

## End Note, a Retrospective and Perspective from the Senior Author

*Our editor, who believes that a culture's engagement in organismal biology is not only a crucial discipline for the sciences but civilization's tie-down to reality, has asked the senior author to provide a reflective essay based upon 45 years of botanical study in one of the great metropolitan regions of the world.*

Upon having been drafted into the United States Army in the winter of 1971, I was put to work immediately on a newly-formed team that was to prepare an environmental impact statement (EIS) on a proposed duplicate lock and twelve-foot channel construction project at Lockport, Illinois. This was a curious assignment inasmuch as my technical knowledge, nascent as it was, lay in the fishes, algae, and mollusks of northwest Florida and the Gulf of Mexico. This assignment was also a shock since, at the time, I was convinced that I would endure a period of Advanced Individual Training (AIT) that was to prepare me for the hazards of Viet Nam. A callow graduate of Florida State University and student of biology, I was thrilled that personnel had goofed and given me a duty billet that not only might save my life but render it changed for the better.

Obviously in need of a plant specialist to fill out our mission, the U. S. Army Engineer Waterways Experiment Station, in Vicksburg, Mississippi, was compelled to enlist the services of Floyd Swink and Ray Schulenberg to assist me in my effort to evaluate the vegetation of fifty "potential spoil sites" in the Lockport area and to establish a context for their significance within the EIS framework. The EIS represented a new program that resulted from the implementation of the then two-year-old National Environmental Policy Act (NEPA).

Both Floyd and Ray have since become beloved by Midwestern biologists, but at the time they worked in relative obscurity at the Morton Arboretum. They changed my life as they changed the lives of many others before and since. Floyd later became a mentor to my coauthor on this book, Laura Rericha. It was with Ray, however, that I experienced what only can be described as an epiphany.

In the preparation of the EIS, I had met and worked with many ecologists and biologists and been in contact with some of the more notable ones of the day, but the best of them seemed merely brilliant compared with Floyd Swink and Ray Schulenberg. None seemed to have what I could recognize as a philosophy that would provide a doctrine within which one could formulate a comprehensive system to evaluate which sites, among fifty, could be sacrificed for ship channel and lock construction. Indeed, other than evaluation of land for the suitability of grazing or for wildlife game habitat, most ecological research was essentially descriptive, with evaluation approaches, from the standpoint of system quality in the context of preservation priority, very poorly developed.

The ecological assessment attributes of EIS's at that time, and for years afterward, consisted primarily of inventories, lists of organisms, commonly with gratuitous statements about temporary sedimentation or impermanent impacts. There was no way qualitatively to discriminate an old field from a prairie, a woodlot from a woodland, a cattail marsh from a fen. Indeed, the concept of a non-native weed was virtually unformed and certainly not deployed in a preservation philosophy. Ecologists essentially regarded nature as a random aggregation of value-neutral organisms that lived outside the realm of human culture, typically in a community that was in some arcane state of "natural succession" toward "climax."

To some extent, this idea of succession, with climax as an endpoint, remained a primary doctrine of Western ecological thought, embedded generally in the cultural doctrine of the 1960's and 1970's, which could be described as: I'm OK; you're OK; we don't judge. Through Rachel Carson's admonition that our heedless dispersion of synthetic chemicals was throwing a monkey wrench in the complex workings of nature, and in part because of our adherence to the wilderness philosophy of John Muir, my generation developed a kind of apartheid between man and nature. Humans were not only outside nature, we believed, but should stay outside of it. We believed further that for humans to enter the wilderness or primeval forests is to defile them. Such patterns of belief were bolstered by the observations of Frederic Edward Clements and successive students of ecology. The idea that native peoples, including our own aboriginal progenitors, had been living in harmony within nature for thousands of years either was not considered or represented a point of doctrinal ambivalence or confusion. So, in October of 1972, I was philosophically unprepared for my sojourn in the field with Ray Schulenberg.

