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Introduction

WHAT ARE OUTSIDER ANIMALS?

When we lived in southern California, our house was on what is sometimes called the urban–wildland interface, where the city meets the less-populated and more rugged coastal sage scrubland. We frequently saw ground squirrels, fence lizards, and quail, with an occasional bobcat and roadrunner and, rarely, a rattlesnake.

I always maintained that unusual events—earthquakes, middle-of-the-night phone calls, power outages—were more likely to happen when my husband was away and I was alone in the house. Indeed, one night I was awakened by some odd rattling noises on the deck outside our bedroom. I was reasonably sure it wasn't a human intruder, because the deck wasn't accessible except up the hillside or through our bedroom door, so I grabbed a flashlight and peered outside. On the planks of the deck were four baby raccoons and an adult, presumably their mother. The little ones seemed to have discovered the hose and were romping around it while the adult looked on. They were making a fair amount of noise, and I was eager to get back to sleep, so I rapped on the glass door to the deck. No response. I rapped louder. Still nothing.

I opened the door and stepped out onto the deck in my nightgown, feeling a little silly, and shouted at them—probably something unoriginal like "Shoo!" or "Okay, enough." The young ones looked up, finally, and one of them stood on its hind legs and raised its forelegs invitingly, or at least it seemed inviting, as if saying, hey, want to play with the hose too? I assured it I did not, in fact, want to play, and tried to make yet more noise and disruption, but to no avail. The mother raccoon was unperturbed as well. Eventually I gave up and left them to it, feeling unnerved that my presence was considered so little of a threat.

Raccoons, along with coyotes, rats, gulls, and even cockroaches, are a good example of what I'm calling outsider animals, creatures that can intrude upon our lives and that may use our food or our buildings but that don't need us to survive. They live on the margins of our lives, sometimes obvious and sometimes not. When you see them, you don't necessarily move to get rid of them, though you might. Instead, you ask, "What are *you* doing here?"

I've always been interested in these kinds of animals, the ones that have an uneasy place in human thought. We often try to categorize other species; as the title of scientist Hal Herzog's book about animals puts it, *Some We Love, Some We Hate, Some We Eat*.[1] Herzog points out that our relationship with nonhumans is complicated, and I too have always been leery of creating such tidy classifications. Outsider animals can't be easily categorized into good or bad, maybe because despite being hated under some circumstances, they may also be useful. Rats, for instance, are both urban pests and valuable medical experimental subjects. Coyotes are loved by wilderness fans but feared by urbanites.

These animals blur categories and sit on the borderlands. After spending the past few decades studying insects, I'm used

to defending my subjects to those who find them off-putting, if not downright disgusting. That has meant championing the underdog, so to speak, or maybe the underbug—always ready to point out the hidden value of invertebrates to those inclined to overlook them.

I think these unpopular creatures have something special to teach us both about themselves and about the way we regard and deal with other species. Outsider animals are much more interesting than we give them credit for. They can help us understand a wide range of ideas, like how pregnancy evolved (cockroaches) or what intelligence means (raccoons). It's not that these species are smarter or cooler than we thought they were, though they might be. It's that we haven't always seen them for what they are, which can be exasperating, entertaining, and instructive all at once. I want to push against the notion that animals are all just like us, and that we are somehow at fault for being in conflict with them. Conflicts arise, but often they can inform us rather than making us engage in a fruitless battle to control.

That means avoiding not only anthropomorphism, the projection of human qualities onto animals, but also what noted primatologist Frans de Waal called anthropodenial, describing animals as though they automatically lack those qualities.[2] By examining the outsiders, I hope we can keep our preconceptions and assumptions at bay, instead embracing a curiosity about them that doesn't just confirm a love of nature but asks some difficult questions about how we cope with intruders in our lives.

Because some of the outsiders I will be examining either were introduced to where they are now or have dramatically expanded their ranges, they can also help us think about what it means for an animal to belong somewhere. If coyotes or cowbirds move when humans modify their environment, does that make them invasive species, to use a common term? What kind

of habitat is natural, and can it have humans in it? Answering these questions helps us see how much we've changed the species that now exist in our houses and towns. The raccoons of downtown Toronto aren't the same as raccoons in the woods. It also means discovering that, in virtually every case, there is more to these species than we had realized.

