Carl S. Pike

How did you spend your career?

My interest in a career in plant biology came from my mentors, Arthur Galston, Bruce Stowe, Ian Sussex, Mary Helen Goldsmith, and Winslow Briggs (who taught as a visitor on sabbatical), during my bachelor's and master's degree studies at Yale. Intrigued by the phytochrome system, I joined Winslow's lab in 1967 when he moved to Harvard.

Winslow inspired a dedication to excellence in research and teaching. He supported my interests in teaching, which I pursued both as a teaching fellow in formal courses and as a tutor leading weekly small group discussion classes based on journal articles. I intentionally chose each semester's topic to be something relatively new to me as a way to broaden my knowledge in preparation for a career at a primarily undergraduate institution (PUI).

I was fortunate to secure a tenure track position at Franklin and Marshall College in Lancaster, Pennsylvania, directly out of graduate school. The Biology Department had a strong reputation for preparing students for health professions and graduate schools. During my 41 years there, the department nearly doubled in size, adding programs (often interdisciplinary) in biochemistry, neuroscience, public health, and environmental science.

In addition to teaching plant physiology (and later plant development), I instituted a heavily subscribed general biochemistry course and participated in the introductory cell and molecular biology course. Over the years I taught various nonmajors courses that combined several of my interests, including nutrition, plant biology, agricultural systems, GMOs, world and U.S. hunger and poverty issues, and the origins of agriculture. I credit my mentors, my colleagues, and my historian wife for providing me with the encouragement and support to venture well beyond my comfort zone to provide science-based interdisciplinary courses for the broad student body. The irony was not lost on me that someone who grew up in New York City, surrounded by concrete and brick, was teaching about plants and agriculture in the heart of the most productive nonirrigated cropland in the entire country.

Initially my research program with students involved physiological responses to phytochrome. An interesting sidelight was serving as the adviser on an NSF Student-Originated Studies grant (1975) and additional student projects involving lab and field studies on the effects of toxic levels of zinc on maize growth and physiology. This work was prompted by a chance conversation with a geologist colleague about a local site where zinc had been mined. The careers of several students were substantially influenced by their participation. Ironically, the field site soon became the location of a breakfast cereal factory: from corn to corn flakes.

I became interested in physiological ecology as a result of reading I did for my biochemistry and plant physiology courses. I was awarded an NSF fellowship to spend 1978–79 on sabbatical at the Carnegie Institution Department of Plant Biology working with Joe Berry, John Raison (visiting from Macquarie University), and Olle Björkman.

My year at the Carnegie lab was an exceptional experience and greatly influenced the rest of my career. In addition to my research with Berry and Raison on the properties of membrane lipids in plants adapted to or acclimated to temperature extremes, I participated in a field trip to Death Valley, learned about the department's mobile photosynthesis system, and reviewed a physiological ecology book manuscript coauthored by Björkman.

Returning to Franklin and Marshall, I continued work with many students along the lines of my sabbatical research. Inevitably, I devoted more time to department and college governance. During a second sabbatical at the Botany Department of the University

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of Texas at Austin, I worked on phytochrome with Stan Roux and membrane lipids with Guy Thompson. My reward upon returning was a four-year term as department chair.

In the 1990s I was privileged to be asked to join colleagues in biology and chemistry in their research on conjugates of auxin and choline. Richard Fluck had a long-standing interest in acetylcholine in plants. Students in Phyllis Leber's lab synthesized choline conjugates of various auxins, and Dick's students assayed their growth-promoting action in peas. My students carried out additional physiological studies, and we also contributed to efforts to isolate and characterize a cholinesterase. Students with interests and skills in genomics and molecular biology sought to clone and characterize a putative enzyme. This work provided a springboard for some students to go on to PhD programs in molecular biology, showing again the power of undergraduate research as a driver for advanced study.

In 1997 I was the principal investigator on an NSF instrumentation and laboratory equipment grant for equipment to study photosynthesis as an integrating curricular theme in introductory and advanced courses as well as in research. Students in my plant physiology course used LI-COR gas exchange systems in semester-long research projects. Our introductory courses used transpiration monitors and simpler gas exchange systems in short-term projects. This is but one example of the many opportunities provided to our students to use state-of-the-art equipment.

Toward the end of my career, I spent two sabbatical years with the Molecular Plant Physiology group, Research School of Biological Sciences, Australian National University. I worked with Dean Price, Spencer Whitney, Susanne von Caemmerer, and Murray Badger on heat shock proteins, rubisco, and aquaporins. A follow-up from this work was a project carried out by several students to show that the overexpression in tobacco of a misfolded rubisco led to increases in the production of certain heat shock proteins. This finding adds support to the idea that heat shock proteins are involved in the recognition and eventual elimination of misfolded proteins. We had opportunities to learn about the ecosystems and human history of Australia and New Zealand; these experiences enriched my subsequent teaching.

The disengagement from my home campus was tempered by a call from the provost asking me to agree to two years as department chair. One can't very well argue from 10,000 miles away. During that time our department moved from our increasingly outdated and overcrowded home (since the 1920s) into a superb new building.