The first day in the field was spent with Floyd Swink, a lithe, living encyclopedia of natural history. Never in my life had I encountered such a mind. Under his direction, the plants of fifteen or so of the fifty potential "spoil" sites were well documented with vascular plants, as determined from sticks, grasses, and vegetable debris—as they seemed to me—but identified and rattled off by Floyd. His rapid-fire identifications were dispensed at a rate of fire not dissimilar to that of an M-16 on rock 'n roll—a relationship with the latter of which I was pleased to have put behind me. Although I had recorded an enormous compendium of plants for each site, I was still uncertain how I would discriminate among them insofar as suitability for the disposition of dredged material. On the second day, Floyd was unavailable, so his colleague

Ray Schulenberg graciously agreed to accompany me: me, this rather bemused character from the Corps of Engineers, this “trained killer” saved from the jungles of Viet Nam by a guardian angel at Army personnel.

Much like Floyd, Ray patiently but relentlessly, dictated the inhabitants of another fifteen or twenty potential spoil sites. My Latin training facilitated the taking of dictation, but I remained in awe of these botanists’ abilities to recognize so many plants in that cold, overcast autumn, the ground bedecked by a dusting of snow. At each new site, the job became a little easier, because the plants were everywhere similar: *Solidago altissima*, *Oenothera biennis*, *Acer negundo*, *Pastinaca sativa*, *Arctium minus*, *Melilotus albus*, *Populus deltoides*, *Geum canadense*, *Poa pratensis*, *Poa compressa*, *Brassica nigra*, et cetera. Ray, after each site, however, did something unique at that time in ecological history. He uttered decisively, yet humbly, “You can spoil here, Jerry. You cannot hurt it. It could grow back.”

I was mystified, as my countenance must have reflected. Here was this overwhelmingly knowledgeable practitioner, one who obviously cared deeply about plants and animals, telling a factor from the Corps of Engineers that every site we had been on could be despoiled! This was counterintuitive to a 60’s-generation eco-freak who had been taught that the land (like morality) was value-neutral: One vegetated landscape was not to be discriminated from another; each was an “ecosystem,” governed by successional processes on its way to a “climax.” Some ecologists even had drawn out esoteric energy pathway schematics that presented ecosystems as analogous to complex electronic circuits.

“You can spoil here. You cannot hurt it. It could grow back.” This enigmatic mantra, proclaimed at each site that we visited, drew my mind to the directive in the NEPA that required one to evaluate the extent to which the impact on an area was “irreversible or irretrievable.” But on what basis could such an evaluation be grounded? Who was this guy, Ray Schulenberg? I lay awake that night in my motel room in Downers Grove, wondering, as the sports announcer droned helpfully on the progress of a World Series baseball game. Rollie Fingers . . . You can spoil here . . . the 3-2 pitch . . . You cannot hurt it . . . a swing ‘n a miss . . . Who was this guy?

Next day was the same. Site after site, Ray declared that each was recoverable, that they contained only “weeds.” Finally, as we approached an area south of Division Street at Lockport, unceremoniously designated “Spoil Site L2” on the blue-line aerials, Ray stopped abruptly on a berm that was dominated by the ubiquitous *Brassica nigra*. He extended his arm to block any further advance on my part—as if I would actually find myself stepping ahead of him! He pointed with his chin, after the manner of an Indian, toward a small vegetated vignette, then spoke with the deepest reverence the following hallowed names: “*Andropogon scoparius*, *Bouteloua curtipendula*, *Muhlenbergia cuspidata*, *Isanthus brachiatus*, *Verbena simplex*, *Kuhnia eupatorioides corymbulosa*, *Allium cernuum* . . .,” names I had never before heard uttered.

After a moment, he placed his hand upon my shoulder and admonished me in the most authoritative but gentle way: “Don’t spoil here, Jerry, for this is America, and it will not grow back.” I was stunned, slack-jawed. My knees were weakened as I looked soulfully at America. America! There it was: a tiny remnant of America. “This is America. It will not grow back!” I muttered to myself. “This is America. It will not grow back!” I resolved then and there that I did not want to live another day of my life not knowing whether or not I was in America. I learned, too, that the only way to know this was to learn the plants, to discover which ones were the “Old World weeds” and which were the natives.



Ray Schulenberg at spoil site L2, October 1972, taking careful notes on a population of *Muhlenbergia cuspidata*. Note the 1969 edition of *Plants of the Chicago Region*, by Floyd Swink, under his left arm. Photograph courtesy of the U. S. A. E. Waterways Experiment Station.

