ROOTSTALK

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When we began the task of bringing out this premiere issue of Rootstalk, we knew we were taking on a huge challenge. We knew that designing a multimedia online journal from the ground up—one that could do all that our vision statement and mission statement said we wanted it to do—would require the creative input and work of a large community of students, faculty and alumni. During the two semesters we have been engaged in this project, all those involved had to fulfill multiple roles in performing a seemingly endless list of interdependent editorial, design, production and research tasks.

In order to conquer this long roll of jobs, we divided our classes into task-specific teams which studied best practices, created and administered potential audience survey instruments, conducted focus groups with potential readers and contributors, tabulated data, explored the arcane world of online design, whipped up layouts and logos, recruited allies and delved into the ways in which we could support a twice-yearly publication into the future.

Spring 2015

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Photograph: Larry Stone

A Note

For several years we have felt that the prairie region of the central United States needed a forum for the exchange of ideas and information about the region, expressed by people from the region or those who care about it, addressed to one another and anyone else who cared to drop in. A few unsuccessful attempts to start such a journal failed to dislodge the idea, so when another opportunity presented itself, in the form of a course at Grinnell College, we reached for it. Now—thanks to support from the College's Program in Enterprise and Leadership and a bit to our own surprise--we have created a first issue, and offer it up in hopes that others will enjoy reading it as much as we have enjoyed putting it together.

It seems appropriate to say a few words about what we intended to create and hope we have achieved. First, the journal is on-line. This allows us to include not only the written word, but pictures and sounds as well. This will also permit us, in future issues, to incorporate readers' comments. Second, we want the journal's content, aimed at a general audience, to reflect the range of subjects which play out in the region: art and agriculture, food and immigration, prairie restoration and urban growth, business and climate change, politics and social justice.

Related to this is our interest in the wide range of viewpoints which we know exist concerning these and other topics. People do not all think alike, but we can all benefit from the exchange of information and ideas. Also, we hope to include the work of people who have important things to say, and yet may not have thought themselves capable of saying them in a public forum. That said, we do admit to preferences, and even a quick glance at the contents of our first issue might reveal some of them.

We are interested in notions of place and place-based education. In the Midwest, place frequently (though not always) evokes the land. What Joseph Frazier Wall, the late bicentennial historian of Iowa, wrote about Iowa could apply to all of the states in the prairie region: "The history of any state must begin with the land itself. For Iowa, the land serves as more than an introduction. It is the major story line." Every issue of *Rootstalk* will include content about the land and our connection to it, to this Midwestern place. Also, we are sympathetic to the writer and humorist Finley Peter Dunne's adage that the job of journalism is to comfort the afflicted and afflict the comfortable. Finally, we want to juxtapose art and science and society and put them into conversation with one another because, ultimately, they are all addressing the same question: how can we best live together in harmony with one another and with the land?

We welcome your comments—and your submissions to future issues of *Rootstalk.*

Jonathan Andelson
Director, Center for Prairie Studies
Grinnell College

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Encroachment, *Crowley, 12 x 8, woodcut.*

Prairie Home

Photo Courtesy of Thomas Dean

Thomas Dean is Senior Presidential Writer/ Editor at the University of Iowa with primary responsibilities in speechwriting, and he teaches interdisciplinary courses at the university as well. He also teaches with the Iowa Summer Writing Festival and the UI First-Year Seminar Program. Dean received a BA in English, a BM in Music History and Literature, and an MA in English from Northern Illinois University, and a PhD in English from the University of Iowa. Dean has published essays in regional and national publications. Books include The Grace of Grass and Water: Writing in Honor of Paul Gruchow (edited collection, Ice Cube Press, 2007) and Under a Midland Sky (essays, Ice Cube Press, 2008).

• *Website*

Thomas Dean

I still love to listen to the "News from Lake Wobegon" on Garrison Keillor's *A Prairie Home Companion* every Saturday night. Mr. Keillor's droll yet often sharp narratives of life in a small middle land town continue to amuse and comfort me after all these years. Over those years, the phrase "prairie home" has resonated more deeply, more acutely in my imagination, my heart, maybe my soul.

For two years in the late 1990s, I lived in the northern prairie region in Moorhead, Minnesota, the Red River of the North serving as the good fence with our neighbor Fargo, North Dakota. Tucked in the middle of Moorhead, not six blocks from my house, was the Prairie Home Cemetery, from which Mr. Keillor himself says he derived the name for his radio program after a 1971 reading at Moorhead State University (the institution where I taught at the time I lived there). It's an old Norwegian graveyard, and in fact the house my family and I lived in in Moorhead was connected to one of those buried there. Our beautiful 1925 Dutch Colonial was built by Bottolf T. Bottolfson, an ophthalmologist and two-term mayor of the town. (The "T" stands for Thomas, in welcome serendipity). A small, tarnished brass plate engraved with "Bottolfson" still sat above the house's doorbell, which we of course left on. Once we found out the mayor was buried in Prairie Home, my family and I could not resist the urge to wander the field of grave markers in the cemetery until we found and paid our respects to our home's builder and his wife, Jeanette.

Prairie as home is an evocative idea that extends beyond my brief two years in Moorhead, and even my many years of Saturday-night appointment radio. As my life's years have marched on, "prairie home" has be-

come a phrase, an idea, and increasingly a reality that has compelled, even called me more and more. It has been a yearning, a longing as well as a comfort, even solace. Now, today, I know deep within me that prairie is my home.

But how can this be? How can the prairie be my home? I hail from Rockford, Illinois, a western outpost of the Rust Belt. As I grew up in that city of 150,000 during the 1960s and 1970s, Rockford's industrial base collapsed, sending it into an economic spiral from which it has yet to recover. My childhood landscape was not one of bluestem and coneflower, but of shuttering factories and spreading suburbs. My adult homes have all been Midwestern, but an academic career has brought me to cities and college towns that boast very little tallgrass within their borders: DeKalb, Madison, Milwaukee, East Lansing, Fargo/Moorhead, Iowa City.

Even had I grown up on a farm or in a small town "out on the edge of the prairie," as Garrison Keillor would say, that "prairie" would have been corn or soybean fields. Here in Iowa, where I now live, the prairie is 99.9 percent extinct. Geographers and literary critics speak of home as a concept that has been ruptured in the late twentieth and twenty-first centuries, thanks to the multiple forces of technology, instant communication, mobility, and diaspora resulting from war, persecution, economic privation, environmental disaster, and so many other horrors of contemporary life. The great irony of the idea of "prairie home" is that the tallgrass prairie is almost certainly the most ruptured natural habitat in human history. With the replacement of prairie by modern agriculture, at no other time has humanity completely removed a functioning ecosystem and replaced it with another (dysfunctional) one.

And yet…

My psyche, my emotions, my mind's eye, my imagination, my senses all pull me toward the prairie as home. Again, how can this be?

To be honest, I probably wasn't specifically aware of what a "prairie" even was until my college years. Yet since I grew up in Illinois, flatness, horizon, and thunderheads piling high in the distance were imprinted on me as my foundational geography. Side oats gramma and blazing star would have been foreign notions to me, but the basic prairie architecture was pervasive in my childhood days. The natural world that our senses absorb in childhood become the template, the perspective from which we comprehend the universe. I am fortunate to have enjoyed a childhood in one place, unbroken by moves to new landscapes that can disrupt the deeper grounding that comes from consistency. I did not realize it until adulthood, but the prairie is, and always has been, strong in me.

Perhaps the most powerful imprint of the middle land on me, even more than the visual splendor of the horizontal, has been the smell of home—the odor of grass. I realized this most dramatically after having left land for water. I spent four years teaching in Milwaukee, Wisconsin—obviously a deeply Midwestern city, yet the lake effect was profound. Aside from the temperature modifications that Lake Michigan provided, I didn't realize how this grand body of fresh water would affect the smell of the region, even miles inland. After a few years as a Great Lakes denizen, I had an interview for a teaching position at a small college back in my home state of Illinois. It was late spring. After the several-hour drive from Milwaukee, I arrived in Eureka, Illinois, stepped out of the car, and was immediately overwhelmed by the sweet, yellow aroma of early grass in the warm twilight. I called my wife, Susan, to let her know I had arrived safely, and I had to simply say, "It smells like grass."

I know that I wasn't smelling native prairie grasses, and today's characteristic rural plant odor is corn. But I think there's a fundamental commonality among graminoids, and corn is a grass. Just as the visual scaffolding of the gently undulating prairie terrain draws my eyes, the ur-aroma of grass pulls my nostrils toward the ground of home. We know we are home when we feel the rightness of our return. Although we did not end up moving there, my nose told me Eureka, Illinois, was right.

Throughout my whole life, the return has grounded me in my knowledge of prairie as home. The other beloved landscape in my life is the North Woods. Each year when I was a child, my family vacationed at "the lake" in Wisconsin, as did—and do—many Illinois denizens. For several years, "the lake" changed every

Photograph: David Ottenstein

year or two, moving ever northward, until we found our beloved spot on Tomahawk Lake in the North Woods. The lovely, dark, and deep woods of pine, birch, and fir, with its own sweet umber smells of needles and sap, in truth made a more immediate, direct imprint on my nature memory in my younger years. More ready at my fingertips and less implicit than the essential shape and contour of the prairie, the woods continues today as my second terrain; my own family and I revel in our annual treks to the edge of Minnesota's Boundary Waters.

On my childhood journeys northward, the fields and meadows of Illinois and southern Wisconsin gradually grew sparser outside our family station wagon's windows, giving way to stands of pine and birch as we plowed a furrow up the middle of the Wisconsin map. My and my brothers' excitement grew less and less containable at the nearing prospect of lakes and lumber towns. The mirror image of that journey occurred two weeks later. Our appetite for northern adventure satisfied, the southerly trek was more somber. Yet as the woodsy America's Vacationland morphed into America's Dairyland, as we gradually entered the land of open cow pastures and cornfields, I felt an anchor of security pulling me gently. More than just a feeling of the familiar, this was a sense of well-being, a reassuring embrace of rightness.

Among my most potent memories of Wisconsin family vacations is piling out of the car, a bit stiff-legged,

in our driveway at the end of our return journey and deeply inhaling the Illinois air of home—and it smelled like grass. The warmth on my arms and face was both literal and figurative, summer's hot breeze gliding over my body and home's balm of rightness centering in my chest. That is when you know you have gravitated toward your geographical center.

Minnesota writer Bill Holm in his masterful essay "Horizontal Grandeur" said, "There are two eyes in the human head—the eye of mystery, and the eye of harsh truth—the hidden and the open—the woods eye and the prairie eye. The prairie eye looks for distance, clarity, and light; the woods eye for closeness, complexity, and darkness. The prairie eye looks for usefulness and plainness in art and architecture; the woods eye for the baroque and ornamental." Since childhood, the prairie and woods eyes have held nearly equal sway in my geographical vision. It's not either/or for me. Yet I know exactly what Holm means and feels as he describes driving home at night from a claustrophobic visit to the woods of Ely, Minnesota, "when woods finally fell and plains opened up." In the clear, moonlit night, Holm "saw for miles" and began singing at the top of his voice. "It was simply cataracts removed from the prairie eye with a joyful rush."

Despite my love for the deep woods, I have felt the grounding of rightness, Holm's relief in horizontal grandeur, throughout my adulthood as well as childhood. For two years, we lived in the south-central Lower Peninsula of Michigan—East Lansing, to be precise—a patchwork of fields and woods. Even now, nearly twenty years later, one of my most vivid memories of life in mid-Michigan is driving a particular spot south of town where you suddenly burst from wooded suburb to open farmland. Each time, I would feel my chest open and rise in almost palpable relief at the sweeping vista of fields as far as my prairie eye could see.

Over time, the feelings I have experienced when returning to the grassy flatness have resolved into better awareness and more conscious understanding. I have learned what a prairie really was—a complex, gorgeous ecosystem that is virtually extinct. Some of my teachers were literary—Willa Cather's Jim Burden walking "straight on through the red grass and over the edge of the world, which could not be very far away," or Paul Gruchow walking the recently burned Compass Prairie in *Journal of a Prairie Year*, marveling at the early blossoming spring big bluestem, the grasses' ovaries "plump with seed" (44). But the best mentor has been the land itself. Visiting prairie restorations and preserves as an adult, I slide my hand up delicate stalks of bluestem, my palms tickled by the lacy seed heads. The gracefully arcing petals of shooting stars charm my eyes. The ecstatic champagne of the bobolink's song bubbles in my ears. These are the prairie realities that I never knew as a child, now rendered materially for me on the horizontal canvas. I feel the at-easeness of home when I walk the tallgrass, like coming into a loving family I never knew I had.

But even as I walk the bluestem and breathe in mellow hints of prairie sage at the Hoover Prairie or Kent Park or Waterworks Prairie Park near my home in Iowa City, or even further afield at the Neal Smith National Wildlife Refuge in Prairie City, these isolated places are mere traces (even the eight thousand–plus acres of Neal Smith) of the vast integrity of the unbroken prairie of long ago. The daily living of my prairie home in my consciousness remains the shape and distance of the horizon and the smell of grass, writ broadly. Despite a strong prairie eye, I still have not arrived at an adequate answer to the question of how the prairie can anchor me in such a strong sense of home. Shapes and shadows of what once was do not make for a solid home's foundation. Geometry is not geography. Remnants make for a poor residence.

Perhaps home lies in hope. At the end of the beautiful documentary film *America's Lost Landscape: The Tallgrass Prairie*, anthropologist and Ioway Indian Lance Foster says, "There's a circle, and someday anything that was at one time will again be. As traditional people, we believe that prairie is not dead. Prairie is alive. It may sleep, but underneath the invasive grasses, underneath the carved-up subdivisions, that land is still there. . . . Someday, this culture's not going to be anymore. The culture that we live in is not going to always exist. But the prairie, as long as there's one stem of grass somewhere, it'll come back." There is always the prospect that the prairie will return, and maybe dwelling in

possibility is where we live best. Emily Dickinson says it is a fairer house than prose, and perhaps the poetry of the prairie can lead us to gather paradise. After all, if we think of home narrowly as family and household, none of our homes is perfect, yet we always strive for the ideal.

But honestly, I would rather be Walt Whitman, fetching the grass with full hands—I would rather "go to the bank by the wood and become undisguised and naked, I am mad for it to be in contact with me." I would rather live in the now than a conditional future. Somehow, the prairie is home to me not only as a shape or an ideal but as a material reality, bounded in the hereness of dwelling. But, returning to my original question, how can that be when my home ground has been industrial cities and college towns, and when the native landscape as a whole is a mere specter anyway?

Frankly, I don't have a definitive answer for you. I know in my heart and gut that the prairie is home for me because I feel it. I feel it whether I am reading and writing in my study, whether I am teaching in the classroom, or whether I am taking a walk by myself or with my family, be it on the bike trail along the creek near my home or through a nearby park or preserve. The feeling of home, however real and powerful, is ineffable, just as is its close cousin, the feeling of love.

For me, and maybe for you, "I feel it" is necessary but not sufficient. I still reach for something of matter. Where is that feeling emanating from, within the material? I believe that matter, that material, may be in roots. Even in its original state, most of the prairie was not what a human could see above ground but what lay in the soil, especially the roots. Prairie roots run deep—very deep—in order to tap water in times of drought. They also spread wide to consume the soil's nutrients needed to thrive. Two-thirds to three-quarters of the mass of a prairie lies underground. As Paul Gruchow says in *Journal of a Prairie Year*, "A square meter of prairie sod might contain twenty-five miles of roots" (39).

The plow of white settlement eliminated many of those prairie roots. But even with 99.9 percent of the above-ground prairie gone, I imagine that more than that tiny fraction of the native prairie root system survives deep underground. Often, a field or pasture left fallow long enough will play host to native prairie grasses reemerging above ground in their skyward journey once again. No matter where I stand here in the middle land, whether in the midst of my native Rust Belt Illinois city or the college town I now call home, the prairie—the real prairie—likely still lives deep under my feet.

So the best explanation I have for the strong, persistent sense of prairie as home is that I connect to these roots, and I have done so since my childhood, even when I didn't realize it. And what better descriptor for home is there than *rooted*? I still don't precisely know how those prairie roots have pulled me toward them into home ground. Perhaps it is a matter of an unfathomable spirit of the land. Perhaps there is a scientific explanation in quantum mechanics. University of Virginia psychiatrist Jim Tucker, who studies spontaneous past-life memories in children, posits an explanation in quantum mechanics, by which memories, even the self, are material and can attach to new hosts. Maybe in some inexplicable way, the material essence of those roots was able to find the fresh, open spirit of a young Midwesterner and establish a profound connection to him.

Whether by spirit or by nanoscopic particles and waves, or even by the alchemy of imagination, my bonding with prairie roots is beyond my ability to fully explicate. But it seems right, and secure, and comforting—themselves essential qualities of home—that my prairie home is in roots. I can begin to make these connections in my adult mind, but my heart knows I have lived with them for decades. The love I feel accounts for this: The prairie is nowhere. The prairie is everywhere. The prairie is home.

A Conversation

Linda Omaña with David Ottenstein

Photo Courtesy of David Ottenstein

David Ottenstein is a free-lance commercial photographer based in New Haven, Connecticut where he has worked since graduating from Yale University in 1982 with a BA in American Studies with a concentration in photography. In addition to his commercial work, he pursues fine-art/documentary photography, exploring interiors of abandoned and decaying buildings in the northeast, the vanishing agrarian landscape of the Midwest, and visual/cultural themes contained in the landscape of the American west. His work is being collected by the Western Americana Collection at the Beinecke Rare Book and Manuscript Library at Yale University and is part of collections at Grinnell College, the Nelson-Atkins Museum of American Art in Kansas City, and the Palmer Museum of Art at Penn State among others.

•*Website*

A member of our editorial staff sat down with Mr. Ottenstein to discuss his thoughts on photographing the Midwest and how his process connects him to its places and people.

Linda: How long have you been a photographer and what began your interest in that?

David: Depending on how you define it, I have been a photographer for about forty years. It started when I was about fifteen and I really quickly discovered photography and I really quickly fell in love with it and just became fully immersed in it, and I have been ever since in somewhat different capacities. When I was fifteen and got started, I was selling photographs here and there, but I certainly wasn't needing or trying to earn a living doing it. That started right after college when I graduated from Yale University in 1982. And I have remained completely and fully immersed in it since then.

Photography had a tremendous history rich in creative photo journalistic sort of work that was happening in the 50s, 60s and into the 70s that seems to have created a spark with a lot of people. And of course photography was becoming so much more accessible, so much easier as it continues to do so now with the digital. I just kind of happened to have fallen into all of that.

Linda: I saw that you have a degree in American Studies, and I was wondering how your degree in that has influenced your photography. How has your

Ottenstein Speaks: Why Iowa

The architectural landscape – the places where the built environment meets the natural landscape, or wherever one pursues the other – is changing dramatically in Iowa. New farming methods and technologies have rendered the traditional family farm obsolete. The result has been depopulation of rural areas and continual consolidation of farms. Fewer entities, operating with larger, more efficient modern machinery are accumulating larger tracts of land. As a result, farmsteads – groupings of traditional farmhouses, barns, silos, corn cribs and sheds – that populated the Iowa landscape are left empty and gradually disappear. Traditional grain elevators, the symbol of heartland America's bountiful agricultural success, are also falling into disuse as multinational agricultural giants replace local facilities with huge, modern regional ones. Likewise, the proliferation of giant retail box stores has helped to decimate many small towns, already stressed by the diminishing farm population that had supported and, in turn, depended on local, family-owned shops. In short, the demise of the single-family farm culture has created discernible, physical changes to the architectural landscape. This is the subject of my Iowa photographs.

I first traveled to Iowa to explore issues of beauty amidst decay and the inevitable encroachment of nature back into the built environment as I had been doing with industrial subjects in the northeast. I discovered in Iowa that the traditional structures which symbolize a way of life, foreign to me as a lifelong resident of the metropolitan northeast, yet central to so many of the values that have informed and shaped Americans, are disappearing. They are being replaced by "corporate agriculture" and the all-too-familiar architecture of suburbia and modern retailing. My photographs explore, perhaps even celebrate, the inherent beauty in what remains of the architectural landscape we associate with the single-family farm and its way of life.

interest in American history and culture had an impact on your photography?