In *Coyote America*, Dan Flores says he wants to "rearrange the furniture in people's heads" about coyotes.[3] I want to do the same thing, but about even more species, from cockroaches to cowbirds to garter snakes. We need a different way to think about animals on the edges of our cities and our lives. It's not that people need to love all of them. It's that there is more to all of these animals than people realize.

Think of this book, then, as an appreciation of those animals we sometimes shun. I mean "appreciation" not as unmitigated praise, but in the way you might approach a course on appreciating wine, or art. If you take one of those courses, you don't (or at least you shouldn't) feel obliged to love every wine or every painting. One of the definitions of appreciation is "a full understanding of a situation," without any values attached. But ideally you come away with a heightened understanding of where wine or art comes from, how it is made, and how it fits into the world.

Part of that appreciation means realizing how little people—including both scientists and the lay public—know about outsider animals. For example, white rats have been laboratory staples for over a century, but little is known about how their ancestors, the brown rats of the alley and gutter, behave under natural circumstances, or at least as natural as urban settings can be. Do they form long-term bonds? Do they travel long distances when young to settle in new places? We don't know.

Even when we understand something about a species, we can miss the richness of the group in which they occur. For

instance, the cockroaches we see in our houses seem dull and brown, characterized mainly by being unwanted visitors. But did you realize that thousands of species of cockroaches exist? Most of those are not hanging around our garbage, and some of them, the wood roaches, are even monogamous, spending blameless lives in rotten logs as bonded couples. One species, the Cape Mountain cockroach, is native to South Africa, and the females give birth to live young, like mammals, rather than laying eggs. You do not have to embrace rats or cowbirds, even figuratively, and certainly not literally (though people do keep rats and Madagascar hissing cockroaches as pets). But by discovering more about them and others like them, we can think more clearly about our relationship with animals and nature.

Love—and Hate—of the Animal World

Studying outsiders not only helps us understand which animals we love, it also helps us understand why. I often start a class, regardless of level, with the icebreaker of asking the students to tell me their favorite animal, a question that has the advantage of not being too personal but also not too boring. Because I teach biology, the students are usually already fans of animals, and you get some offbeat answers—Giant squid! Galápagos tortoises! Aye-ayes!—but there are always people who just really love their dog. I reassure them that they won't be held to their answer for life, but they still choose carefully, wanting their animal to be evocative of their personality, or maybe just a way of showing off their insider knowledge. It's admittedly a biased sample, but no one has ever professed indifference—everyone has an animal they care about.

Lots of people besides my students (and me) love animals and find them interesting, of course. But often, as Herzog's

book attests, their focus is on creatures that are pets, or food, or vectors of disease. Even when people like animals, they often do so with a narrow focus. In *On Animals*, writer Susan Orlean says, "we look at animals because they're funny and companionable and interesting."[4]

But how do outsider animals fit into this? They are sometimes the first, rarely the second, but always the third. Outsider animals don't serve a purpose the way that cows or chickens or even cats do, because although they impinge on the borders of our lives, they never permanently cross them.

Outsider animals also make us question our own place in nature. Are we the rulers of the world, the keepers of creatures great and small? That view of humans used to be the prevailing one, but it is starting to fall out of favor, maybe when we view the biodiversity crisis and see how poorly that dominion is working, or maybe when we see how many other species have the qualities we thought were ours and ours alone. Increasingly, it's turning out that humans aren't as exceptional as we'd always thought. Lots of other animals use tools, and have something that looks like language, and cooperate with each other.

What, then, is the alternative? We could, for instance, see ourselves as just one part of the circle of life, connected to other living things. For example, Sy Montgomery and Elizabeth Marshall Thomas, both noted authors who write about the animal world, say in *Tamed and Untamed* that they want to "affirm the fact, told to us by both evolution and our sacred creation stories, that we belong together with our fellow animals, and without them, we cannot be whole."[5]