So, I returned to Vicksburg and began the painfully tedious but sublime process of learning the plants of Warren County, Mississippi. Sadly, however, the flora I was using provided scant clue as to whether or not a plant was native, since “naturalized” species needed no such codification. I also tried to explain to my boss, a civil engineer by the name of Major Emge, that spoil site L2 was “America” and that it should not be spoiled upon, that it would not grow back—as could the other 49 sites. One would have had to have been a male Private 1<sup>st</sup> Class in the United States Army in 1972, reporting to a square-jawed major, to appreciate how well that went over. The overall EIS process, nevertheless, resulted in setting aside the proposal to construct any modification of the Chicago Sanitary and Ship Canal, which decision spared spoil site L2. As it happens, the L2 area was part of what later would become known as “Lockport Prairie

Nature Preserve." I later discovered that L2 was among the world's last remaining sites for the now federally endangered Leafy Prairie Clover and Hine's Emerald Dragonfly.

The fates smiled upon me, again. When I terminated service in the Army, in the spring of 1974, I lucked upon a position working in the herbarium of the Morton Arboretum for Ray Schulenberg, under the tutelage of Floyd Swink. Thus, I began a lifelong study of the landscapes of "America." I grew to understand that aboriginal landscapes and natural plant communities are the blessings of The Creation, that very Eden for which we were created to love and care.

I learned that when natural remnants are cared for properly, with knowledge born of intensive study, humility, and goodness of heart for their sake, they are ineffably beautiful, full of mind-numbing diversity, and exhibit an infinite array of complex relationships. Remnant landscapes inspire the artist and the poet to all manner of expressions of beauty. Indeed, caring for the land, in and of itself, is an endeavor that can heal our own fragile souls. Alas! Mother Nature's quite a lady, but we have not been perfect gentlemen. Not only have we not looked after her and loved her, but we have rendered battery against her with so much obliviousness and misdemeanor that precious little of her countenance is recognizable.

One could drive randomly all day long, however, within the Chicago Region today and not pass a single aboriginal remnant, not witness a single recognizable tract of natural plant community. Most remnants are so tiny as to be nearly unresolvable on a Google Map. Aside from the sterile developments of subdivisions, malls, industrial-scale fields of corn and soybean, manufactories, golf courses, vast tracts of lawn, and master works of landscape architecture and architecture—replete with their drug-dependent rugs, lollipop trees, and poodle-shrubs—nearly all the interstitial landscapes today represent neglect and abandonment, the covenant of Creation forsaken.

Unkempt roadsides are dominated either by a depauperate coterie of ruderal Eurasian weeds that sustain only if mowed periodically to keep weedy shrubs and trees from growing and obscuring views. See the discussions provided for *Artemisia vulgaris*, *Atriplex prostrata*, *Bromus inermis*, *Chenopodium album*, *Cichorium intybus*, *Leucanthemum vulgare pinnatifidum*, *Lonicera maackii*, *Lonicera ×muendeniense*, *Salix ×rubens*, *Solidago sempervirens*, and *Symphytotrichum pilosum*. Where moisture accumulates in ditches and flats, *Phragmites australis* and *Typha ×glauca* form monocultures interspersed with drifts of *Agrostis gigantea*, *Amaranthus tuberculatus*, *Lythrum salicaria*, and *Phalaris arundinacea*.



A ubiquitous scene around Chicago today: *Phragmites australis* and the steel trees of transmission lines. © Keith Board

Farther back, past roadside fences, desultory growths of trees are commonly misinterpreted by passersby as woodlands. Most often, however, rather than remnants of natural woodland plant communities, these stands of trees represent erstwhile old fields with even-aged growths of *Acer negundo*, *Acer platanoides*, *Fraxinus lanceolata*, *Prunus serotina*, *Robinia pseudoacacia*, and *Ulmus pumila*, commonly with an undergrowth of *Lonicera ×bella*, *Lonicera maackii*, *Lonicera ×muendeniense*, *Rhamnus cathartica*, and ruffs of *Rubus occidentalis*, the ground below bare and eroding or commonly with colonies of *Alliaria petiolata*, *Geum canadense*, *Hesperis matronalis*, or *Parthenocissus inserta*.