It has had tremendous influence on it. My degree, to be very precise, was American Studies with a concentration in photography, so that I was very much concentrating on both—being a photographer and taking pictures as well as studying the work of other photographers—and the history of photography all as part of my major in American Studies

It turned out that the work that I was producing as a student and the project that I did as my senior project in American Studies, essentially became my portfolio as I started looking for work in commercial photography.

For quite a few years, I became almost totally immersed in making a living as a photographer, in doing commercial work, and therefore strayed considerably far from what I had been doing and studying as an undergrad, but eventually, I came back to that. So that in a sense, the work that I am doing now and the work that I started 11 years ago in Iowa really brings me right back to precisely what I was doing and studying and enjoying so much while I was earning my American Studies degree.

I'll add that the project I did in Am St was a photographic essay and written text about the New Haven Harbor. I came from central Pennsylvania to New Haven and was astounded that a city could have such incredible resources: a body of water right in the city and yet New Haven pretty much ignored it. My project was about exploring through the photographic process, but also through an examination of NH history: how

did that come to be? So, in a lot of ways, again, that was a model for what I ended up doing quite a few years later. Both, first photographing decaying industrial buildings in [this?] part of the country and then that actually led me to the Midwest—Iowa in particular—where I was photographing similar sorts of things. Again, I was exploring how the landscape came to look the way that it does: why is it this way? And that involved a lot more emphasis on the visual part of it and then gradually more and more learning and understanding.

Linda: You have a lot a lot of landscapes, but you also have the buildings, trains, etc. How do you feel that you capture the essence of the Midwest in your photography?

I suppose in a lot of ways I think that I photograph what interests and excites me. I believe—though I'd be hard presses to explain why or how that is—that my pictures, because they are well constructed, captivating to others, that they must describe something that I see. In fact, what I hope for is for them to describe what I see both visually and emotionally. If some of that does capture the essence of something, good. But I guess I just don't think so much about trying to do that.

Linda: When you take a specific photograph, what conditions lead you to take that picture? Do you have a specific shot in mind that you are searching for? Is it you just roaming around and then finding something and getting that?

The latter. It's rare, or maybe it just doesn't even happen, that I'm looking to take a certain picture. I have a friend, another very good photographer, who has often talked about: putting another book together and he's pulling pictures that he took here and there over the years and then he goes out because he has certain things that he needs to fill in. To me, that's kind of a foreign way to think about it. Basically, for me it's about roaming: I spend untold hours just on the gravel roads in Iowa wondering, maybe not even having any idea where I'm headed. I'll go out and say "lets go north for a while" and then I'll see an intersection and something will make me decide to turn left there. Sometimes I know I'm going somewhere: I need to be at such and such town by tonight, so I'll start heading that direction. but really, I'm out there, to use a fishing analogy, trolling for pictures. I'm not looking for anything. There are certain pictures that "fit" into my classic definition of my Iowa photographs: the kinds of things I'm searching for, the kinds of things that I'm after. My radar is perked and watching for those sorts of things, but at the same time, I might see something completely different that has nothing to do with what I'm presumably looking for, but it interests me: like, "Wow, this is intriguing, I wonder how this will photograph." So I'll photograph those things too. So even while I'm out mostly looking for photographs that can be part of my Iowa project, and make sense in the book of the Iowa work, there will be multiple other things and ideas that I'm experimenting with, playing with also.

Linda: You mentioned the classic Iowa photograph; how would you describe that?

It would be black and white, not color. Certainly, the nighttime shot of the grain elevator along the railroad tracks, black and white. And the old school house with the brown bales of hay behind it, and the road, and basically open flowing fields. Now, there's one of the side of a chicken coop with a kind of dramatic sky. That was actually Kansas, but it certainly could have been Iowa and certainly fits in that category. I guess what I would tend to describe as most of my classical Iowa images, they tend to be—but they're not exclusively—of structures, and they tend to be old and generally speaking, unused

structures. Whether that's a farm house, or a church, or a grain elevator, or a cornfield. But often, it is not just the picture of the structure, but of the structure in its landscape. Sometimes that means that it's a building that's very small in a large landscape, but sometimes not at all. Sometimes it's just a hint of what that landscape really is, but enough of a hint or suggestion that, to me anyway, it is a building in its landscape. You asked a question about what makes me select something and not something else: well, I might, for instance, see this old farmhouse that hasn't been lived in for 25 years. There's a really good chance that I'll hit my brakes when I notice that and back up if I've already started to pass it or just make sure I'm looking at it. But where I stop has a whole lot to do with where and how the farmhouse is situated. And it's both an artistic decision, which you know, also by the way has a whole lot to do with what the light is that day. It may be a house that on another day, with the right light, I would be all over it. But some days the light just doesn't call me, doesn't get me excited to take a photograph of it.

Photograph: David Ottenstein

Linda: Taking a look at the pictures that we have here, I've noticed that there are few during the winter time. What seasons were these taken? Why then?

I have taken a number of pictures of Iowa in the winter when there is lots of snow on the ground and in the winter when it was just sort of down and cold. I think I've been photographing in Iowa every season. I'm wondering right now if I've ever been there in February… maybe not. But I've been there in just about every other month. Early on, my choice of when to come had way less to do with "when is the best time to be in Iowa photographing" than with "When could I get away for 4-8 weeks at a time". After a while, I started to realize how important it would be to be there during all the different seasons. I also discovered that being there around harvest time is really cool. There's so much happening—the big machinery… So i tend to be there a lot during the fall. But, like I said, it's important to see it in all different types of year because you know, when the corn is ten feet high, for one thing, a lot of your views are blocked and there's a lot that you can't see or access. It varies a lot, but I look for that variation.

Linda: Have you ever photographed the same place/area during different seasons to see and mark those

Photograph: David Ottenstein

changes in your work?

David: Yes, there are some places. Grinnell is sort of my base out there, almost like a second home for me. There's a farm outside of Grinnell where I usually stay and I have photographed a lot in that area. There is a spot that I really like in the southern part of Tama County and I go there frequently, and I have photographs of the same thing over and over again in different light; different times of year; different everything. There are a number of places like that. And then, because I'm often based in Grinnell, the counties around there are areas that I travel over and over and over again. So, there are a lot of places that I have photographed repeatedly. Sometimes intentionally, other times not even realizing that I took that before because it just looks so different now. Since I started eleven years ago, so much of what I have photographed isn't there anymore, and sometimes I realize that I'm so familiar with a particular spot that if the barn is gone

next time I go there, I know that. But there are plenty of places that once the structure is gone, and all evidence of it has been removed—which is usually what happens rather fast. There is just so much I don't know; not even enough to realize "Wow, this is that spot!" And then there are times when I'm driving along the road looking at a map and I see the name of some old town that doesn't sound familiar and I don't think I've been there, so I figure I'll head to that town. And then I get there and realize, "Oh! I have been here; I have photographed this"—that happens a lot. There are something like 1000 named towns in the state of Iowa. I could be in a town, or really just out there somewhere and all of a sudden it will come to me: "I remember that building, I sat there in 2007." The more time I spend in Iowa and the more that my subject matter disappears, the harder it is, the more time I might spend driving before I stop to take another picture. That's in part because there's not as much.. There aren't as many of those abandoned buildings and wonderful old relics anymore. But also, because I have photographed so much… Even things that I haven't seen just may not feel "new" or interesting enough for me to stop and photograph.

Linda: Are there any artists whose work you admire, follow and appreciate that you would like to clue our readers into?

David: Yes. David Plowden—I'm envious of him. He's my father's age. He has been photographing in the Midwest (in many of the same places that I've photographed), but he's been doing it since the early 1960s. I'm envious that he's had an opportunity to photograph the landscape of the single-family farm in the Midwest since it was a vital, functioning entity. And he has continued to photograph it in its decline and its demise. I came in kind of late; I missed that point.

And Walker Evans—photographing in the 1930s, 40s and beyond. He had been a professor of photography at Yale, but I got there about 5 years after he died. But his work there had a hard presence and I've just always admired his work.

Linda: What would you say are some of the more unusual experiences that you've had while shooting in the Midwest prairie region, Iowa, or anywhere, really?

There are all kinds of interesting stories that I can tell you. My favorites would have to do not so much with what I'm photographing, but with the people I meet along the way. There's a story I like to tell

I stopped somewhere. I saw a farmstead up on the hill and the hillside with an old fence on it. It was really interesting-looking to me, and I wanted to photograph it. So I went to the farmhouse, knocked on the door and there was nobody there. I was standing in front wondering what to do: "Do I shoot anyway? Do I just move on?" Then, way down the road there was a big pick-up truck coming and I thought: "Maybe it'll pull in here." Sure enough, it did. The guy pulled up, and as is often the case, there was a bit of a rather "rough" quality like, "Can I help you with something?" (*in deep voice*) And I explained; I usually tell people my name; that I'm a photographer from Connecticut; I'm photographing the farm landscape of Iowa. He told me that this was his brother's property, but that I am absolutely welcome to go ahead and photograph; that if his brother came by, just to tell him I said it was okay for you to photograph here. He drove off and I took my pictures. Fifteen or twenty minutes later, he came back because he thought of a barn ten miles away that I might be really interested in photographing. So he went completely out of his way to come back and tell me that. I was very impressed by that. That sort of thing happens frequently.

There's a picture: a nighttime photograph of an ethanol plant. That is an ethanol plant in Iowa Falls. The first time I was there photographing (and that picture is from one of those first sessions), it was late at night when I was there working. I was doing a very long exposure pictures of working with 4x5 film. Anyway, there was a truck driver who was delivering a tank load of the poison that they add to the ethanol so that people won't want to drink it, and it takes quite a while (forty-five minutes—an hour) to pump all of the contents from his tanker truck. While he was hanging out we began talking, and he was interested in photography so I told him about what I was doing. Then I was taking a picture of the plant and you could see against the dark sky that there was a lot of steam, but in my picture, it just wasn't showing up. What I realized I needed was a good, strong, bright light shining onto the steam. I mentioned that to him, and he said: "oh, well I can move my truck. I have this big beam, spotlight-thing on there." I said: "You know, once we do that, it's going to take a while since exposures are long. So he went to ask his wife since they still had about an hour drive home. Anyway, he was all for that. He had to keep moving and maneuvering his truck because the floodlight was designed to face down as opposed to up. He eventually got the floodlight to the ceiling where I wanted it, and it made the photograph work. Again, it's all about the people I encounter and the process.

Photograph: David Ottenstein

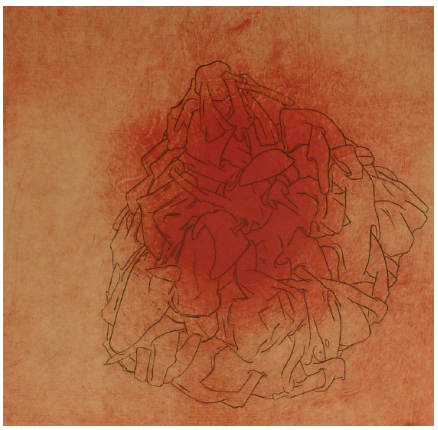
Close-up: Tony Crowley

Photo courtesy of Tony Crowley

Crowley's interest in and work with prairie themes began when, as a faculty member at Grinnell, he became involved in the Center for Prairie Studies. His interest in all things prairie has been a recurring element in his studio practice ever since. Currently a professor of art at Illinois State University, he continues to explore the significance of place in his work while encouraging his students to do the same through assignments and discussions.

Encroachment, 12 x 8, woodcut.
This image was influenced by the gradual transformation of the prairie by settlements, agriculture, etc..

Storm, 8 x 8, engraving and drypoint.
Of course, we are all aware of the power of storms on the prairie and this alludes to that power and chaos, but another underlying theme is the storm of life forms that swarm the prairie and bring to it unending energy and variety.



Germination, 10 x 10, engraving and collagraph.
The process of germination is filled with potential energy and the anticipated bursting forth of life. This image addresses that instant that the process of germination begins.

Transformed, 12 x 8, woodcut.
This woodcut addresses the conclusion of the direction suggested in Encroachment in which the land is given over fully to human intervention.

Photo Courtesy of John Ikerd

John Ikerd is Professor Emeritus of Agricultural Economics, University of Missouri - Columbia. He was raised on a small dairy farm and received his BS, MS, and Ph.D. degrees from the University of Missouri. He worked in private industry for a time and spent thirty years in various professorial positions at four different state universities before retiring in early 2000. Since retiring, he spends most of his time writing and speaking on issues related to sustainability.
• Website

Where is Industrial Agriculture Taking Rural Iowa?*

John Ikerd

I care about rural communities. I have spent my entire life living and working with farmers and others in rural communities. I grew up on a small dairy farm in southwest Missouri. I was fortunate enough to attend the University of Missouri where I received my BS, MS, and PhD degrees in agricultural economics. I spent 30 years as an extension agricultural economist on the faculties of four different Land Grant Universities. I held various titles and positions but always worked with farmers and people in rural communities. After I retired, the college town of Columbia, Missouri eventually became too large to suit me. My wife, Ellen, and I moved to Fairfield, Iowa about three years ago – a town of about 10,000 people. I wanted to spend what time and energy I have left living and working with people in rural communities.

I think Iowa still has more viable rural communities left than most other states. That was one reason I was willing to leave my home state of Missouri for Iowa. I didn't see many vibrant rural communities left in states where I had worked—in North Carolina, Oklahoma, and Georgia. I came back to Missouri in the late 1980s, hoping to find some communities like those I had left behind 20 years before. However, I found the farm financial crisis of the 1980s had pretty much decimated rural Missouri. I spent my last five years at MU working on a grant-funded project with rural communities in North Missouri. When Premium Standard Farms brought their big, concentrated animal feeding operations or CAFOs into North Missouri in the early 1990s, the negative impacts on the quality of life splintered social fabric of the community and pretty much destroyed the hopes of people in that area for rural revitalization.

**Endnotes listed in Appenidx*

During my later years in Missouri, I had several opportunities to visit Iowa. The traditional values of family farming culture seemed to be more deeply rooted in Iowa than in other areas where I had worked. The houses and businesses in rural Iowa still seemed to be well-kept and the small communities still seemed to be "alive" – and hopeful. Iowa had steadfastly rejected the large-scale, confinement animal feeding operations, until growth in hog CAFOs in North Carolina and the incursion of PSF in North Missouri seemed to threaten Iowa's status as the leading hog producing state in the nation. In response, Iowa rolled out the welcome mat for CAFOs, which complemented its chemically-intensive, industrial corn and soybean operations. I guess Iowa farmers felt they had to maintain the proud status of Iowa as the "agricultural state."

That being said, when I moved to Iowa I thought there was, and still think there is, real hope for a rural renaissance in Iowa that could provide new hope for rural communities everywhere. Admittedly, some Iowa communities already look like those further south, but many of Iowa's rural communities are still good places to live. The air and water are still clean, the soil is still fertile, the landscapes are pleasing, the people are friendly, and the economies are still healthy. Good places to live are becoming scarce and more difficult to find, which makes them more economically valuable. To realize this hope for rural renewal, however, Iowans need to understand what has led to the demise of rural communities elsewhere. Iowans need to understand what agricultural industrialization does to rural communities and where industrial agriculture is taking rural Iowa today.

First a bit of history. European settlers established communities primarily for the purpose of extracting economic value from the natural resources located in rural America. Of course Native Americans were already using the land, but their purpose was quite different from what the Europeans had in mind. Natural resources—such as land, minerals, landscapes, and climates—must be utilized, at least initially, in the geographic locations where they exist. So, the settlers traveled west, dispersing themselves across the countryside in relation to the productivity of the natural resources they sought to extract or exploit.

Some early settlements were mining and logging towns. However, the resource that brought settlers to most rural communities was agricultural lands—particularly in places with fertile soil, like Iowa. Distances between early community centers tended to reflect how long it took farmers and ranchers to travel into town to trade their surplus production for necessary supplies. But the size or density of rural populations was determined largely by the number of farmers or ranchers needed to tend the land. Rangelands of the West were sparsely populated, and vegetable growing areas around cities were densely populated. The Midwest was settled by diversified family farmers, which supported a corresponding density of population and size of rural communities.

Historically, non-farm economic activity in rural communities reflected the numbers and sizes of farms and farm families. More farm families supported more schools, churches, doctors, and other providers of social services. As early farmers moved beyond self-sufficiency and began to specialize and trade, communities evolved into economic centers. More farmers means more need for markets, credit, machinery, feed, and fuel. The farms grew larger in size, but also larger in numbers, and farming was still a "way of life"—not just a bottom-line business. Rural communities became places of refuge during the Great Depression of the 1930s, when the number of farms in the U.S. reached an all-time high. Rural communities were still considered good places to live and do business through World War II and the post-war years of the 1950s.

However, the industrial technologies developed for the war effort during World War II were redirected to agriculture, where they brought dramatic changes in American agriculture. Factories that had built tanks were converted to producing farm tractors, munitions plants switched to producing nitrogen fertilizer, and chemical warfare technologies were used to produce agricultural pesticides. These new technologies facilitated the industrialization of agriculture. A farm could now be managed as a bottom-line business rather than a multi-faceted way of life. Agriculture could be transformed into an industry

Contrary to popular belief, industrialization is not

defined by the shift from an agrarian to an urban manufacturing economy and society. Urbanization is but a characteristic of industrialization. The basic strategies of industrialization are specialization, standardization, and consolidation of control. Specialized functions are standardized so various tasks can be routinized and mechanized—as on assembly lines. This simplifies management and allows control to be consolidated into larger organizations to achieve the economic efficiencies of large-scale production." This basic process was first employed in manufacturing, resulting in the assembly of large workforces in urban areas.

The industrialization of agriculture had to wait for new chemical and mechanical technologies that allowed farmers at least to tame, if not standardize, the vagaries of nature. With standardization and mechanization, management and control could be consolidated into larger specialized farming operations—resulting in economies of large-scale agriculture. Industrialization initially resulted in economic benefits in both manufacturing and industry, but both had unanticipated environmental and social consequences. For agriculture, the benefits have been fewer and the costs have been greater, because agriculture doesn't fit the mechanistic model of industrialization. Healthy living ecosystems, such as those on real farms, are inherently diverse, not specialized monocultures. Living things cannot be "standardized," they are self-making, and thus cannot actually be controlled. In agriculture, industrialization inevitably had and still has unintended consequences.

Following World War II, millions of farm families were destined to abandon farming as a "way of life" and transform their farms into industrial enterprises. We see the ecological consequences of this transformation in the pollution of air and water in rural areas with agrochemicals from large monocropping operations and biological wastes from animal factories or CAFOs. The primary economic advantage of industrialization comes from the ability of industrial operations to produce more output with fewer, less-skilled workers and managers. This meant fewer farmers and diminished economic opportunities in farming. We see the social and economic consequences in the demise of small and mid-sized family farms and the social and economic decay of rural communities, which had depended on farm families.

During the late 1950s and early 1960s, farms became fewer and larger, and by 1970, farm numbers in the US had dropped by more than one-half from their peak in the 1930s. The global economic recession of the 1980s caused roughly one-fourth of the remaining farms to go out of business. Since then, the number of farms has continued to decline and average farm size and farming operations have increasingly come under the control of large, agribusiness corporations—through ownership as well as comprehensive contractual arrangements. Farms have been turned into biological factories and agriculture has been turned into an industry.

Some rural communities have survived as agribusiness centers, as the remaining farmers became more reliant on mechanization, markets, and purchased inputs. But, managers of large operation are businesspeople; they buy equipment and farm inputs wherever they are the cheapest, not necessarily in their local communities. In addition, it takes people, not just production, to support communities. It takes people to buy houses, cars, and clothes on Main Street; people to justify local doctors and health care, and people to serve on school boards and city councils. It takes kids to keep the local schools open and to regenerate the population of rural communities.