I'm more sympathetic to their view than to the idea of ruling over nature, but it still doesn't sit well with me, and outsider animals are part of the reason for my discomfort. Certainly as a biologist I believe that we belong with other animals—we share ancestors and genes with them, and hence the structure of our

bodies and our brains. But that belonging doesn't have to mean everyone needs everyone else. I'm also skeptical about the belonging because when people talk about communion with animals, usually they are talking about the "easy" animals: dogs, dolphins, chimpanzees, or the majestic creatures in the documentaries like lions and wolves. It's easy to love an animal that looks you in the eye or seems to have its own language or represents the glory of the wilderness, or one that greets you at the door when you come home. But I challenge anyone to have a sense of connection with the roaches streaming out of the toaster or the caterpillars on the tomato plants. This doesn't mean I don't love lots of kinds of animals. I do. I even love animals no one has heard of, like tardigrades, or animals that make most people nervous, like spiders. It's just that that love doesn't require me to be in sync with their psyches.

The reason to focus on outsider animals is to help us see them as themselves, rather than extensions of people to be glamorized or held up as models. If they were closer to us, like dogs, we would automatically be anthropomorphizing them. If they were totally alien or unfamiliar, like aardvarks, we just wouldn't care. But maybe we can find a middle ground, and admit to a certain curiosity about coyotes, or gulls, or even rats. It's not that I want people to stop romanticizing animals, or not exactly. I want people to romanticize them better. That means seeing them as they are, with their off-putting characteristics alongside their endearing ones.

You Had One Job

Outsider animals, these animals that can be too close for comfort, also challenge the notion that all creatures have their own place in the world, a job to do that is part of the cycle of life and that never changes. According to that view, some animals are

predators, some are prey, and some scavenge on the leftovers. It's like recycling your trash, only better. We are thus all necessary components of the natural web, showing those connections that people like Montgomery and Marshall Thomas extol.

It's true that connections among species are often subtle and unconsidered, and people can underestimate the degree to which small instances of interference can have big consequences. For example, mosquitoes that found their way to Hawaii in water containers from ships proceeded to breed and infect native bird species with avian malaria, which then decimated the birds. The world is full of such cases, with the implication that if we just left things alone, what is often called the balance of nature would remain intact, and all creatures would coexist. The *Lion King* features the wise lion Mufasa telling his son Simba that "Everything you see exists together, in a delicate balance," a notion that has been around for thousands of years in many cultures.

But that balance of nature is an illusion. Certainly, humans can do a lot of environmental damage, intentionally or not, when interactions among species are disrupted. But ecologists and other scientists have long recognized that nature isn't particularly tidy. Populations of many kinds of plants and animals fluctuate, sometimes wildly, with or without human interference. Predators sometimes eat all of their prey, and then their populations collapse. New diseases arise. The distribution of species in a given habitat changes over time.

This doesn't mean that it's all just inexplicable chaos out there, or that we shouldn't be concerned about those unintended consequences of human intervention in the natural world. It does mean that searching for a purpose for every animal will just leave you frustrated. Animal lover though she is, Orlean cannot find it in herself to feel anything but outrage at

ticks: "I defy anyone to tell me what redeeming quality ticks have and what purpose they serve in the great circle of life other than to be disgusting. They have none. Everything that eats ticks could eat something else instead. They look ugly. They suck blood, which on a primal level is just wrong."

Um, sure. She is presumably tongue in cheek here, but at the same time, she's got a point (though I could argue that sucking blood isn't any worse than any number of other animal habits, and for that matter that ticks are absolutely fascinating creatures). We really don't need ticks, or any other animals—the world would function without them, albeit differently. But whether we embrace or shun animals, we need to let go of the expectation that all animals have a role to play, a job, and one that isn't too offensive to our human sensibilities.

Thinking about outsider animals can help free us from that expectation. The out-of-whack impression we get when rats overrun an apartment building or raccoons show up on the patio is a good reminder that nature is messy and doesn't have to play by our rules.

Invaders and Interlopers

> "For one, it was the symphony of birds! What a filling and glorious way to begin and end each day. It was a time for me to heal, assess my life, calm my mind and BE."
>
> "How nice to wake up to a cool breeze and a multitude of bird songs!"

These quotes are from the guest book at a rental on the Hawaiian island of Kauai, one of the places where my colleagues, students, and I have been studying crickets for the past few decades. We usually stay in places where we can fix our own

meals, which both saves money and lets us get out promptly to do our fieldwork outside at night, when the insects are active.

