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How did you spend your career?

My interest in agricultural research was stimulated by my selection to the inaugural class of the honors program of Iowa State College (now Iowa State University) in 1960. I was one among a group of fewer than 40 students from across Iowa who were nominated by their departments. We were provided the opportunity to enroll in coursework outside of our major, participate in honors seminars, and conduct a personal research project. My project on the sterilization of soil using gamma radiation was guided by Lloyd Frederick, a professor of soil microbiology and my honors program adviser. I found the experience exciting and thought-provoking.

Early in my senior year at Iowa State, Nyle Brady, then head of the Agronomy Department at Cornell University, visited Iowa State's Agronomy Department on a graduate student recruitment mission. I was one of several undergraduate students he interviewed, with the result that I applied for admission to graduate studies in Cornell's Agronomy Department. I was accepted and relocated to Ithaca, New York, in the summer of 1962. I completed an MS in crop science under the guidance of Robert Musgrave in 1964 and planned to continue under his mentoring for the PhD.

However, I soon had an early career decision to make. Musgrave advised me that he was soon to leave for the College of Agriculture at the University of the Philippines



(UP) Los Baños as a faculty member of the UP-Cornell Graduate Education Program from 1964 to 1966. I could either join that program as a graduate student or transfer to another adviser and remain at Cornell. I decided to join the program and complete the research for my PhD degree at UP. Another of Musgrave's PhD students, Anthony F. E. Palmer, made the same decision.

During my time (1964-1966) at UP, I taught one semester of general chemistry to freshman students, took a course in advanced statistics from A. D. Yniguez, helped construct leaf and crop community gas exchange chambers for measuring photosynthesis of corn and other crops under field conditions, and built thermocouple psychrometer instrumentation for measuring water stress in plants. I used the chambers and instrumentation during my PhD research on corn, the second most important Philippine crop.

After completing my thesis research in the Philippines, I returned

to Cornell to teach and write my PhD thesis for graduation in spring 1968. During my last year at Cornell, I was recruited by Paul Waggoner to a position as assistant plant physiologist at the Connecticut Agricultural Experiment Station, New Haven. For eight years I conducted field and laboratory research on CO₂ assimilation by corn and other agricultural crops, investigated the response of hardwood trees to insect defoliation, demonstrated the genetic control of stomatal frequency in corn, and conducted some of the first research on the efficiency of fossil fuel use in production of major agricultural crops. I also collaborated in research on previously unknown sources of ingested lead that caused lead poisoning in children.

In 1976 I accepted a position as plant physiologist with the ARS Plant Science Research Unit located on the Saint Paul campus of the University of Minnesota. Concurrently, I was appointed adjunct professor in the Department of Agronomy and Plant Genetics. My principal responsibilities were to investigate nitrogen fixation and cycling by perennial legumes in cropping systems and to collaborate in development of alfalfa with an increased capacity for nitrogen fixation. I was a member of a team that included Donald Barnes (geneticist) and Carroll Vance (biochemist) and our graduate students and postdoctoral scientists.

In 1990 I made a career change and accepted a position as professor and head of the Department of Agronomy at the University of

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ASPB Legacy Society Founding Member

Illinois at Urbana-Champaign. Because the state was in financial difficulty, I spent the first three years crafting department budgets to accommodate rescissions in the university's state appropriation. Concurrently, I collaborated with college development office colleagues to lay the groundwork for financial gifts that would later benefit the department.

In 1993, further state budget cuts led to the closing of academic units in several colleges of the university. As a result, in 1994 I also became interim head of the Department of Plant Pathology until a merger with part of the Department of Agronomy could be crafted. The new Department of Crop Sciences, which lost soil science faculty but gained faculty from the former units of Plant Pathology and Applied Entomology, was launched in 1995. I was appointed head of the new department. New undergraduate recruitment initiatives were developed. The department succeeded in new "faculty excellence" hires, successfully recruited 16 additional new faculty, and established two endowed chair positions in the last six years of my career with the university. I retired in 2004 after more than 36 years in plant and agricultural sciences.

What do you consider to be your most important contributions to plant science?

In reflecting on a career, it is instructive to consider the new knowledge provided and how it was accepted by the scientific and lay communities. My gradu-

ate work established that inbreds of corn and their hybrids differed in rates of photosynthesis on a leaf area basis and illustrated that "hybrid vigor" or heterosis was likely involved. At Connecticut, I established that stomatal frequency of corn was under genetic control, which might be a factor in the difference between gas exchange by inbreds and hybrids. My work on efficiency of fossil energy use by different cropping systems stimulated a lot of interest, bringing invitations to write for publications and speak to audiences often beyond the usual plant science community.

