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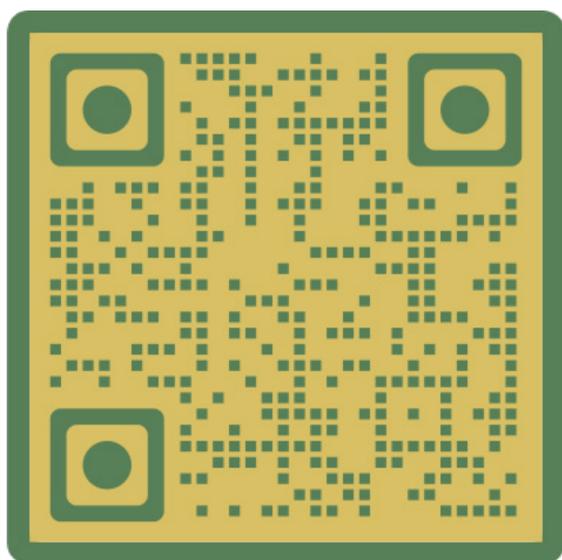
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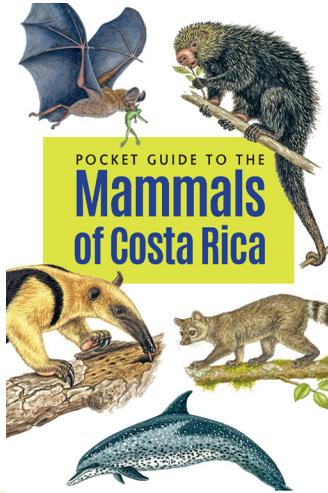
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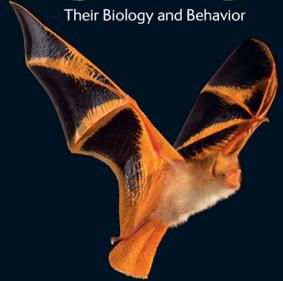
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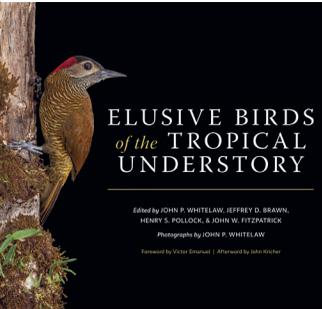
A HONEYBEE HEART HAS FIVE OPENINGS

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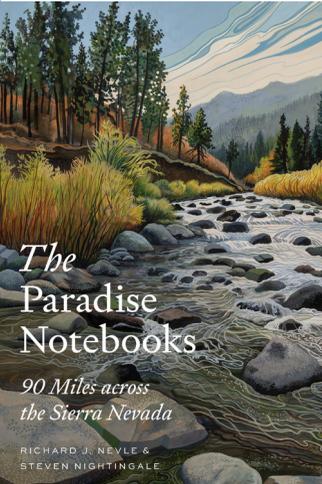
SECOND EDITION



ELUSIVE BIRDS of the TROPICAL UNDERSTORY

Edited by JOHN P. WHITELAW, JEFFREY D. BRAUN, HENRY S. POLLOCK, & JOHN W. FREDERICK
Photographs by JOHN P. WHITELAW

Foreword by Vicki Emanuel | Afterword by John Mather



The Paradise Notebooks

90 Miles across the Sierra Nevada

RICHARD J. NEVLE & STEVEN NIGHTINGALE

A CLOUDED LEOPARD in the MIDDLE of the ROAD

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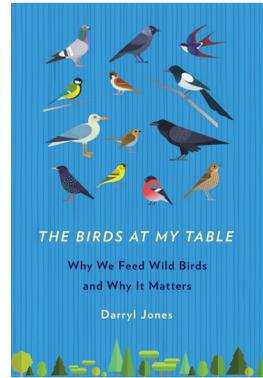
The Article

WHAT HAPPENS WHEN WE FEED WILD BIRDS

by *Darryl Jones*

Feeding wild birds is probably something so familiar, so everyday, so commonplace—so tame perhaps—that we can forget that this is a fundamentally artificial activity. In virtually every case, the types of food we use to attract birds to our house yards—typically mixtures of various seeds but sometimes leaf-overs from a family meal—are entirely different to those they consume in their natural diet. Our feeders also concentrate birds into closer interactions than they would normally tolerate, often bringing together species which would never have anything to do with each other. Even the structure of the feeder itself is starkly unnatural: a swaying glass cylinder or a conspicuous platform, typically in an open and potentially dangerous setting.

Yet—wonderfully—the birds don't seem to mind. They wing in to consume the unusual offerings from these strange structures, freely and willingly, wild creatures entering our lives for a while and then leaving just as quickly. These visits are often brief but they can be deeply valued by the people watching. Nonetheless, regardless of what we may think, these snacks usually occupy only a fragment of their busy lives. There have been concerns that our provisioning of bird food may lead to dependence but there appears very little evidence for this. Apart from extreme situations such as prolonged cold periods or drought, most birds visiting feeders obtain only a small proportion of their daily diet this way; most of their food remains entirely natural.



We think our feeders are for the birds. Our feeders are actually for us. But the birds don't seem to mind.

We might pride ourselves on our efforts at providing plenty of food for lots of species. And that this makes a real difference in their lives. But, it seems, this may speak more about us than it does about them. Now there are definitely circumstances where the provisioning of foods for birds in towns

and cities is vital – the hummingbirds now resident in wintry Seattle, for example, or the song thrushes on Britain, whose primary habitat is now urban. But the reality is that almost all of the seed (and it is a truly massive amount) put out for untold millions of birds which visit our feeders, is not really necessary. It all gets eaten, sure, but it is really is an addition, sometimes just a passing snack, to their dietary requirements. For most individual birds, the feeder food appears

to be a welcome option but is rarely essential.

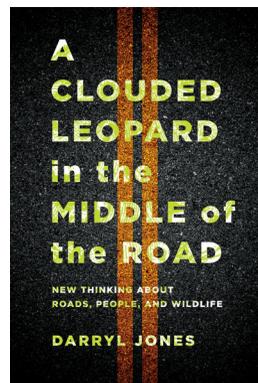
That statement might suggest that I don't think that feeding birds is important. On the contrary, I believe this pastime to be one of the most significant means by which humans are able to interact with nature. In an increasingly urbanized world, where more and more people are concentrated into increasingly smaller areas, our connection with wildness becomes ever more vital. There is now an abundance of evidence of the benefits—mental, medical, physical, spiritual—of even passive form of contact with non-anthropogenic features. A walk in the park, time in the garden, walking beside a lake, jogging along the river. These are all valuable. But there is something especially profound about direct contact with genuine wild-life. The simple, everyday, commonplace action of filling a feeder can result in a truly wild creature entering our lives. That can be an experience of enormous significance.

If we are going to invite birds to share or table, we must face up to the responsibility of the host.

And responsibility. This everyday, commonplace action also changes entirely natural communities. Feeders attract feeder birds, not everything. Many of these birds displace, other less pushy types. And by concentrating birds into unnaturally small areas, the possibility for the spread of infection is enormously increased. Feeders can attract vermin and predators, and the food can be of poor quality. If we are going to invite birds to share or table, we must face up to the responsibility of the host.

The most important issue of maintaining a bird feeder is, however, even less obvious. We are typically focussed on our feeder, in our garden. But these are part of a huge network of other feeders, all interconnected by the birds which travel between them. As a whole, this is a landscape, state, country, continental, possibly global web of connections. Currently, we know virtually nothing about the how these interactions work. But it's time to take this everyday activity much more seriously.

Darryl Jones is also the author of the brand new, *A Clouded Leopard in the Middle of the Road: New Thinking About Roads, People, and Wildlife*.



THE
EXCERPT



November

The day the idea arrives I am wanting badly to escape. Home from work and too wound up to stay inside, I open the back door, step out. A nerve at the back of my eye buzzes as if the whirr of the computer screen has got inside my head. My shoulders are hunched and my neck is stiff. A thick wad of muscle has bunched itself at the top of my spine and now I knead it with my knuckles, hard.

I'm tired. And I'm still wearing my work shoes, which are not made for walking about in a frosty garden, at dusk. But this evening I need to cover some ground—to get somewhere else, not here. In the back garden of an end-terrace on a busy road leading out of Oxford's city center you can only get so far. I count the strides, and make fifteen. Past the shed with a vine like a trailing wig and the pond silted with fallen leaves. Along the wall adjoining our neighbors' garden, which crumbles slightly when you touch it. Near the end of the garden this wall gives out altogether and becomes high beech hedge. Here is a compost bin, and then a thicket of weeds.

I moved in recently, with my friend Becky. I'd been offered a job working for a charity in Oxford just as the last project

A Honeybee Heart Has Five Openings

I'd been working on in the South of England was drawing to a close. The new one was a permanent contract, and after a lot of moving around over the last few years, that felt like an opportunity; a chance to stay in one place, maybe even settle down a bit. When I called Becky and told her I was moving to the area, she suggested we get somewhere together. So then we found this place. A redbrick two-story with clothes moths in the carpets and a narrow garden at the back that's grown overcrowded with weeds. That was a few months ago, and it hasn't been an outright success so far. The job's been tough, and I've been struggling with the workload. Wishing I had a thicker skin, and was better at managing things like office politics and fluorescent lightbulbs and those desk chairs with the seats that spin and spin. Last week, a colleague told me that both my predecessors quit when they hit overload, and it was clear from her face as she took in my rather diminutive frame that she was not expecting the story to be any different this time around.

