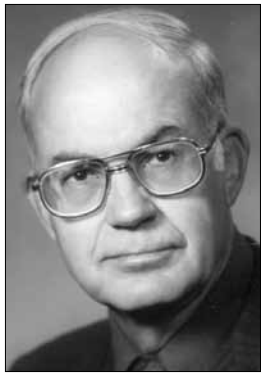
Paul H. Williams, Professor Emeritus
BSA, '59, British Columbia; PhD '62, UW–Madison, Plant Pathology (Pound)

UW–Madison, Plant Pathology, 1962–97
Breeding for disease resistance; crucifer genetics; science education; Wisconsin Fast Plants



D. Kyle Willis, Associate Professor
BA ’75, California State-Fullerton; PhD ’82, UC Berkeley, Molecular Biology (Clark)

UW–Madison, USDA and Plant Pathology, 1986–present
Molecular genetics of plant-pathogen interaction



Gayle L. Worf, Professor Emeritus
BS ’51, Kansas State; MS ’53, Kansas State; Ph.D, ’61, UW–Madison, Plant Pathology (Hagedorn)

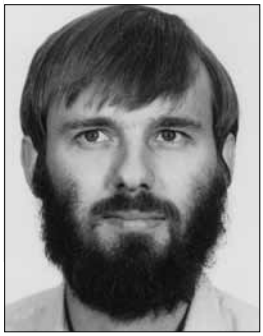
UW–Madison, Plant Pathology, 1963–92
Extension; diseases affecting turf, ornamentals, corn, and shade trees

Appendix 10: MS and PhD Graduates of the Department, 1985 (continued from Vol. I) through May 2010