Some communities attempted to diversify their economies and others abandoned agriculture entirely. Industry hunting became a preoccupation of many small town councils and chambers of commerce. Jobs, any kind at any cost, seemed to be a priority development objective of many declining rural communities. Many of these development activities were rooted in nothing more than short-run exploitation of undervalued human and natural resources in rural areas. The number of "working poor"—workers with full time jobs who live below the poverty line—in rural areas has continued to rise. In addition, many manufacturing companies and branch plants that initially relocated to rural areas eventually have moved to other countries where laborers can be exploited to work even harder for far less money.

The highest valued "economic" use for rural plac-

es has become as dumping grounds for the wastes of an industrial economy. Rural communities compete for "economic opportunities" such as prisons, urban landfills, and toxic waste incinerators. However, many rural communities, including many in Iowa, remain awash in the chemical and biological wastes of an industrial agriculture that no longer supports the local economy or community. Some rural communities dream of opportunities such as tourism, vacation homes, retirement communities, and rural residences. However, prisons, landfills, toxic waste incinerators, and industrial farming operations have destroyed any hope of "quality of life-based" development for many rural areas. This is the sad legacy of industrial agriculture in the South, the West, and increasingly across the Midwest. This is where industrial agriculture is taking rural Iowa. Most rural communities, including many in Iowa, are "places in search of a purpose."

I awakened to what was happening to family farms and rural communities during the farm financial crisis of the 1980s. I was forced to reevaluate what I had been taught and was teaching. The 1970s had been a rare time of prosperity in farming, when many farmers decided to follow the advice of us so-called experts." They decided to "get big" rather than "get out" and borrowed a lot of money at record high interest rates to finance their expansion. Unexpectedly, the booming export markets, which had fueled the farm profitability of the 1970s, collapsed under the weight of the global economic recession in the early 1980s. Many of these new "big farmers" were caught with large debts that they couldn't repay. Farm bankruptcies and foreclosures were regular fare on evening network news programs. Stories of farmers committing suicide were not uncommon. American agriculture was in crisis.

I was head of the Department of Extension Agricultural Economics at the University of Georgia at the time. The responsibility for helping farmers survive the crisis fell upon my department. If we couldn't help farmers find ways to survive, we counseled them to "get out" farming while they still had some equity left—or at least not to commit suicide. In counseling with dozens of farm families, I was forced to conclude that the crisis was not really the fault of farmers who had made bad management decisions, although some obviously had. The farm crisis of the 1980s was an inherent consequence of the industrial system of farming that I and other so-called agricultural experts had been promoting. The only way for some farmers to "get big" was for others to "get out." In other words, some farmers had to fail so others could survive—but only until the next time when it might be their turn to have to "get out" rather than "get big."

Conventional farmers in rural areas today are the survivors of decades of agricultural industrialization, their neighbors having been forced out of business by the relentless economic forces to either get bigger or get out. This is not going to change until the basic approach to agriculture is changed. Regardless of how big today's independent farmers may be, they are not nearly as big as the giant agribusiness corporations that eventually will control the whole of American and global agriculture if the relentless trend toward agricultural industrialization is not stopped. It's time to stop and think about where industrial agriculture is taking us.

Margaret Wheatley, one of the leading thinkers in the U.S. on issues related to institutional and cultural change, recently returned from an extended retreat where she contemplated the major trends shaping U.S. society. She identified three:

1) "A growing sense of impotence and dread about the state of the nation,"
2) "The realization that information doesn't change minds anymore," and
3) "The clarity that the world changes through local communities taking action—that there is no power for change greater than a community taking its future into its own hands."[1]

I agree with Wheatley. First, I think "a growing sense of impotence and dread" accurately describes the prevailing mood about and within rural America today. Fred Kirschenmann of the Leopold Center at Iowa State University has written that the "predominant attitude toward rural communities is that they have no future. In fact, this attitude seems to prevail even within rural communities." He quoted a 1991 survey conducted in

several Midwestern rural communities. The survey revealed that people in most rural towns harbor only two visions for their communities. "One vision sees their town's death as inevitable due to economic decline." The other vision is also of "a dying town" with only a fading hope that "they can keep the town alive by attracting industry." These were the visions I found in the rural areas of the South and increasing in the Midwest. I suspect they are becoming more prevalent even in rural Iowa.

Secondly, I agree that information no longer changes minds, at least not about issues such as global climate change, genetically modified organisms (GMOs). For decades the proponents of industrial agriculture have consistently called for decisions based on "sound science." The bits of research available early on had come from the agricultural colleges—the academic allies of industrial agriculture. Now, a large and growing body of scientific information from highly credible academic institutions provides compelling evidence of the negative ecological, social, and economic impacts that industrial agriculture has had on rural America.

Now that the sound-science has turned against them, the defenders of industrial agriculture have resorted to a multi-million dollar, nationwide propaganda campaign.[2] One public relations initiative alone, *The U.S. Farmers and Ranchers Alliance*, reportedly has an $11 million annual budget pledged by the agricultural establishment, including major commodity organizations and the American Farm Bureau Federation, the USDA (using farmers' check-off funds), and large agribusiness corporations—including $500,000 each annually from Monsanto and DuPont.[3] The campaign appeals to emotions and feelings rather than to factual information.

If Margaret Wheatley and the corporate public relations campaign are correct, as I suspect they are, the destructive forces of industrial agriculture on rural Iowa cannot be reversed by simply making people aware of the facts. However, although I may be an idealist, I believe the truth must ultimately prevail. If Americans are to make "informed" decisions, which I believe ultimately we must, people must be made aware of where industrial agriculture is taking rural communities and where it ultimately will take the rest of America if we do not reverse its destructive course. It's just that information will not bring about the necessary changes in public policies and government regulations until change is demanded by public consensus. It will take time, energy, and commitment to develop the consensus for change—but lasting change must be based on truth.

Rather than cite individuals studies, I have increasingly come to rely on comprehensive studies or broad reviews of research that include many studies. I think these "meta-studies" create the correct impression that our concerns are rooted in a growing scientific consensus. Research regarding the impacts of CAFOs provides a useful example, since CAFOs are the epitome of industrial agriculture, and CAFOS are perhaps the greatest current threat of industrial agriculture to the future of rural Iowa.

For example, A comprehensive assessment supported by a 2008 Pew Charitable Trust report cites more than 200 sources in drawing its conclusions: "The current industrial farm animal production (IFAP, i.e. CAFO) system often poses unacceptable risks to public health, the environment and the welfare of the animals themselves… the negative effects of the IFAP system are too great and the scientific evidence is too strong to ignore. Significant changes must be implemented and must start now."[4] Five years later, a follow-up by the Johns Hopkins School of Public Health concluded that instead of addressing the problems "the Administration and Congress have acted 'regressively' in policymaking on industrial food animal system issues."[5]

A recent comprehensive study and report by the Center for Disease Control and Prevention relies on dozens of studies linking CAFOs to antibiotic resistant bacteria, such as MRSA: "Scientists around the world have provided strong evidence that antibiotic use in food-producing animals can harm public health. Use of antibiotics in food-producing animals allows antibiotic-resistant bacteria to thrive. Resistant bacteria can be transmitted from food-producing animals to humans through the food supply. Resistant bacteria can cause infections in humans. Antibiotics should be used in food-producing animals only under veterinary oversight and only to manage and treat infectious diseases, not to promote growth."[6]

A Canadian study sponsored by the World Society for the Protection of Animals cites numerous studies documenting inhumane treatment of animals in CAFOs: "In the 20th century, intensive agriculture (ILOs i.e. CAFOs), broke the ancient rule that militated in favour of good welfare for farm animals. No longer was it necessary to respect animal nature… Modern agriculture put animals into environments for which they were ill-suited, yet still assure production and profitability. Modern intensive production practices were first criticized on animal welfare grounds in the 1960s. Research in the subsequent 50 years has shown that these criticisms were well-founded."[7]

A 2006 study commissioned by the State of North Dakota Attorney General's Office reviews 56 socioeconomic studies documenting the negative social and economic impacts of CAFOs on rural communities: "We conclude that public concern about the detrimental community impacts of industrialized farming is warranted. This conclusion rests on five decades of government and academic concern with this topic, a concern that… has grown more intense in recent years, as the social and environmental problems associated with large animal confinement operations have become widely recognized. Five decades of social science research which has found detrimental effects of industrialized farming on many indicators of community quality of life, particularly those involving the social fabric of communities."[8] There have been no significant studies since that cast any doubt on these conclusions.

I could provide similar comprehensive reports that include hundreds, probably thousands, of scientific studies that point to similar negative ecological, social, and economic impacts associated with industrial cropping systems, such as the overuse and misuse of fertilizers, pesticides, and genetically engineered crops (GMOs). The evidence indicting industrial agriculture for destruction of the rural environment, rural economies, rural culture, and the quality of rural life is clear and compelling. Margaret Wheatley obviously is right in the case of agriculture and rural communities: *Information no longer changes minds.*

So where is the hope for the future of rural Iowa? The hope is in Wheatley's final observation: *There is no power for change greater than a community taking its future into its own hands.* I believe rural communities should focus their efforts for change on issues of broad public concern, including their own concerns, such as environmental protection, public health, and animal welfare—not because they will succeed in the political arena, but because such issues have the power to change public opinions and attitudes.[9] These issues can be used to promote a wide range of policy initiatives, such as opposing various "right to farm" laws, which exempt industrial agriculture from various regulations and ensure the rights of industrial agriculture to continue to exploit rural areas. In the process of promoting specific issues, communities can form local advocacy groups and join political coalitions with the power to change public opinion.

Industrial agriculture not only affects rural communities, it affects the entire food system and the health and well-being of all Americans.

Local crises, such as threats posed by CAFOs, can bring concerned citizens together around a common cause. I have often said that local organizing in opposition to CAFOs is creating the future leaders of rural America. By focusing on broad public concerns, coalitions can be formed between rural and urban community groups, with support from large nonprofit organizations. Local resistance against the continued destruction brought by industrial agriculture can help build strong communities—both rural and urban. Industrial agriculture not only affects rural communities, it affects the entire food system and the health and well-being of all Americans.

We already see rural and urban communities joining together to replace industrial agriculture with new sustainable food systems. New kinds of farming are emerging to meet the ecological, social, and economic challenges of agricultural industrialization. The

new farmers may call their farms "organic," "ecological," "biological," "holistic," or "biodynamic." Their farming methods may be called "agroecology," "nature farming," or "permaculture." They all fit under the conceptual umbrella of sustainable agriculture. They are meeting the needs of the present without diminishing opportunities for the future.

Unlike industrial producers, these farmers share the values of traditional family farmers. They are committed to caring for the land, caring about their neighbors, and building strong communities, as well as themselves. To them, farming is a way of life, not just a bottom-line business. They market their produce locally, to people with whom they have a trusting relationship. They sell through farmers markets, community supported agriculture organizations, and through multi-farm local food networks. These new farms are good places to work and to raise a family. They are good places to "live around" as well as "live on." They help make rural communities good places to *live* rather than good places to *leave*. While still a small minority of all farms, with the support of caring communities, their numbers are rapidly growing.

Much has been lost, but there are still many vibrant and viable rural communities left in rural Iowa. There are places that still have clean water, clean air, scenic landscapes, and people who care about the land and about each other. These are "quality of life" communities. This is the kind of community my wife and I were seeking when we moved from Missouri to Fairfield, IA. There are still possibilities for vibrant agricultural communities wherever rural people are willing to reject industrial agriculture and create a new approach to agriculture that produces good food while contributing to a desirable quality of rural life. Rural people need not continue to live with the sense of "impotence and dread;" there are positive possibilities for a new and better future.

I agree with Margaret Wheatley, the success of this new vision for rural America and rural Iowa ultimately depends on the *power of community*. Ultimately, people in both rural and urban communities must find the courage to stand up for their basic human rights of self-determination and self-defense, regardless of what our current laws or constitutions may allow. As our forefathers wrote in their Declaration of Independence, whenever people are confronted with situations that "reasonable persons" would find threatening to their basic right of "life, liberty and the pursuit of happiness," they have the right to defend themselves—even if it requires rejecting the laws that fail to "effect their safety and happiness."

There are occasions when individuals must act collectively, as communities, to defend their rights against common threats. Any "reasonable person" or "reasonable community" in rural Iowa now has more than just cause to feel that their safety and happiness are threatened by industrial agriculture. The public health risks of CAFOs are real; they can and have destroyed the health and even lives of individuals within rural communities. MRSA, which clearly is cultured in and spread by CAFOs, now kills more people in the U.S. than AIDS. The air and drinking water clearly is being polluted by chemical and biological wastes from industrial agriculture. In such situations, people have no moral imperative to wait for expert opinions or changes in laws before they rise up and claim their basic human right to defend themselves.

Even as the scientific evidence mounts against them, industrial agriculturists cling to the futile "tobacco defense," claiming the science is still inconclusive. As did the evidence linking tobacco smoking to public health, the scientific evidence against industrial agriculture eventually will become so large that it cannot be denied. It took several decades to change regulation of the tobacco industry, even after the evidence against tobacco use was clear. We need to continue to proclaim the truth, informing the citizenry of the negative impacts of industrial agriculture on the safety and happiness of both rural and urban residents. Eventually, the growing public consensus of concern will become so strong that it simply can no longer be denied.

Even if we lose a few political battles, we will be forming enduring personal relationships within and among communities that can empower rural people to fight the next battle, and the next battle, and with each battle, strengthening our communities and coalitions, until the battle to reclaim the soul of rural Iowa is won.

In the words of Margaret Wheatley, "Having observed [the empowerment] process in so many different communities has led me to eagerly affirm: Whatever the problem, community is the answer." The problem is industrial agriculture, the answer is community.

Photograph: David Ottenstein

Photo Courtesy of Mary Swander

Mary Swander is the Poet Laureate of Iowa and has published in such places as Poetry Magazine, the New York Times Magazine, and The New Yorker. She is the author of 13 books and numerous plays that are touring the country. She lives in an old Amish schoolhouse near Kalona, Iowa.
*Website

Belltower Triptych Part I: Ding Dong

Mary Swander

"You find a school bell, Mary, and I'll make that tower," Joe, the Amish carpenter, told me one day when I met him on my bike on the gravel road that runs between our houses.

The Amish had just had their Fairview School Reunion at my house. They had filled a table with old songbooks, report cards, and photos of the schoolhouse cut from newspapers. One of the photos captured many of the then young neighbors walking up the lane, swinging their lunch buckets. A six-year-old Joe headed toward the steps where the teacher stood pulling the rope of the bell in the tower. Until I saw that photo, I had never known that the schoolhouse where I now live had housed a bell tower. Instantly, I wanted it restored.

And Joe was the guy to do it. But Joe was extremely busy running his own farm and his carpentry business. The Amish rarely say no. They say they'll "think about it". Or they'll ask you to "check back in a couple of months." Or, they'll stall you out by giving you a task that they know is next to impossible to accomplish. Authentic antique school bells are hard to find. I'm sure that Joe figured my pocketbook or patience would soon run out.

First, I tried to find the original bell. One rumor said that the local auctioneer had it in his barn. But he had paid $400.00 for the bell twenty years before. That was way beyond my budget. Another rumor said that the bell was in the museum in town. That was way beyond my control. So, I combed the newspapers for auctions and huddled together with other bidders in the rain and the snow, looking for a school bell. I found dinner bells and hand bells and sleigh bells, but no school bells.

Friends told me about collectors. I made phone

Photo Courtesy of Mary Swander

calls and found church bells and fire station bells, and even a couple of real school bells that were priced three times as high as the auctioneer's. I got on the Internet. I found several moderately priced bells, but the shipping put them beyond reach.

I became discouraged and thought that maybe I would never find the right bell. I drove by Joe's place and waved and smiled, not wanting him to know of my pending defeat.

Then one Sunday afternoon a friend called me from his cell phone. He was on I-80 and had just stopped at a flea market in Des Moines. There he had spied a school bell in good condition for $75.00. I hopped in my car and drove four hours round trip, bought the bell, brought it back to the foundry at home, had it sand-blasted and painted. I pulled into Joe's lane with the rehabbed bell in the back of my car.

"Joe, Joe," I said. "Take a look at this! Isn't it perfect?"

"So, you've found a bell," was all Joe said.

Photograph: David Ottenstein

Photograph: David Ottenstein

Photo Courtesy of Craig Howe

Craig Howe is the founder and Director of the Center for American Indian Research and Native Studies (CAIRNS). He earned a PhD in Architecture and Anthropology from the University of Michigan, then served as Director of the D'Arcy McNickle Center for American Indian History. He also served as Deputy Assistant Director for Cultural Resources at the Smithsonian's National Museum of the American Indian, before teaching in the Graduate Studies Department at Oglala Lakota College.
• Website

Photo Courtesy of Craig Howe

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Traditional Lakota Governance

Craig Howe & Abe Katz

Traditional Lakota belief is that their ancestors emerged onto this earth through a cave in what is now the Black Hills of South Dakota. The descendants of these ancestors are the Titonwans, and they organized themselves into seven oyates, or nations: Oglala, Mniconjou, Sicangu, Oohenunpa, Itazipco, Sihasapa, and Hunkpapa. Today these seven Lakota oyates constitute six federally recognized tribes in the United States and one first nation in Canada.

After their emergence the Titonwans joined the Oceti Sakowin confederacy, which is commonly and incorrectly referred to as "Sioux," as the seventh, and youngest, Council Fire. The four oldest of the six earlier Council Fires, also known as oyates, constitute the Dakota division; the fifth and sixth oldest oyates compose the Nakota division.

What follows describes the governing structures developed by the Lakota oyates and the roles and responsibilities of their socially-sanctioned offices, or positions. Though a discussion of the personal characteristics of individuals who filled these positions is outside the scope of this report, we do believe that the range of their "leadership qualities" would align closely with leaders through time and across the world. In other words, leaders exhibit a shared range of "leadership" traits, regardless of where or when they lived. Governing structures, on the other hand, were and are developed and modified by societies and therefore embody the social and cultural values of societies in time and place. After discussing Lakota governing offices and their functions, we will identify trends in these structures and their implications for those wanting to model modern organizations on traditional Lakota ones.

Traditional Lakota Governance

The basic social unit of Lakota society was a tiyospaye, or extended family. Though a tiyospaye was governed in some sense, the source of authority over its internal interactions was kinship. In this account we will not examine tiyospayes, but rather larger residential communities composed of members of multiple tiyospayes, where true Lakota governing systems are found.

The traditional governing systems of Lakota oyates took several forms depending on the unit and activities involved. Lakota governance was complex and situational. The basic residential community of Lakota society was an otonwahe, similar to a town. But whereas towns today are typically conceived of as stationary, in Lakota society otonwahes were mobile. Regardless of how often they moved or where they were located, each maintained an oceti, or council fire, to signal its independence. Otonwahes featured a certain system of governance when they were located in place, but other systems were temporarily implemented when they moved, convened or were established for specific communal purposes, such as buffalo hunts or ceremonies. Also, when the number of residents of an otonwahe reached a threshold, we believe an additional level or levels of governance were put in place.

When an otonwahe was situated at a site, it typically had four types of governing offices. At the highest level was an omniciye, or council of men. One member of the omniciye was the itancan, or leader, whom the omniciye chose. The itancan, in turn, delegated much of the day-to-day governing of the otonwahe to a circle of advisors, each called a wakiconza. The fourth governing office of a stationary otonwahe was also a group of men. These akicitas, or marshals, enforced compliance both with Lakota social mores and with the explicit policies of the other governing offices. Residential communities with enough residents to constitute an otonwahe would have had these four governing offices. The following paragraphs provide a fuller description of each of these four types of office.

Omniciye. The decision-making authority within an otonwahe was placed in the hands of a council of respected men. Not limited by a specified number, nor inclusive of all eligible members, this group of men, the omniciye, tended to consist of older and respected men residing in the otonwahe. Admittance to the omniciye was by consent of sitting councilmen. The omniciye convened regularly around the otonwahe's oceti, in a central meeting lodge where it deliberated on matters of public interest, determined its relations with other otonwahes, ruled on disputes between the otonwahe's residents, and decided where and when to move the otonwahe. One of its key decisions, which occurred infrequently, was to choose from among its members a leader of the otonwahe.