With the ARS in Minnesota, I was a member and coleader of a research team that developed new knowledge of nitrogen fixation by perennial legumes, both in the laboratory and in the field. I was the first to use novel stable isotope methodologies to show how innate host plant capacity for nitrogen fixation could be distinguished from rhizobial and environmental influences, how nitrogen fixation varied with management during the growing season, and how much fixed nitrogen was transferred to a companion grass in the crop community. This led to development of the first alfalfa line released for enhanced nitrogen accumulation and storage characteristics. Our team was recognized by group awards and by individual awards, which was encouraging attention in a scientific community that primarily emphasized individual achievements.

Service to scientific societies is also an important component of the plant science enterprise. I served on the editorial board

of *Plant Physiology* for nearly 17 years and on the board of trustees of ASPP for two years. I served a term as associate editor of *Crop Science* and as editor-in-chief of the American Society of Agronomy (ASA). Later, as president of two companion societies, the Crop Science Society of America (CSSA) and ASA, I led the development and policy acceptance of the first statement of professional ethics adopted by CSSA and ASA, which was regularly printed in society journals.

During my 14 years as a department head at Illinois, I led academic units through restructuring and years of fiscal stress, recruited faculty and students from groups underrepresented in the profession, initiated and facilitated solicitation of nearly \$4 million in gift and endowment funding, and established the first two endowed chairs in the Department of Crop Sciences. One was held by the first woman appointed to an endowed chair in the College of Agricultural, Consumer, and Environmental Sciences.

When did you become a member of ASPP/ASPB?

I joined ASPP in January 1967.

How did the Society impact your career, and what motivated you to become a Founding Member of the Legacy Society?

The Society was particularly influential in the first one-third of my career. I joined ASPP as a graduate student after attending plant science seminars organized by F. C. Steward, in which prominent

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plant physiologists came to the Cornell campus to speak and hold postseminar audiences with graduate students. André Jagendorf joined Cornell in the late 1960s and broadened the influence of ASPP in Cornell's plant science community. Additionally, I used the journal *Plant Physiology* extensively in preparation for my PhD research and in writing my thesis. Early in my career I frequently attended ASPP annual meetings and published in *Plant Physiology*. In 1971, I participated in a symposium at the meetings held in Asilomar, California. Martin Gibbs invited me to join the editorial board of *Plant Physiology* in 1973, where I served for 17 years. I also completed a two-year term on the board of trustees in the late 1980s. In the middle of my career, I became less active with ASPP as I served in the presidential succession of two other scientific societies. However, my early experiences with ASPP served me well throughout my career and have continued to be important well into my retirement.

Crispin Taylor invited me to become a Founding Member of the Legacy Society. After reflecting on his overture, I realized the important influence of ASPP on my early career. Through articles in *ASPB News*, I saw a role I could play

in helping to ensure that forthcoming generations of students and young scientists in plant biology will have enriching and formative experiences through ASPB development programs. I hope my financial support through the Legacy Society will contribute to allowing future young scientists to realize their dreams and aspirations.

What important advice would you give to individuals at the start of their career in plant science?

For young plant scientists at the beginning of their careers, I suggest the following:

1. Distill the advice of your academic and postdoctoral mentors into a few key principles. What nuggets of wisdom did you learn from them? What principles did they exemplify in their own careers?
2. Choose a career position that really excites you, and be able to explain why.
3. Be certain that you understand the institutional requirements for successful performance in your new position and how you will be evaluated.
4. Know the sources of extramural funding for your new program and how to write clear, crisp, focused proposals for it.
5. Develop a five-year plan for success in your position, review it often, and update it annually.
6. Write an honest annual report of your performance every year for your own use. Be your own evaluator.
7. Seek out chances to speak about your program at professional forums and to serve in professional and scientific societies.
8. Craft a healthy work life–personal life balance.
9. Seek out professional collaborations that strengthen Items 3, 4, 5, and 6.
10. Understand the downstream, off site, and societal influences of your program. Who does it benefit, who does it neglect, and is this outcome ethical? Always be prepared to be surprised. Plant science is full of unanticipated discoveries.

Academic Family Tree

<https://academicfamilytree.org/plantbio/tree.php?pid=813226>