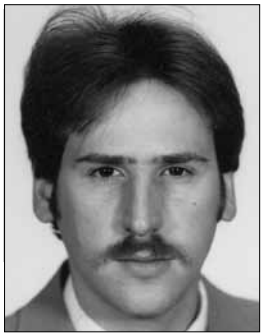
Sharie Fitzpatrick
MS '85
Grau

Alemu Mengistu
PhD '85
Grau

Cindy Morris
PhD '85
Rouse



Philippe Nicot
PhD '85
Rouse



Jay Pscheidt
PhD '85
Stevenson

Julie Sanderson
MS '85
Smalley

Glen Stanosz
PhD '85
Patton

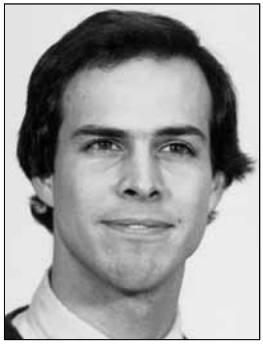
Randy McLaughlin
PhD '86
Sequeira

Willem Stemmer
PhD '86
Sequeira

Kuo-Ching Tzeng
PhD ’86
Kelman

Ayad Al-Heeti
PhD ’87
Smalley

Mark Boudreau
MS ’87
Andrews



Steven Ingels
MS ’87
Ellingboe

Claudia Jasalavich
PhD ’87
Sequeira

Susan Mahr
MS ’87
Sequeira

Melinda Carr
MS ’88
Stevenson

Eric Holub
PhD ’88
Grau

Linda Kinkel
PhD ’88
Andrews

Janet MacFall
PhD '88
Berbee

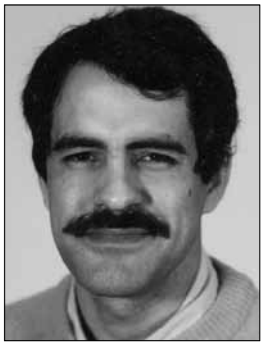
Melissa Marosy
PhD '88
Patton

Dennis Matthews
PhD '88
Durbin

Andrea Muehlchen
MS '88
Parke

Jens Mullen
PhD '88
Leong / Hagedorn

Deborah Samac
PhD '88
Leong



Jose Souza-Dias
PhD '88
Slack

Andrew Westra
MS '88
Slack

Robert Bowden
PhD '89
Rouse

Michael Drilias
PhD '89
Kuntz

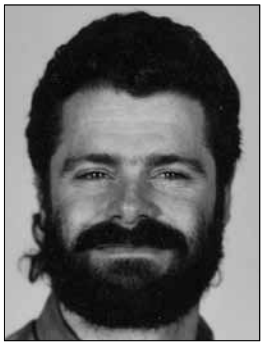
James Fuller
MS '89
Kelman

Judit Monis
PhD '89
de Zoeten

Kimberly Reinke
PhD '89
de Zoeten

Caroline Young
PhD '89
Andrews

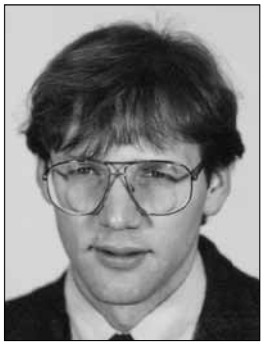
Douglas Cook
PhD '90
Sequeira



Thomas Forge
PhD '90
MacGuidwin

Brian Hudelson
PhD '90
Upper

Kimberly Knoche
PhD '90
Durbin



Robert Proctor
PhD '90
Smalley

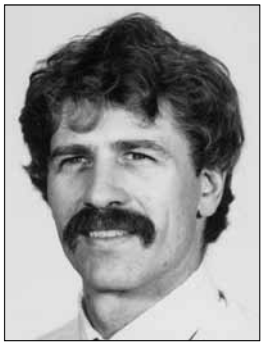
Daniel Roiger
MS '90
Jeffers

Wei-Dong Wu
PhD '90
Smalley

Abdul Gafur
MS '91
Williams

Gregory Gilbert
PhD '91
Parke / Handelsman

Sri Hendrastuti Hidayat
MS '91
Maxwell



Peter Sanderson
PhD '91
Jeffers

Denise Smith
MS '91
Maxwell

Shamsul Abd Shukor
MS '92
Grau

Terese Barta
PhD '92
Willis

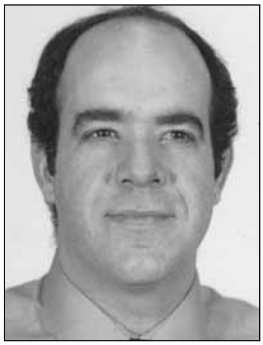
Jajuk Beti
MS '92
Smalley

Estelle Hrabak
PhD '92
Willis

Elisabeth King
MS '92
Parke

Maria Rojas
MS '92
Maxwell

Eric Adee
PhD '93
Grau



Ricardo Araujo
PhD '93
Handelsman

Krishna Ella
PhD '93
Helgeson

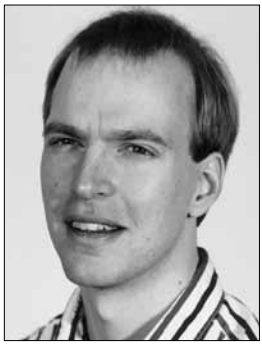
Rebecca Hoogstraten
MS '93
Maxwell

Michael Peterson
MS '93
Upper

Laureano Simon
MS '93
Allen

Darmono Taniwiryono
PhD '93
Parke

Mary Bett
MS '94
Maxwell



Walter De Jong
PhD '94
Ahlquist

Kier Klepzig
PhD '94
Smalley/Raffa

Zhengyu Huang
PhD '95
Smalley

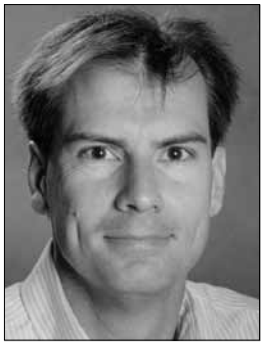
Elizabeth Kazmar
MS '95
Parke

Kristen Marshall
MS '95
Stevenson

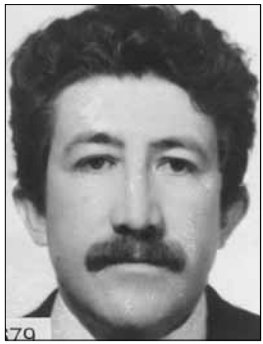
David Maxwell
MS '95
Stanosz

Eduardo Robleto
MS '95
Handelsman

Scott Adkins
PhD '96
German



James Blodgett
PhD '96
Stanosz



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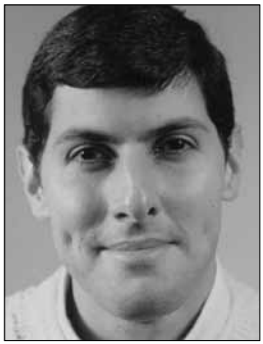

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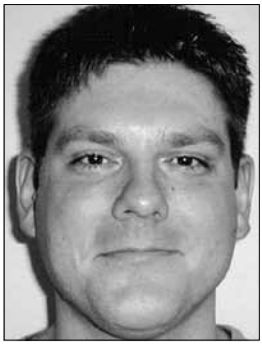