At the far end of the garden is a wooden fence. It's hidden behind a loping conifer and dried-up gooseberry bushes, hidden again under a mess of brambles, so you wouldn't know it's there or quite where the garden ends—except for a gap to one side, between a holly bush and a bird feeder, where you can see it. I squeeze through, and touch the fence. Tiptoe up, but I can't see over it. And now for one moment, maybe two, sheltered by the holly, which also pricks my thighs, I forget where I am. Forget the house that doesn't feel like home yet, and the hectic work schedule. This is when the idea arrives. Here is where the bees would be, I think, and then catch myself thinking it. Step back with surprise. It used to be a habit, looking for gaps like this. It's been a while since I remembered it. But now I begin checking for prospect, wind exposure, the damp. I glance up, to where the trees won't shadow them. There's a warehouse

Doorway

roof some distance away, the sun sinking. A plop behind me, as a raindrop falls.

I learned a bit about beekeeping a few years ago when I lived in London, where I met Luke, a friend of a friend, who had hives all over the city. His beekeeping began as a hobby: he was given a small plot at the Natural History Museum in exchange for a pot of honey each year—but then it grew. Soon he was being approached by other companies who wanted to keep bees, and they were offering to pay him. By the time I moved to London and asked for an introduction he had hives at magazine and fashion houses, pubs, hotels—he was keeping the bees and training the staff until they could do it for themselves.

The first time we met, Luke was wearing a cream three-piece suit, a pink shirt and a summer boater, and he was swinging a blue IKEA bag. He exuded charm—“*Helen!*” he beamed when he saw me. “How *wonderful* to meet you!” We were outside Coram’s Fields, a children’s park in central London, where he kept two hives in a thin strip of undergrowth behind the café.

“So you want to see some bees?” he said, and I nodded. Underneath his hat was a head of short gray hair. He looked a bit like a mole, I thought, as I spied metal contraptions and gauze masks inside the bag. “Some people believe that bees can smell your fear,” he said, as he unlocked a gate in the iron railings and we followed a gravel path around. So as we pulled on our suits I concentrated on not being afraid, but when he lifted a hive lid and they began seething out I was terrified.

I hadn’t even realized until that day that honeybees are different from bumblebees; that there are over twenty thousand species of bee in the world, and only a small fraction of them make honey. “*Apis mellifera*,” Luke announced, as though in-

A Honeybee Heart Has Five Openings

roducing an old friend. That's the western honeybee, and the one most extensively kept and bred.

These bees were not fuzzy and they were not soft. They were brittle and trembling and when Luke lifted the hive lid they didn't buzz, they hummed—like a machine but more unstable, more liable to volatility. Beneath the lid the space was packed with wooden frames hanging perpendicular to the roofline, each one filled to its edges with comb covered and crawling with bees.

“Look,” Luke said as he lifted a frame out, pointing first to where the queen had laid eggs inside the cells, then to where the workers had stored pollen for feeding young larvae, and finally to where nectar was undergoing its conversion to honey. Honeybees are among the few species of bee to live together as a colony—even bumblebees, who are social in summer, reduce down to a single queen in winter. They work to produce as much honey as they can while flowers are blooming, so as to sustain themselves through the cold season.

They were crowding from the frames and from the entrance. We had unsettled them, and now they wanted to unsettle us in return. I glanced over at Luke, who was working calmly and swiftly, with an ease I hadn't noticed before.

“They're swarming!” I yelled.

“They're not swarming,” he said. “Swarming is what happens when a colony splits and leaves a hive; these lot are just defending this one.”

I was hooked. By the bees, and by the beekeeping too—those precise and careful movements that were not unlike a kind of tenderness; not unlike a kind of intimacy. Soon I was beekeeping whenever I could. Luke would send a text message with an address and a time, and I'd jump on my bike and race through the streets to go and join him. It felt like slipping through a

Doorway

hidden side door, stepping slightly outside the flow of things and into a different version of the city. Nothing was as it first appeared when we went beekeeping. Walls had recesses, windows could be climbed through, roofs climbed onto. We followed underground tunnels and hidden passageways, entered green spaces I hadn't guessed were there. But all of this was peripheral to the actual task of opening a hive, when we had to settle down, become very attentive to the colony and ourselves. The beekeeping suits covered us from hooded head to boot-clad ankle, and looked more like they'd been designed for protecting against nuclear radiation than opening a beehive. Inside the suit I was both cocooned and strangely conspicuous—that space behind the café at Coram's Fields bordered a pavement, and passersby used to stop and point through the park railings as we worked. We hardly noticed them. Once the lid was off, we were absorbed. Each movement of arm, leg, hand and head was freighted—a sudden grab or drop would disturb the bees, and then we'd have to watch awhile and wait as the disturbance moved through the colony as a wave or a change in frequency or a shudder.

I could do with finding a hidden door now, I think to myself, crunching back over the frosted grass of the Oxford garden with my arms folded and my hands tucked into my armpits. Perhaps I *will* get bees, I think, looking up. And by the time I've reached the back door of the house the idea is already taking shape in my mind, gathering and becoming solid, bedding itself in.

Yes, I think, eyeing the collection of abandoned plant pots by the doorway. We could do with a bit of pollination here. Something to inject a bit of life. My fingers are like ice blocks

A Honeybee Heart Has Five Openings

and I'm not sure if they're freezing my armpits or if my armpits are thawing them.

Next day I'm at work again, pinned between a laminate desk and a wall.

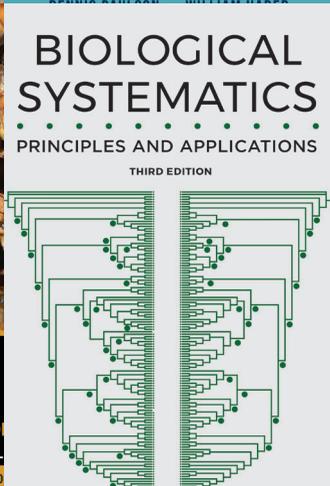
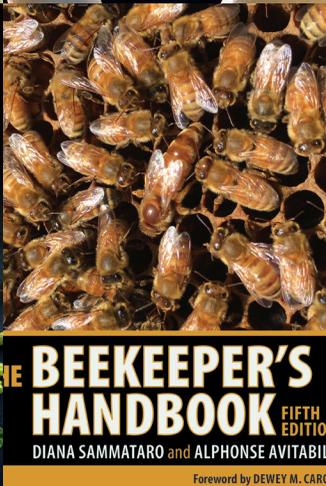
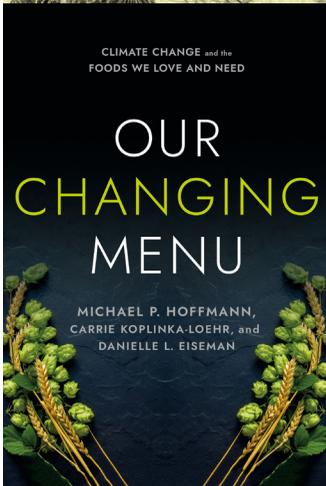
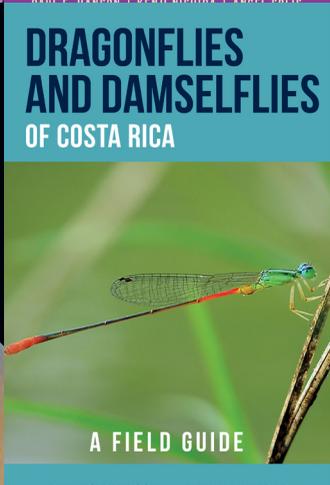
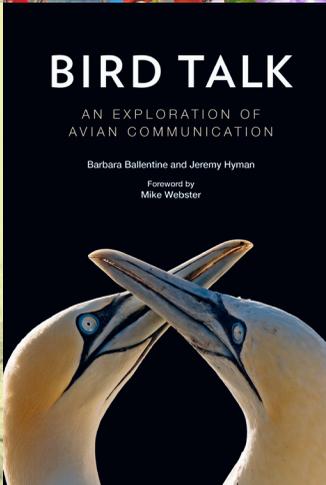
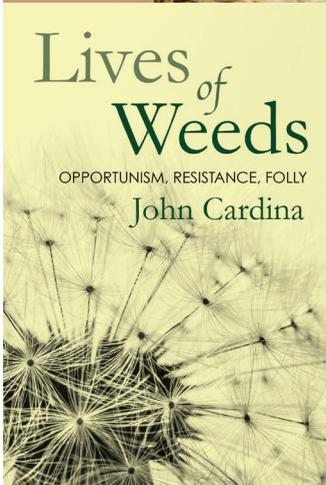
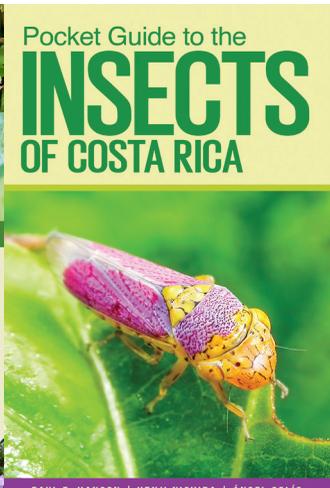
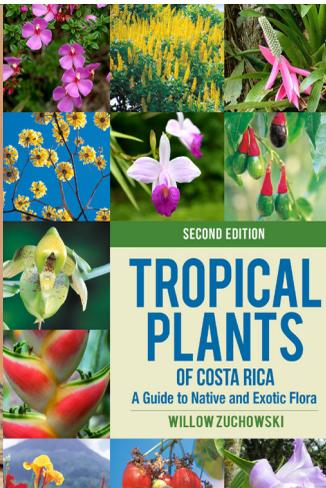
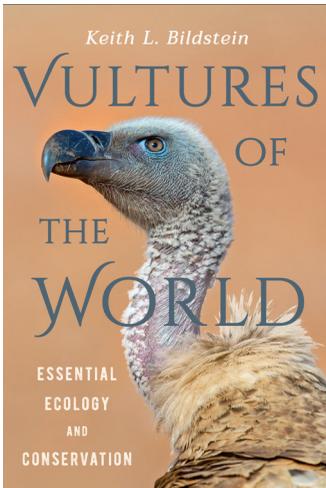
The office is small. There are five workstations jigsawed in, each one a slight variation on a type. Desk, computer, chair, worker—like not-quite-conjoined cells, and you can't see who's inside each one except by leaning, which is a dangerous game when you're seated on a swivel chair with wheels.