A capstone to my career was collaborating with Chris Williams, a geoscientist, and students on a project using the katsura tree as a model to explore photosynthetic properties of plants grown in CO_2 and day length conditions that prevailed in the Cretaceous when related species grew in Alaska. This work integrated many of my interests over the years.

I was fortunate to be among an exceptional group of colleagues. Expanding my horizons in both research and teaching provided continual intellectual stimulation for 41 years. My family was always supportive, even when Dad felt compelled to offer a lecture about whatever plant we happened to encounter on a hike.

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

I would say my most important contribution was bringing knowledge of plants to the close to 2,000 students I taught. In particular, I mentored more than 60 research students during the academic year (many of whom earned departmental honors) or during the summer. Their high-level research often led to coauthored publications and presentations at ASPB meetings. Many research students became lifelong friends, and most went on to either graduate school or health professions schools; several joined the faculties of colleges and universities. I trust that they benefited from the skills they learned at the lab bench, analyzing data, critically reading articles, and writing.

In addition to full-semester upper-level plant-focused courses, I included plant material wherever I could in other courses such as introductory cell biology and general biochemistry. As part of a major curriculum overhaul in the early 1990s, I joined a team teaching a sophomore-level required course

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on the physiology and development of plants and animals. It was a great experience to work with zoologist colleagues to develop multiweek research-based lab projects in these areas. Becoming reasonably adept at teaching topics such as kidney and nerve physiology was an intellectual challenge and reward for me. Almost all Franklin and Marshall classes have 25 or fewer students, so there were routinely opportunities for discussions, small group projects, debates, and so forth. This curriculum development work led to publications and meeting presentations. ASPB colleagues provided ideas and models at meetings.

My academic background led to various community activities. For 20 years I have served on our city's Shade Tree Commission, grappling with trying to preserve and increase the tree canopy in the face of many constraints in a congested urban environment. I served on the boards of community groups that support school gardens as a way to engage students in science and nutrition, and I compiled an extensive school gardening manual. I am currently a board member of our local land trust. For eight years (including two as president) I was on the school board of the School District of Lancaster. That role required me to develop an entirely new skill set. Nothing in my background prepared me to face hundreds of residents angry about a tax increase as we tried to provide for the needs of our urban students. A few years ago I served for 18 months as a community member of the editorial board of our local newspaper. Our main task was advising on each day's main editorial.

When did you become a member of ASPP/ASPB?

I joined ASPP in 1968, during my first year of PhD work.

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

In graduate school and at the beginning of my academic career, I attended annual meetings regularly both to present my own and my students' work and to broaden my knowledge for the courses I taught. The major symposium talks and oral and poster presentations were invaluable.

From 1992 to 1996 I was a member of the Education Committee and served one year as chair. I worked with the Society's elected leaders and the staff who helped the committee. I particularly valued the increasing number of education-related booths and posters at the annual meetings, which provided learning opportunities for attendees. I helped organize career workshops at the annual meetings, making sure there were presenters representing the breadth of academic, industrial, and government opportunities. In the 1970s I was also a member of the Meeting Site Committee.

Most of us at primarily undergraduate institutions may be the only plant biologist in our departments. So maintaining contacts with colleagues elsewhere can be vital throughout one's career; such links were often initiated at the annual meetings. It's been gratifying to see the growth in ASPB's programs for PUI faculty and others interested in undergraduate education: meetings and speakers, poster sessions for undergraduate researchers, and now a dedicated Society section. Maintaining a strong undergraduate pipeline in all types of institutions is crucial to the strength of our discipline.

Of course, my greatest honor was to receive the Excellence in Teaching Award in 1995 in recognition of my efforts with undergraduate researchers and in formal teaching. Those research students are jointly the recipients of this award.

So upon learning of the opportunity to become a Founding Member, there was no doubt that I wanted to give back to the Society that had honored me and that had been so important to my professional development, and also to ensure the growth of programs in education and outreach.

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

One bit of advice is not to be deterred by an early setback. During my summer program for high school students in 1961 at the Rockefeller University, one of the modules was on photosynthesis, with lab work on the Hill reaction, as I recall. My lab report was returned with a full page of less-than-flattering red pencil comments about my complete lack of understanding. I would occasionally show

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that to my students so they knew that anyone could rise above such experiences.

I'd also encourage early career scientists to explore the whole range of options for places to work in academia, industry, and government. During your graduate school and postdoctoral years, look for opportunities to spend time in different venues so you can experience firsthand what it would be like to accept a position there. Mentors often facilitate such opportunities through their professional networks, and ASPB has many resources to help members learn about a broad range of career paths.

Based on my own experience at a PUI, there will be ample opportunities to collaborate broadly within and across departments. And such work can be rewarding no matter what sort of organization one works at. At some point I worked with every other member of my department in teaching, research, student advising, governance, building construction, and many other activities. I had research and teaching collaborations with colleagues in chemistry, geosciences, and international studies.

Academic Family Tree

https://academictree.org/plantbio/tree.php?pid=777970