Many agricultural fields of yore, now fallow, languish and await "improvement." They are characterized by colonies of *Conyza canadensis*, *Cornus racemosa*, *Dactylis glomerata*, *Elaeagnus umbellata parviflora*, *Leucanthemum vulgare pinnatifidum*, *Oenothera biennis*, *Phleum pratense*, *Poa pratensis*, *Rubus occidentalis*, *Schedonorus arundinaceus*, *Solidago altissima*, *Solidago canadensis* and *Symphytotrichum pilosum*, commonly punctuated in wet spots with pustules of *Phalaris arundinacea* and *Salix interior*. In wet areas, under the influence of industrial salts and heavy pollution, *Artemisia vulgaris*, *Hordeum jubatum*, and *Phragmites australis* are common denizens. In flats subject to warm, growing-season stormwater, *Phalaris arundinacea* and *Typha ×glauca* are the default inhabitants. See also the notes under *Glycine max*.

Occasionally one may pass a woodland with shade-pruned oaks, which represent the skeletons of once grand savannas and forests. Having been grazed out, or logged out, or in some other manner abused, the old oaks weaken and decline, without young ones to replace them. They are inevitably stressed by soil oxidation and competition from the thrifty growths of trees and shrubs, such as *Fraxinus lanceolata*, *Lonicera ×bella*, *Lonicera ×muendeniense*, *Prunus serotina*, *Rhamnus*

*cathartica*, *Ulmus americana*, along with a duke's mixture of other woody plants and herbs, including *Alliaria petiolata*, *Circaea canadensis*, *Geum canadense*, and *Parthenocissus quinquefolia*. See also the discussion under *Acer saccharum*.

As discussed earlier in the book under the sections that deal with natural quality and introduced versus native species, for none of these highly damaged contemporary systems is there the possibility that they could "succeed" into some diverse natural plant community, even if we waited for a "very long time." Too much is gone. Too much of the living tissues has been obliterated. Such depleted and altered systems are more akin to cicatrix or chronic bleeding ulcers than to primordial germ material destined to become an organ or vital tissue. The loss of a remnant is more like the loss of an arm than like an epidermal abrasion or local contusion in otherwise healthy tissue. Remnants today represent tiny vital islands in a sea of lifelessness manufactured by people—an empty sea—the leavings of a culture deluded into imagining that it can create life and thrive in a world of its own making. The role of a culture is to nurture life within and around it. To engage otherwise is, in the long run, self-destructive.

At a time when human cultures were engaged in a felicitous relationship with the biota and landscape around them, when a portion of a landscape was damaged it could repopulate: the plants and animals aboriginal to the broader system able to coalesce into vitality from the germ of ambient richness and fecundity. Local examples include the re-inhabitancy of railroad rights-of-way 150 years ago when the rail lines knifed their roadbeds through an endless prairie. Some of the better examples of prairie remnants today are along these 19<sup>th</sup> century railroads, although they are characterized by what could be interpreted as having an exaggerated proportion of plants in the Asteraceae.

Over the last fifty years there have been many attempts to restore prairies by planting prairie plants into wholly depleted landscapes. Some attempts are more successful than others, particularly in the sandier loams, but few attain the richness that is seen in aboriginal remnants. See also the discussion under *Andropogon gerardii*. Over the same period, but especially since the 1980's, there have been significant efforts to rehabilitate damaged prairie, wetland, and woodland remnants. Such efforts, in some cases, have achieved remarkable success in restoring the richness, fecundity, and vital capacity characteristic of remnant landscapes.

If we continue to preserve and manage remnant landscapes, one can hope that if nascent generations and generations yet unborn develop an abiding empathy for the free-living world of nature, perhaps there will be enough diversity to begin to knit together and reclaim lands around us with much of their comely diversity and complexity. Perhaps, one day, children could grow up, seeing themselves as part of nature, in an environment so beautiful and composed that it can inspire not only the healing of the landscape but the nourishing of the human soul as well—that we might wander back from the land east of Eden and partake in the great covenant afforded to the world on the sixth day.



Leafy prairie clover (*Dalea foliosa*). © A. Cressler