Itancan. The itancan occupied the catku, or position of honor, in the omniciye meeting lodge, and it was the invitation by his fellow members of the omniciye to sit there that signaled his promotion to this office. He was the leader of the omniciye, and therefore of the otonwahe. Once appointed, he generally held this office for life, although the omniciye reserved the power to depose him. The role was usually, but not always, assigned hereditarily, passing from father to son. A man whose accomplishments were sufficiently impressive, though, could win the endorsement of the omniciye and earn this position. The itancan was the executive of the otonwahe, working to realize the omniciye's resolutions, appointing akicitas to enforce these decisions, and leading the otonwahe's larger military campaigns.

Wakiconza. Ideally, an otonwahe would have had four wakiconzas selected by the omniciye. Any man residing in the otonwahe, including members of the omniciye, could fill the role of wakiconza. During a wakiconza's one-year term, however, any other governing roles he may have had were suspended. During the day-to-day governance of the otonwahe, the wakiconzas mediated disputes among the residents of the otonwahe as well as between the people and the leaders, represented the decisions of the omniciye, refereed games among the people, and provided advice to the itancan. They were considered hunka, or relative, to everyone residing in the otonwahe.

Akicita. The akicitas in an otonwahe were a police force of sorts. Appointed individually or as members of an okolakiciye, or society, these public servants enforced otonwahe policies and social mores. Even the omniciye, the itancan, and the wakiconzas were not exempt from the judgment and sentences of the akicitas. Different groups of men would serve as akicitas over the course of a year and during more specific otonwahe functions. The lead akicita was the eyapaha, or crier in the otonwahe. He was charged with announcing policies, moves, summons before the governing bodies, general news, and also with maintaining the otonwahe's oceti. While akicitas could be called into this compulsory service by governing officials for a variety of purposes, the charge of akicitas was consistent: to enforce the authority of their appointers.

The above descriptions provide an outline for the day-to-day governance of a civil, stationary, Lakota otonwahe. Different structures governed the otonwahe during special times. Two such instances were when an otonwahe was moving from one site to another and during the wanasapi, or communal buffalo chase.

Moving the Otonwahe

Throughout the year, for various reasons, otonwahes moved en masse. As a community, all of the residents, all together, moved their otonwahe. The decision to move an otonwahe was made deliberatively by the omniciye, but the move itself was conducted under the exclusive authority of the wakiconzas. They alone decided when the tipis should be taken down, how far to travel, when and where to rest during the day to separate the journey into four equal segments, and when and where to erect tipis again at the end of the day. They decided whether the existing akicitas would police the move, or to appoint new akicitas for this purpose. In addition to compelling compliance with the pace and direction of the move, these akicitas scouted for game to feed the otonwahe residents, and for enemies from which to protect the residents. When the move was completed, oversight of the otonwahe transferred from the wakiconzas back to the omniciye, and authority reverted from exclusive to consultative.

H*unting Buffalo Communally (Wanasapi)* An otonwahe, either independently or in collaboration with one or more other otonwahes, conducted a wanasapi in order to efficiently and collectively obtain meat for its residents. In many instances, a wicasa wakan, or medicine man, performed rituals to discern a probable location of a herd of buffalo. Whether by this or some other process, once a herd was located, the omniciye decided when to hunt, how long to hunt, whether to invite neighboring otonwahes, and other logistical concerns. During the hunt, governing authority shifted from the omniciye to the wakiconzas, and changed from a consensual model to an exclusive model. The akicitas policed the hunters and enforced the wakiconzas' decisions. After a successful hunt, any surplus meat was apportioned by the wakiconzas, who advised whether the hunt was complete or was to continue for more meat. Once sufficient meat had been accumulated, the authority of the wakiconzas ended, and the omniciye resumed its day-to-day consultative authority.

Moving the otonwahe and hunting buffalo communally were two civil functions of the otonwahe that required a significant change in the day-to-day governing system. During these operations, the margin for error was dramatically reduced. In the first case, all of the otonwahe residents were exposed and therefore vulnerable to outside forces. In the latter case, all of the residents were depending on the hunt for meat to cure and store for times of scarcity. In both cases, authority shifted from the omniciye to the wakiconzas, and it changed from consensual to exclusive. Thus, during these critical times we see a change in who had authority as well as a change in the nature of that authority.

Another governmental shift occurred when many otonwahes convened, typically in the summer, for any number of purposes, including tribal deliberations, appointment to tribal offices, and preparation for pubic ceremonies. Even though a resulting otonwahe tanka, similar to a city, coalesced for a relatively brief period of time, it nevertheless faced unique challenges, one of which was maintaining social unity among its residents—and by extension, their tiyospayes.

Integral components of Lakota social order that mitigated this potential disunity were okolakiciyes, or societies, that cross-cut social units as well as residen-

tial communities. Because their memberships were drawn from across different tiyospayes and otonwahes, okolakiciyes inherently promoted integration among the residents of an otonwahe tanka. It is not surprising, therefore, that okolakiciyes assumed decision-making authority at all levels of governance in an otonwahe tanka. The following paragraphs briefly describe three of these okolakiciyes.

Naca. The decision-making authority in otonwahe tankas rested with one of a select set of okolakiciyes, or societies. For purposes of this report, we call a member of any of these societies a "naca." Whereas each of the men in a day-to-day omniciye may have been affiliated with a different okolakiciye, the nacas governing an otonwahe tanka all belonged to the same okolakiciye. The nacas convened regularly around the otonwahe tanka's oceti in a central meeting lodge where it deliberated on matters of national interest. One of its key decisions was to appoint wicasa yatapikas.

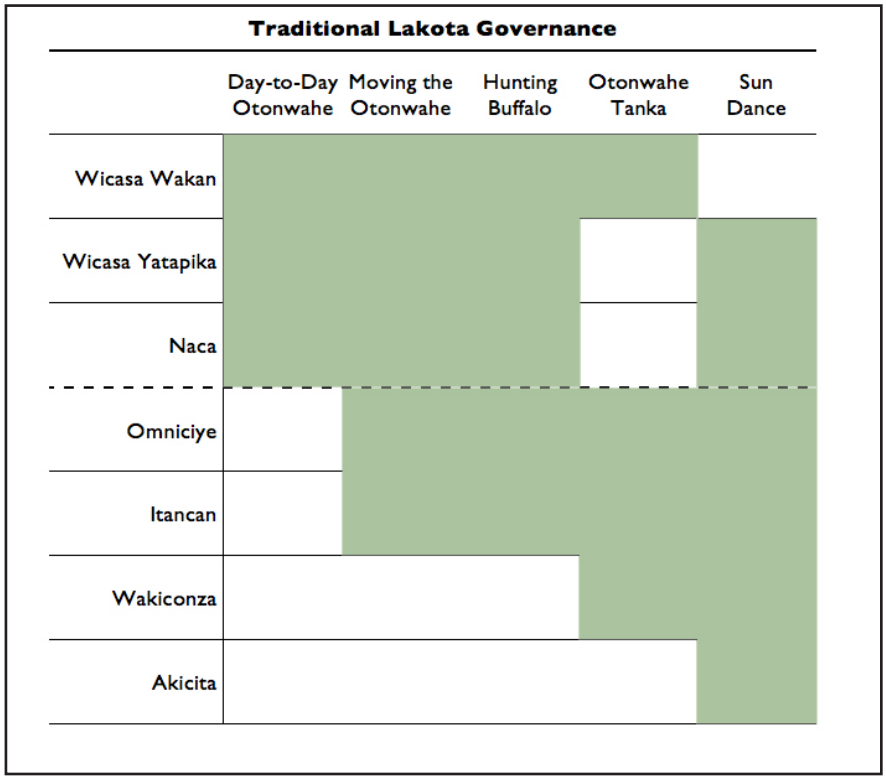
Wicasa Yatapika. The nacas chose four men for this special office. During large gatherings, these four wicasa yatapikas, or shirt-wearers, assumed a position of prestige. They tended to be younger and to have distinguished themselves in battle. They were guardians of the entire oyate, or nation, both literally and figuratively. As such, they were referred to as "praiseworthy men." Their office was denoted by a shirt fringed with hair, which the people considered "owned by the tribe." As was the case with an itancan, a wicasa yatapika held the title for life, although the nacas could depose him. Unlike an itancan, though, this office was not hereditary.

Wicasa Wakan. The role of wicasa wakan, or holy man, was conferred by the spirits. His authority was understood to come from direct communications with Wakan Tanka. He was relied upon for intelligence on the whereabouts of buffalo and to foretell the success of a war campaign, among many other things. Similar to a naca, a wicasa wakan belonged to one of a select set of okolakiciyes. During a Sun Dance the governing authority of the otonwahe tanka shifted from the nacas to the wicasa wakan. Then, at the end of the ceremony the authority of the wicasa wakan ended.

When the purpose was fulfilled for which an otonwahe tanka coalesced, then the otonwahe tanka devolved into a number of otonwahes. Under the authority of their wakiconzas, these otonwahes set off for distant places. Upon arrival there, the governing authority of each would shift from its wakiconzas to its omniciye. The different otonwahes would thereby resume their day-to-day organizational structures once again. The table below exhibits what offices govern the different situations we have examined. The empty cells indicate governing authority. Shaded cells do not indicate the absence of this office but rather the absence of its governing authority.

Principles of Lakota Governance

A critical characteristic of traditional Lakota governance is its complexity. From the information presented above we can abstract the following principles of Lakota governance.



Shifts in traditional Lakota governance structures over time.

There is a set of governing systems from which to choose. There is no fixed, unitary system of authority applicable throughout the course of a typical annual cycle. While all of the civil systems share the similarities of a council, its leader, and enforcers, the order and nature of their authority varies. Complementary systems of governance are substituted seamlessly in predictable ways to meet the needs of specific situations.

The day-to-day system relies on deliberation, consensus, and delegation. Decisions are resolved after careful consideration and discussion. It is very rare that the decision-making and the execution of decisions are done by the same office. It is similarly rare that the office carrying out a decision acts alone. Rather, it delegates to a small group of lead deputies or implementers, who in turn appoint their own enforcers to ensure the policy's implementation.

At critical times, a system of exclusive authority emerges. When a situation has a narrow margin for error, all decision-making shifts to a small and select group whose authority is unimpeachable and whose decisions are unquestionable. Such times are finite in duration, and upon their conclusion decision-making reverts to a deliberative and consensual model.

During large gatherings, subgroups that cross lines of difference cohere the assembly. Participants in a large assembly are also members of subgroups according to their affinities and skills. These subgroups cross-cut normal organizations and contribute to the unity of the assembly. Some of these subgroups even play governing roles over the assembly, ensuring that the interests of all those gathered are put before the interests of any single constituent. Through all we have examined so far, a critical characteristic of traditional Lakota governance is its complexity. We will discuss the implications of these principles—and complexity above all—presently.

Implications for Organizations

The Lakota identity of a corporation is not determined by the membership of its board or staff, where the corporation is located, or whom the corporation serves. Modern corporations staffed by Lakotas, located within Lakota lands, and serving Lakota people are not necessarily "Lakota." For example, a United States Post Office staffed by citizens of the Oglala Sioux Tribe (OST), located in the town of Pine Ridge, and serving residents of that town and the surrounding area, is not a Lakota organization. A school staffed by OST citizens, located in Pine Ridge Reservation, and serving citizens of the OST, is not necessarily a Lakota organization. Lakota-ness is more complicated than the demographic characteristics of staffs and constituencies, or the spatial location of facilities; in other words, it is more complex than biological background or spatial coordinates.

The following recommendations, then, may be applied to any organization seeking to develop an institutional identity that is Lakota. Our study is not normative, neither arguing for or against the efficacy of traditional Lakota governance, but rather descriptive. In other words, we are not advocating the adoption of these principals categorically. While they were written first for nonprofit corporations, they should be readily adaptable to any organizational structure. In the rich discussion of what it means to "be Lakota" that exists among Lakota communities and in entities that work with Lakota communities, the majority of the arguments revolve around language revitalization and land retention. This study of governance design is a different contribution to the discussion of Lakota identity.

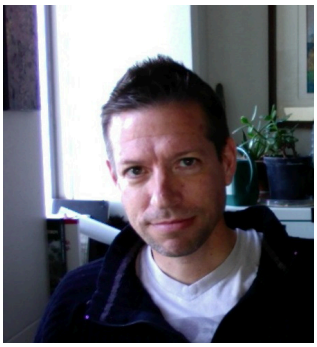
Two strategies for implementing the principles discussed above into a nonprofit corporation are through its Articles of Incorporation and its Bylaws. The former includes basic information mandated by state or tribal statute. With regard to the State of South Dakota, this information includes the entity's name, its period of existence, its purpose, whether or not it has members and how classes of these members are defined, the method of appointing directors, the provisions for regulating

internal affairs, the number and names of its board of directors, and the names and addresses of its incorporators. Of these articles, those dealing with members, classes of members, the appointment of directors, and the regulation of internal affairs are the most readily adaptable to the principles of Lakota governance.

There are even more strategic possibilities in the corporation's Bylaws. These documents are created by a corporation for governing itself and do not require specific criteria. Bylaws therefore are the best place for a corporation to more fully align itself with the principles of Lakota governance. As such, the corporation is like an otonwahe. This means that the *entity* is Lakota, rather than its members, the people with whom it interacts, or its location. People will come and go, and the corporation must remain Lakota regardless of who runs it.

Finally, the most fundamental principle of Lakota governance may be its complexity. There is no single manifestation of Lakota governance, and therefore no one "authentic" or "traditional" model of a Lakota corporation. Corporations that strive to identify themselves as Lakota will have to think critically and creatively about how to incorporate the principles of Lakota governance articulated above into their organizational documents, and thereby their day-to-day operations. And when they do, then they rightfully can call themselves a "Lakota corporation."

Photos Courtesy of Lisa Schulte-Moore



This essay is based on Drake Larsen's Master's thesis at Iowa State University. After working for many years with the Practical Farmers of Iowa on agricultural policy and communications, Drake is now applying his knowledge to the land as a farmer in Ontario, Canada. Drs. Lisa Schulte and John Tyndall are associate professors of, respectively, landscape ecology and natural resource economics at Iowa State University.

• *Website*

How Should Iowa's Agricultural Landscape Look?

Drake Larsen, Lisa A. Schulte & John Tyndall

Twenty-five years from now, what will fertile agricult rural landscapes of today look like? What benefits will they provide to the people who rely on them? And, if people want something different, how might they craft the landscapes they prefer?

These were the questions that underlay the creation of the six photorealistic landscapes we share with you here. We used these images as a tool to enhance communication with diverse agricultural and environmental stakeholders about the management of rural Iowa. Previous studies have shown that visualization can be a useful tool for this kind of engagement; they help set a level playing field for discussion, whereby miscommunications commonly associated with complex information are minimized and divergent interpretations can be more openly conveyed. Additionally, such images can evoke deeper elements of human consciousness than words do alone.

The photorealistic landscape images combine art and science. They are similar to one another in that they all depict the same place: a hypothetical Iowa landscape, 66.4 hectares in size, and bisected by a stream. The environmental template for each half is typical of two of Iowa's primary landforms: the Des Moines Lobe on the right and the Southern Iowa Driftplain on the left. Scenarios differ, however, in the amount of perennial vegetation depicted, with the percentage increasing according to a base-2 logarithmic scale (i.e., two percent, four percent, eight percent, 16 percent, 32 percent, and 64 percent perennial cover). Land management strategies portrayed were established by four natural resource professionals—an agronomist, an ecologist, an economist, and an engineer—in a single planning session facilitated by the lead author. The professionals prescribed

management for each of six scenarios based on template topographic, soil, and hydrological conditions and potential perennial-based agricultural practices, including bioenergy plantings, constructed wetlands, prairie strips, rotational grazing, and variable-width riparian buffers. The images were created using Visual Nature Studio 3 (3d Nature, LLC) software.

Accompanying each of the photorealistic images are quotes representing the depth and diversity of responses from our interviewees. We gathered these quotes from structured, in-depth interviews with 37 stakeholders between June and December 2010. Participants were asked to sort the images from "the landscape that would provide the fewest to the greatest benefits." The term "benefits" was intentionally undefined to allow participants the freedom to define topics without a large degree of influence or preface from the interviewer. Participants were then asked to list and describe the benefits they had in mind when performing the sort, and were asked to describe specific features that led them to believe these benefits were, or were not, being provided. The interview concluded with a question about balancing the output of agricultural products with other benefits.

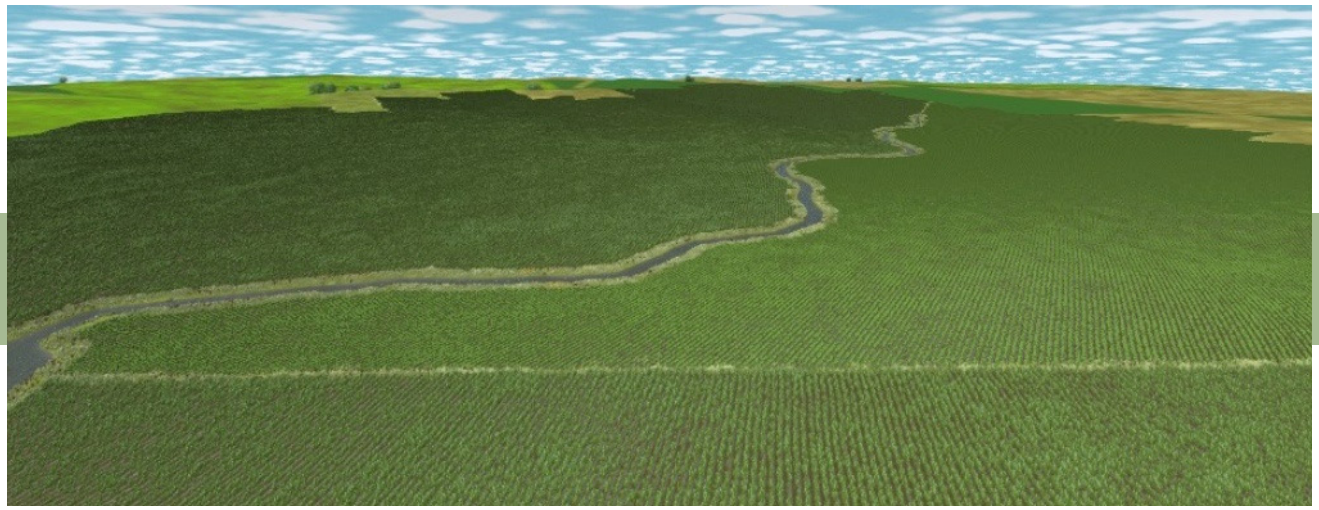
Overall the interviews generated vivid and specific descriptions of expected benefits associated with agricultural landscapes, likely due in large part to the photo elicitation. Many individuals accepted the scenario images as a real place, and accordingly the responses became more personal in nature. This attachment suggests that the images allowed participants to start interviews "on the same page" and provided them a better understanding of some of the spatial and biophysical aspects of the scenarios, which would be difficult to convey in a text-based depiction alone. The benefits and associated values expressed by interviewees were always seen as being dependent on the specific ecological and socioeconomic context at hand.

The benefits from agriculture were commonly divided by participants into two general categories, environmental and economic, with many participants asking for clarification when prompted to provide benefits; "are you asking for environmental or economic benefits?" While the answer to that inquiry was consistently "any and all benefits to you," given this distinction, the theme of economics took on a much greater role in some interviewees than others, as reflected in the accompanying quotes.

The number and type of benefits associated with each scenarios differed among individuals, and the aesthetic value of a place was dependent on an individual's expectations for a landscape. For example, row-crop farmers expressed a higher number of benefits associated with landscapes with lower percentages of perennials and described them as pleasing; farmers with livestock generally voiced the opposite. Aesthetically pleasing landscapes that could provide recreation and tourism opportunities were frequently described as being an essential part of thriving rural communities and rural development.