It's late afternoon and my attention has strayed. The plant I brought in to brighten my desk has died, and I am unsure how to dispose of it. Outside in the corridor people are shuttling past, shoulders pinched, their feet thudding dully over the squashed-down carpet hair. A girl from the marketing department hurries in and dumps a pile of papers on my desk. "You asked me to print the posters but I can't print the posters," she says, loud enough that everyone else in the tight-packed room can hear her. She can't print the posters because the printer is broken, and the person who normally fixes it is off with stress.

We look at the pile of papers. She shrugs at me. Then she turns on her heels and leaves.

I shift the pile to the edge of the desk and blink at my computer screen. I want out, I think, then quickly bury the thought. Because I can't just get *out*. I've moved houses, changed cities, to take this job—I can't just up and leave.

The skin around my eyes is tight. Maybe the screen is too bright or my focus is too narrow or maybe the muscles are tired of bracing themselves against everything that has been pressing in. I rub my eyes, refocus. This is when the idea comes back again.



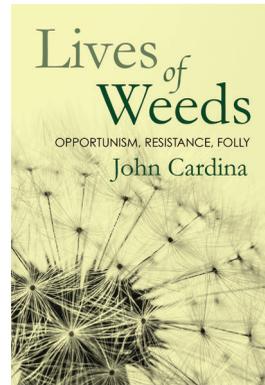
The Article

WEEDS OF CHANGE

by John Cardina

Nature responds to us, how we behave, understand the world, and practice our values. But the scale of global change is so great that one person's daily choices seem insignificant. Communities are recovering from the latest hurricane made worse by atmospheric warming. But who can possibly see a connection between a trip to the grocery in the SUV and the next tropical storm? To get a more intimate sense of how nature responds to us, it helps to look at weeds.

Lives of Weeds explores connections between humans and the natural world. Weeds are part of everyone's life. Even if you've never tangled with them in a farm, garden, lawn, or flower pot, weeds are present in hay-fever pollen and in the cost of food and hundreds of products. Choices about your food, health, and lifestyle are reflected in the weeds that persist in your neighborhood and infest local farms. We all live lives of weeds whether we know it or not. Looking at weeds, we can see our connection to natural processes, even things like evolutionary changes and adaptation to a warming climate.



In my own backyard, just this morning, I spied a patch of weeds that got away. I thought I had them beat this time around. After all, I had cleared all the lambsquarters and ragweed in June. But when my enthusiasm slumped in summer heat and humidity, the late-season goosegrass and carpetweed found a happy home beneath the fading green.

To get a more intimate sense of how nature responds to us, it helps to look at weeds.

Last week on a visit to center city Philadelphia I was greeted by a tangle of different weeds—marehail, pigweeds, foxtails, and crabgrass. What luck: I'd found a parking space. Beside the meter, a haggard tree surrounded by waist-high weeds. Down a few blocks of noisy gritty sidewalk, the pavement cracks sprouted with botanical diversity: barnyardgrass, nutsedge, purslane, smartweed, and bindweed. Farm weeds. In the middle of the city. How did this happen? What does it mean to find them here?

I explore such questions in *Lives of Weeds* as a way to link plant ecology with human ecology.

The weeds tell a story. They tell of the history of the place, the people who make their home there—their health and happiness and the quality of their lives. Weeds and people are inseparable. So are their histories and their fates.

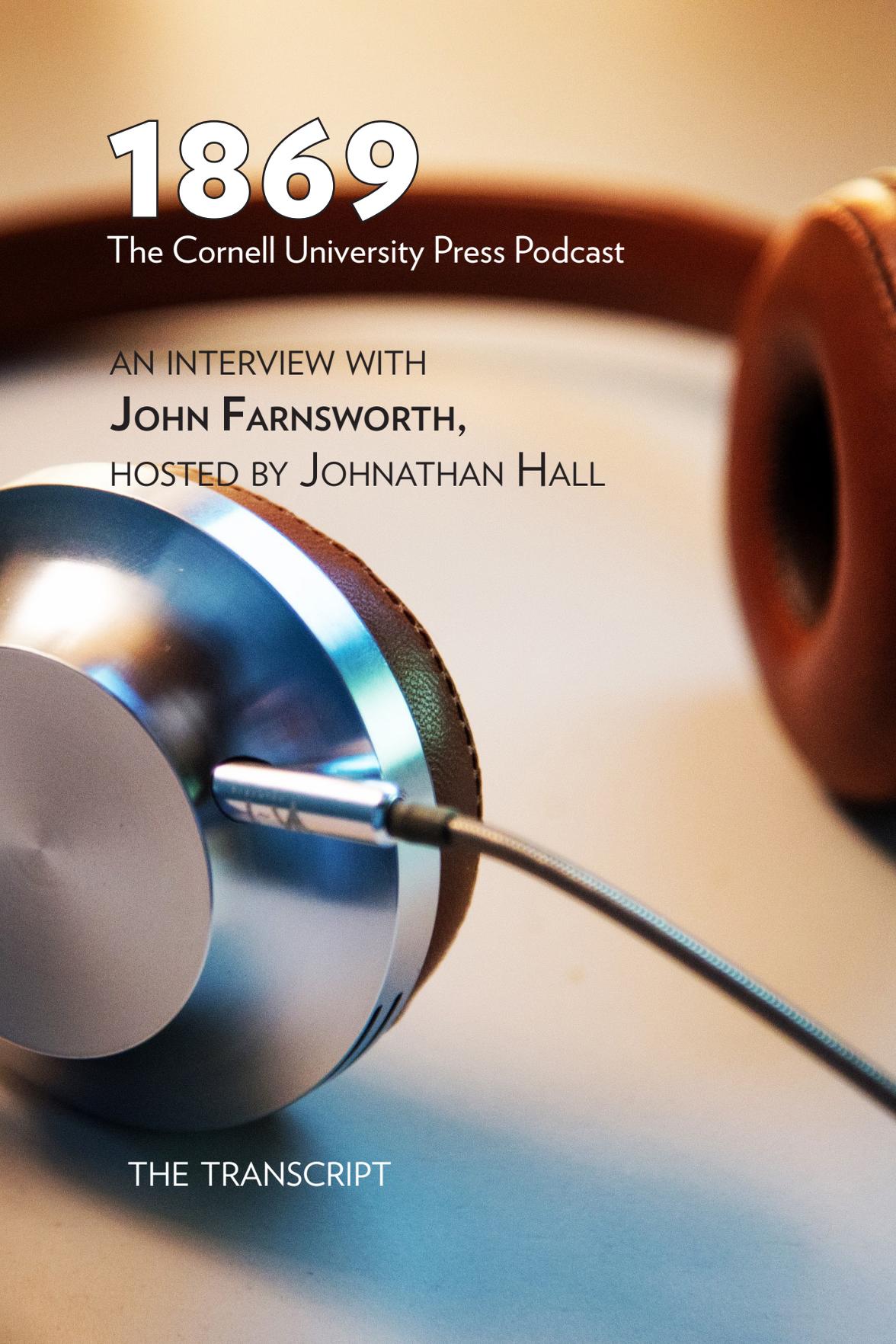
You plant a garden that reflects your taste in flowers, herbs, or vegetables. The weeds in your garden are the types that tolerate the practices you use to bring your favored flora to fruition. The weeds that celebrate life in my garden reflect my own hapless efforts to be rid of them. The patch I discovered in my garden today is a tribute to simple laziness.