I also love birds, and in Hawaii I too hear the symphony mentioned by the previous guest. But when I do, my reaction is rueful, rather than inspired. Some of the songs I could hear at the place on Kauai I could recognize, some I could not, but one thing was certain: none of them were from native species. All of the bird songs you hear in Hawaii, unless you make a special trip to higher elevations than most visitors ever venture to, are from species like Common Mynas, European Starlings, or North American Cardinals that were introduced to the islands by humans. Many of them are colorful and engaging, but none evolved where they now occur. Some came by accident, others by design, like the mockingbirds released by the Hui Manu Society in Hawaii during the early twentieth century, whose goal was to decide which birds it would be fun to see flying through the trees of the tropical paradise and then transplant them there. Hawaii has a larger proportion of introduced bird species than anywhere else on the planet.

The people at the house on Kauai probably didn't know that, and indeed there's no reason that they should. But those introduced animals—and many, many others like them all over the world—are often referred to as invasive species, organisms that arrive via human intervention to places they do not normally occur. Invasive species can wreak havoc on natural ecosystems. A 2023 report from a group supported by the United Nations tallied the cost of more than 3,500 invasive species at $423 billion per year.[6] That doesn't include other devastating but difficult to measure costs of events such as the extirpation of native birds on Guam after the introduction of brown tree snakes.

Sometimes outsider animals are invasive species, and other times they are not. Raccoons, for example, are North American

natives that cause problems when they insinuate themselves into our cities. They are outsiders not because they are invasive but because we see them in our gardens rather than off in the forest. Common Mynas, as I mentioned earlier, were introduced to Hawaii from Asia, and they are invasive by virtually any definition of the word. Yet other outsiders I will explore sit rather uneasily on the boundary between native and introduced, like the Brown-headed Cowbird. Native to North America, the birds have extended their range far from their usual habitats as they followed agriculture and its cleared fields.

Outsider animals thus bring up the question of who counts as invasive, and how we even use the term. Some scientists are questioning the validity of the concept of invasive species, suggesting that it's unnecessarily pejorative and also draws harmful parallels between animals and human immigrants to new lands. Others think it muddies the waters of our understanding of how animals get to new places to begin with, and yet more question how castigating animals as invasive gives humans too much of a license to kill them. In this book I'll explore how those outsiders make us ask questions about how we cast those animal villains, how they disrupt so many of our assumptions about wildlife and wilderness. Conflict between humans and wildlife happens, without a doubt, but maybe we can recognize the futility of trying to eradicate outsiders like coyotes or even rats, and instead think about how best to coexist with them.

Who Are the Outsiders?

This book considers four groups of animals on the fringes of our lives. Most of them are North American, mainly because that's the part of the world with which I'm most familiar, but several global characters will be included, and one, the Common

Myna, is a bird known almost exclusively in Australasia. In some chapters I consider just one species, in others, an entire group, like rats or snakes. All of them have one thing in common: when we see them, we ask, what are *you* doing here?

Part One, "Clever Opportunists," looks at raccoons and gulls. Both are animals that have come into our lives because we created a niche for them, whether by putting out garbage, eating lunch at the shore, or providing shelter from other, more menacing predators. They also have fascinating lives completely outside those of humans, and it's worth seeing how their behavior illuminates our own. Their cleverness, especially in the case of raccoons, has allowed scientists to ask questions about how all creatures—maybe including humans—adapt to new circumstances. They are also both animals that, like it or not, are with us for good.

Part Two, "Invaders, Intruders, or Visitors?" examines three species that have ended up in parts of the world where at least some people think they do not belong. Brown-headed Cowbirds are, as the name suggests, associated with agriculture, and human alterations to the landscape of North America have allowed them to spread far beyond their original range. The problem is that cowbirds are brood parasites, birds that lay their eggs in other species' nests, to the detriment of those other birds. Efforts to control cowbirds by killing them have sparked controversy—they are, after all, a native species—and forced us to examine which animals matter, and why. Common Mynas are native to India but have been introduced by humans to many parts of the tropics, including Australia and Hawaii, as I mentioned earlier. Aggressive and noisy, they outcompete native birds and can damage crops. They also can make us question what we mean by belonging to a particular place, and illustrate the dilemma of unintentional immigration. Third,