Benefits related to water and soil were the most frequently mentioned and were highly favored by a wide range of stakeholders. Specific benefits included fresh drinking water, water bodies for recreation, habitat for aquatic wildlife, regulation of hydrology for flood mitigation, reduced water runoff, prevention of infield water erosion, maintenance of nutrient cycles, long-term maintenance of soil fertility, and carbon sequestration. Water was viewed as being most important for three reasons: 1) water was described as being essential for life; 2) water quality was described as being an indica tor of greater agroecosystem "health", and 3) clean water was foundational to many other benefits (e.g., aesthetic and spiritual benefits, tourism and recreation, and livestock production).

We posit that agriculture worldwide is at a pivotal stage in terms of integrating 20th Century production norms with 21st Century societal demand for sustainability and enhanced quality of life. As the depth of commentary suggests, these images allowed us to have a broad conversation about agricultural land use *and* complex outcomes that otherwise couldn't have happened: our discussion with stakeholders in Iowa went beyond food, feed, fiber, and fuel to include the additionally important topics of water, wildlife, and wonder. Which landscape do you prefer?

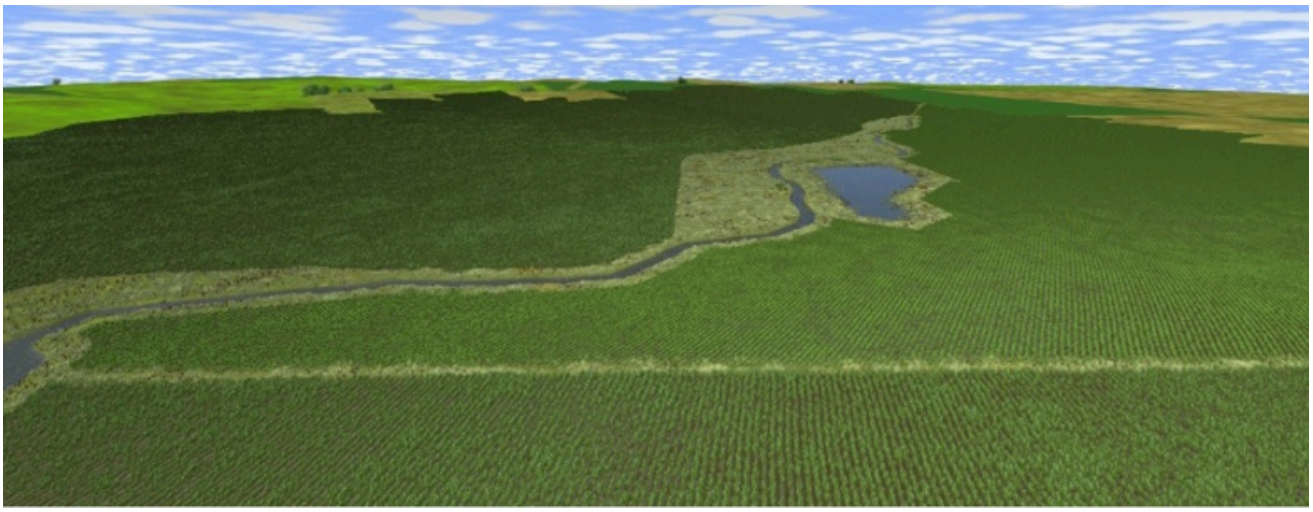


"I hate to say it but it is pretty much...there are no environmental benefits. "

"Unfortunately we tend to see more and more of this, 95-plus percent of the land is in agricultural production, this is what we see across the landscape in Iowa…we put a lot of demands on the resources here."

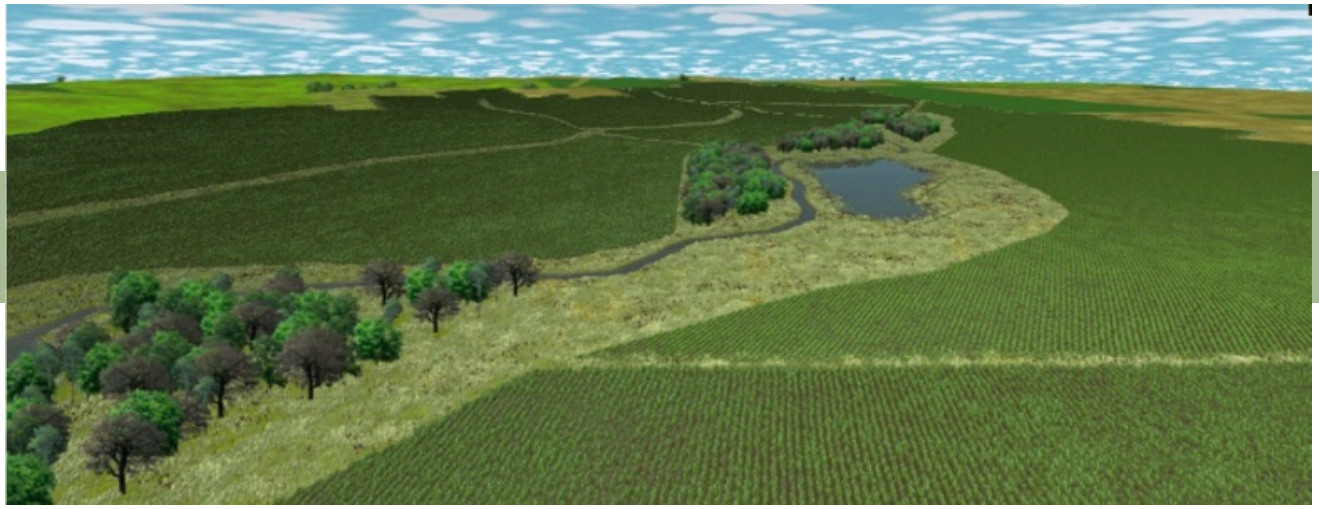
"I don't consider this to be sustainable. Remember we have only been doing this corn bean rotation for the last 40 years or so, it hasn't always been like that."

"That is what we have today. And it is practical to farm. If there were terraces in that picture I would be happier."



"The buffer strip is probably … and the wetland is, from an economist['s] perspective, unproductive land. So unless you can generate some revenue off of that in some way…"

"I have read some of the research so I know where some of the numbers are, and the 10 percent is [what's needed], if [perennial conservation practices] are targeted."



"This would be best, with the tree and the buffer, [this] is far less intense now than what is going on in a lot of areas today. But it is still in pretty intense agriculture too…[this] would be the best."

"This would probably be a compromise…it is in perennials but it is being used, because you got cattle, some place you will have hay land that is going to be cropped and things like that, so it's not like it's not productive agricultural land, it is just a different crop."

"I prefer this one, fewer brush and trees. [This] is a landscape that has not been appreciated much in Iowa is the open country grassland landscape; grass and wildlife, and soil quality would be a better in this system. I think it is better soil tilth, better soil quality. Those are the things I care about the most: soil, water and wildlife."*

"Not in my world, I am not a hunter or fisherman. I don't take time to recreate...[I] would be cutting trees along the ditch here to get rid of them."

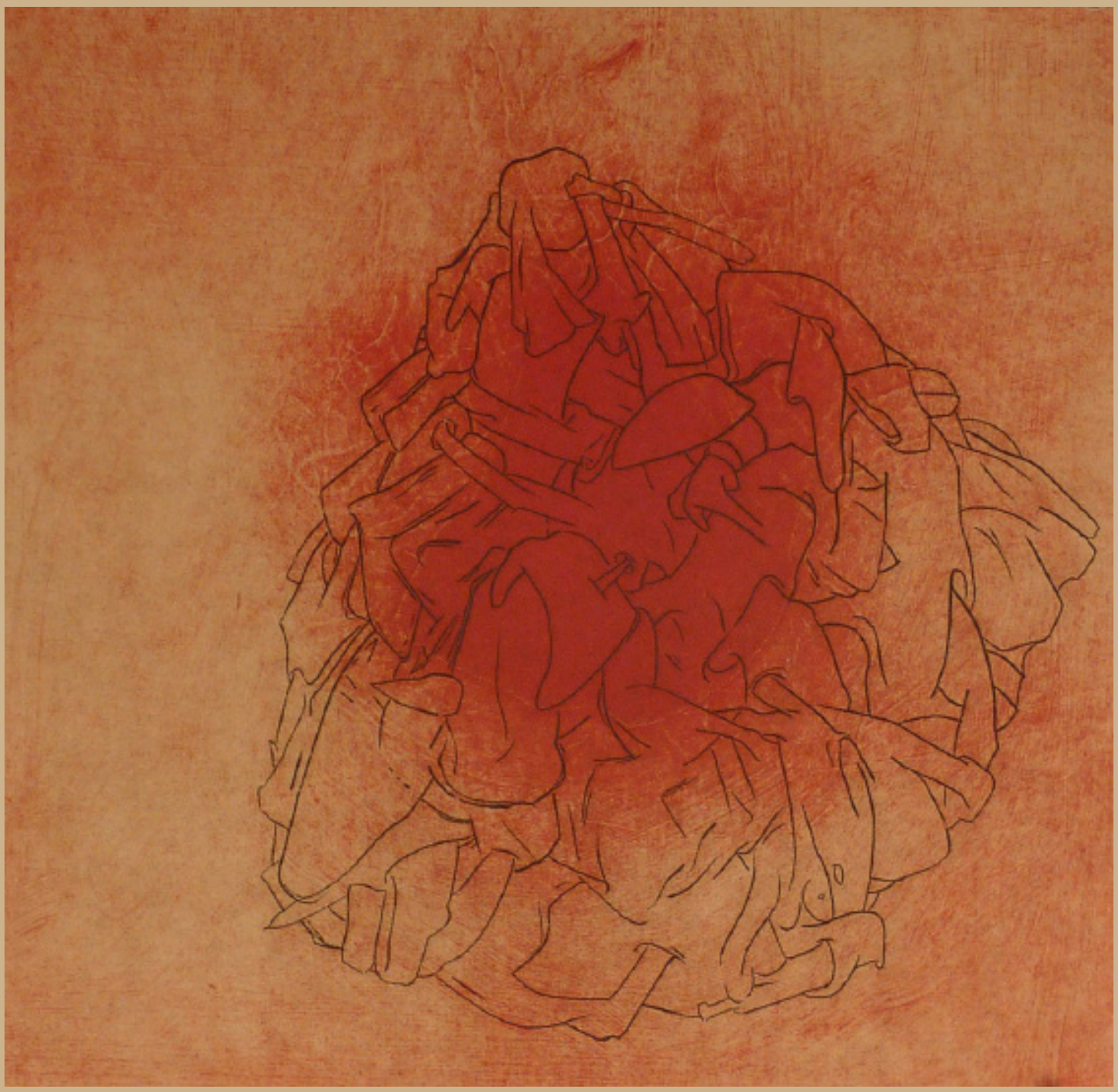
"This is where I'd build my house."

"Small plots, large amount of land that generates no revenue or is in crops that have over time. People have gone broke trying to do this, like cattle production."

"I certainly see something like this in the future."

"I might enjoy it, but it may not pay the mortgage."

*suitability for planting or growing a crop



Germination, *Tony Crowley, 10 x 10, woodcut.*

Storm, *Tony Crowley, 8 x 8, woodcut.*

Belltower Triptych
Part II: Which Way the Wind Blows

Mary Swander

The bell tower rose up into the air over the entryway of my old Amish schoolhouse. Joe, the Amish carpenter who had restored this part of my home, stood on a ladder resting against the eaves. Melvin, Joe's twelve year old son, sat on the roof's peak, a chain wrapped around one of the beams. The other end of the chain was hooked to the bell tower, and then slowly, Joe and Melvin winched the structure into place.

Half the neighborhood had gathered in my front yard to witness the event, unfolding their lawn chairs. Amish women held babies on their laps. Picnic baskets rested on the ground and toddlers ran through the grass with sandwiches in hand.

"Joe," I called up. "Do you mind if I get a picture of this? I'll just shoot the bell tower." The Amish observe the biblical ban on "graven images," including photographs of their faces. I might take a picture of their horse and buggy, but I've always been careful not to violate their religion or privacy with my camera.

"Take whatever pictures you want," Joe said. "As long as you don't publish them in the newspaper."

I snapped another shot of the men bolting down the bell tower to the roof, then ducked inside to carry on with my work at my computer desk.

A half an hour later Melvin appeared at the screen door as if he were a page at the royal court.

"We are about to place the bell in the tower," he announced.

I jumped out of my seat, ran outside and steadied my camera. Joe picked up the thirty-pound bell with one hand and placed it on its hook in the tower. Then he began boring a hole through my roof with his air-powered drill. Back inside the house, I returned to my computer while Joe and Melvin threaded the rope down through the ceiling to its old resting place near the front door.

Father and son returned to the roof.

I answered a handful of e-mails.

"We are about to place the weather… vane on top of the bell tower," Melvin said from the porch.

I raced back outside just in time to see Joe fit the parts of the weather vane together and slip them on top of the pole peaking out of the top of the tower. Now the job was complete. I stepped back and clicked the shutter again and again, taking in different views of my house. My camera was full, so I returned to my computer to download the pictures.

"The wind is coming from the northwest," Melvin called.

Outside, the little brass rooster spun between the letters N and W.

What a great job, a beautiful project, I thought to myself back at my desk, wondering what I was doing inside anyway on a day like this, head down, typing away at my computer, trying to connect to the world through wi-fi, when other much more important connections were being made. After all, according to Melvin, the wind was now shifting to the northeast.

Photo Courtesy of Mary Swander

Photo: Nick Chill

Kayla Koether grew up rotationally grazing cattle and sheep on her family's 5th generation farm in Northeast Iowa's driftless region. Her parents' and grandparents' strong conservation ethic fostered her passions in sustainable agriculture and led her to create an independent major, International Agriculture and Rural Development, at Grinnell College. Her contribution to Rootstalk is part of her 2012 senior thesis research guided by Professors Jon Andelson and Kathy Jacobson. Kayla has taught gardening and nutrition in public schools as an AmeriCorps member with the Northeast Iowa Food and Fitness Initiative, and currently works at the non-profit Winneshiek Energy District helping farmers reduce their carbon footprints and adopt renewable energy. She and her partner, Landon Corlett, plan to start a rotational grazing operation in 2016 and research the effects on soil health and biodiversity.

• *Website*

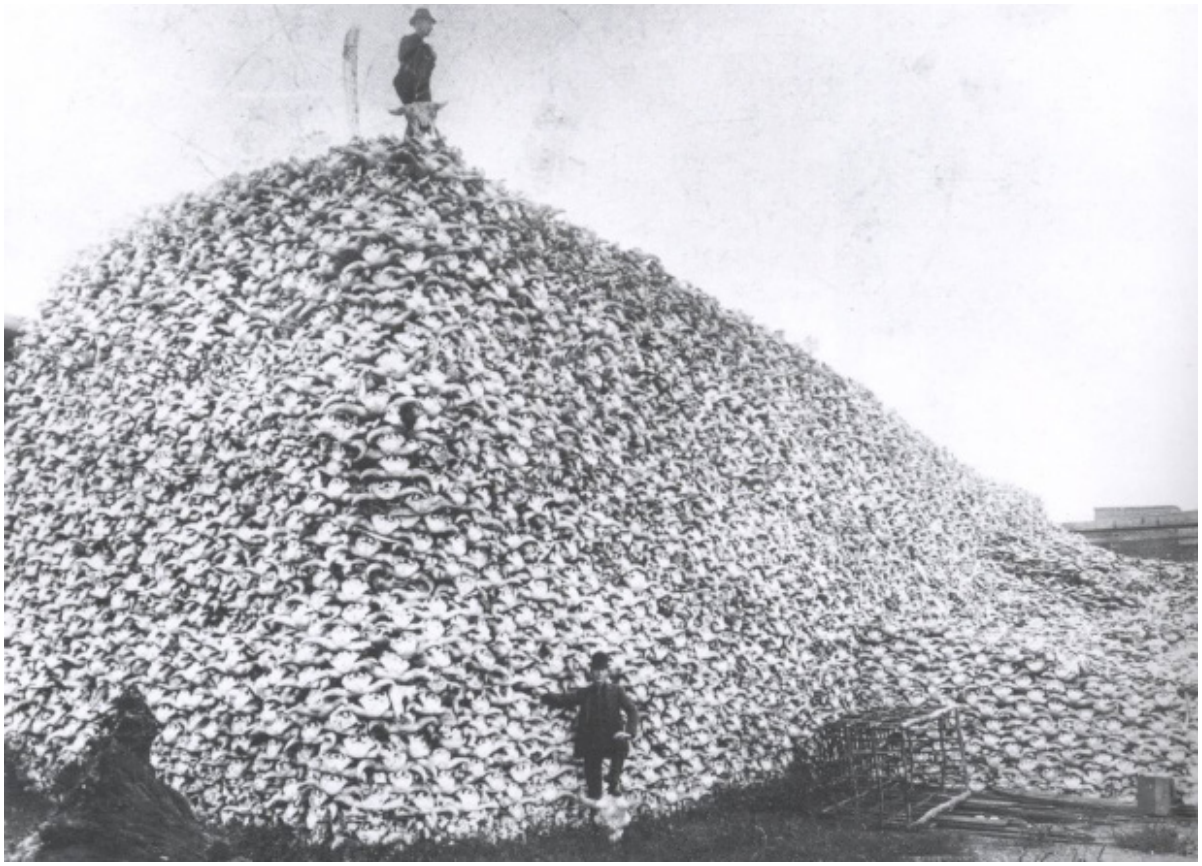
Iowa's Bison: Wild Animals in a Domesticated Landscape*

Kayla Koether

Less than 150 years ago the bison of the North American Great Plains were nearly wiped out by European-Americans pushing west. Scholars estimate that prior to their near extinction the North American bison herd numbered somewhere between 30 and 75 million animals.[1] Bison were a keystone herbivore on the prairie; through grazing, wallowing, and depositing nutrients they acted as an important source of disturbance, contributing to habitat and species diversity.[2] They were not only crucial to the prairie ecosystem, but also to the Native cultures that relied on them for food, shelter, and materials. For the latter reason, in the second half of the nineteenth century the U.S. government actively promoted the slaughter of bison, a policy intended to exterminate Native Americans and their way of life. Drought, habitat destruction, competition from exotic species, and introduced diseases also contributed to the bison population's sharp decline.[3] By the time preservationists focused their attention on the buffalo, little remained of the species or their habitat and bison "had become an imprisoned, domesticated species maintained only by the constant intervention of human keepers."[4] In 1889, North American bison numbered only 1,091, of which 635 were running wild and unprotected;[5] the wild population further declined to 325 in 1908.[6] Since then, through the efforts of private individuals and the government, bison numbers have slowly been building up again. By 1914, the American Bison Society counted 3,788 'North American Bison of pure blood' in its census, a near 100 percent increase from 1908.[7]

Today, the bison population has grown to an estimated 500,000 animals living in North America. Most are raised by private owners; less than 30,000 are in public herds, and of those less than 5,000 are free-roaming,

*Endnotes listed in Appenidx



Euro-Americans killed bison in large numbers, using their meat, hides, and bones for various purposes. However, bison were also hunted purely for sport and to reduce their availability to the Plains Indians. This undated photograph of a pile of bison bones, almost certainly from the late nineteenth century, was taken at the Michigan Carbon Works in Detroit, Michigan, by J. Klima. The original is held by the Detroit Public Library.

unimpeded by fences.[8,9] Like the prairie itself, bison exist in mismatched patchworks, tended by a diverse array of human managers. Most bison in the United States now occupy the western plains, where less-fertile land has remained unplowed. Of the bison in private herds, over half are concentrated in South Dakota, Montana, and North Dakota.

Many people are surprised to learn that bison can now be found again in Iowa, a state more transformed from its pre-European character than any other in the U.S. Prior to settlement, Iowa was blanketed by 28.6 million acres of expansive tall-grass prairie.[10] Today, cultivated cropland alone covers 26.3 million acres of the state.[11] The industrial farmscape, divided into precise squares, is intensively cultivated with modern machinery to generate countless rows of corn and soybeans. In addition, 6.2 million cattle, 20.5 million pigs, and 64.8 million chickens now inhabit the state.[12] Bison's return to Iowa thus juxtaposes a wild, native animal with an aggressively manipulated terrain. How, I wondered, do bison fit into Iowa's modern agro-industrial landscape? To delve into that question I travelled around Iowa during the fall of 2011 interviewing the managers of ten bison herds.