The weeds tell a story. They tell of the history of the place, the people who make their home there.

Likewise, city streets host a diverse weedy plant community that represents the breadth of diversity in the surrounding human community. Cities are crucibles for the mixing of cultural and genetic materials and information, human and botanical. They reveal ongoing migration, settlement, redistribution, along with commerce and trade, and culture including culinary traditions and habits. So farm weeds far from the tractors and herbicides reflect incredible mobility of people and machines along with urban-rural linkages.

Even the weeds along suburbia's green lawns and edge-trimmed driveways tell a story. Stinkgrass, spotted spurge, path rush—survivors of the springtime herbicide sprays. They are flat creepers, too low for the blade, and generally homogeneous, monospecific, reflecting surrounding regularity.

Weeds respond to our manipulation of the environment as we react to them. Pull one weed and another—tougher one—replaces it. Scale up to the burning, plowing, and draining of vast areas of grassland to build farms or cities, or suburban allotments. Now spread that environmental manipulation around the world: industrial farms and confined animal feedlots with herbicide-resistant weeds outside of urban centers linked by petroleum. Call it development. Call it lifestyle choices. The weeds are still there—robust kudzu, phragmites, and giant knotweeds.



1869

The Cornell University Press Podcast

AN INTERVIEW WITH

JOHN FARNSWORTH,

HOSTED BY JOHNATHAN HALL

THE TRANSCRIPT

JONATHAN Welcome to 1869, The Cornell University Press Podcast. I'm Jonathan Hall. This episode we speak with John Farnsworth, author of the new book, *Nature beyond Solitude: Notes from the Field*. A lifelong student of literary natural history, John taught environmental writing and literature at Santa Clara University. He is author of *Coves of Departure*, also from Cornell. We spoke to John about his positive experiences at six different fields stations along the West coast. Why in nature, it's hard to see what you are not seeing, and why he believes we are now entering a golden age of Natural History. Hello, John, welcome to the podcast.

JOHN It's good to meet you, Jonathan. Finally, nice to meet you as well.

JONATHAN Congratulations on your new book, *Nature beyond Solitude Notes from the Field*. Beautiful, beautiful cover, we're getting a lot of great comments online about the cover, people are loving the cover, and they're also loving what's inside, and we're getting some good reviews. So tell us what inspired you to write the book.

JOHN The inspiration for this book came in a few ways—there wasn't an a lightning bolt moment. My previous book, which was with Cornell as well, *Codes of Departure*, there's the main narrative about kayak expeditions I took with my students. But I interrupt them with two interludes, I call them, where I've included basically my field notes from two visits to two visits to field stations down in Baja. And as I was getting feedback from other writers, they were telling me that that was their favorite part of the book, you know, these interludes, and I thought, I wonder if I could do a book, just of field notes, just of visits to field stations, kind of in a dreamy way. And then I was at a seminar with Dr. Peter Kareiva, who at the time was the Chief Scientist for the Nature Conservancy, friend of mine. And he had been, he's a fellow with the National Academy of Sciences, and had been on a committee that was looking at better ways to preserve and make more sustainable biological field stations. So the seminar was about that, and he was talking about trying to find new matrixes, to show the worth of these stations. And because he's speaking, as a scientist, and as a scholar from the humanities, the environmental h umanities, I'm thinking, now what you really need to do is just tell the story of these stations. So that was kind of the second layer of maybe I could do this field notes thing and tell that story. And I decided just to try experimentally, I started researching and I was seeing a lot of the most interesting stations to connect with. We're doing long term studies, like 45-year studies, 30-year studies, and so on, which all the studies in this book are, you know, one of them's a 200-year, proposed study. So I thought, I'm gonna, I'm gonna just kind of reach out to one of these, and it was a professor from Cornell, Walter Koenig, who is involved in a 45-year long study of acorn woodpeckers and their cooperative breeding. And I wrote to him and I said, I'm thinking about this book. And I'd love to join you for two weeks to a month and just be an unpaid research assistant and write about it. Within 30 minutes he wrote me back, welcomed me to the team, started

setting things up. And I think that was the greatest inspiration—it was just the people there in the field were saying, “yeah, come do this, be part of us.” I wrote to six field stations. And within a month five, had me on board, and two set me up with residencies. I was getting honorariums. I was getting grant money. So there was enthusiasm on the other side. And, and I expected to have to jump through a lot of hoops and run into brick walls and all that. And there’s a little bit of that, you know, I was in the field for six months. But certainly the inspiration I got from the principal investigators I was working with initially told me this is the right this is the book to write right now.

JONATHAN Excellent. Excellent. So you’re getting a lot of positive feedback right off the bat from people in the field.

JOHN Yeah, a real sense of welcome. Usually within an hour or two of when I showed up at a field station, I’d be teaming up with someone going out in the field and actually doing work. So there was there was not ever a time where I felt like a stranger at these stations. And that that was no matter where I went. We were We were involved right away in their projects.

JONATHAN Excellent. Excellent. So reading your book, I see that there are six stations you studied, there’s the Hastings Natural History Reservation, the Santa Cruz Island Reserve, the Golden Gate Raptor Observatory, HJ Andrews Experimental Forest, and the North Cascades Environmental Learning Center. It’s difficult to choose amongst all of these places, but you have a favorite memory from one of the sections in the book from your notes.

JOHN Hmm. I think the cool thing about it was I was working basically south to north. And so I was with the seasons. I was almost working backwards. But I was trying to start at work when I was working at Hastings and then the Santa Cruz Island Reserve. I wanted to be there during nesting season and during, during times where they were doing specific surveys or whatever, I think the Santa Cruz Island Reserve was the coolest place to be only because I was in a part of the island, about two thirds of that island is controlled by the Nature Conservancy, and then the Reserve itself, which is part of the University of California system. And nobody can get back in there. Unless you have a research permit or you’re there with a class. So I had, I had kind of this island to myself a lot of the time unless I was working with other researchers. And that was just cool. That was it was neat to be at a place where I had a very unique access while they were doing restoration ecology.

JONATHAN Yeah, that sounds amazing to have this sense of being in this isolated area that you you know where people are, but you also know that you’re one of the few on this island.

JOHN Right. And we were working there with island foxes, which is like a grey fox only smaller. It’s like a miniature version, there’s a thing called island

dwarfism where a species will kind of, they even have one less vertebrae in their tail. And they're there maybe three pounds, they're they're no larger than a cat. They can climb trees, but they're they're kind of tame, they'll come right up to you. Especially if you're cooking chicken outside or something like that. And to have that kind of access with a species that was hugely endangered five years ago, and just now got taken off the endangered species list. It was neat to do that kind of research and to be in an area where the normal public doesn't get to do that.

JONATHAN That's such an amazing experience. You start off your book with a quote from Henry David Thoreau. "The question is not what you look at. But what you see." Tell us a little bit more about how this quote from Thoreau informs your writing informs your experience and your philosophy of life.

JOHN I had a transformative experience. Decades ago, I went to a writing conference called Art of the Wild. That conference hasn't existed for 20 or 30 years now. But one afternoon, we were having activities. And one of the possibilities was going on a butterfly hike with Robert Michael Pyle, one of the great lepidopterists in the country and a fabulous writer. And there were also wildflower bird hikes, but I knew the wildflowers, I knew the birds, and butterflies I didn't really know much about at all. So I thought I'm gonna go out with this famous naturalist and learn butterflies. And we started up a trail that I had hiked the day before, and I had not seen any butterflies. And I almost said Hey, Bob, maybe, maybe you want to take a different trail. But I was smart enough to keep my thoughts to myself. And as we went up, there were butterflies everywhere. And more species than I even knew existed. And you know, he was capturing him in his butterfly net. And we were getting a close up look at him in awe. And I had hiked that same bit trail the day before and hadn't seen a signal butterfly. And that taught me something really important about observation. You know, we saw the butterflies because we were looking for the butterflies. And that transformed how I approached nature. Sometimes it's just hard to see what you're not seeing. And that's something I work on with students and one of the first writing exercises we'll have in class is what did you fail to notice when you came to class tonight?

JONATHAN I like that. I like that. And so when you're out in the wild when you're out in nature, what type of frame of mind do you have? Are you just open to any possibility? So you're so your eyes are as wide open as possible. How do you experience?

JOHN One of the things I learned from my PhD supervisor, the great Scottish nature writer Kathleen Jamie is, you really look at the common so that when you see something that isn't common, then you know. But to not just always looked for the exotic but to really get to know the landscape as an important first step. In this book, I was trying to not only write about nature, but to write from nature. And so I made a commitment

to the reader that everything would be written in situ, not only from the location, but from the moment. So I would maybe do four hours of field work every day, and then spend four or five hours writing that up, of course, taking notes during the fieldwork, and then transplanting them when I got back to my cabin or whatever. So that was a very immediate experience of writing that way. I don't know that I'll do it again. Because it was it was pretty intense. Aldo Leopold said in his Sand County Almanac, he said that books about nature, rarely mentioned the wind because they're being written from behind stoves. And I wanted to do just for my own self, a different way of writing from nature so that the reader, hopefully as I'm doing this work in these field stations is kind of peering over my shoulder.