while butterflies are not usually considered to be outsiders, the cabbage white butterfly has been introduced across the globe. Its caterpillars, as the name suggests, eat crops such as cabbage and its relatives kale, bok choy, and broccoli, where they cause quite a bit of damage. They don't eat much of the plant, but as an Oregon State University information sheet notes, "the typical consumer has very low tolerance for worms in their frozen vegetables."[7] Monarch butterflies may have more charisma, but cabbage whites are probably the most widespread butterfly in the world. Originally found in Europe, Asia, and North Africa, they were accidentally introduced to Canada in the middle of the nineteenth century, and they've spread not only throughout North America but also to New Zealand and Australia.

Part Three, "Much More than Pests," delves into the lives of animals we almost reflexively abhor: rats and cockroaches. Most of what is written about both species has to do with how to get rid of them, but I want to highlight a different side to both. Rats, it turns out, are probably the animal most used as a model for understanding human physiology, disease, and psychology, and it's worth exploring what that means. Rats also have complex social lives, and they will work hard to get their handlers to tickle them, which has spurred discussions of the evolutionary origins of laughter. Cockroaches, too, are misunderstood in many ways, including their supposed resistance to a nuclear holocaust (they aren't any more likely to survive one than most insects). They are also reminders of ongoing evolution, right in our kitchens, with no need for fossil excavation, through their adaptation to human foods and pesticides. That evolution even includes their sex lives, to which I wager most readers haven't given much thought.

Finally, Part Four, "Conduit to the Wild," shows how two very different animals, snakes and coyotes, are feared out of all

proportion to the danger they pose. Compared with some of the other outsiders, they are relatively unchanged by their contact with humans. Understanding the fear of snakes leads to an exploration of the human shared history with the reptiles, which goes back hundreds of thousands of years, to our earliest ancestors. Snakes may have shaped the evolution of the primate brain, something no other outsider can claim. And even though snakes don't eat our garbage, they have become an increasing problem in places such as Florida, where people have released pythons once they realize the reptiles are getting too big to keep in an aquarium. The pythons then wreak havoc on local wildlife, in a recurring theme of problems we humans brought on ourselves. At the same time, most snake bites, at least in North America, are the result of people—mostly young men—doing what can only be described as stupid things, like trying to catch or even kiss them (I am not kidding). Coyotes have become familiar denizens of many North American cities, including heavily urban ones. They are big enough to seem threatening, but their reputation as attackers of pets—and even their body size—is exaggerated. They are seen as tricksters, clever beasts, in several indigenous cultures, but have been methodically hunted down and shot, trapped, and poisoned over the past few centuries. They can, I hope, teach us to coexist with nature even when it makes us uncomfortable.

Learning about outsider animals also means learning about the people who study them—without fail, they become champions of their subjects, including even the most unlikely (I'm looking at you, cockroaches). Scientists have always been passionate about what they study, but there is something especially compelling about defenders of the underdog, or underbird, or even underinsect. I am lucky to have colleagues and friends who share their obsessions in these pages, whether that's Mark

Hauber staunchly defending cowbirds, Allen Moore enthusing over cockroach diversity, or Susan Alberts being concerned—after an attack by a spitting cobra—that the cobra itself would suffer.

I hope this book provides a makeover for some species that could use one, making us see animals like gulls and rats and even cockroaches as fascinating in their own right, not as symbols of filth or risk or disease. There is much more to outsiders than meets the eye. Further, I'll argue that we exaggerate the risk from many of the outsiders, with fearmongering coming either from people who benefit from it, such as pest control companies, or from our inability to tolerate even a small amount of nature in our homes and cities.

It's common knowledge that we are in a biodiversity crisis, with species becoming extinct at an alarming rate. This is not a book mourning the loss of that biodiversity. None of the outsiders are in danger of disappearing from the earth. But one of my goals in writing is to help people see how incredible even creatures like cockroaches can be, that untold mysteries linger in the brains of cowbirds and the flights of common butterflies. Maybe if we can look at an abundant and taken-for-granted animal—and really see it for the wonder that it is—there is hope for all the other species as well.

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