All of the managers grew up or currently live on farms but have diverse approaches to managing bison. (To protect the anonymity of interviewees the names in this account are pseudonyms.) Diane[13] manages a 91-member herd at a federal wildlife refuge, and Darci[14] cares for seventeen bison at a tribal refuge. The remaining managers own private herds. Doug and Connie[15], a middle-aged couple, have a herd of 230. Dave, his wife

Sarah, and his adult son Jake[16] manage a herd numbering 300 on their native and reconstructed prairie. Lee[17], in his 80's and respected by other managers for his many years of experience, manages 64 bison. Lon[18] keeps careful watch over his 50-member herd and is proud to share his childhood passion for bison with his six-year-old daughter. Others have 25 or fewer bison. Brothers Tim and Will[19] milk cows and raise organic livestock and crops in addition to their bison herd, and Mark[20] mainly has crops and other livestock--bison are not his main enterprise. Art[21], at age 78, enjoys his bison and his Hereford cattle, and opens his herd to the public for tours and hunts. Frank and Deb[22] both work full-time off the farm, and in their interview said that raising bison is their hobby.

As I conducted interviews, I soon found I was dealing with a unique breed—and I don't just mean the animals. I encountered dedicated managers who are deeply passionate about bison. I found that bison do still fit into Iowa's landscape, in the niches carved out and preserved from conventional agricultural techniques and industrial mind-sets. They survive in the state due to a unique system that crosses wildlife management with alternative agriculture and takes a 'nature knows best' tactic; such a system exists not only because managers respect bison's prairie origins, but also because bison's inherent traits make them incompatible with industrial agriculture. These surprising attributes— their strength and speed, social interactions, ruggedness, and biology—have captured managers' imagination and respect. In what follows I report what I learned from these men and women about the habits of bison and how they fit into the Iowan landscape. Here, managers impart their intimate knowledge of Iowa's bison and tell a tale or two as well.

You Can't Outrun One

Bison are particularly striking and admirable for their size, speed, and agility. While cows can weigh anywhere between 700 and 1,300 pounds, fully developed bulls can reach 2000 pounds.[23] Lee had one bull that weighed in at 2,200 pounds. Despite their large size, bison can reach top speeds of 30-35 mph, and maintain those speeds for up to half a mile.[24] They're nimble too; they've been observed clearing 10-14 feet horizontal jumps and six feet vertical jumps from a stand still.[25] But, when coupled with instinctual aggression, these traits can spell danger for human handlers. As Will said, "You can't trust them at all." Tim agreed, "People should be more scared of them than they are. They're not an animal that really instills fear in you, because they seem so quiet and docile, but they're not." Managers take significant risks when handling bison; many told stories about narrow escapes from aggressive animals. A bison cow once chased Will, who was driving a four-wheeler at 45 miles an hour, around the pasture until he got so desperate that he bailed off the ATV and dove under a fence. Lee similarly tried to outrun a distressed cow on foot in an open pasture and escaped only because the cow made a detour into the herd to look for her calf. He rolled under the fence in the nick of time, but noted, "You can't outrun one" and, "She'd have got me if she could have." Doug says it's too dangerous to be on foot in the pasture with bison:

> *In the open pasture, I'm comfortable on the four-wheeler, but I won't get off and walk to the other end. No, I won't do that, because … there always seems to be one cranky cow in the bunch. I don't want to chance it.*

As these stories illustrate, bison can be aggressive in the open, particularly when they feel their young are endangered. Yet, they can be even more aggressive when they are pushed into tight spaces or confined. While sorting cows from calves in a corral, Lon's nephew "took a ride on a cow's horns" with so much force that he flew through a corncrib wall. Doug retold his son's experience with a stressed-out bison cow when they were sorting bison:

> *…we got down to the last couple of cows… we had them too worked up. And…my son, he went in with the four wheeler, because he wasn't feeling comfortable even, and that one cow hooked the front of his four wheeler…she hit that and just roughed him all up and bent the front of his four wheeler up.*

Photo Courtesy of Kayla Koether

When confined, not only can bison harm people, they are also more likely to fight amongst themselves and gore each other with their horns.

> *Buffalo, when they get in confinement, when they start getting irritated, they start taking it out on each other, and they can kill each other in confinement, or they'll beat the hell out of each other, just because they're pissed (Mark)*

> *….during the round up it gets pretty exciting and you see how powerful they are and that they are really not like cattle, because once you get them confined they fight, and they are really wild animals (Diane).*

> *The trouble is if you start crowding them… they start to spook (Deb). It's natural instinct for them to fight or flee, and they either want to run or they're gonna get aggressive if they feel threatened, and they start to feel threatened if you start getting them in a corner (Frank). So we just try to avoid handling them that much, just [for] safety, just so they don't get hurt (Deb).*

They Know Who You Are

Managers say bison are socially complex and fascinating. Lon said, "I could just sit out there and watch them for hours." Lee agreed, saying "It's just interesting to watch the interactions in those animals, and mine are as tame as you can get a herd because I'm with them a lot." Managers say each bison has its own personality. As Lon and I ended a visit with his herd and left his pasture, one cow followed us to the gate, and he said the cow's mother used to do the same thing. Others have even

given their bison names; Frank and Deb have named almost all of the individuals in their herd.

Bison managers also feel that their herds get to know them and can distinguish them from other people. Lee once bottle-raised a calf whose mother died, and though she is now an adult cow, "Lucky" often approaches his truck and lets him pet her. Lon described that his bison even preferred one of his trucks to the other. Frank and Deb only tend their bison together and make sure all the bison are in place before a vet arrives because they say, "The minute they smell other people they're wary." Darci shared:

> *…you get to know them, and they know who you are and everybody's got their own personality and they know right away if they like you or not. And, they usually know if it's one of [us] three going out there in my vehicle. And they're ok with that. They'll come up to the truck and stuff. And it's nice to know that they're comfortable enough with you.*

When retelling his nephew's accident incident with the cow, Lon said that he'd told his family not to get in the pens with the bison because they didn't recognize the strangers and would be more likely to become stressed.

They Fit In As A Clan Of Ladies

Managers explained that bison herds are organized along matriarchal family lines. "There's usually one boss cow or dominant one that rules the roost, you might say, and the others follow," said Doug. Frank and Deb explained that the lead cow tops the pecking order, which is based on family ties and social interaction. A calf born to the lead cow, they noted, seems to have a higher social rank among those in its age class as well. Bringing in a mature cow from a different herd will cause social upheaval, with familial cows continually fighting the newcomer (Frank and Deb). Frank and Deb had problems trying to buy other mature females and add them to their herd, as did Doug. Doug bought some dehorned females and added them to his horned existing herd, which killed one of the 'best' new cows. On the other hand, Frank and Deb also said that once cows calved together they were able to establish a peaceable pecking order. "Once all the cows get bred and they all have a calf, they find their pecking order…then they fit in as a clan of ladies," said Deb. Darci explained that females then work together to care for the herd:

> *If you set them up in the wild there's a matriarchal system, they have family units… you've got a dominant cow and a dominant bull. The herd will follow usually the dominant cow, and the bulls will follow behind. With that dominant cow you'll start to see aunts and sisters and everybody as a whole will take care of calves.*

Diane observed females helping each other with their young during the tail-end of a birth. She saw other cows come over and help the new mother clean off her calf. Overall, Frank and Deb said, having a lead cow with a calm disposition is important because it affects the whole herd as well as human handlers' ability to move bison without causing stress.

We Have the Same Emotions That They Have

While cows fight to establish a pecking order and control of the herd, bulls compete with each other to become the dominant breeder. Lee explained that he has four bulls in the herd, which have their own pecking order:

> *#1 gets the choice of the cows. You know, if a cow comes in heat, he's the one that's gonna service her. If there's two or three come in heat he can't control it all, and the others get a chance…But the lesser bulls… work that cow clear away from the herd before he tries to breed her because he knows if he's too close to the main bull, he's gonna get it!*

In cases where dominant bulls are overthrown, managers say the bulls get 'depressed.' Will and Tim had an older, dominant herd bull, and a young bull. Over time, the young bull grew up:

> *And then one time, we realized the old one, you'd go out in the pasture, and he'd be in the complete op-*

posite corner of the pasture than the rest of the herd. And he was big and fat and in good shape, and we noticed that different times, and then we found him dead out there (Will).

They discussed this with Lee, who said it wasn't uncommon. "Lee said it was almost like they die of depression" (Tim). One of Lon's dominant bulls was similarly overthrown, and Lon found that he had moved away from the herd into a separate pasture. When he opened the gate, the bull fled across the road into the sorting enclosure. Lon surmised that the bull had given up. The bull knew his time was up and wanted to get out of the herd. He has stayed out of the herd and been especially moody ever since, and Lon may have to slaughter him. Tim and Will thought that behavior followed the natural order. As Will said; "You know, years ago out on the prairie, the young bull grew up so he became the dominant one, and the old one would have been the outcast, and he's the one that the wolves would have gotten."

These were not the only instances in which managers attributed complex motives, understanding, and emotions to bison. Lee and Lon both related stories about herd members protecting each other from death. When Lee sold meat, he used to shoot his bison on the farm and then take them to the slaughtering facility:

…and I swear, they knew which one was going to die. You know I'd have a bunch of bulls in the yard feeding them, and somebody was always between me and the bull I was going to shoot. I said I always figured that somehow they sense who's gonna die. I don't know. They're quite an animal, they really are.

Lon told the story of a thrilling hunt he had hosted; the hunter shot at the bull and dropped it, although it was not yet dead. Before the hunter could get another clear shot, the herd gathered around the bull, preventing the hunter from shooting again, and tried to help the bull up. One of the cows charged the hunter multiple times before he finished the hunt.

Doug, Sarah, and Jake feel that their herd mourns the loss of its members, and so when they harvest animals for slaughter, they move 3-4 animals into a separate pen and shoot and field dress them out of sight of the herd to minimize psychological stress, and give prayers out of respect. When an animal dies naturally, they drag the carcass into the trees but leave it accessible to the herd.

I like the idea of having carcasses out there… not just for the sake of leaving the resource out there, but also for the herd. Because… we do harvest and part of the herd leaves, and they never see them again…. [leaving the carcass] gives them an opportunity to grieve… but also psychologically not every animal that they lose sight of is just gone…they can go back and see that there is a body there. It closes the loop a little for them (Sarah).

Jake noted that the herd will go back and sniff the carcass, and if it's a calf, the mother cow will stay with it for a few days before returning to the herd. "It's good to just leave them out there, it's kind of a little funeral, I guess" (Jake).

Sarah, Dave, and Jake have been accused of anthropomorphizing their animals, but that's not quite the way they see it. Instead, they argue that it's anthropocentric for humans to assume that we alone have emotions. According to Sarah and Dave:

Sarah: We are, we're totally doing it [anthropomorphizing], but I don't think of it as that they're human emotions, I just think that they are emotions…that we have the same emotions that they have. So it's not that we're trying to make them into people, it's just saying that they're no different than people.

D*ave: They're universal emotions.*

Dave, Sarah, and Jake say that herd association is matrilineal, but that all members of the family unit care for one another and contribute to the herd's culture, knowledge, efficiency, and survival. Sarah explained that older generations teach younger generations how to forage by showing them which plants to eat and when to eat them, as plants may grow or become palatable at

Photo Courtesy of Kayla Koether

different times. Foraging knowledge, she says, is especially valuable during infrequent or cyclical events like droughts and floods that drastically alter the environment and the vegetative structure. Older, experienced individuals can better equip the herd for survival under such conditions. Family members such as aunts, uncles, and grandmothers are not only important sources of knowledge, but also contribute to the herd's success through their altruism. Sarah and Dave described herd altruism this way:

Sarah: If you have a set of genes that will produce an individual that doesn't necessarily breed… but is more helpful… like helpers at the nest, then you're going to have a more competitive family. You will have one that takes on the roles of making everyone else more efficient, lowering stress, [etc.]. So it's an altruistic gene… They say… that altruistic genes will breed themselves out because they will never reproduce and create new altruistic offspring. But if you look at it as a family and…that lineage… will produce an altruistic gene, then it will continue on... If as a whole, your herd, your tribe, your flock has helpers that make it more efficient, then you will survive [long] enough to continue to pass on those types of genes or behaviors (Sarah).

D*ave: So that's what the family is. That's why we tell people… you don't have to produce offspring to pass on genetics*

S*arah: You don't have to look at individual traits, you can look at the traits as a whole.*

Dave emphasized that the loss of family members, then, not only causes a loss of knowledge, but also stresses remaining herd members, causing them to be less productive and psychologically "dysfunctional". Ultimately, Dave, Sarah, and Jake believe selection and competition occurs at the family unit level, rather than

at the individual level. Therefore, they strive to keep many generations in their herd (including old cows that may no longer be productive) and to foster a functional social structure that they feel mimics historic, natural herds.

They Like Rough Feed

Managers commonly shared that bison are highly efficient at converting feed to energy or body weight. They report that bison maintain their body condition with less feed, or with 'lower-quality' forage, than that required by domesticated cattle breeds. During the winter, many livestock are fed hay made with alfalfa, a more expensive, high-protein legume, but managers say bison don't require such a high-protein diet. According to Mark,

> *They do not require the land base that a stock cow does. Buffalo eat probably 1/3 less than a stock cow will, and they survive on extremely marginal ground. In fact, in the winter, it's not highly recommended to feed buffalo…high protein hay. We supplement with good alfalfa but most of the time the buffalo are maintained through the winter on slough grass...Buffalo maintain themselves on lower-quality hay… just mature grass. That's what they lived on in the plains all the time…I mean, we keep body condition just as good in the winter as they are on good green grass with lower quality hay, because they just maintain themselves that much better.*

Doug explained that even when he makes hay and leaves it at the edge of the field his bison will continue to "eat that grass through the snow as much as they can" and only "nibble on the hay." Not only can bison make do with what is considered "lower-quality" forage, but as Frank and Deb explained, their metabolism seems to slow in the depths of winter. Recounting her herd's experience, Deb said:

> *They pack on the pounds right now [in the fall] and we think we're never gonna make it through the winter with the hay we have… but once Christmas gets here, they back off and they just maintain. It's like they're preparing for winter… By Christmas they slow down… we're not putting out as much hay.*

Diane explained that they don't give the bison supplemental winter feed at the federal refuge: "We just let them eat on their own and they do okay. They always get thinner during the winter, so around February-March… people [start] calling, saying 'your bison are too skinny.' It's normal for them to be skinny….they're pretty tough. Darci has had a similar experience at the tribal refuge. She noted that since the tribe's bison are treated "like wildlife," they don't give them supplemental feed "unless their health is being threatened." When they do, they give them alfalfa mixture hay. She says they like it, but they can't digest it properly. Furthermore, she said "If you [supplement their] feed...with corn and grain, they won't eat it…. They'll eat it if that's all they have to eat… their system's just not set up for it."

Bison's dietary resourcefulness is particularly helpful for private bison-managers; they can maintain their herd on less expensive hay and other roughage like cornstalks. Furthermore, those managers who do choose to finish their bison on grain (as cattle are conventionally finished) find bison easier to care for because bison "won't overeat" (Lee).

> *If they got the grass and that, they won't stand at a feed bunk and eat 'til they drop. They'll come in and eat what they want and then they go back to the pasture…What I hear, they got to get their beef on full feed a little bit at a time to get them up there or else they'll bloat.*[26] *Where a buffalo, I can take him right out of a grassfed pasture and give him as much feed as he wants to eat, and he's only going to eat what he wants to eat, and I've never ever had anything bloat (Doug).*

> *You can put them on a self-feeder the first day you put them in the lot… and they'll walk up and eat what they want and walk away, where a cow will stand there [eating]'till she dies… They like rough feed, they like cornstalks (Lee).*

On the other hand, beef cattle will gorge themselves on grain or even high-protein legumes in a pasture. It is not uncommon for cattle to bloat, a process which, without human intervention, is usually fatal.

They Can Handle Themselves

Bison, it seems, find ways to take care of themselves and are particularly suited to Iowa's environment. Managers spoke highly of their bison's ability to survive and thrive in all seasons with little or no human intervention. When I asked Art how he managed his bison, he said, "Well, we don't really. It's our feeling that they've gotten along for 50,000 years without us and so we're not going to do anything." Mark agreed, saying "They can handle themselves." Will observed his herd's tolerance to climactic variability:

> *…Even this hot summer that we had this year, you'd go down in the pasture and think they'd be in the shade somewhere but a lot of times they'll be just out in the sun, playin' or whatever, where they could be in the shade. You know the heat don't seem to bother them and in the wintertime, the cold don't bother them a bit.*

Doug added his own experience with this hardiness:

> *I had one winter that it got cold enough that it froze, but they would still go down in that creek and paw and break the ice and get some water…They'll find water or else they'll eat the snow and convert it over. A beef cow, they won't do that I believe.*

Lon and Lee both reported that their bison would drink out of mud puddles or small streams when it rained instead of drinking out of the watering tanks they had installed; Lee was surprised by his bison's ability to drink "crappy" water: "It don't seem to make them sick. There again I think that's still hereditary from way, way back when. They'd rather drink off the ground than out of something mechanical." Overall, Tim and Will said their bison eat less and drink less than their domestic livestock do, but Will noted that "of course they grow slower too."

Not only are bison relatively self-sufficient when it comes to feed and water, they are also largely disease-free, apart from a reported susceptibility to internal parasites and some problems with pink eye. Mark described their hardiness, saying, "As far as management health-wise, either you've got a live buffalo or you've got a dead buffalo. It's just most of the time we don't have too much health problem[s] with them." Although a few managers like Doug and Lee vaccinate their animals, most managers don't vaccinate against any diseases or use antibiotics. Many of the private producers stressed that their animals were 'grown naturally' and that they didn't receive any antibiotics (Mark, Lee, Lon, Deb, and Frank) or hormones (Doug, Mark).

All of the managers did express concern for bison's intolerance to internal parasites. Parasites are deposited in manure and live on grass waiting to be re-ingested for a portion of their life-cycle. Thus, extended rest periods between grazes can break the parasitic lifecycle. Tim invoked evolutionary history to explain why bison are less resistant to parasitic infestation than domesticated livestock:

> *My theory is that when they were in the wild, they were always moving, so that they wouldn't' be eating where they'd been manuring. But then when you take them and you pen them up, you know, they can't. Whereas like the domestic animals, they've been penned up for centuries.*

All managers, including those at work on both of the refuges, medicated against the parasites. In fact, a few private owners used less anti-parasitic medicine than the refuges, or treated animals less frequently. Other disease reports were scarce; Doug reported a nasty pink-eye infection one year, and Darci said the tribal herd had experienced a lungworm infestation due to some previous pasture management problems.

They Calve Really Well

Bison reproduce with considerably less support from managers than domesticated animals require. Bison managers don't handle or separate cows from the

herd in preparation for birth, and they almost never intervene in the birthing process itself. Diane explained that when bison give birth at the refuge, "They do it themselves, and we usually don't even know about it until it's over." Private producers shared the refuge's natural birthing strategy. Doug said, "They always say leave them alone," and Jake pointed out that they've hardly ever had problems with calving:

> *They calve really well, you don't have to pull calves… we've only had like three or four over these 35 years now that have had issues having a calf, because the calves are a lot smaller than with cattle. I mean, cattle have been raised to have large calves.*

Jake reveals a crucial point; since humans have genetically selected cattle over time for size and fast-growth, cattle have evolved to have larger calves. Without human supervision during the calving process, those large calves and their mothers could die in the birthing process. Bison, on the other hand, having evolved without human intervention, have smaller calves.