JONATHAN That's great. How do you how do you feel your book will impact readers as they're reading it?

JOHN I don't know. And, Jonathan, part of that is because I don't really write to impact anyone other than myself. I can tell you how it impacted me that that process. But I'm not trying to change anybody's mind or make them feel the same way as I did. But certainly there were two major lessons for me as I spent six months in these field stations. The first is that I was just impressed about the the the quality of the natural history going on that the the depth of the research, there's so many new tools they have that didn't even exist when I was an undergraduate. And I make the case that I really think that we're entering into the golden age of natural history. And I think, I think that's going to be controversial, because so many people are thinking that we're seeing natural history on the decline. There were certainly fewer and fewer people specializing it at the university level and so on. But I came away from that experience, really, not only energized, but hopeful about about what I was seeing the people I was working with in the field, were just wonderful. The other thing, and I really hadn't expected this, but you know, most of the principal investigators I was working with were, you know, old white guys my age, facial hair, kind of what you'd expect. But the young people were overwhelmingly female. And that certainly changed the nature of community in these stations. And I think as these people progress from being interns and research assistants, to grad students, and then finally, you know, start their own labs and stuff, I think that's going to change the very nature of the science. And I think that's going to be very good. So I came away, encouraged about the future of of these kinds of projects. I certainly hope that by telling the story of these field stations, I can be part of promoting their preservation because it's expensive for a university or a conservancy, or bird observatory to keep these things going. But when you look at these long term ecological studies, we're learning stuff that we're just not going to learn from people doing PhD dissertations that take three years.

JONATHAN Yeah, yeah. You mentioned the future and the future of natural history writing. And the books that you've published with us, *Coves of Departure*

and *Nature beyond Solitude* are part of this. You passing on the torch you passing on your wisdom, and in correspondence you've let me know that you're actually teaching workshops on how to write about nature at Hugo House in Seattle. What's it like to teach nature writing in a major city, in Downtown Seattle? What's that like?

JOHN

Well, yeah, I have to say, I've been here less than two years. So I'm still a stranger in a strange place. Seattle's got the most marvelous topography surrounding it. You know, you've got Mount Rainier, to the south, Puget Sound to the west. And then beyond the sound. On the other side of the sound, you've got the Olympic Peninsula, and from the Seattle shore, you can see the Olympic Mountains. To the north, you've got the San Juan Islands. And to the east, you've got the North Cascade Mountains where I spent a month in the fifth chapter of the new book. They're just absolutely spectacular. Seattle is very urban and has very urban problems. Two days ago, in the Seattle Times, there was an article about the county is now seeking a permit to harass bald eagles because there are more than 200 bald eagles feeding in the county dump. Yeah, I mean, how many how many cities have that kind of problem?

JONATHAN

It's a high-quality problem.

JOHN

Yeah, it is a problem because the eagles are opportunistic feeders. And they'll do whatever they need to get protein including scavenge. But they would prefer to be eating fish. And right now there's not enough salmon in the rivers to take care of their population. So they're doing whatever they have to do. So there are conservation issues there. I'm conservation chair right now for the Seattle Audubon Society. And we had a meeting last night, a regular scheduled meeting where this eagle question came up. And, you know, we're really scratching our heads. What do you do about 200 bald eagles in the dump, other than, of course, help try to restore the salmon population, which is desperately needed up here in the Pacific Northwest. So you've got this great nature. I've got these students who are our wonderful naturalist really outdoors people, one of the sweetest classes I've ever taught. A couple of weeks ago, we had a gang shooting right before class, it was eight blocks away. And I was started getting text messages from students, I've tried to leave my building, but the police are making a shelter in place. I can't get downtown because the buses have all been suspended and so on. So I started with the class of 14, I started with five people. And then another person came in half hour late and said I had to walk I couldn't get a cab. I couldn't get a bus. You know, Uber wasn't running. So you know it. We were a little distracted from nature. And that particular session, but it's Seattle is something it really is we've we've we've got a grounding here, and yet the growth with all these corporations, you know, Amazon, Microsoft, Boeing, the growth is so severe that it we're really fighting to keep some sense of an urban canopy. Seattle wants to keep 30% of its tree cover within 20 years. And that's so hard to do when you've got all this development going on and

so on. So it's exciting because it's in a place where I get to spend the next couple of weeks researching bald eagles and dumps.

JONATHAN You're very lucky. I mean, Seattle, Portland, and Vancouver, that whole northwest corridor, those cities have a very strong level of environmental consciousness and environmental pride. So you have a ready population for your teaching of your class.

JOHN Yeah, I think our classe called "Reading Nature," it's going to fill up, you know, that's, that's for sure in this area.

JONATHAN That's great. That's great. Well, I wish you the best of luck with this ten-week workshop that you're doing at the Hugo House. And I want to congratulate you again for your new book, *Nature beyond Solitude: Notes from the Field*.

JOHN Thank you. Thank you, Jonathan, for all you've done to help bring that to its readers.

JONATHAN Oh, our pleasure. And it was a pleasure talking with you.

JOHN Okay, all right, you take care. Thanks, Jonathan.

JONATHAN Thanks, John.

That was John Farnsworth, author of the new book, *Nature beyond Solitude: Notes from the Field*.

THREE QUESTIONS WITH DARRYL JONES

author of *A Clouded Leopard in the Middle of the Road*

1. In both *A Clouded Leopard* and your previous book, *The Birds at My Table*, you choose to adopt a more narrative and conversational tone. Why did you opt for that, rather than a more formal voice??

The choice of the highly informal writing style was deliberate and comes from a critical approach to a career-long practice of popular science writing. My primary objective has always been finding better ways of effective communication. A lot of discussion following my recent books made me much more conscious of the language used. Here I am writing for an audience who may almost certainly

to the peripheries and transition zones of established fields, mixing with colleagues from a wide range of disciplines. These are places not well understood or accessible to those outside the specializations yet are of enormous significance to conservation and sustainability. I was one of the first active urban ecologists in my country and have become used to being regarded as being a bit “fringe.” Yet these topics have turned out to be vital to contemporary conservation efforts.

If there is one take-away from reading this book
it is that there is genuine hope.

completely unaware of this topic and need as much assistance as possible to get across often complex ideas. The field of road ecology is very technical, populated by engineers, ecologists, or planners who are often not aware of the community and how best to get their messages across. I hope I have managed to bring a new, reader-friendly way into that unfamiliar world.

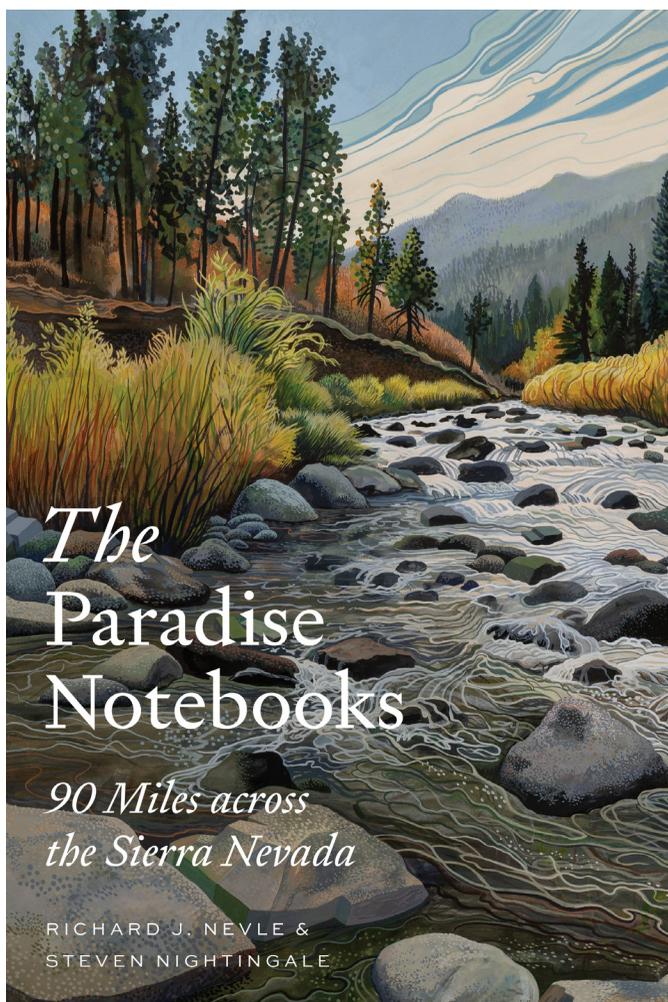
2. For both of your books, you chose what could be considered more niche topics in the broader field of animal conservation. What led you to these topics?

I've always appreciated the importance of interdisciplinary approaches to the many complex problems we face. This has naturally led me

3. What do you hope readers will gain from reading *A Clouded Leopard*?

If there is one take-away from reading this book it is that there is genuine hope. The environmental messages from across the world are so relentlessly negative at present that people do need to see that positive and affective action is happening. I certainly do not shy away from the perilous state of things but my mission here is to demonstrate how, around the world, extraordinary partnerships have led to amazing outcomes for people and biodiversity.

