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The Paper Trail: An Arid Connection & A Book of a Thousand Plants

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THE PAPER TRAIL

Editor's Note: In this issue of *The Paper Trail*, a connection is made between a beginning researcher and an established ecologist in the area of invasion biology. They write about their trails in ecology and how they have been influenced by scholarly work; the beginner referencing a scholarly paper by the established.

An Arid Connection

Steve Young

Cornell University, Ithaca, NY USA



Dr. Steve Young, Plant Ecologist, surrounded by *Phragmites australis* in the Platte River of central Nebraska.

It took me awhile to decide that ecology was where I wanted to focus my career. My upbringing was on the dry side of Washington, which might be considered the wrong side to some. The search for scorpions under rocks in the foothills of the Cascades and attempting to identify the many grasses and tree species in the meadow pastures adjacent to the nearby Naches River consumed many a summer.

I moved on from eastern Washington to an equally dry location in southern Idaho for graduate school. The long drives across the sagebrush steppe region that make up the lower half of the panhandle state caused me to pause and think. How could plants not only survive, but grow and reproduce on what appeared to be desert pavement?

Moving to northern California where I worked on my dissertation in the dry foothill region near Davis was where the connection to the interests I had growing up began to be transformed into something more solid. I remember being intrigued by the rain or lack thereof and warning the director at the UC Hopland Field Station that surely the next rainstorm that summer would wash off the white paint that was used to shade the glasshouse. Little did I know. The harsh roadsides and a field site near the UC Davis airport were where I learned first-hand the resiliency of plants and plant communities and their mechanisms for survival.

Following my Ph.D., I moved on to Nebraska, where as a beginning faculty member I was able to start a research program in ecology and continue to study what intrigued me most: plant competition and stress. It was during this time that I came across the paper by Peter Alpert (see his article below) and his colleagues on “Invasiveness, invasibility, and the role of environmental stress in preventing the spread of non-native plants” (*Perspectives in Plant Ecology, Evolution and Systematics* 3:52–66). It was an “aha” moment in reading about biological invasion research and the current consensus at that time regarding invasiveness and invasibility in plant species and communities.

I had seen first-hand or at least I had thought about things like nonnatives remaining noninvasive for long periods, the relationship between plasticity and invasiveness, and the “unlike invader” hypothesis, which were all touched on in the paper. Add to this the discussion on the topic of stress (e.g., drought) affecting invasibility and the conceptual diagrams showing hypothetical responses of native and nonnatives under minimum and maximum levels, and I was convinced that my ideas were similar to those of others. For the first time, I did not feel alone in my thinking. In a way, it was a newfound freedom that allowed me to ponder more deeply the effects of stress on invasive plants. Extreme drought is a type of stress or selection pressure imposed on plants and communities of plants that can reveal fitness and plasticity differences that if understood could have profound impacts on invasion and community assembly theory.

As I look back over my time growing up and in graduate school and now early in my career as a researcher in ecology, I see how my interests throughout this period have been maintained, refined, and now connected with previous generations. Like Peter and his predecessors, I now have the opportunity to “struggle” with long unanswered questions such as which traits enable a species to invade and what makes a community susceptible to invasion. I hope to contribute in answering these questions as others have done in order to advance the field of ecology through the scholarly word.

A Book of a Thousand Plants

Peter Alpert

University of Massachusetts, Amherst, Massachusetts, USA

My first written key to ecology was taxonomic. As a graduate student, I learned about accessible review and synthesis from the publications of my Ph.D. advisor, Bob Cook; and about clear, innovative research articles from the papers of Hal Mooney, who was persuaded to supervise me for a postdoc. But the writing that really drew me into ecology was the *Marin Flora* by John Thomas Howell, who curated the Herbarium at the California Academy of Sciences.



Dr. Peter Alpert in Tilden Regional Park, near Berkeley, California, in 1969 (credit: botanical printmaker Henry Evans).

My remarkable sixth-grade teacher, Virginia Ryder, charged with leading the weekly “special class” at Cabrillo Elementary School in San Francisco, decided to economize by teaching what she was herself learning at the Cal Academy, botany. I did not care much for counting the parts of flowers from gardens, but after a month or so, in April, she took the class to Mt. Davidson, the highest point in the city. The hill was topped with wildflowers, ones that I had never seen. I wanted to learn their names, and Mrs. Ryder took me to her teachers, Mr. Howell and the assistant curator Dr. Elizabeth McClintock, who kindly said I could come to the herbarium every Thursday after school. For years, I carried the Marin Flora back and forth between Marin County, where the Marin Municipal Water District let me collect plants on Mt. Tamalpais, and the Herbarium. That book taught me to see specifics, to use terms, and to reconcile theory with fact.

The Marin Flora was a true work of individual scholarship. Marin County is not very big, but it has more than a thousand species of ferns and flowering plants, and the Flora described them all. Mr. Howell knew them all. He was the savior of the annual wildflower show at Stinson Beach. The collectors for the show, who seemed all to be women, would have him come the day before it opened, and one year he took me along. I recall an airy room full of assorted vases and cups of plants. In front of each plant was a card, some of them inscribed with the common and scientific names and some of them blank. As he chatted charmingly with a circling throng of ladies, Mr. Howell took a moment’s glance at the next unknown species, wrote its name on its card, and passed on to another. It was a bravura performance.

Learning the plants and where they grew on a mountain grounded me as an ecologist. Those species and habitats gave me facts against which to check ideas. Bob Cook was one of the last cohort of graduate students of Evelyn Hutchinson, and this had also been his advice: learn both a topic in ecology and a natural system or taxon, both a subject and an object of study.

I went back to Mt. Davidson a few years ago. It was spring, but there were no wildflowers on top. Like most of the grassland in California, it had been claimed by grasses introduced from Europe. I had already started working on invasive species and here was a very good reason. Knowing a system gives one something to care about. Knowing a subject in ecology may give us the means to help do something for it.