The mothering process also proceeds naturally and easily. Bison hardly ever reject calves after giving birth or fail to care for them the way domestic livestock sometimes do. It is not uncommon for cattle or sheep to refuse their offspring, and in those cases managers often step in and bottle feed the baby or facilitate bonding between the mother and the offspring. As Darci at the tribal reserve noted, "Buffalo calves are very good; buffalo mothers are very good- they're actually very protective. They will keep their calves kind of hidden." The calves, too, seem especially hardy, a source of amazement for Lee, who said:

> *I've had calves come in December, January, just one or two. It'd be a terrible blizzard if it hurt them at all. They're born with, I think, twice the hair that a calf that's born in the spring [has], they're just like a little wooly bear. And [beef] calves, they freeze their ears or freeze their tails, but a buffalo, I've never had that happen.*

Only Frank and Deb reported a case in which they intervened when a cow had problems calving. They pulled the calf and raised it on a bottle. In that instance, the cow had been bred before she was fully mature. At the refuge, cows that have such problems die, because, as Diane says, "even if we wanted to we couldn't do anything to help. We'd have to tranquilize her just to get near her."

Tim and Will had calving problems with one cow, which they promptly sold. In another case, when Doug attempted to check a new-born calf, the mother got nervous and started stomping the ground, accidentally breaking the calf's ribs, an injury which was fatal. On the refuges, intervening in such processes is undesirable in its own right as managers want natural genetic selection to take its course. Private managers share that sentiment; they don't want that problematic genetic stock to remain in their herd and cause repeated calving problems.

It Takes Twice As Long To Build A Bison Herd

While the reproductive process requires little work from managers, bison's slow rate of maturation constrains herd growth. In a typical cattle production system, animals reach maturity at age one to one and a half. At that age, male livestock are said to be finished and ready for slaughter, while heifers[27] are ready to be bred. In contrast, Doug explained, bison are usually not mature until age two and a half to three, when male bison are 'finished,' and females are sexually mature. "If they do breed too early, then that cow or heifer, she's kind of done growing…If you give her that extra year… it builds her body frame," Doug said. The reproductive process cannot be rushed. Bison that are bred at a younger age won't be as successful individuals and in some cases, could die giving birth, as Diane explained happened at the refuge.

> *This year for the first time we found a dead bison cow… it was only a two-year-old… after looking at the skeleton… there was actually bones of a calf there too. So we think that she probably died giving birth, but it was probably because she was so young and she*

wasn't quite ready for it.

Bison's longer maturation time has important implications for building a herd and preparing animals for slaughter. As Mark summarized, "…it takes twice as long to build a bison herd as it does a stock-cow herd." Furthermore, whereas domestics, once sexually mature, are expected to give birth once a year, bison may 'skip a year' as they get older. As Frank said, "Even if they skip a year, it doesn't really matter." Deb added, "We're usually patient because sometimes they will [skip a year]." Lee also agreed: "When they get about so old, they start skippin', but that's Mother Nature again."

For private managers, slower rates of offspring replacement translate into slower returns on investments, including not only the capital investment of buying the bison, but also the continuing expenses of feed and labor. Tim and Mark both said that raising bison was "Not a get rich quick scheme." On the other hand, some producers speculate that bison may remain productive longer than cattle. Lee spoke about a friend in Cheyenne, Wyoming, who'd been a long-time bison producer. Though he'd had to feed them range cake[28] to supplement their diet as their teeth got bad, his bison lived for 39-40 years. Lee also said he had 20-year-old bison in his own herd that were still having calves every year. In contrast, cattle in the conventional system rarely remain productive beyond 10 -15 years of age.

There's A Lot Of Health Reasons For It

The differences between bison and traditional livestock extend beyond their life cycle and into the finished product. Interviewees shared that bison meat is lower in fat than other meats; USDA research has shown that 100 grams of raw bison meat contains 109 calories and 1.8 grams of fat, whereas 100 grams of beef contains 291 calories and 24 grams of fat.[29] Thus, Marchello and colleagues write that bison is a "highly nutrient-dense food because of the proportion of protein, fat, minerals, and fatty acids to its caloric value."[30] They found higher concentrations of phosphorous, calcium, iron, and magnesium in bison than in beef, although beef was higher in potassium, copper, manganese, and zinc.[31] Some managers feel the meat is healthier and therefore directly contributes to customers' well-being. As Deb said, "You feel like when you sell it, you're selling it healthy, to people and their children, and that makes me feel good." Doug especially emphasized the health benefits of eating bison, which he feels have impacted not only his own life and the lives of his family, but members of his community as well.

> *…My wife here…4 years ago or so…when she got [breast] cancer…the doctor said if she wouldn't have been on buffalo meat to build her body, her higher iron content and higher protein, that there was no way that she would have pulled through all the chemo and radiation that she went through…. There's another lady…in church and her husband has worked with me in construction…but she is real low in iron…she was taking like 10 iron pills a day…she's had a couple miscarriages, just strictly because she's low in iron… she lost the one, and so I said… 'just give her meat, get her on it and have her eat it if she will'… and it brought her iron content of her body back up that the doctor said 'I don't know what you're doing but you don't need to be taking these iron pills anymore'… their previous baby they lost, but now they had… one since that one. So I mean, there's a lot of health reasons for it.*

All private producers direct-market some of their meat to consumers, and report that the majority of their customers are concerned about their health. Dave said 90 percent of his family's customers are health conscious, and Doug pointed out that some customers, especially heart patients, are unable to eat beef and pork because of the fat content, but they can eat bison. Will says many of his customers are "…interested in not only their own health but the health of the Earth."

Conclusion

Seen through the eyes of their managers, Bison are truly remarkable animals. They are strong and fast, aggressive, social, family-oriented, emotive, and protective. Having evolved with the grasslands, they are suited to the dramatic climate and rough forages, resistant to disease, and can "take care of themselves" and their off-

spring. Some of these characteristics are advantageous to bison managers, who find great efficiency in taking a "hands-off" approach to their herd and letting nature take its course. Managers have to learn to minimize handling and use less medication, and they can't confine their animals in a feedlot or rely solely on grain for feedstuff. Raising bison can be physically risky due to the animals' inherent wildness and financially risky because of their slow rate of maturation. Given the latter, growers must think and invest long-term, getting lower production from their animals, but putting in fewer inputs.

Thus, the resulting management system radically departs from conventional agriculture. Bison do not fit inside the neat squares and clean lines of the dominant industrial farmscape; rather, they are adapted to the native ecosystems that once cloaked Iowa and sustained life here. In their wildness and self-sufficiency, they contradict that old paternal delusion of conquering and improving upon nature. It seems that in order to raise bison, managers must acknowledge nature's framework and make compromises to work within it, rather than against it. This is certainly a different arrangement than the one conventional agriculture strikes with the natural world, and it requires a divergent mindset. Being different, however, can be a social risk- one more hazard of raising bison.

Managers acknowledge the obstacles, and recognize that raising bison isn't for everyone. They are self-professedly "different," and "passionate." "Trust me," Mark says, "it takes a special individual to want to raise bison." Reading between the lines of bison managers' detailed observations, we see that managers take great pleasure in bonding with their bison and speculating about their evolutionary history. Managers sense that they are helping preserve a majestic North American species. In doing so, they feel deeply connected to the historic prairie landscape as they continue to carve out a place for bison in contemporary Iowa.

Photo Courtesy of Kayla Koether

Iowa *Ivaluktaktok*: A Video

Jonathan Andelson

View "Iowa Ivaluktaktok" here

"Ivaluktaktok" is an Inuit word meaning the sound that pieces of ice floating in water make when they knock into each other. I made this short video one day in March at Rock Creek Lake in Jasper County, Iowa, when conditions were just right: winter ice breaking up on the lake, a strong wind, and late afternoon sunshine.

Photo Courtesy of Jon Andelson

Jonathan Andelson teaches anthropology and directs the Center for Prairie Studies at Grinnell College. His academic interests are in intentional communities, especially the Amana Colonies, religion, and the relationship of human communities to their natural environment. In his spare time he enjoys prairie rambling, canoeing, and photography.

Photo Courtesy of Ella Williams

"train"

from Early Winter Songs from Middle America

Ella Williams

"train," as well as other songs from her debut album, can be found here.

Ella Williams is a first-year from Boston, MA. She attends Grinnell College and is currently spending her time on developing her first album.

Ella writes:
In its entirety, it's sort of an ode to the prairie and to the way the stark landscape has the power to fundamentally change one's perspective of the world, and of oneself. The union pacific train had this effect on me and was the subject of endless reflection.
What had this train seen? What other small communities in and beyond the prairie had this train lovingly infiltrated? I wanted to recreate the sounds of the train and embody the mystery of it, by writing "train." Overall, each song isn't much on its own. They're all pieces that together tell the story of my time in Iowa—from the landscape, to the people I met, and ultimately to the decision to take a semester off to record the album.

A Reflection

by Chloe Williams

Listening to the album *Early Winter Songs From Middle America* under the sun on a spring afternoon in Iowa actually made me wish it were snowing a little. This album is the perfect companion to a quiet afternoon spent settling into a comfy chair with a hot drink and a good novel. Williams crafts a wistful blend of sounds, relying on finger-picked electric guitar lines that reverb seamlessly with the loop pedal-generated melodies. These techniques give her songs an uncanny feel, reminiscent of the prairie after a heavy snowfall. Her lyrics and tone remind the listener of the ephemeral quality of not just the winter, but of life itself. One of my favorite tracks is "i'll go now," featuring vocal loops with intermittent guitar, which results in an expansive, echoing chorus that is both hopeful and haunting. Her song "train" was particularly influenced by Grinnell, a town bordered by Iowa's prairie and criss-crossed by train tracks. At times, Williams' voice echoes the whistle of a train, a sound common to those up late into the Grinnell night. Though the train route is no longer part of the lifeblood of the town, freight vcars continue to rumble through Grinnell. And as the song's chorus reminds us: that's just the way it goes. No doubt, Early Winter Songs is worth the $7 you'll part with to own a piece of the ephemeral, if only for a moment.

Photograph: David Ottenstein

The Garbage Man

Jason Darrah was born in Sioux City, Iowa. Raised in an atmosphere dominated by drugs and violence, he chose a path of crime that led him to prison at the age of sixteen. Viewing prison as an opportunity to find redemption through self-improvement, while incarcerated he dedicated himself to academics and to helping others. He is now certified in braille transcription, mental health first aid, guide dog training, and is a mentor for struggling souls recently released from prison. He recently received his first college degree and will continue his academic endeavors at the University of Iowa in the Fall. Jason Darrah has been a garbage man for two years.
He can be reached at
jasonboydarrah73@gmail.com

Jason Darrah

I watched his arrival through the eyes of a child. I stood breathless as he swung from his truck, huge but graceful. Wrapped in sunlight banded in silver, he was a comic book super hero come to life. After quickly emptying the can, he deftly remounted .

Then he paused, only for a moment, but to me it has become a moment which defies eternity. His laser-blue eyes peered at me through the lightning bolt crags of a sun-forged face. A smile flickered at the edge of his chew-stained lips. And he was gone.

That was the day my life was forever changed. That was the day the Garbage Man became my hero.

Thirty-four years have passed since that summer day, when I was an eight-year-old boy . I still smile every time I look back to that moment, to when the Garbage Man briefly locked eyes with a hopeful child filled with adulation. That look was an agreement, a contract promising that even a small boy, if he held his dreams tightly enough, could himself be a Garbage Man.

And now I am one.

But the sun doesn't shine quite as brightly as it did when I was a kid. Don't get me wrong, I love being a Garbage Man, but playing the role, as I do now, is a lot different than seeing it on stage. And the longer I'm a Garbage Man myself, the more questions I'm asked about the position. This leads me to the conclusion that the general public has a convoluted view of this most noble vocation. Although many people are dead-on with some of their assumptions, they are generally shooting air balls when it comes to others, and—as a true defender of trash—it is my responsibility to set the record straight.

People who work for the city make great money and are provided awesome benefits. Many people be-

lieve the Garbage Man works for the city. He doesn't, at least not in the Midwestern gem that is Sioux City, Iowa. People have this belief because up until the 1980s, we *did* work for the city. But in an attempt to save money, city management contracted the job out to a private company. This in turn led to said private company using staffing agencies to provide their hiring services--services which exploit desperate job-seekers by guaranteeing fast work at a high-turnover job.

The result is a dangerous, highly strenuous occupation that provides no benefits, at a near-minimum wage-rate. So no, we do not work for the city, and we feel more than a trifle of animosity for it, as well .

Many people believe the Garbage Man is uneducated. This is partly true. The low qualificationsfunnel a unique sector of society into the position. Practically all of my thirty-three coworkers are military veterans or ex-convicts. Many of the vets have psychological disorders, as do the former prisoners, and this particular job provides the structured hard work that isolates individuals from social constraintsencumbrances. Contrary to the above-mentioned assumption, though, many of the vets attended college through the GI Bill, and the ex-cons have a surprising array of life experiences that no formal education can replicate. So although we may not all have degrees, we are not uneducated; our experiences just don't represent traditional models of education. And why are vets and cons so similar? When asked that question, all vets will almost inevitably say, "The only difference between a prisoner and a soldier is the direction the gun is pointing."

Garbage Men attain other kinds of education on the job. A friend of mine recently cited an article she had read, which stated that we know everybody's secrets. When asked if this were true, I answered without hesitation: Yes, we know everybody's secrets. Whilethis might be disturbing to some , I don't think this should be a real surprise to anyone, an opinion which I see confirmed each time a customer is unable to lock eyes with me on those rare occasions when necessity dictates they are present when we dump their little cans of discarded secrets. But yes, in that four or five seconds that their unwanteds are spread before us, we see a snapshot of every habit and embarrassing secret the customer has.

Automobile drivers regularly fly around the garbage trucks with reckless abandon, assuming they are not (or perhaps not caring whether they are) a threat to the brave men who run back and forth across the street before them. Contrary to these travelers' beliefs, , the Garbage Man lacks x-ray vision, and so reckless drivers are a huge threat to our safety. As a matter of fact, a recent study ranked the Garbage Man as having the third most dangerous job in the United States. What's our biggest threat? Chain-smoking soccer moms desperately speeding their kids to an academic drop zone. No kidding. We jokingly refer to the high-visibility vests we wear while working as "mini-van targets." So please drive carefully and with respect when around the Garbage Man.

I am a Garbage Man in America's heartland, a place where there is already a unique pride in hard physical work. Some people have the opposite belief—that our job is easy and we don't earn the respect that someone in a better economic bracket may deserve. If you are one of these people, I recommend treading lightly when voicing your opinion to the Garbage Man. We are tough as liver gristle and have a general hatred for the world. Ok, we're not misanthropes, but we do work a tough job and have a lot of reasons to be mad at the world. Treat us with the respect we deserve; nobody wants to find how difficult it is to escape the confines of a garbage can feet-first.

People are always asking me to tell them stories regarding my garbage-laden adventures. I never refuse. My most notable memory is about a little girl who couldn't have been more than eight years old. There she was, standing at the curb, bawling like a ruptured sprinkler, screaming, "Noooooooo! Noooooo!" No more than twenty feet behind her, two adults stood stone-faced and determined. I was at a loss to decipher the scene before me. Not willing to get involved in mysterious domestic matters, I ignored the screams of the little girl which, it was increasingly apparent, were directed at me. I was bemused until the moment I dumped the can. There before me, completely filling the truck's hopper, was an eclectic rainbow of plastic toys. *Somebody's been a bad little girl*, I thought. That's when I learned the disturbing truth: Contrary to my own experience with the Garbage Man, we are not every child's hero.

Photograph: David Ottenstein

Pete Ferrell

The following was written in 1992 when my children were young, as a vision of a brighter future for them.

T*uesday, May 30, 2027*

D*ear Diary,*

This is my last day before returning to sedentary life for the next month. It seems that I'm more at home out here with the herd than I am at the ranch anymore. If it weren't for my children, I might request more time with this four-legged crowd. The kids are eager to do herd duty as soon as they are old enough.

Limiting each person's time with the herd to every other month has strengthened our community: life no longer seems split between work and non-work. I enjoy my "time off" and spend most of it working in the Beaumont community. Most people who live here now are either directly employed by the grazing co-op or an auxiliary business. The spiritual, recreational, and artistic activities here are amazing for a small town. Few people seem stressed by "work" which makes quality leisure events and civic volunteerism more common.

Our multi-species herd will reach a major market terminal in about 2 weeks, so I assume it will be somewhat smaller when I return, although it's hard to tell in this 90,000 head menagerie when a few are gone. A large grazing cooperative was an obvious solution to many problems created by CAFOs … less fossil fuel usage, less pollution from run-off, improved water & mineral cycling. In short, the land has been restored. This blend of cattle, sheep, and goats does a good job of replacing a harvest. We sell most of our meat directly to individuals who live in the region. However, about twice a year we thin the excess marketable animals. They are processed locally and shipped out of the area by rail. This meat typically ends up in trendy coastal outlets which can market forage finished meat at a premium.

Yesterday I talked with my brother Jacob who is the co-op's meteorologist. He says we'll have to pick up our pace a bit, as dry weather will force us out of the southern Flint Hills region before the end of June. His satellite perspective is an essential part of the grazing plan which directs our swath of impact across the plains.

We marvel at how well the ranch has responded since we took down the fences and joined the co-op. Infrequent high impact has had a breathtaking effect on the health of the plant community. Although we still have a few grazing cells around for growing replacement livestock, the health of the prairie in the cells does not compare to the response we've seen from allowing our land to be grazed by the "big herd".

The herds of wildlife have also flourished and seem to follow us … preferring the regrowth produced by our intense grazing pattern. Predators are not a problem for us and we accept the occasional loss as nature's way of keeping things in balance.

Living so close to life and death has a calming effect on me. My sedentary friends still don't understand my preference for this lifestyle. They think it odd that a person with a Masters in Range Ecology should chose to be a professional herder. They don't understand that it's not for the money.

~Lauren Beatrice Ferrell

Photo Courtesy of Pete Ferrell

Pete Ferrell has worked at the Ferrell Ranch (established by his great-grandfather in 1888) basically all his life. He was a full-time ranch hand from 1974 to 1980, when he became general manager upon the death of his father. In 1995, he co-founded and was president (2000) of the Tallgrass Prairie Producers Cooperative, a rancher-owned business for marketing forage-finished beef. From June of 2004 to December of 2005, he performed the duties of executive coordinator for the formation of the Tallgrass Beef Company, LLC owned by Bill Kurtis of Chicago, Illinois. He is the initiator and primary landholding member in the development of the Elk River Wind Farm, LLC. Pete was on the Board of Directors of Rancher's Original, which is creating an aggregate supply of range cattle for branded beef programs.

Photograph: David Ottenstein

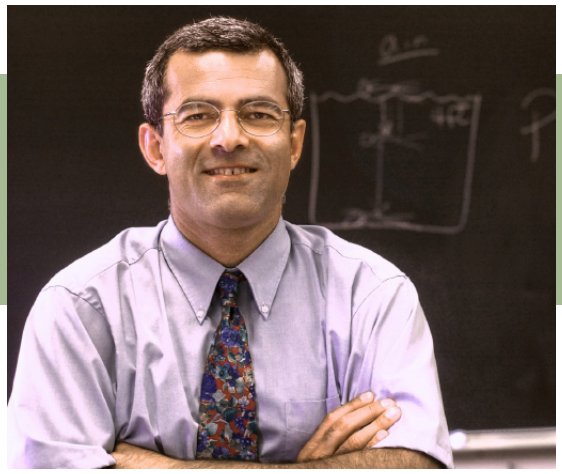


Photo Courtesy of Kamyar Enshayan

Kamyar Enshayan works at the University of Northern Iowa's Center for Energy & Environmental Education in Cedar Falls, Iowa. His formal training has included studies in mechanical engineering, solar energy, climatology, and agricultural engineering. "Working as an apprentice on a vegetable farm in Maine for a year after school was my most educational experience," Kamyar says. He was awarded the Sustainable Agriculture Achievement Award by Practical Farmers of Iowa in 2008, and served on the Cedar Falls City Council for two terms.

Taking STEM Seriously in Iowa

Kamyar Enshayan

You can't swing a stick without hitting a STEM hub these days. There is a lot of excitement around Science, Technology, Engineering and Math, otherwise known as STEM. STEM education is seen as critical; governors are promoting it; legislators are funding it. There is an air of discovery: new understandings that are coming to us from outer space, from the Mars rovers, and the frontiers of science are being pushed back. There is a feeling that somehow life will be better as a result of more math and science.