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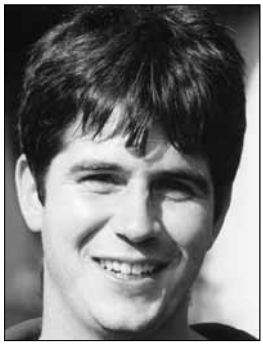

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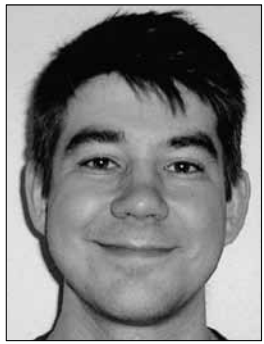

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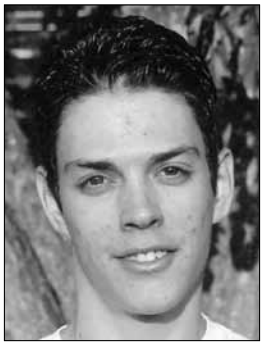

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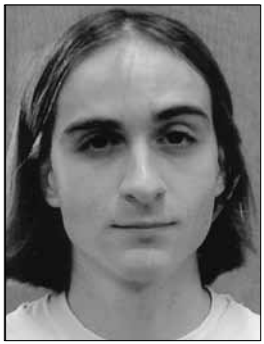

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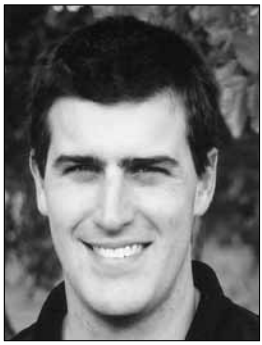

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Appendix 11: References

Bruehl, G. W. 1980. James G. Dickson: The man and his work. Annu Rev Phytopathol 18:11–18

Curti, M. and V. Carstensen. 1949. *The University of Wisconsin: A History, Vols I and II, 1848–1925*. University of Wisconsin Press, Madison

Elliott, C. and F. W. Poos. 1934. Overwintering of *Aplanobacter stewartii*. Science 80: 289–290

Hanson, E. W. and D. C. Arny. 1962. James Geere Dickson, 1891–1962. Phytopathology 52: 1093–1094

Keitt, G. W. and F. V. Rand. 1946. Lewis Ralph Jones, 1864–1945. Phytopathology 36: 1–17

Leben, C. 1981. Pioneer leaders in plant pathology: G. W. Keitt. Annu Rev Phytopathol 19: 35–40

Matta, C. 2008. Charlotte Elliott (1883–1974): great interest and unusual natural ability, *In:* Pioneering Women in Plant Pathology (J. B. Ristaino, ed). Amer Phytopathol Soc Press, St Paul, MN. Pp. 47–56

Pound, G. S. (chairman) 1972. Report of the committee on research advisory to the USDA. National Research Council PB 213 338 and PB 213 339 (appendices b–r). Distributed by National Technical Information Service, US Dept Commerce, Springfield VA. 464p