THE
EXCERPT



The
Paradise
Notebooks

*90 Miles across
the Sierra Nevada*

RICHARD J. NEVLE &
STEVEN NIGHTINGALE

SETTING OUT

We were two families: Richard, his wife, Deborah, and their daughter, Sophie; Steven, his wife, Lucy, and their daughter, Gabriella. In the summer of 2017, we planned a hike through the High Sierra with the idea to traverse the whole range, west to east. To prepare for the trip, we read the accounts of those who preceded us on the trail and found alarmed posts about the dangerous currents in the creeks, their danger multiplied for us by our carrying heavy packs. And then there were stories of rattlesnake infestations in the lower elevations and even a photograph of a mountain lion lying in the middle of the trail. And we knew that, early in the trip, the climb to Kaweah Gap might require a crampon and ice ax traverse across a steep and icy snow chute.

But on August 3, we set out, and over the next thirteen days walked ninety miles. Beginning at Crescent Meadow in Sequoia National Park, the hike led us through big valleys, along the edges of precipitous canyons, over passes and around blue and silver high mountain lakes, to the summit of Mount Whitney; through brilliant green meadows and by the sides of creeks that, because of the big winter, had become torrents. Our destination would be Cottonwood Lakes in the Golden Trout Wilderness, on the eastern side of the Sierra, looking east over the Great Basin.

Our daughters were close friends, both sixteen years old, and followed the trail with the speed and grace of gazelles. The rest of us strode along in their slipstream.

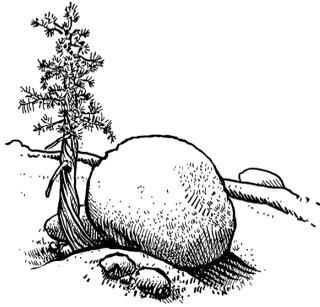
Our journey across the range was more than an excursion through terrain filled with resurgent wildness. It was a vanishing into beauty, in which our lives were re-created from within by the power of the mountains—beckoning, forthright, irresistible.

STONE, FIRE, WATER

The essential thing is to become again the light vagabonds of the earth.

—Jean Giono

GRANITE



With hope one can do anything. And the mountains that one causes to arise
are real flesh-and-blood mountains and the trees are at home on them and
the streams sleep on beds of granite as clean as golden corn.

—Jean Giono

Passive—as Granite—laps my music—

—Emily Dickinson

8/3/17, Day 1. Up at 3 am, anxious. Feels like pre-race jitters. Big breakfast at the lodge at Cedar Grove. Last real coffee for two weeks. Skies overcast, humid at the trailhead. Thank God, moving at last. Afternoon splinters of lightning and cracks and booms of thunder. Reached a creek that was raging fast and had to scoot over a log bridge. Sketchy. Lush, lush, lush along the trail. Wildflowers everywhere. Ferns and elderberry. Fireweed, different species of paintbrush, sneezeweed, pale blooms of tincture plant, sprays of groundsmoke, little eriogonums.

Granite is the geologic backbone of the Sierra Nevada. The great spine of rock holds diverse forests, dreamy meadows, skeins of streams, radiant lakes, and rare glaciers. Life ascends even to the highest reaches of the range, thousands of feet above tree line, where gardens of black, orange, and chartreuse lichen adorn the rock. Everywhere a tenacious living skin sheaths the ancient bones of the mountains. But this choice of metaphor—life as skin—is one shaped, like so much of our understanding about the universe, by a particular, human, limited experience of time.

Imagine, for a moment, if we could peer through a lens that sped up time so that centuries hurtled by in seconds. Trees would leap into the sky as they snaked their roots into fissures, wedging and prying apart the granite. Lichens would spread across the rock, enlivening its surface with colorful splotches, secreting caustic acids, and digesting minerals. Exposed to such vigorous and irrepressible activity, stone monuments would decompose over the course of a few, brief, time-warped days into humble soil. From the rock's perspective, this so-called living skin might seem more invasion than ornament.

If our lens allowed time to race by even faster, whole eons drifting by in hours, we would learn that granite is a product of life, a rock unique to Earth, made possible by photosynthesis. The discovery of photosynthesis by primitive microorganisms had consequences: it transformed Earth's early atmosphere into an oxygenated, caustic pall that could weather rocks into dust with unprecedented efficiency. Dust is where granite begins. Such dust settles on the seafloor in thick, spongy blankets of sediment whose pores cumulatively hold small oceans of water, which with time is bound to minerals as sediment hardens first to sedimentary rock.

Then, where dense slabs of seafloor rock plunge into the Earth's scalding interior, dragging their sedimentary blankets and metamorphosed beds along for the ride, water is baked out and released into the overlying mantle. The flux of water eases the mantle's melting, giving rise to glowing, buoyant pods of magma that push up against and crack the rocks above. The magma ascends, penetrates the crust, ingests slivers of the crustal rock, and takes on the composition of granite before cooling and crystallizing into stone. It is in this way, from the seeds of dust, that granite emerges into the world.

Bodies of solid granite, when with time they rise to the surface by the action of tectonic events or slow mantle churnings, make great spines of mountains like the Sierra Nevada. The mountains heave miles up into the clouds, and life takes hold. Each living thing finds its place to thrive—the oak, the bear, the green bottle fly, the ruby-barked red fir too. Even among the highest peaks, the gray-crowned rosy-finch, the bighorn sheep, the pika, and the skypilot with its violet-cobalt blooms make their home among the enchanted stone that air and dust and time and life made possible.

—RJN



We might ask, as we look at any landscape, how its history resembles a land we carry within. Walking among the granite peaks, over the lichen, near the black bear, close to the marmot and among the meadows, we came slowly to understand that the whole Sierra is a most unlikely gift. In the sweep of time, it is a gift made just now, just here; a gift with the power to awaken us to our chance to watch and listen.

Sometimes the land turns into words; sometimes into proverbs.

As we hiked, what we saw—pines and oaks, grasses and lilies, coyotes and golden trout, root fungus and moss and the grace of deer—was just the beginning of what was before us. It was, and is, to the reality of the Sierra what the skin of a peach is to a peach; what the flashing of light on the surface of a river is to the whole surging river; what the first paragraphs of a beautiful book are to the finished and intricate story within.

This is true for everyone, wherever we are: what we see is the preface to what we can see. Beyond that preface, with work and love, is what we can come to understand.

If we can understand, then we can live.

In the Sierra, we understood that we might, after all, belong here with tree and rock and time and light. We might, for a brief spell of years, have the luck to find a home here by following the beauty that beckons us. We are spellbound here.

Thoreau wrote, in the last sentence of his book about life in a cabin alongside Walden pond, “The sun is but a morning star.” The thirteenth-century poet Rumi wrote, “As soon as you entered this world of forms, an escape ladder was put out for you.” Emily Dickinson wrote, “This world is not conclusion.”

If we are to follow such declarations, we have to immerse ourselves in this world, so as to find our way through to the deep reality of another world held within this one. It is as if the earth is complete unto itself, and yet a gorgeous portal. It is as if, over a long period of study, we must dissolve ourselves. In just the same way that oxygen was an agent of change, because of its toxic power, so the clarity we come to will break down the person we have constructed, who stands between us and reality. Once that dissolution has happened, then we can await the heat and

pressure and movement, the patient re-creation of ourselves, until one day in the sunlight we learn that our lives can hold oak and bear, green bottle fly and rough-hewn ridgeline. We can learn how a place we love composes us. We can work and live to honor the symposium of the whole.

Is it possible that we are unified, body and mind, with this earth, and the life it offers? That books are nature, and that we can walk across a beautiful meadow, even in our own houses? Is it possible that there is, in rock, a plainly offered paradise?

It's true, there's a wildcat in the pantry,
Falcons in your hat. To live wide and free

In this homely destination of soul, means
That we are here, friends, together, talking
In the sunlight as twenty antelope careen

Around the table, as from the next room
We hear books cartwheeling off the shelves,
Novels opening, women standing, themselves
At last, transfigured at last—whatever doom

Or triumph they suffered in their story, now
They set aside, for a chance to be walking
Curiously through a meadow, as the oaks bow

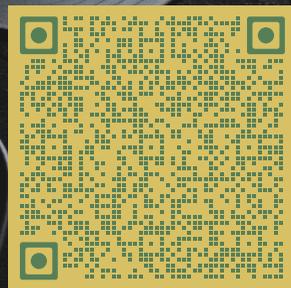
Before bullsnake, honeybee, and peacock,
Before paradise irrepressible in plain rock.

—SN



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The Article

BIRD MIGRATION, SONGS, CALLS, AND COLOR

by Barbara Ballentine & Jeremy Hyman

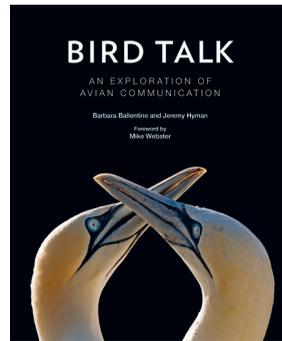
Spring arrives in the southern Appalachians with new colors as resident species are joined by the arrival migrants to fill the forest with new sights and sounds. A flash of yellow reveals a hooded warbler, a blaze of red a scarlet tanager. New sounds also announce bird migration to our neighborhood. Greetings of a bright “cheerio” or the hopeful echoes of “ee-o-ee-o-lay” alert us to the arrival of less flashy migrants like the red-eyed vireo and wood thrush.