But when math and science produce knowledge useful to living in Iowa, or that is vital to our health or our survival on the planet, too often we totally ignore it. The real message this sends to aspiring scientists is: *Go ahead; do your math and science, but if you discover something that goes contrary to the vested corporate interests, we will ignore it. Don't expect we will do anything with that knowledge*.

In higher education, "discovery" and new knowledge are prized, but they are considered to be "scholarly." Actually implementing and putting into widespread practice what we already know, what we have invested lots of time and resources to learn, is just not valued.

• • •

Right after the flood of 2008 hit Iowa, I received a call from Mr. Don Palmer of Cedar Rapids, who was very eager to do something that would make the Cedar River basin hold more rain water upstream, and release it more slowly. He knew that I, as a council member of the flooded city, was concerned about the role land use could play in reducing flood damage. We immediately connected and met a few days later. He discussed engi-

neering strategies, and I shared what I knew about landscape remedies in which more water could be stored in the soil profile. We discussed all sorts of ways Iowa could be a more secure and resilient state in the face of future floods.

I was amazed to learn that Mr. Palmer was a retired engineer from the aerospace engineering firm Rockwell Collins--the very man whose team had developed the radio communication devices for the Apollo's first Moon landing 40-some years before. We both joked that it was ironic that four decades after the Moon landing, we still had not figured out how to live in Iowa without causing damage, as was evidenced by degraded watersheds that couldn't handle downpours, and by all the houses that were built on floodplains.

The frontiers of science are right here, where we live.

Knowledge derived from science concerning floodplains is ancient, and can be vital to our wellbeing in Iowa, if we take it seriously. Currently cities allow building in the floodplain as long as you build at least one foot above the 100-year flood elevation. This is in spite of what we learned from the flood of 2008, after which a committee of Iowa's brightest water resources and hydrology experts suggested to the legislators to make the 500-year flood elevation the rule. This would have given more room to the rivers, and matched our experiences with recent reality. However, this became one more instance—one among many—of the best science being ignored by local and state government. Actions speak louder than words: however much we might want to appear to be serious about STEM and what it tells us, our decisions say something else entirely: we are not serious about math and science.

There are other indicators of this lack of STEM seriousness. For instance, scientific evidence has been piling up over recent decades which shows that the current system of corn-bean commodity crop agriculture has not served Iowa well, and is in fact causing soil erosion, water pollution, loss of habitat and biodiversity, and public health hazards due to massive use of pesticides and large scale animal confinement operations, not to mention rural decline. STEM educators ought to respond to these facts by presenting legislators with curricula and testimonies that address our need for answers to these problems, rather than continuing to support policies which, it is clear, only deepen them.

Now, here is some good news from the STEM sector: long-term studies by Matt Liebman and colleagues at Iowa State University have demonstrated that diversifying the simple corn-bean cropping system can have a huge positive impact on Iowa. According to the ISU researchers, compared to conventional corn-bean rotation:

- Diverse rotations require 88 percent fewer herbicides, resulting in 200 times less freshwater toxicity.
- Diverse crop rotations require 80 percent less synthetic nitrogen.
- Diverse rotations require 50 percent less energy per acre.
- Diverse crop rotations have significantly fewer soybean diseases.
- And, diverse crop rotations have higher yields.

This is what writer and environmental activist Wendell Berry calls "solving for pattern"—meaning an elegant solution that solves multiple problems. Research has been tending in this direction for decades, but these recent scientific results are even more compelling. What would happen if these cropping systems were incentivized in the watershed that provides the drinking water for the city of Des Moines? With findings such as these coming from our state's land-grant universities, one can't help but wonder why STEM-supporting legislators and our STEM-boosting governor are silent concerning such findings.

Nowhere is the disregard for the research findings which STEM delivers to us more visible than in PK-12 public schools, where, ironically, it ought to be thriving. Here, the research clearly calls for sound early childhood development, as well as developmental programs which carry on all the way through the teenage years and into adulthood. However well-intentioned our schools might seem to be in this area, rhetorically, once again practice tells us a different story. Nearly all of our public schools routinely use pesticides that have a demonstrated record of interfering with hormonal and

nervous systems in children, causing life-long learning and cognitive disabilities (you need only Google "pesticides & children" to see what I mean). Despite the abundantly available scientific evidence which indicates this is bad practice, our science-touting school officials nearly always insist that it is important to have the school ground dandelion-free, no matter what.

Similar concerns can be registered as regards the meals our schools are serving to schoolchildren. With very few exceptions, all public schools continue to serve fatty, salty, highly processed meals, as if our educational decision-makers are ignorant concerning widely published, extensively vetted good-sense guidelines concerning what constitutes a healthy meal. There is often a long list of excuses as to why a school district cannot feed children as the research shows they ought to. Once again, this ignorance concerning available scientific evidence would seem to indicate that good nutrition is just not a priority in our allegedly STEM-promoting schools.

Nearly all of our public schools routinely use pesticides that have a demonstrated record of interfering with hormonal and nervous systems in children, causing life-long learning and cognitive disabilities.

• • •

Similarly, our STEM-boosting educators, legislators and governor are failing the state of Iowa in another category, this one concerning the evidence coming from atmospheric sciences.

The same science which fuels the spirit of "discovery," which has enabled advanced heart surgery, which was behind the development of the polio vaccine and the prescription for your glasses, which made it possible to build the safe buildings you work in; the same science which led to NASA's successful program of Mars landings; the same rigorous science which has ensured that math, physics, chemistry and biology continue to produce reliable results—has indicated that our burning of fossil energy is negatively impacting the chemistry of the oceans, and the stability of the atmosphere that supports all life, and our economy.

And what do STEM-supporting legislators, STEM educators and STEM-touting university scientists have to say in response? Too often, their only response is a big silence.

It really is hard to take our policy-makers' rhetoric about the importance of STEM seriously when so much of what we already know—not to mention the new findings which continue to flow from the laboratories and offices of university and government—is routinely ignored, on a daily basis, on matters vital to the preservation of our health, our land, and our economy.

This is why science historian Naomie Oreskes, in her new book *The Collapse of Western Civilization: A View from the Future,* calls this time of disregard for science "the second Dark Age," where "the children of the Enlightenment failed to act on robust information about climate change and knowledge of damaging events… even those involving imminent threats."

I say to young scientists, STEM hub managers, and university scientists: it does not have to be this way. As biologist Sandra Steingraber puts it, we too often confuse objectivity with neutrality. Of course it is necessary to practice objectivity in the process of science. But when science produces compelling data vital to the future of the planet, we are morally obligated not to be neutral. There is a lot we do not know, and a lot which we need to learn; but there is a vast amount we know which we ignore. We must insist on putting into practice that which we already know.

It should be a primary task of STEM educators, legislators, and all citizens to use the data which science produces to move from "know-how" to "do-now." Otherwise, what is science for? We need to be out there at press conferences with our white lab coats, with our agronomy field clothes, declaring what we know, and engaging others in developing strategies to implement it.

• • •

In her introduction to *Into the Field: A Guide to Locally Focused Teaching,* naturalist Ann Zwinger writes "Getting to know home is the most human and necessary of occupations. To give the power of observation to students is to give them something of infinite value and importance—something to do for the rest of their lives."

This is what some have called "place-based education"—education that is connected to a place; education that will turn out citizens with deep appreciation of their region and a good sense of how to care for it. This is the context in which STEM education should be situated: producing citizens who understand the impact of their habits on other people and other lands, near and far. It's what Wes Jackson calls a Homecoming education.

A couple of years ago, about 70 people from all over Iowa gathered at Iowa State Senator Dotzler's home in Waterloo, from which we floated down the Cedar River for a few hours in our canoes and kayaks, to celebrate the treasures of this watershed and to reaffirm our commitment to its protection. It was a beautiful day, pelicans with nine-foot wingspans flew by; kingfishers were active, and a bald eagle posed for us on a nearby tree.

While this was a thoroughly terrestrial experience, I can also say that the frontiers of space exploration were—and are—right here with us. We've spent billions funding Mars landings and searching for water on the Red Planet, while we have water here, and an urgent need to protect it. Science has produced results we can and should put to practice in our region, today.

There is so much to do here, so much to pay attention to, so many mistakes to correct, so many legacies to appreciate which have come down to us from the generations who came before; so many streams to restore, so many neighborhoods to revitalize, so many ways to show our children and the world that it possible both to care for a region by leading sustainable and responsible lives.

Photo Courtesy of Mary Swander

Belltower Triptych Part III: Birthday Presents

Mary Swander

Once I had the bell tower restored on top of my old one-room schoolhouse, every Amish child in the neighborhood wanted to ring it.

"I'll tell you what," I told Joe the carpenter's children last winter. "You can come down to my place and each ring the bell on your birthday."

The next spring, when I had long forgotten my promise, their mother presented me with a piece of paper listing all of her younger children's birthdays. "I don't know if you remember about the bell, but my children haven't forgotten," she said.

I glanced down at the list. It was time to begin with five birthdays spread out over the course of the summer. The three older children were teenagers and beyond bell

ringing. Melvin, the twelve year old, was first. I drove down the road in my car and scooped up all the children—two squished in the front seat and three in the back. We sped the half-mile home, the children marveling at the buttons on the doors. Up went the window, then down went the window, then up again.

Inside my house, Melvin grabbed hold of the rope.

"Oh, first we have to sing Happy Birthday," I said, breaking into song. Only the three school-age children joined me. I often forget that young Amish children only speak Deutsch until they go to school and learn English by total immersion.

Bong, bong. Melvin rang the bell twelve times, the sound echoing over the valley.

Then we raced outside with the dog and played a rousing game of Frisbee, the disk sailing through the clear, blue sky.

Each child had his or her turn throughout the summer. We kept the ritual the same—the song, the bell, then the romp with the dog. The children learned where I kept the Frisbee and rummaged it out of the basket, then raced outside. I gave each sibling a gift of a cookie and the birthday child a slice of pie. They carried the desserts home gleefully on their laps in the car.

"Mom, Mom, look. I got apple pie!" Seven-year-old Daniel shouted when he reached his house.

Oh, that you could please all "English"children so easily, I thought. But in this family the children had never played a video game, never watched TV, had never even listened to the radio. At Christmas time, they might receive a comb or handkerchief from their grandparents. On the drive home I was amazed that they kept their cookies on their laps. I had expected them to start eating the treats immediately, gobbling them up in an instant. Instead, they slipped their prizes inside their pockets. The Amish culture is semi-communal, non-competitive and non-violent. Sometimes it's astonishing to see how these principles translate on a small scale.

Inside the house in the kitchen Merlin asked his mother for a knife. With tiny, careful strokes, he cut up his slice of apple pie into eight parts and shared it with each of his brothers and sisters.

Close-up: Larry Stone

Photo Courtesy of Larry Stone

Larry Stone never outgrew a fascination with playing in the creek on the Iowa farm where he grew up. After 25 years as outdoor writer/photographer for the Des Moines Register, he now is a freelance nature writer, photographer, and lecturer. Larry and his wife, Margaret, live in the hills along the Turkey River near Elkader. They have two grown children, and four grandchildren who love to play in the dirt.

• *Website*

Larry says:
"What a wonderful world!"
I often think of those words from my favorite song when I'm photographing or writing about nature. My goal is to create a visual or mental image that helps the viewer/reader get in touch with his or her natural surroundings. If I need motivation, I take a walk in the woods or prairie.

Photograph: Larry Stone

Photograph: Larry Stone

"What a thousand acres of Silphiums looked like when they tickled the bellies of the buffalo is a question never again to be answered and perhaps not even asked."

~Aldo Leopold

Photograph: Larry Stone

The Tie That Binds

Photo Courtesy of Justin Hayworth

Howard McDonough is a retired farmer who lives northeast of Grinnell. He has four sons with his wife, Sue. The family raised and processed a majority of the food that they ate. He has also worked as a contractor building stadiums. He has written "The Tie That Binds" to share an important, personal piece of history and to illustrate the impact of the interactions between one generation and the next.

Howard McDonough

Emma Schnell (age 25) married Hugh Cassius McDonough (age 27) on November 28, 1906, and settled down to farm in Richland Township, Jasper County, Iowa. They were the parents of four sons, and I am the son of one of those four. In addition to farming, my grandfather did blacksmith work and made harnesses in the winter months. As long as Grandpa was able to farm, Grandma was the one who took care of the business details, quite unusual for a woman in those days. This involved buying and selling the livestock, grain, and farm equipment. She also made most of the work plans for the week for my father and uncles. Every Sunday morning after church the family would gather and discuss the next week's work plan. My grandparents worked hard, and approximately every eight years of their married lives were able to buy an additional farm.

Preparing a Meal

My earliest memories of Grandmother McDonough are my overnight stays at her home. For a long time I was the only grandson (though there were five granddaughters older than me), so I sometimes got to stay with her by myself. On such occasions I usually got to help her prepare dinner. The hogs had been fed earlier by scooping ear corn onto the large cement slab next to the corn crib, and after they had eaten we went to pick up the cobs for her cook stove. There would already be a fire in the stove from breakfast, and Grandma would fill the fire box with cobs and put the big tea kettle on to heat water. She knew exactly how many cobs it took to boil water, cook a meal, bake a pie, or anything else. She also knew how many strokes of the hand pump at the well it took to fill the large tank in the attic, and by helping with this we children learned to

count even before starting school. We also counted the eggs when we picked them up from the hen house.

I remember one time, after the cobs were in the stove and the tea kettle on to boil, Grandma and I went out and picked enough cherries to make a pie since company was coming for dinner that day. Then we caught a big white rooster to fry. She had both red and white roosters, but on this occasion she chose a white one because its pin feathers did not show as much as those of a red rooster, and she wanted the bird to look good. She chopped off the rooster's head and I held it up so it would bleed out well. She went in to get the tea kettle, put the rooster in a five gallon pail, and poured the boiling water over the bird to make the feathers come off easily. She plucked it, took it into the house, cleaned out the innards, and cut the bird into pieces. She dipped the pieces in flour and browned them in a hot iron skillet, then placed them in a heavy Dutch oven and into the stove. After that we pitted the cherries, rolled out the dough for the crust, and poured in the filling. Grandma let me help design the pattern cut into the top crust to let out the steam, and to this day that is what I enjoy most about making a pie.

Photo Courtesy of Howard McDonough

With the pie in the oven we went to the garden and picked some peas and dug some new potatoes, which were about the size of golf balls. I shelled the peas while Grandma washed the potatoes and started them to boil. When the potatoes were cooked she made a white sauce out of flour and milk to add to the peas. She brought the ingredients to a boil for at least a minute, stirring to make it smooth and to take the flour taste out of the sauce. When the peas were added she put the pot on the back of the stove to keep the vegetables warm until dinnertime. She could cook a variety of dishes at different temperatures all at the same time by choosing where she placed the food on the stove. When the chicken was done she placed it on a platter and put it on a shelf at the back of the stove, covering it with the lid from the Dutch oven. Then it was time to make a gravy. She mixed flour and milk, stirring it well to remove the lumps, and added it to the chicken drippings in the Dutch oven. Again she let this bubble for at least a minute. She poured the gravy in a bowl and placed it on the warming shelf as well. All was now ready and waiting.

When the company arrived we sat down to the big table and she served the food. In a matter of minutes what had taken a whole morning to prepare was gone, although I am sure that without my "help" Grandma could have done it a lot quicker.

Medicine

My grandmother took care of most of the medical needs for the kids in the family even though our mothers were registered nurses. In her medicine cabinet she kept pine tar, bag balm (a salve for cow udders), Corn Huskers Lotion, blood poison salve, iodine, tobacco, and Vicks Vaporub. She used them creatively.

When my cousin and I were five or six years old, we were trying to catch kittens from under the small corn crib in the barn, and a pitch fork left lying on the floor accidentally went through the calf of my cousin's leg. I pulled it out and we ran to the house for help. Grandma took care of the matter by washing the wound and placing a wad of moistened tobacco on each side and wrapped the leg with a strip of cloth. She used tobacco or mud for bee stings, which, in my opinion, didn't help any. She often soaked cuts in salt water or iodine. For deeper wounds she made a butterfly bandage by folding a wide piece of tape and cutting it at the center, applying it so that it held the cut together tightly. On infected wounds she sometimes placed a piece of moldy bread.

> After she went blind she would ask me after we had gone somewhere together what I had heard or smelled, and if necessary we would return so that I might learn to be more aware of these senses.

For a bad case of diarrhea I had after eating too many green applies Grandma gave me a teaspoon of black pepper in a glass of milk, which proved quite effective. (Black pepper could stop other kinds of leaks; Grandpa once used it for a leaky radiator in one of his farm trucks.) She used a lot of Vicks Vaporub. When I had a bad chest cold she rubbed my throat with Vicks, put a wool cloth around my neck and then put a thick pancake she had made on my chest. When any of her grandkids had a nose bleed she would tear a piece off of a heavy brown paper bag, roll it up, and tell us to hold it under our tongue. The bleeding would stop immediately.

Even for serious illnesses Grandma could be more helpful than the doctor. One of Grandma's neighbors told me a story about a boy in town who had diphtheria. When his throat was swelling shut, she said my grandmother boiled a small onion, pushed out the center, and inserted the onion in the boy's throat so he could breathe.

When I was twenty I developed a dangerous condition known as quinsy, an acute inflammation of the tonsils and surrounding tissue. Two pus pockets developed in my throat, and there was a danger I could suffocate, so the doctor put me in the hospital. I remember overhearing nurses in the hallway during the night say that I probably would not survive. Not wanting to die in the hospital I put on my clothes and left. I made it home, but soon passed out and was unconscious for three days. When I awoke my grandmother came to see me, examined my throat, and told me that when I felt the pus pockets break I should cough them out immediately or I would suffocate. I followed her advice and began to improve at once. When I was strong enough I went to see the doctor, who admitted that he had never expected to see *me* again alive.

Going Blind

Grandma went blind from glaucoma when she was in her early sixties. I would visit with her every day since I was using her barn to raise hogs, but I always avoided being there at noontime because I knew she would want me to stay for dinner, and I didn't want to cause her extra work. One day I was running late and got there at dinner time. She called out to me to come in. I said I was in a hurry, but seeing through my excuse she insisted, so I went in and she fixed me a dinner of hamburgers and potatoes, done to perfection. I was amazed and asked her how she did this when she could not see. By this time she used an electric stove, although she still preferred using the old cook stove. She said that when she knew she was losing her sight she had to learn new ways to do things. Cooking was easy, she said, because you could hear and smell how things

were cooking and when they were done. She said that although people claimed that when you lost one sense you would learn to develop others, she didn't think it was true. She felt that with practice anyone could develop all their senses. After she went blind she would ask me after we had gone somewhere together what I had heard or smelled, and if necessary we would return so that I might learn to be more aware of these senses.

She said she had always thought that when you went blind everything would be dark, but for her everything was light.

The Tie that Binds

Many of the historic events that have greatly influenced who we are as a nation and a people were not planned or anticipated. Often, their importance is not recognized until many years later. Lincoln hastily wrote the Gettysburg Address on the back of an envelope during his train ride to the battlefield site, though today it stands as one of our most famous historic documents. So, too, in our own lives, we may not realize until years later the full impact that an experience or the people who are part of our world can have on us. Looking back on my own life, I recognize the influence of my grandparents, and especially my Grandmother McDonough.

My family was not the type that showed affection, but this was not uncommon for the times. They held strongly to a Puritan ethic and standard of behavior, and if you were having "too much fun" you were risking being sinful. To most of my family, then and now, I was always having too much fun and was considered the black sheep of the family. But whatever I did I was always accepted by my grandmother, and she would defend me whenever she felt it necessary. No matter what happened, Grandma supported me with my family and encouraged me from childhood on until she passed away. Much of who I am I owe to her encouragement. To this day she is with me in much I do, the tie that binds one generation to the next.

From the money she received on her wedding day Grandma saved a dime, for the saying was that if you did you would never be broke. She gave that dime to me, and I have it still.

Photograph: David Ottenstein

Transformed, *Tony Crowley, 12 x 8, woodcut.*

Appendix

Ikerd, "Where is Industrial Agriculture Taking Rural Iowa?" Endnotes

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