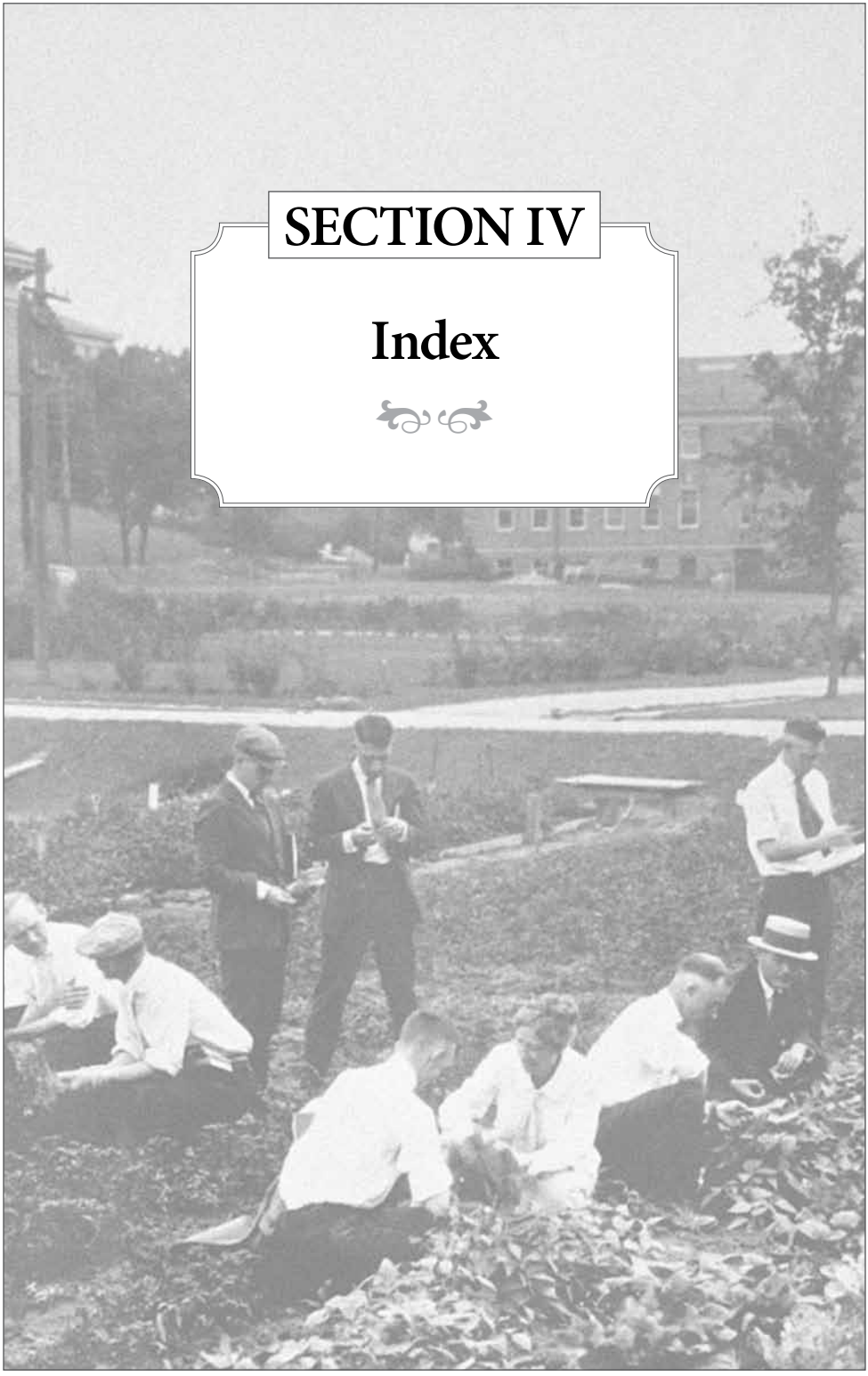
Pound, G. S. 1987. John Charles Walker: pioneer in phytopathology. Annu Rev Phytopathol 25: 51–58

Robert, A. L. and J. G. Moseman. 1976. Charlotte Elliott, 1883–1974. Phytopathology 66: 237

Sequeira, L. 1994. Albert Joyce Riker, 1894–1982. Biogr Mem (NAS) 65: 323–337

Walker, J. C. 1963. The future of plant pathology. Annu Rev Phytopathol 1:1–4

Walker, J. C. 1979. Leaders in plant pathology: L. R. Jones. Annu Rev Phytopathol 17: 13–20



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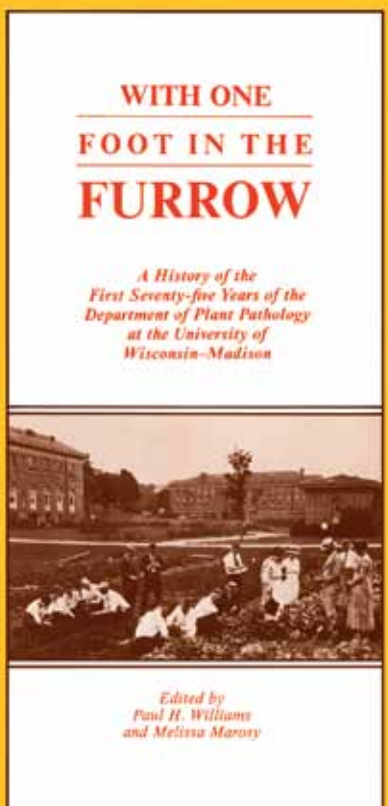

The comprehensive history (1910–2010) of the Department of Plant Pathology at the University of Wisconsin–Madison appears in two volumes. Volume I (illustrated above), *With One Foot in the Furrow*, published to mark the 75th anniversary of the Department of Plant Pathology, covers the period 1910–85. Volume II (this text), *And One Hand on the Bench*, marks the 100th anniversary and covers the entire history of the department with emphasis on the most recent 25 years. Both volumes are available as PDFs on the CD enclosed in a sleeve on the inner cover of this book.

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