Migration is one of the great spectacles of the natural world, and birders all over the world are welcoming the return of “their birds”. But of course, the migrant birds breeding in the forests surrounding our house are no more a North Carolina bird than they are a bird of the Caribbean, Central America, or South America. The same pattern holds true worldwide and billions of birds move between the continents. Because migrants are dependent on wintering and breeding habitats found on different continents, they face significant threats and conservation challenges, and many migrant bird species are declining.

World Migratory Bird Day, celebrated May 8th, is an annual event dedicated to raising awareness of migratory birds and the need for international cooperation to conserve them.

Greetings of a bright “cheerio” or the hopeful echoes of “ee-o-ee-o-lay” alert us to the arrival of less flashy migrants like the red-eyed vireo and wood thrush.

The theme of this year’s event was “Sing, Fly, Soar -Like a bird!” The focus on the song may act as a reminder that bird songs allows birders to identify unseen birds, which allows us to more accurately count populations of birds, particularly in forested habitats where birds may be hard to spot. On the same day, the eBird Global Big Day is a citizen event aimed at using citizen science to better understand global bird populations. Much of the data generated by such efforts will be collected by birders who identify birds by their songs. Data documenting bird abundance is extremely valuable in a time when many bird populations are declining.



The spectacle of bird migration, for one of us, led to a career in bird biology. And, for our students, the arrival of new birds leads to the discovery of a new world of sights and sounds. By encouraging students to recognize bird songs, we hope that we've added another dimension of enjoyment to their hikes, as they recognize the diversity of life present, and recognize that those songs, calls, and colors have meaning to the birds.

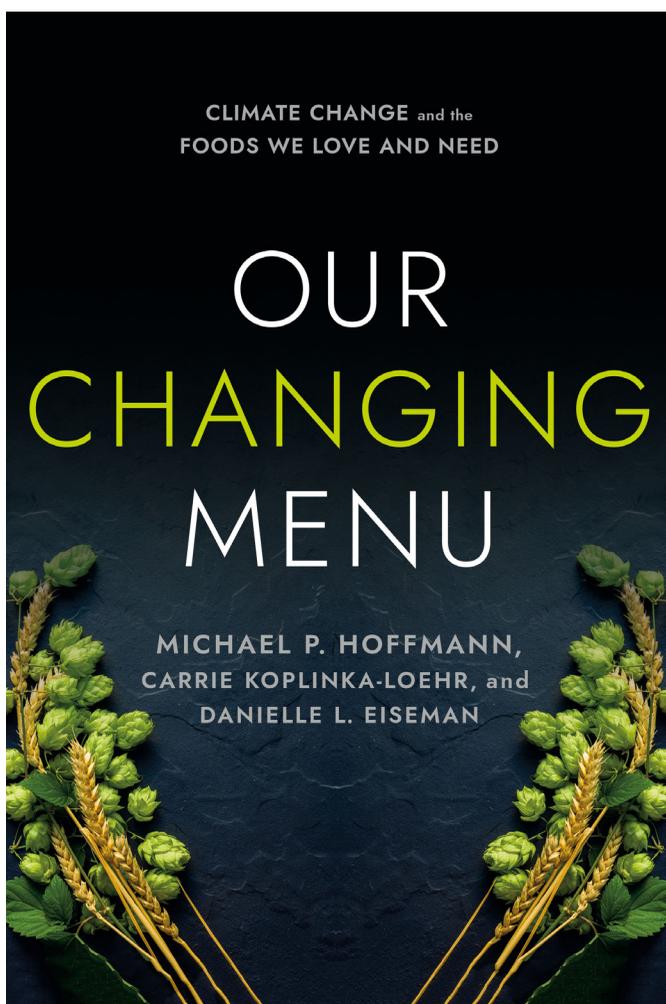
As the spring progresses into summer, we will hear the chipped warning calls of parents to each other, or the begging calls of new fledglings demanding attention from parents. As summer turns to fall we notice the ebb of songs in late summer and the increase of contact calls

The sights and sounds of birds not only help us locate and identify bird species but also give us insight into their inner worlds.

in the fall as migrants fly through the night to get to their wintering grounds. Fall migrants that stop by our neighborhood might look drabber as they have already molted into their winter plumage. The sights and sounds of birds not only help us locate and identify bird species but also give us insight into their inner worlds. We can track the progress of breeding birds as they arrive, attract a mate, raise a brood, fledge young and prepare for winter.

Bird Talk: An Exploration of Avian Communication examines research on bird behavior, recognizing that bird songs, calls, and flashes of color are not merely things to be enjoyed by people, but they are signals, and the birds are engaging in communication as they navigate their surprisingly complex social lives. Ultimately, we hope that learning to recognize birds by song and recognizing that may encourage people to care more about bird conservation and ensure that the sights and sounds of birds can be enjoyed by generations to come.

THE
EXCERPT



Introduction

It's bad enough that climate change is melting glaciers and causing the seas to rise, but to many people the potential loss of coffee is downright scary. If not coffee, consider tea, spices, chocolate, seafood, rice, wheat, or whipped cream. The entire menu, including the before-dinner drink, salad, main course, and dessert, is all changing. *Our Changing Menu* is intended to provide a wake-up call by depicting the sweeping changes coming not only to the staples we depend on but also to many of our delectable favorites.

Despite the legitimate potential for doom and gloom when writing about food and climate change, this book is in part a celebration of the foods and beverages we enjoy: the aroma of coffee, the sting of a hot pepper, or the bitterness of a hoppy beer. It's also a refresher on the history of some delightful cuisines, where they come from, and their contributions to cultures and the world's economy. We don't intend this book to be comprehensive. We chose to focus on key examples of foods, beverages, and ingredients to which most everyone can relate.

The audience for this book is very broad—we all eat. Whether you're a connoisseur of fine wines, chef, baker, distiller, restaurateur, CEO of a food company, or someone who simply enjoys a good pizza or great drink, it's critical to know what is happening to our incredibly diverse and interwoven global food system. The emphasis is on the world's rich countries, but especially the United States—the “we” in *Our Changing Menu*—because cumulatively, we have contributed the most to climate change and are best positioned to do something about it.

This book delves into the backstories of the foods that appear at our local grocery or favorite restaurant. We include interviews with people who

When the climate dishes up change

Before Leña Brava opens its doors, burly, soft-spoken Andres Padilla has time for a conversation in the dining room. Within earshot, cooks chop vegetables and banter as they prep Baja-inspired cuisine. Padilla is creative culinary director for six restaurants in Chicago, each conceived and owned by Rick Bayless, the author of nine cookbooks and host of the public TV show *Mexico—One Plate at a Time*.

One of Padilla's jobs is to source achingly fresh ingredients so chefs can transform them into entrées that tug at your heart with whimsy and intrigue. He has a very local source: Leña Brava's rooftop and backyard gardens and greenhouses, which yield flowers, herbs, and hundreds of pounds of vegetables each year. He buys almost everything else he needs directly from farmers within 250 mi. (402 km) of the restaurant.

When Padilla first began sourcing, he could depend on ramps popping up nearby in late March, morels after that, and then peas. "We got accustomed to getting them at a certain time," he says. "Seasonality is a huge thing for us."

But lately, foods that appeared like clockwork years ago now arrive weeks ahead of schedule, may be available much longer, or disappear unexpectedly.

Mexican cuisine relies on tomatoes, but in 2018 Padilla asked himself, "Where did all the tomatoes go?" The chefs had to stop making their

work the land, fish the seas, and make our wine and beer. Millions of people around the world are on the front lines of climate change, and we introduce you to some of them.

The book is organized like a restaurant meal but opens with an overview of the world's food system, putting the menu in a global context. Just where does our food come from? We are accustomed to an extraordinary interconnected network that provides fresh produce year-round. Many people are surprised to learn that most grass-fed beef consumed in the United States comes from Australia, that a lot of tree nuts are from Vietnam, and that large quantities of fish caught by the US fishing fleet are processed in China, then shipped back to the United States. Food is also big business, providing 40% of global employment and 10% of consumer spending.

INTRODUCTION

famous rooftop salsa when supplies failed and Padilla couldn't buy tomatoes elsewhere.

Similarly, he learned that warmer ocean temperatures are killing the kelp forests that sea urchins thrive on, threatening the supply of uni, the roe-producing gonads of sea urchins. "I've had to say, 'Sorry, chefs, no uni today,'" recounts Padilla. "I would try to order it, and the divers weren't having any luck."

Padilla wants to buy from sustainable fisheries but verifying a long chain of sources and distributors can require research for which he doesn't have time. He consistently opts for fish raised in farms he has visited because they are dependable and he knows exactly from where the fish are coming.

Two other items on the menu are rare mescals and tequila. Although both are distilled from the crushed hearts of agave plants, tequila is made from 100% blue agave, which can be cultivated. On the other hand, each unique mezcal is made from wild agave plants, some very rare and region specific. "One kind, *tobolá*, grows up high between crevices of rocks, and people have to climb mountains to harvest it," says Padilla. The plants are sensitive to human activity and changes in the climate. "If we continue to harvest at the rate we're harvesting without replanting to the wild, some types of agave may go extinct."

With a global view of the food system as a foundation, we shift to the broad challenge posed by a rapidly changing climate. Why is it changing? Where do greenhouse gases come from? What does the future hold? We live in a very thin layer on the surface of the planet, much like a peel on an apple, and it is warming because of the greenhouse gases we're pumping into it. And as we continue to warm this thin layer, glaciers melt, seas rise, and storms intensify; the climate changes. Be prepared, as this topic can be depressing and overwhelming, but it's an essential starting point.

All of these changes affect the plants we depend on for life. Plants need air, water, the right temperature, soil, and sunlight. The air now has more of the greenhouse gas carbon dioxide, which means that most plants will grow faster and bigger, but any benefit will be offset by stress from increasing heat and drought. More carbon dioxide also means less nutritious crops in the future and tougher pests to control. Precipitation for our crops

INTRODUCTION

is becoming less dependable in many regions. Rising nighttime temperatures are reducing yields of some crops. At the same time, some of the shifts may mean new crops can be grown in more northerly regions, benefiting their economies.

Strikingly, it's not just our favorite foods that are changing but also perfumes, flavors, pet foods, pharmaceuticals, cosmetics, medicinal herbs, clothing, and soaps. All these items, from the flowers used in perfume to the cotton in our clothing, depend on plants.

With this as background, we look closely at a meal, starting with alcoholic beverages. These beverages have been around for thousands of years, are important to many cultures, and are major contributors to today's economy. Beer, wine, and spirits depend on grains, grapes, other fruits, water, herbs, and spices (gins tap about 150 botanicals). That's all changing. Warmer winters in Belgium are threatening the production of some Lambic beers. Droughts are affecting not only the availability of hops but also the quality of water used in brewing beers. High temperatures alter the aromatic compounds and sugar levels in wine grapes and also increase the "angel's share" in bourbon production—the amount lost to diffusion through the oak barrels. Despite these challenges, brewers, vintners, distillers, and those who supply the essential ingredients are working hard to adapt, reduce their impacts on the climate, and keep these delightful beverages flowing.

The delicious and diverse salad is next on the menu. Increasing temperatures and extreme weather are affecting the production of salad ingredients, including greens, fruits, herbs, spices, and avocados. The United States is the largest importer of avocados worldwide, consuming about 4,000 tons (3,600 metric tons) of them on Super Bowl Sunday, mostly as guacamole. Olives are under stress in the Mediterranean because of higher temperatures and increasing droughts. Growers are adopting new ways to reduce stress on orchards, and some production is already shifting to regions where climate change is less challenging.

Following salads? The main course: pork, lamb, fowl, fish, and beef, which we eat a lot of in the United States. Meat has been part of the human diet for over two million years and is an essential component of diets for millions of people in developing countries. But the higher temperatures and droughts are affecting the animals we eat. At the same time, greenhouse gas emissions from the animal sector are significant and are start-

INTRODUCTION

ing to be addressed through improving animals' diets and grazing systems. This book encourages people in the United States and other rich countries to shift to a more plant-based diet and to view meat, and in particular beef, as a delicacy rather than a staple.

Chicken, another main course option, is the most widely consumed meat in the world. Along with chicken, the United States produced over one hundred billion eggs in 2017. Chicken and egg production in the United States is somewhat protected from climate change, since most fowl are enclosed in houses, but intensifying storms and heat waves have caused losses globally.

Fish and other aquatic foods can round out the main course choices. Seafood is big business, with the US fish industry harvesting 5 million tons (4.5 million metric tons) per year. The United States imports an additional 3 million tons (2.7 million metric tons). The most common seafood eaten in the United States is shrimp, usually imported from Thailand or China.

Because of climate change, the vast oceans are warming and becoming more acidic, with profound implications to this critically important source of human food. In some regions, phytoplankton—small floating plants that form the basis of the food chain—are declining, and oysters and clams, which depend on shell formation, are threatened by the increasingly acidic conditions.

What is needed to keep the menu supplied with this incredibly important food source? Given the scale of the challenge it is imperative to reduce greenhouse gas emissions worldwide, manage wild fisheries more wisely, and expand sustainable aquaculture.

Starches, grains, and other side dishes accompany the main course. Many of the grains are ubiquitous, such as rice, a staple for 3.5 billion people worldwide. Wheat follows closely behind rice in global importance, and in the United States, the potato is the leading vegetable crop. All are under increasing risk due to climate change, but in response, scientists are developing more climate-resilient varieties.

We ultimately arrive at dessert and coffee. Many flavors and key dessert ingredients, such as nutmeg, milk, maple syrup, vanilla, coconut, and sugar, are changing. Overheated cows give less milk; intensifying storms in Madagascar destroy vanilla farms; and a lot of coconut is grown near rising seas. Our beloved coffee is also changing as temperatures warm and rain falls at new times of the year. Here again, researchers are developing

Keeping current: Our Changing Menu website

We have created an online presence, Our Changing Menu (<http://ourchangingmenu.com/>), to complement this book. Because the foods we love and need are changing so rapidly, we believe it's important to keep information current. This website includes a searchable database of foods, beverages, and their ingredients so that consumers, chefs, retailers, food processors, and others in the food business can learn what is happening to their essential or favorite ingredients from around the world. Each item includes the nature of the impact, such as drought, floods, or high temperatures, its severity—currently and what is projected for the future—and where the impact is occurring (e.g., vanilla in Madagascar, spices in India, wine in California). Images, graphics, and sources for the science-based information are included. An interactive component allows users to share their experiences of changes in foods due to climate change.

new and hardier varieties and farmers are growing crops under shade trees to reduce heat and water stress.

After illustrating how the menu is changing, we switch to what farmers, businesses, and scientists are doing to save it. Farmers, the stewards of the land, are using water efficiently, keeping the soil healthy, adopting tougher crop varieties, and producing renewable energy with solar and wind. Many food businesses are also reducing their risks from climate change by assessing threats along their supply chains and supporting growers around the world to build resiliency.

The scientific community is also responding by developing climate-resilient farming tactics, crops more tolerant to heat and drought, and improved predictions of severe weather, to name a few. Unfortunately, federal support for research and development in the United States has declined. The government spends about \$4 billion annually on agriculture and food research. To give this some perspective, people in the United States spend over \$43 billion per year on video games and accessories. With the multitude of new challenges facing the food system, science—the pursuit of knowledge—needs to be valued and supported like never before.

We wrap up by describing what we can do. By reading this book you will be better informed about the causes of climate change, how each of

THREE QUESTIONS WITH KEITH BILSTEIN

author of *Vultures of the World*

1. What inspired you to write this book?

My love and biological appreciation for vultures.

2. How will your book make a difference?

This is the first global treatment of vultures, their biology, ecology, evolution, and protection as a group. I've taken an authoritative approach and used the accumulated wisdom of the field to draw attention to these oft-maligned birds.

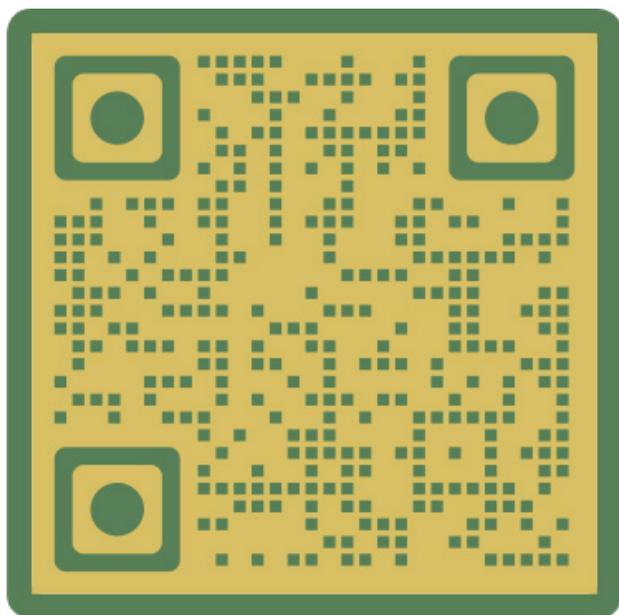
“I want to draw attention to these oft-maligned birds”

3. In what ways will your book resonate with readers?

The book describes how vultures evolved and speciated in both the new and old worlds that have enabled them to play critical roles in recycling elements necessary for sustaining ecosystems on six continents. More than simply serving as “sanitation engineers” vultures function as essential recyclers of essential elements in ways that allow ecosystems to function successfully across generations of organisms.

Over the course of the next twelve months we will publish more than fifteen new books about science and nature under our Comstock Publishing Associates. You can find these, as well as all books previously published by Comstock on our website. Either use your smartphone camera to scan the QR code below or visit cornellpress.cornell.edu/imprints/comstock-publishing to see our extensive list.

If you are a Comstock author and would like to have your work featured in the next issue of *Comstock Publishing Associates: A Cornell University Press Magazine* please contact the marketing department.



SCAN ME